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**Empowering Parents to Use a Core Board with Children who have Complex
Communication Needs: A Multiple Case Study**

A thesis presented in fulfilment of the requirements for

Doctor of Philosophy

In

Speech and Language Therapy

At Massey University, Albany Campus, Aotearoa New Zealand

Sam Brydon

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Note for Examiners

Explanation of COVID-19 Impacts

Thank you for taking the time to examine this thesis, which has been undertaken during the Covid-19 pandemic. The New Zealand Government's response to Covid-19 includes a system of Alert Levels which have impacted upon researchers. Our University's pandemic plan applied the Government's expectations to our research environment to ensure the health and safety of our researchers, however, research was impacted by restrictions and disruptions, as outlined below.

For a six-week period from March 26 to April 27 2020, New Zealand was placed under very strict lockdown conditions (Level 4 – [Lockdown](#)), with students and staff unable to physically access University facilities, unless they were involved in essential research related to Covid-19. All field work ceased and data collection with humans was restricted to online methods, if appropriate. The restrictions were partially lifted on April 27, but students and staff were not generally allowed back into University facilities until May 13.

Ongoing disruptions have also been encountered for some students due to uncertainties over the potential for future Covid-19-related restrictions on activities, and a Covid-19 cluster outbreak based in Auckland in New Zealand on 12 August 2020 led to the imposition of rolling Level 2 ([Reduce](#)) and Level 3 ([Restrict](#)) conditions until 23 September 2020. Auckland campus based students remained on Level 2 until 7 October 2020.

This Alert Level system continues to be utilised throughout 2021, and in particular from 17 August 2021 when the whole of New Zealand again moved to Level 4 lockdown for an extended period. The Auckland region remained in alert level 3 or 4 for a number of months. Please see the [NZ Government website](#) for more information on lockdown dates.

These changing Alert Levels have meant that some research students had experimental, clinical, laboratory, field work, and/or data collection or analysis interrupted, and consequently may have had to adjust their research plans. For some students, the impacts of Covid-19 have been substantial as they may have had to significantly revise their research plans.

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Updated September 2021

Abstract

Augmentative and alternative communication (AAC) for children with complex communication needs is an area that has seen rapid recent change, both in the AAC systems that are provided, and the methods used to support implementation. AAC is recognised as an evidence-based approach in early intervention that can increase successful communication outcomes for children with complex communication needs. There is increasing awareness that for implementation to be successful, the child's communication partners need to be supported to learn strategies that will help the child to use their new AAC system. The 77-cell core board with fringe vocabulary used in this study is widely used in Aotearoa New Zealand, but there has been little research conducted to provide evidence that it is an effective or appropriate tool for beginning communicators.

This thesis describes a multiple case study with a mixed methods research design, capturing the implementation of an AAC support intervention that was carried out over a year. The study sought to explore the effectiveness of a training and coaching intervention for parents to support the implementation of a core board with their pre-school children who had complex communication needs and used less than 10 spoken words. The intervention described in this study, named *Empowering Parents for AAC (EP-AAC)*, took place over a year, and included an intervention phase of 9 weeks and a long maintenance phase. Six families were recruited, and one parent from each family participated. The children had no prior experience with using AAC. After an initial intervention phase consisting of group workshops and in-home coaching to learn evidence-based strategies to support their child's communication through AAC, parents continued to receive bi-monthly maintenance coaching sessions for the remainder of the year.

Quantitative data were collected on both the adults' use of the taught AAC strategies and the children's use of the core board and spoken language. Additionally, qualitative data were collected through a variety of sources including two surveys and a final semi-structured interview aimed at gaining deeper insights into the supports and barriers to AAC use, and how the family had experienced the intervention and implementation of AAC.

The findings suggested that the intervention was successful, with all the adults learning and maintaining the supportive strategies alongside all the children making significant gains in their communication. Five children learned to use the core board to communicate within the first few weeks of the intervention, and all six children were able to communicate using a core board by the end of the year. Family retention over the duration of the study period exceeded expectations, despite a challenging year during the pandemic. Four children used spoken language as their main form of communication by the end of the intervention, whilst the other two continued to use AAC to communicate. The parents reported positively about the intervention, in particular the on-going coaching. The core board was viewed as a helpful tool, but not as a long-term AAC solution. For the children who still required AAC for communication, parents wanted to explore high tech AAC options.

The findings from this study provided additional evidence that parents are a key component to ensuring the success of an AAC system. Initial training and ongoing personalised coaching proved to be a successful combination for this group of parents to learn and maintain the supportive AAC strategies. Core boards were found to be an adequate initial AAC system when implemented within this supportive framework and were a contributing factor in the improved communication skills of all the participating children. The EP-AAC intervention was a useful framework that could be used in the future by service providers to

support the implementation of a range of AAC options with young children who have complex communication needs.

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1. Introduction

In the past several years, practitioners working with children with complex communication needs have seen a rapid change in the philosophies and practice of augmentative and alternative communication (AAC) (Hourcade et al., 2004; Light & McNaughton, 2014; Zangari, 2017a). One of the most significant changes is vocabulary size and composition, particularly in AAC systems provided to beginning communicators with complex communication needs. It is now common for AAC systems to offer a large vocabulary containing both core and fringe words from the offset. Prior to this shift, it was common practice to provide children who were considered to have intellectual disabilities with restricted AAC systems that allowed them to make only simple choices or requests for items or activities in their immediate environment. These systems typically had a small vocabulary, usually representing common or preferred objects (Adamson et al., 1992; Bondy & Frost, 1994). The symbols were often introduced gradually, with the child being required to show that they could discriminate between the symbols that they already had and use them in a functional way, before more were provided (Adamson et al., 1992; Cafiero, 2001). Essentially, the providers of AAC systems were the gatekeepers of language. The child therefore had little autonomy over what they could communicate, and had to prove their ability at each step before they had access to more language (Bondy & Frost, 1994). AAC systems were often composed of mainly concrete content words and were primarily set up to enable requesting (Iacono et al., 2016; Yorkston et al., 1988). The adults managing the AAC system had total control over the vocabulary that the child could learn and use. The underlying assumption was that the child had limited abilities and had to learn their new language step by step, in an order determined by the adults around them (Zangari et al., 1994).

Although such systems still exist and are in use, for example, the Picture Exchange Communication System (PECS) (Logan et al., 2017), it is now more usual for children with complex communication needs to start their AAC journeys with much larger initial vocabularies, allowing them the potential to use a range of communicative functions far beyond requesting (AssistiveWear, n.d.; Porter & Cafiero, 2009; Zangari, 2015). Many experts in the field of AAC now advocate that children with complex communication needs should be viewed as having the potential for communicative competence when AAC is introduced (Hourcade et al., 2004; Light & McNaughton, 2014). It is widely accepted that one aim of introducing AAC is to give the child some immediate communicative autonomy, with a long term goal that they will eventually achieve their full communication potential, which is now thought to be something that cannot be assessed or guessed at beforehand (Light & McNaughton, 2012; Mirenda, 2008, 2017). The use of a core vocabulary of high frequency words that are often flexible in use and serve a grammatical purpose, combined with fringe vocabulary featuring more personalised, concrete words, has become the favoured approach across a variety of both low-tech and high-tech systems (Van Tatenhove, 2009; van Tilborg & Deckers, 2016).

The preferred instructional approaches for children with complex communication needs who are learning to use AAC have also shifted from highly structured methods applied in clinical settings (Bondy & Frost, 1994) to more naturalistic strategies that integrate components from behavioural, developmental and social interactionist theories (Gevarter & Zamora, 2018; van der Meer & Rispoli, 2010). The context for AAC implementation has moved from clinical settings to everyday environments and natural routines (Gevarter & Zamora, 2018), and communication partners are now encouraged to model and use the AAC system when they interact with the child, alongside spoken language (Biggs et al., 2018;

Dodd & Gorey, 2014). These shifts have brought the practice and learning of AAC more in line with theories of typical language acquisition in children (van Tilborg & Deckers, 2016).

There has also been an increasing recognition of the importance of the key communication partners in the child's life, and their roles in supporting the implementation of AAC. There is improved recognition that the skills and strategies that communication partners need to support the introduction and use of an AAC system, take time and practice to learn (Biggs et al., 2018; Gevarter & Zamora, 2018). Communication partners therefore need access to good quality training with multiple opportunities for practice and reflection to learn the necessary skills (Kent-Walsh & McNaughton, 2005). For young children with complex communication needs, the key communication partners are usually parents. The success of an AAC system depends on the use of supportive strategies across a range of contexts, environments and routines, and parents are usually best placed to ensure that this can be achieved (Gevarter & Zamora, 2018; Johnston et al., 2004; Parette et al., 2000; Ronski & Sevcik, 2005). While the importance of parents in this process is recognised in the literature and by most professionals, in reality, the level of support required is often lacking during AAC implementation in the early years, due to service delivery and constraints in funding (Light et al., 2019). This can lead to early abandonment of the AAC system (Baxter et al., 2012; Moorcroft et al., 2019b).

When there is a shift in the underlying values and beliefs in a professional field, practice can move ahead of research, and this has happened in the field of AAC (Light et al., 2019; Mirenda, 2017). Whilst there is a growing body of evidence to underpin changes in how AAC is supported and taught (Shire & Jones, 2015), and increasing use of communication partners as participants in research (Kent-Walsh et al., 2015), some of the changes in AAC practice described above, particularly those relating to vocabulary size, content, and layout, have become widely accepted despite limited research evidence. This

paucity of research is particularly noticeable for the use of larger, core based, AAC vocabularies with early symbolic communicators (Laubscher & Light, 2020; Light et al., 2019). The American Speech-Language-Hearing Association (ASHA) have defined evidence-based practice as a combination of knowledge from high quality and current research evidence with professional expertise and client preferences (American Speech-Language-Hearing Association, 2005). Practitioners who value the principles of evidence-based practice would find that the research component is lacking for some of the current recommended AAC systems (Light et al., 2019; Thistle & Wilkinson, 2015).

My Journey to Research

I hold both speech and language therapy and social work qualifications. As a social worker in the UK, I supported families who were affected by disability. This allowed me to see first-hand the effects that living with a child who has complex needs can have on a family. As a speech language therapist in the UK, I worked in a Sure Start centre, setting up and running prevention and early intervention communication programmes for families with young children who were socially and economically disadvantaged. This, along with my social work experience, contributed to my development as a holistic practitioner, one who is keen to work alongside families in a collaborative manner, to empower them to be full partners in the process.

For the past 14 years I worked in a special school in Aotearoa New Zealand, and I saw the difference that AAC can make to children with complex communication needs. Over this time, I helped to bring about a shift within this school towards a different approach to communication. This is a shift that I have seen reflected in the wider Aotearoa New Zealand specialist school community and in AAC support services in general. There has been a move away from more behaviourally based communication interventions such as PECS (Bondy & Frost, 1994), and instead, a shift towards more naturalistic AAC systems that are

implemented in a way that more closely mirrors the process of typical language acquisition. In the school I worked at, staff were expected to always carry a 77-cell core board with a large fringe vocabulary, and this system is used school wide as well as a wide range of personalised AAC technologies for individual children. Staff were trained to point to the symbols on the board as they interact with the children; this is called aided language modelling (ALM). As the children settle into school and their communication is assessed more thoroughly, they often change to a more individualised system that suits their specific needs. All the AAC systems used in the school utilise core vocabulary to some extent.

Anecdotally, I observed that this shift has led to some very successful outcomes, with teaching staff expressing more enthusiasm about supporting and working with AAC in their classrooms, and children expressing themselves more frequently and using a wider range of communicative functions. Many children have learned to communicate using a core board with fringe vocabulary, and then moved on to either using spoken language, or a more robust AAC system such as a Pragmatically Organised Dynamic Display (PODD) book (Porter & Cafiero, 2009) or an app on a speech generating device (SGD). Some students have had more success using the core based LAMP Words For Life app combined with the LAMP therapy approach (Halloran & Halloran, 2006). Over time, I became concerned by the limited research supporting the use of core-based systems with large vocabularies, particularly with beginning communicators who have complex communication needs. In terms of evidence based practice, the core-based AAC systems introduced in many specialist schools in Aotearoa have mostly been received well by both families and school staff and can be argued to have strong clinical reasoning to underpin them (American Speech-Language-Hearing Association, 2005). However, as discussed previously, there is a lack of high quality, current research to back up the widespread use of these systems. This is what motivated me to undertake research in this area.

Given the above context, my aim was to contribute to the research base around AAC practice, including the central role of parents as communication partners, the provision of training and coaching for parents, and the use of AAC systems with larger, core-based vocabularies with early communicators. My study sought to explore the impact of a parent training and coaching approach when introducing an initial AAC system: a 77-cell core board with a large fringe vocabulary. This study followed the journey of six children and their mothers in detail over a year, as they implemented a core board to support communication. It explored areas that have experienced recent changes or are currently lacking in research evidence, including introducing larger, core based AAC vocabularies with beginning communicators, parents as the main interventionists, parent training and coaching in AAC, the use of different AAC instructional strategies, the development of different communicative functions when using AAC, using AAC in everyday routines and contexts, and finally, generalisation and maintenance.

Research Design Rationale

Once I started to consider a research project in earnest, I realised that it would be a complex undertaking. The more complexity and the larger the vocabulary offered by an AAC system, the more difficult it becomes for researchers to accurately track the outcomes of implementation. Complex AAC systems may take longer for children to learn and to use the system to its full potential. Systems with large vocabularies aim to offer a closer experience to spoken communication, which is difficult to predict or apply experimental control to. The success of earlier or simpler AAC systems could be measured to some extent because they only provided a limited range of options for the child and often only supported the use of requesting, or labelling (Tager - Flusberg & Kasari, 2013). However, although these systems were easier to measure, they had the disadvantage that they limited the development of communication and were likely to be abandoned over time (Light et al., 2019).

More recently developed AAC systems, such as the core board, which have a larger vocabulary of both core and fringe words and a more naturalistic approach to implementation, have come under scrutiny in recent years for the apparent lack of robust research evidence (Andrews, 2016; Light et al., 2019; Mirenda, 2014). Critiques such as these initially led me to consider more tightly controlled, experimental research designs in the hope of providing evidence that compared to some of the more structured, simpler AAC approaches of the past. However, the research decisions required to ensure strong internal validity in an experimental approach would not have allowed for the flexibility I needed to fully capture the benefits of offering children with complex communication needs more choice and autonomy from an early age. As I investigated further, I realised that using an experimental design would constrain the level and type of support I could offer to my participants and would have made it more difficult to capture the full experience of introducing a more complex AAC system with beginning communicators in naturalistic contexts. The implementation of an AAC system with a young child should mirror natural communication as far as possible, therefore occurring in everyday environments, across daily routines and activities, and involving the child's most significant communication partners. Any attempt to control or remove these critical components of early communication would have strong implications on the external validity and social validity of the research.

Communication is a complex behaviour; in its natural state it cannot be predicted or controlled. Previous studies in the field of AAC that have managed to use experimental designs have tended to focus on smaller AAC vocabularies used in carefully controlled situations, that often result in the child making only requests (e.g., Ronski et al., 2010), or the use of AAC for communication in very specific environments or activities (e.g., Binger et al., 2010; Drager et al., 2006). Studies such as these have been extremely valuable for building the evidence for specific aspects of AAC use or support strategies, but they cannot

fully capture all the factors involved in introducing an AAC system with a large vocabulary that is intended for use across different environments and communication partners. In this research, I was keen to capture realistic and holistic AAC implementation, across a range of everyday activities. I was also hoping to capture the potential for AAC to be used to support a range of communicative functions.

In my professional experience, I have seen many examples of skilled speech language therapists managing to achieve communication success for a child with a new AAC system in a short space of time, sometimes within minutes. Replicating this success across home, day care settings, and classrooms is much harder to achieve, but it is essential for long term AAC use. I wanted to explore what is needed to achieve this more useful outcome. I knew from experience and from researching the literature, that implementing an AAC system with a child is a complex process, and to be successful, the main communication partners (i.e., parents or caregivers) would need to learn a set of skills and strategies. Further reading suggested that this required more than just basic training; I would need to use a coaching approach that was maintained over time with the parents of each child for the highest chance of success. This understanding of the importance of coaching communication partners, alongside the desire to use a naturalistic and holistic approach to AAC implementation that is also family centred and routines based, led to the development of an AAC support intervention named *Empowering Parents for AAC* (EP-AAC). This is a comprehensive training and coaching package for parents of young children who are using a core board for the first time, and it formed the central component of my study.

Alongside the development of the EP-AAC intervention, I considered the most effective ways to gather evidence and measure progress. The nature of the intervention, carried out over a full year, would allow access to a range of rich data sources over a prolonged time, which would be valuable to tell the story for each individual family, as well

as measure the effectiveness of the intervention. I needed a research design that was flexible and pragmatic, allowing for multiple data sources. This led me to choose a mixed methods multiple case study design.

Overview of the Study

Six pre-school children with complex communication needs were provided with a core board for communication. Their parents were supported to learn and use evidence-based strategies to help their children communicate using the core board. This parental support was provided by the EP-AAC intervention, which took place over a year, and was carried out by the researcher. Multiple sources of quantitative and qualitative data were collected over the year of the intervention, to answer the following four research questions:

1. What are the individual experiences of each family as they participate in the journey of introducing a core board with their child?
2. What are the effects of a comprehensive training and coaching intervention on parents' use of communication strategies to support their child to use a core board?
3. What are the effects of the introduction of a core board, combined with parent training and coaching, on the communication skills of pre-school children with complex communication needs?
4. What factors influence the success of implementing a core board as an AAC system for pre-school children with complex communication needs?

Overview of the Thesis

This chapter has provided an introduction and background to the thesis. Chapter 2 will provide a detailed literature review of relevant research and writing. Chapter 3 will introduce and provide details regarding the EP-AAC intervention used in this study. Chapter 4 will provide further rationale for the research design and provide full details regarding the

methods employed in this study. Chapter 5 will address the first research question and provide a detailed and personal account of the journey for each case, weaving together the personal experiences of each parent and myself as the researcher, using the full scope of the quantitative and qualitative data collected throughout the year of the study. Chapter 6 will provide the cross-case analysis, which specifically addresses research questions two, three and four. The thesis will conclude with chapters 7 and 8, the discussion and conclusion. The discussion will draw together common themes and explores factors of interest that came out of the study. The conclusion will summarise the key points, as well as describing the clinical implications, limitations of the study, and future directions for research.

Summary

This chapter has provided a background of current AAC practice and the issues of some pertinent gaps in the research relating to this. It has provided information about my personal journey to research and the rationale behind the research design. It concluded with a brief overview of the study, and the thesis. The next chapter will provide a review of the literature.

2. Review of the Literature

Introduction

This chapter will consider literature that is relevant to this research study.

Augmentative and alternative communication (AAC) is a field where practice often moves ahead of research (Hourcade et al., 2004), so it was necessary to cast the net wide when considering relevant literature. Therefore, the review will include some grey literature sources as well as the scientific literature, as there are many well-written, current, and informative on-line articles relating to AAC systems and strategies.

This review will start by examining the general evidence for the use of AAC, particularly in the early years. It will then explore the barriers and supports to the implementation of AAC with children who have complex communication needs, because these factors were instrumental in shaping the design of the intervention used in this study. Consideration of these supportive factors led to the conclusion that parents and caregivers must be central to any AAC intervention for pre-school children. Therefore, the next section will look at the important role of communication partners in AAC implementation. This will lead on to literature that examines the most effective ways to support parents and caregivers: training and coaching. The next section will cover evidence-based skills and strategies that communication partners need to learn to support their child to use AAC successfully.

Having considered all these factors that provide support to AAC implementation, the literature that relates to the specific AAC system used in this study will be examined, i.e., a core board with fringe vocabulary. This will include literature that covers the current debate relating to the selection of vocabulary in AAC systems, including the use and prioritisation of core and fringe vocabularies in AAC systems; cultural considerations for AAC in Aotearoa New Zealand; considerations about design features such as size, organisation and layout, use

of colour, and motor planning factors. Finally, the gaps in the current literature will be highlighted, with reference to how this study will gather evidence in these areas.

The Use of AAC in Early Intervention

The field of AAC is relatively young, tracing its earliest roots back to the 1950s. The idea that communication is a human right first started to emerge in the 1970s, but there was a persistent concern that the introduction of AAC may inhibit the development of spoken language (Zangari et al., 1994). AAC was therefore usually regarded as a last resort after traditional speech therapy had failed. This view has changed over the past 20 years and AAC is now regarded as a first line of support for children with complex communication needs (Ronski et al., 2015).

The idea that the use of AAC may prevent the development of potential speech has been undermined by many studies (e.g., Langarika-Rocafort et al., 2021; Ronski et al., 2010; Walters et al., 2021). There is continually growing evidence of the benefits of AAC in early intervention (e.g., Branson & Demchak, 2009). Ronski et al. (2015) carried out research that examined 70 different studies from 1985-2014 relating to AAC and young children and found strong evidence that the implementation of AAC with pre-school children improves communication, language development, speech development, and may improve the development of early literacy skills. AAC use has also been linked to improvements in the receptive language skills of children (Dada et al., 2021). Despite growing evidence of the benefits of early AAC implementation for children with complex communication needs, practitioners report that many AAC systems introduced to families are not successful. The reasons for this will be examined in the following section.

Barriers and Supports to AAC Implementation

Carlson (1981) provided an early warning about how the implementation of AAC systems could fail, citing the lack of an appropriate vocabulary as a common cause. Practitioners and researchers alike have expressed frustration that AAC systems are frequently under-utilised by children with complex communication needs and their families and educators, or they are abandoned altogether (Moorcroft et al., 2019b). Johnson et al. (2006) surveyed 275 speech language therapists and found that less than 40% of AAC systems are used for more than a year.

Moorcroft et al. (2019b) carried out a systematic review that explored the barriers and facilitators to the implementation of low tech AAC. One important factor was the attitudes of the people involved, including professionals, the family, the child, and wider society. This included the support that the family got from their speech language therapist, the child's educators, and other support workers. Unsurprisingly, they found that poor support and collaboration led to poor outcomes, whereas supportive professionals were predictors of success. Families' individual situations and attitudes were also found to be important. Some families who were overwhelmed by the needs of their child had little time or resources left to spare for implementing AAC. Other families, who were perhaps less overwhelmed, had the resources to streamline their time and include AAC into part of their daily routine; they planned, practised, and made time for AAC.

In the same year, Moorcroft et al. (2019a) also carried out interviews with speech language therapists on the same topic of barriers and facilitators for AAC. The speech language therapists in this study identified an additional factor that may explain why some families seem more able to manage AAC implementation than others: parent grief and loss. They felt that parents who had come to terms with their child's disability were in a better

position to accept the implementation of AAC. Parents who were still coming to terms with their child's difficulties were less likely to accept the need for AAC.

Moorcroft et al. (2019b), in their systematic review, identified that the attitude and personality of the child with complex communication needs could be an influencing factor on the success of AAC implementation. Some children tended to react badly to the AAC system, or get bored with it, whilst others were found to be persistent communicators who made it work for them. Additionally, they found that the design and appearance of the AAC system was important. Some families and educators reported that the AAC system was too big, not portable enough, or lacked an adequate or personalised vocabulary. The appearance of the system mattered, because of wider attitudes to AAC in society, and because of the perceptions of the child with complex communication needs. Each factor that Moorcroft et al. identified as a barrier in this systematic review was conversely able to act as a facilitator. AAC systems could be well designed, well supported and well received.

Lack of training and support for communication partners is a theme across literature that has explored reasons why AAC can be unsuccessful (Baxter et al., 2012; Johnson et al., 2006; Moorcroft et al., 2019a; Sanders, 2017). Johnson et al. (2006) surveyed 275 speech language therapists in the US and found that the lack of time to provide initial and follow-up training and support to the family and other communication partners was cited as one key factor that led to abandonment of the AAC system. Moorcroft et al. (2019a) interviewed 16 speech language therapists, who cited a range of factors for abandonment of AAC, including lack of time to support key communication partners. Sanders (2017) surveyed 16 parents of children who use AAC and found that they would all have liked more support in implementing and using the AAC system at home. Baxter et al. (2012) synthesised data from qualitative sources and identified that families and other communication partners required more support to use the AAC system.

In summary, researchers who have investigated the factors that contribute to the success or failure of AAC have identified several reasons why AAC systems may be abandoned. These factors covered a range of personal and environmental factors, as well as the design of the AAC system itself. The need for effective and ongoing support for communication partners was a common theme, and this will be examined in more detail in the following section.

Parent Mediated Therapy

Many researchers and practitioners in AAC have promoted the idea that parents and caregivers are key to the success of an AAC system for children with complex communication needs (Johnson et al., 2006; Ronski & Sevcik, 2005; Sawyer et al., 2022; Shire & Jones, 2015). Parents usually spend the most amount of time with the child (Binger et al., 2008; Starble et al., 2005) and cover the widest range of daily activities and contexts (Johnston et al., 2004; Nunes & Hanline, 2007). Moreover, families have repeatedly asserted that they want to be well trained (Baxter et al., 2012; Parette et al., 2000). Parents have the potential to make effective therapists for their children, (Roberts et al., 2019; Roberts & Kaiser, 2011) and are capable of learning supportive strategies regardless of their background or socio-economic status (Brian, Solish, et al., 2022). Kaiser and Roberts (2013) cautioned that, for parent training to be successful, parents need to be motivated to learn the strategies and have time to implement them. Moorcroft et al. (2019b) found evidence that parents may not always have the resources to support AAC implementation whilst caring for a child with additional needs.

Without the full inclusion of communication partners in the process, children are likely to resort to less desirable behaviours to communicate (Bingham et al., 2007) and the skills they have learned in therapy are unlikely to be maintained over time and contexts (Bruno & Dribbon, 1998). Communication partner training is therefore integral to the process

and should be included when introducing AAC. There is a strong body of evidence that it leads to positive outcomes for the child (Kent-Walsh & McNaughton, 2005). However, in practice, adequate communication partner training is often missing from the process of AAC implementation (Kent-Walsh et al., 2015). Light et al. (1992) highlighted the importance of training all the key communication partners. In their study, one of the people who used AAC had two different assistants, who were trained at different times in the study. The results showed that this person took more AAC turns with the first assistant who was trained, but these effects were not replicated when the same individual was communicating with the other assistant. It was only after the second assistant received training that the individual who used AAC was able to successfully use their system with both support workers.

Aided language modelling is a supportive AAC strategy that involves the communication partner using the child's AAC system to model symbols as they communicate with the child. In their systematic review of aided language modelling (ALM) interventions with children who use AAC, Biggs et al. (2018) stated that ALM has to be taught and supported to be successful. They viewed the communication partners as key in promoting language acquisition through ALM. From the results of their review, they highlighted that teaching communication partners these strategies is a very promising intervention, as these are the people who will see the children across a range of activities and contexts, and therefore embed the language learning across the day.

Baxter et al. (2012) synthesised data from qualitative and survey-based studies about the success or failure of AAC implementation. They found that parents have a key role in teaching their children how to use their AAC system and stated that they must have training and knowledge to fulfil this role. Other authors have echoed that the success or failure of a system can depend on communication partner training (Light & Drager, 2007). Even highly

committed families are at risk of abandoning an AAC system without the right training and support, and if they are not fully involved in the process (Parette et al., 2000).

Furthermore, learning to support a child with complex communication needs to learn to use an AAC system is not an easy or straightforward process. There are many different skills and strategies required that need to be applied with thought and care (Baxter et al., 2012; Ganz et al., 2013). These skills are not intuitive to most people and need to be taught and practised over time (Kent-Walsh et al., 2015; Sigafoos, 1999). As Brown and Woods (2016) pointed out, it is not enough to learn a script or a set of strategies. Parents must understand how the strategies work, so they can adapt them as the children develop and change. They must learn how to apply the strategies flexibly and reflect and make decisions based on all the different factors in each routine, and they must embed this way of thinking into everyday life. Children with complex communication needs can be unpredictable in their learning and actions, and this may require the parents to learn the full extent of strategies, and apply them with nuance and skill (Kaiser et al., 1995).

Kent-Walsh, Binger and Malani (2010) acknowledged the frustration that might be felt by practitioners working in the field of AAC when they perceive that parents or other communication partners are not providing opportunities for their children to use their systems, or not supporting them with the correct techniques. However, they reminded practitioners that there are many skills to learn when supporting children who use AAC, and a quick demonstration or instruction session is unlikely to be sufficient for these skills to be embedded. They concluded that communication partners need systematic instruction to learn new skills, with a strong active learning component. Brian, Solish, et al. (2022) reminded professionals that interventions need to be flexible and mindful of time-constraints and the needs of individual families.

Having a child who needs to use AAC to communicate complicates the normal processes of interaction. Shire and Jones (2015) explained that all children need an environment that is rich in language models, but an AAC system adds an extra dimension that complicates social interactions and creates a four-way process requiring shared attention between two people and joint attention on the system. This is challenging for children who are still developing their attention skills. Communication partners then must provide frequent, high-quality interactions within this complex set of dynamics. Many communication partners don't have these skills and may have developed ways of communicating with their child that make it harder for them to fully participate (Binger et al., 2008).

Light et al. (1985) analysed the interactions of eight parents with their children who had complex communication needs in a play-based context. They found that the parents took more communicative turns than the children, and tightly controlled the interactions by asking closed questions such as yes / no questions or requesting information that they already knew. The researchers speculated that the parents did this so that they could keep their children's responses predictable, and they could anticipate what their children were trying to say. This had the effect of the children taking fewer communicative turns, initiating infrequently, and using a reduced range of communicative functions. Other authors have also proposed that parents' natural interaction patterns may be affected by their child's difficulties with communication (Kent-Walsh, Binger, & Malani, 2010; Roberts & Kaiser, 2011; Sigafos, 1999). This finding, combined with the previously discussed factors of the importance of the communication partner in AAC implementation, and the complex range of skills they need to learn, all support the need for comprehensive and high-quality training and coaching for communication partners of children who use AAC.

Training and Coaching of Parents or Caregivers

Over the past several years, changes have occurred in the way that early intervention services are provided to families. There has been a move away from providing direct intervention to young children with developmental learning needs, and a move towards providing more information, instruction and coaching to their families. These approaches have been promoted by a range of professionals and are viewed as empowering families and increasing their capacity to use specific parenting and communication skills (Brian, Drmic, et al., 2022). There has been a general shift from interventionists working solely with the child, or giving the parents directions in a top-down fashion, to a more collaborative, family-centred approach that focuses on the family's priorities for the child (Kemp & Turnbull, 2014). In Aotearoa New Zealand specifically, there has been a change in government policy towards interventions that are family centred, capacity building and solution focused. The use of caregiver coaching aligns well with these directions, and its use is becoming increasingly common in early intervention services (Mataiti et al., 2016).

As well as offering families a more empowering and capacity building approach, this type of intervention can also be argued to offer a more effective and efficient solution to service delivery (Kaiser et al., 1995; Light et al., 1992). Parents and caregivers are uniquely placed as they spend the most amount of time with their young children over a wide range of daily activities and contexts. Providing them with the strategies to help their children develop new skills means that they can enhance their children's learning across a variety of daily routines. This can be as effective, if not more so, than direct intervention from a professional (Brown & Woods, 2015; Roberts & Kaiser, 2011). The literature provides many examples of interventions that have been taught to parents in a relatively short space of time, and represent an efficient use of the interventionist's input (Kent-Walsh, Binger, & Hasham, 2010; Light et

al., 1992; Rosa-Lugo & Kent-Walsh, 2008), albeit with sometimes limited follow up on maintenance of the strategies after the intervention is complete.

It is now widely recognised that young children with complex communication needs benefit from the early implementation of AAC systems (Light & Drager, 2007; Ronski & Sevcik, 2005; Ronski et al., 2010). Professionals working with these children in the early years may be introducing AAC to families for the first time. The shift to a more family centred model fits well with current recommendations around AAC implementation, which advise a high level of family involvement, choice and decision making (Parette et al., 2000; Stoner et al., 2013). Speech language therapists and other professionals supporting AAC implementation in the early years need to carefully consider how they support families of children who use AAC to have the necessary skills and information to make the process successful.

Many researchers in the field of early intervention have highlighted the importance of working collaboratively with families, to build their capacity and confidence, as well as using routines and activities that are seen as priorities by the families themselves (Brown & Woods, 2015; Friedman & Woods, 2012; Mataiti et al., 2016; Parette et al., 2000). Brown and Woods (2015) commented that working with families in this way aligns well with adult learning principles of capacity building and active learning. Mataiti et al. (2016) argued that the traditional view of professionals holding the knowledge and expertise can be disempowering to some families. A professional working with families may come with more knowledge of specific early intervention strategies and might therefore initially lead the structuring of the sessions, but over time the caregivers will be facilitated to reflect, learn, and act independently and will become empowered to fully support their child. Other authors, for example, Rush et al. (2003), have stressed the need to recognise parents as experts on their children.

Professionals working with families also need to recognise that each family has different beliefs, cultures, and values, and these need to be respected (Starble et al., 2005). Families need professionals to respect their culture and to take time to explore how their child's disability has affected them as a family (Parette et al., 2000). AAC interventions should emphasise families' strengths and values, and use routines that are important to them (Moore et al., 2014). In Aotearoa New Zealand, early intervention practitioners have a responsibility to uphold Te Tiriti o Waitangi. Important aspects of this include providing services that foster independence and self-determination, and that empower parents to play a key role in their children's education (Mataiti et al., 2016).

Effective Adult Learning

There is a wide variety of parent training and coaching approaches reported in the literature in the field of early intervention and beyond. These range from one-off instructional workshops to intensive, family-centred coaching models. Some approaches will be more effective than others (Kemp & Turnbull, 2014; Trivette et al., 2009). When considering the different approaches available, it is important to examine what is known about adult learning in general.

Trivette et al. (2009) carried out a research synthesis of 79 group design studies that reported on the effectiveness of different adult learning methods. The participants in these studies were mostly professionals or students. This article described adult learning as a collection of theories and methods for explaining the optimum conditions for learning, and identified three main features: planning, application, and deep understanding. Planning involves the introduction and demonstration of new knowledge. Application represents the learner using and applying this knowledge. Deep understanding refers to reflection and self-assessment of the new learning. The authors identified that all three stages were important, however, they found that learning methods that actively involved adult learners in acquiring

new knowledge were the most effective. They also found that large doses of learner self-assessment were related to good outcomes.

These conclusions are reinforced by many other researchers (Brown & Woods, 2016; Friedman & Woods, 2012; Kemp & Turnbull, 2014; Sone et al., 2023). Brown and Woods (2016) based their coaching methods on adult learning theories, recognising that adults are self-directed and will learn best when actively engaged in the activities in real life contexts, and when they have opportunities to problem solve and reflect. Friedman and Woods (2012) referred to adult learning theories that proposed that adults learn best when material is relevant to them and learning is in real-life contexts, with multiple opportunities to practise. Kemp & Turnbull (2014) supported the use of coaching because it fits with adult learning principles of acquisition, mastery, applying learning to personal experiences, and focusing on relevant issues. Sone et al. (2023) found that parent practice with immediate feedback from the practitioner was the most effective strategy, particularly when carried out in a way that built on current capacities and skills.

Training and Coaching Definitions

A range of terminology is used in the literature to describe the process of adults learning new information and strategies to help support the development of children. The meaning of the various terms is often inconsistent across studies (Kemp & Turnbull, 2014). The most common distinctions are made between training (sometimes referred to as instruction or education) and coaching. These two terms are often used interchangeably, but are different in approach and underlying theories (Brown & Woods, 2015).

Training is often viewed as a more directive process, which is intervenor-led. The interventionist will usually provide information, model strategies, and provide specific instructions. Training models aim to increase adults' knowledge and skills about specific,

pre-determined strategies, chosen by the interventionist (Brown & Woods, 2016). Snodgrass and Meadan (2018) defined training as activities to develop knowledge about a new skill, which might involve looking at underlying theories, demonstrations of the new skill and practising it. Training is often delivered in a group format (Trivette et al., 2009), but equally can be delivered in a one on one situation (Kent-Walsh, Binger, & Hasham, 2010). For some experts, the concept of ‘parent training’ is now seen as undesirable, as it can be viewed as too directive and ineffective, and does not easily fit with the shift towards more family-centred practices used currently in early intervention (Kemp & Turnbull, 2014). Nevertheless, the use of training is still common when working with communication partners of children who use AAC, sometimes in conjunction with coaching (Roberts & Kaiser, 2011; Shire & Jones, 2015).

Coaching can be more difficult to define, as there is a wide range of different uses of this term in the literature and it describes a variety of practices. Kemp and Turnbull (2014) carried out a synthesis of intervention studies that described the use of coaching with parents of young children, to define the term ‘coaching’ more accurately. Their results indicated that there is no common definition for the term ‘coaching’ in this specific practice area, and instead the term is used to define a continuum of interventions that encompass a wide variety of adult learning strategies, generally taught within everyday contexts. The use of the term ‘parent coaching’ first appeared frequently in the literature from the first decade of this century and has increased in popularity since this time.

Many researchers in this area refer to the guidelines for coaching in early intervention written by Rush et al. (2003). They defined coaching as a way of building collaborative relationships between family members or childcare providers with early interventionists, who together “select and implement meaningful strategies to achieve functional outcomes that focus on the child’s participation in natural settings” (p. 33). They described coaching as a

structured method for working in partnership, sharing skills and knowledge, and building the capacity of key people in the child's life. They viewed coaching as a reciprocal process with mutually agreed outcomes. Their view that coaching cannot be a one-size-fits-all process could help to explain why it is difficult to define. One of the key components of coaching that Rush and colleagues identified is that it promotes self-observation and correction through reflection and discussion.

Across different researchers, there is agreement that coaching is an active learning process with strong elements of joint planning, collaboration, practice, reflection, problem solving, and mutual respect (Brown & Woods, 2015, 2016; Knoche et al., 2013; Mataiti et al., 2016; Rush & Shelden, 2020). It differs from training because of the involvement of joint planning, observation and practice in real life contexts, reflection, and feedback (Snodgrass & Meadan, 2018). In many studies that combine elements of training and coaching, coaching is perceived as the part of the intervention where the learners get to put their new knowledge into practice with the children they support, whilst receiving feedback (Binger et al., 2008; Kent-Walsh, Binger, & Hasham, 2010; Kent-Walsh, Binger, & Malani, 2010; Wright & Kaiser, 2017).

In their synthesis of studies that described using coaching with parents, Kemp and Turnbull (2014) found that coaching practices fall on a spectrum between relationship directed and intervenor led coaching processes. They described relationship directed coaching processes as the professional and family planning the intervention together and working out what strategies to use based on the family's priorities. The family choose the routines and materials that will be used in practice. In these coaching interventions, Kemp and Turnbull identified that the primary coaching strategies used are joint interaction, reciprocal feedback, and reflection. At the other end of the spectrum, they described an intervenor-led process where parents learn strategies dictated by a specific intervention

curriculum. The researchers in these studies had often developed an evidence-based intervention that they wanted to teach to parents so they could perform it accurately and consistently. Kemp and Turnbull pointed to similarities between this approach and traditional parent training, but with the addition of a coaching element that allowed for practice in context with direct feedback. In this approach, the interventionist chooses the home routines and materials needed for practice sessions and coaching is used to support the parents to achieve implementation fidelity. The most common coaching practices used in this style of coaching were identified as modelling and directive feedback. Many studies described a hybrid of these approaches that fell somewhere in the middle of this spectrum. It is interesting to note that all the studies included in this synthesis, regardless of where they fell on this coaching spectrum, reported that parents developed mastery of the strategies at the time of the intervention as well as improved outcomes for the children, albeit without significant maintenance data for many studies.

Many researchers have described specific protocols used during coaching sessions. Friedman and Woods (2012) observed that early intervention providers are often unsure about what constitutes coaching, and therefore struggle to provide a consistent service in this area. This observation was also made by Pellecchia et al. (2022) who evaluated coaching sessions for parents of autistic children and found that there were high levels of inconsistency across providers, as well as low incidence of coaching behaviours. Friedman and Woods (2012) proposed an operationally defined set of definitions for coaching behaviours. These were formed by observing videos of practitioners in early intervention undertaking coaching in real life contexts and comparing their activities to lists of prescribed coaching behaviours. The behaviours they observed during coaching sessions included: general conversation and information sharing (scene setting), observation, demonstration, direct teaching, caregiver practice with feedback, joint interaction (both coach and parent working with the child at the

same time), guided practice with feedback (caregiver practises strategy with child, coach sometimes joins in and offers ongoing feedback), problem solving / reflection, child focused time (not coaching) and other non-coaching based activities.

Following on from the Friedman and Woods (2012) study described above, Brown and Woods (2016) used the same operational definitions while observing professionals delivering coaching in early intervention. They measured the frequencies and proportions of different coaching strategies used by the practitioners, and studied which ones had the greatest effect on the parents' production of the strategies themselves, using time-window sequential analysis. Based on their findings, they recommended that coaching strategies that encourage high levels of parent participation, such as guided practice and caregiver practice, be given priority in coaching sessions. These are elements of coaching that some inexperienced coaches can find challenging to implement (Friedman & Woods, 2012). Similar recommendations were made by Sone et al. (2023), who also noted that although coaching is now often used in research studies, it is less often used in practice, possibly because professionals do not feel confident to implement it.

In Aotearoa New Zealand, early interventionists are encouraged to use a family-centred approach, with an emphasis on listening, shared planning and collaboration, including the use of coaching to upskill the team around the child (Mataiti et al., 2016; Ministry of Education, 2023). Over the past few years, early intervention teams working through the Ministry of Education have adopted a routines-based model with families of pre-school children (McWilliam et al., 2020), which places an emphasis on collaboration alongside honouring the priorities of the family. Whilst a coaching approach is promoted in service provision guidelines such as He Pikorua (Ministry of Education, 2023), there are currently no specific recommendations for how coaching might occur, or universal training to support early intervention professionals to learn and strengthen their coaching skills. A

systematic literature review conducted by Clarke (2021), found similar gaps relating to the quality and quantity of coaching interventions in professional development for early childhood teachers (kaiako) in Aotearoa New Zealand. It appears that the use of coaching is growing in the early childhood sector, but to date, there is little research to explore how it is being implemented and whether it is effective.

Despite the definitional and implementation challenges around coaching that are described in this section, its use is widely recommended to increase skills and confidence in parents and caregivers. Coaching offers a collaborative approach that respects the contributions of individual families, and, in the New Zealand context, it provides families with opportunities for self-determination and independence that is in keeping with the provisions laid out in Te Tiriti o Waitangi (Mataiti et al., 2016). The next section will examine using training and coaching methods in combination.

Training with Coaching

Most experts in the fields of early intervention, education, and AAC are in agreement that a short-term training model is not the most effective way to achieve long term change in adult learners (Kent-Walsh & McNaughton, 2005; Knoche et al., 2013; Kraft et al., 2018; Wetherby et al., 2014). Adult learning studies have shown that to be effective, intervention programmes must include active learning, multiple opportunities to practise, and time to reflect and problem solve (Trivette et al., 2009). Some families will not benefit from group training alone, as there are many adult and child factors that can affect outcomes. Barton and Lissman (2015) recommended following up group-based training with individual coaching, especially when families are experiencing challenges such as mental health issues, poverty, and disability. There are benefits to group training; it can allow time for parents to support each other, and it can be cost effective and an efficient way to share information (Kaiser et

al., 1995; Moore et al., 2014), but to achieve long term change, it needs to be supplemented with opportunities for individual practice with feedback and reflection.

Studies that have looked at the effects of training followed by individualised coaching have supported the need for practice with feedback. Snodgrass and Meadan (2018) carried out an intervention with a family and school-based team for one child with complex communication needs. After an initial training workshop that introduced all the strategies to be taught, only two of the four participants were observed to use the strategies in their interactions with the child: the mother and the teacher, and not to criterion levels. The two teaching assistants were not observed to change their practice at all. After individual coaching, all four participants achieved criterion levels of the strategies in a relatively short space of time and maintained this over time.

Kaiser et al. (1995) used group training followed by intensive, home-based coaching to teach parents to use Milieu Teaching procedures with their children. After eight sessions of group training, the parents were recorded as showing modest levels of performance in their use of the communication strategies with their children. After intensive coaching at home, with observation and feedback, the parents raised their implementation of the strategies to criterion levels. The training sessions in this study featured a strong active learning component, including role play and group discussions, but this was not as effective as practice in the home environment with feedback. The researchers concluded that short term training can have positive effects but is not sufficient for mastery of a range of techniques or for consistent effects to be observed on the children's communication skills.

The Effectiveness of Training and Coaching Interventions

Most studies reporting on training and coaching interventions with caregivers have demonstrated positive effects, both in terms of the strategy use by the caregivers as well as

the communication and behavioural development of the children. Interventions that are relationship directed and entirely coaching-based have achieved positive results, such as the study reported by Brown and Woods (2015). More intervenor led programmes have also reported high levels of positive change (e.g., Kaiser et al., 1995; Moore et al., 2014).

Within the field of AAC, several training and coaching interventions are described in the literature, involving both parents and other key communication partners. These studies have all reported strong positive changes in communication partner behaviour, with most also able to show positive change in the children's use of AAC (e.g., Barrett, 2021; Binger et al., 2008; Binger et al., 2010; Bingham et al., 2007; Ganz et al., 2013; Kent-Walsh, Binger, & Hasham, 2010; Kent-Walsh, Binger, & Malani, 2010; Marra & Micco, 2019; Nunes & Hanline, 2007).

Kent-Walsh et al. (2015) examined 17 single case design studies involving interventions where communication partners of children who use AAC received training and coaching. They reported that these interventions were highly successful overall and concluded that there is a body of evidence that communication partners can learn strategies to help children use their AAC systems effectively. They discovered a smaller, more moderate effect when autistic children were involved and hypothesised that these children would have specific social needs that mitigate the effects of the improved communication partner input. Biggs et al. (2019) carried out a scoping review of 29 studies where natural communication partners learned to use aided language modelling. The most frequently used instructional techniques were oral teaching, modelling, and practice with feedback. The authors identified that many of the studies were written up without including the full details of the implementation process.

Kemp and Turnbull (2014) described some of the outcomes of parent coaching interventions. Their synthesis of research studies noted that parent outcomes included increased responsiveness, increased positive perceptions about their child's communication, improved working relationships with professionals and decreased stress. They concluded that coaching has been shown to do no harm and generally leads to similar outcomes for children as direct therapy interventions.

Not all researchers in this area demonstrated consistently positive outcomes; there are often issues reported relating to the dosage of coaching. Some researchers have reported issues with ongoing maintenance of the strategies after coaching finishes (Ganz et al., 2013; Moore et al., 2014). Participants in the study by Snodgrass and Meadan (2018) stated that they would have preferred the coaching to have continued on an infrequent basis, rather than stopping when they reached the ideal levels of strategy use. They pointed out that the child's needs changed over time and continued support is needed to adapt to this. Barton and Lissman (2015) reported on parent coaching with "at risk" mothers who were experiencing issues with poverty and mental health. Although the mothers in their study rated the intervention positively, the gains they made in strategy use were small. The authors speculated that at-risk parents may require more intensive coaching over a longer period.

Training and Coaching Practices in AAC Interventions

The majority of research studies looking at communication partner instruction for supporting people who use AAC reported in the literature, use a single case research design and tend to be more interventional in their approach towards the training and coaching aspect (e.g., Binger et al., 2008; Binger et al., 2010; Bingham et al., 2007; Ganz et al., 2013; Kent-Walsh, Binger, & Hasham, 2010; Rosa-Lugo & Kent-Walsh, 2008; Snodgrass & Meadan, 2018; Stiebel, 1999). There are several possible explanations for this. Firstly, using an experimental single case design usually requires the use of pre-determined independent

variables that are applied consistently across participants (Kazdin, 2011), so this would limit the flexibility that can be used in training and coaching methods, as well as the contexts and routines in which they are applied. Secondly, there are a limited number of evidence based strategies that have been shown to support the communication of children who use AAC (Biggs et al., 2018), and they usually need to be applied with reasonable consistency and in a particular way to achieve success, so there is less scope for communication partners to choose what works for them. These skills and strategies are often not intuitive; learning them in a structured way may reduce frustration and increase success for the communication partners (Kent-Walsh, Binger, & Malani, 2010). Lastly, intervention services in AAC tend to be overstretched, and there is a need to find delivery models that are both effective and time limited. Therefore, longer term, intensive, or wholly relationship-based coaching models could be unrealistic (Kent-Walsh, Binger, & Malani, 2010; Light et al., 1992).

Research studies in the AAC literature have involved training a range of communication partners. Most frequently, studies have reported on training parents or family members (e.g., Barrett, 2021; Binger et al., 2008; Bruno & Dribbon, 1998; Kent-Walsh, Binger, & Hasham, 2010; Nunes & Hanline, 2007; Rosa-Lugo & Kent-Walsh, 2008; Starble et al., 2005). Others have reported on training teaching assistants (Binger et al., 2010; Bingham et al., 2007), behavioural therapists (Ganz et al., 2013), or a whole school team including a teacher and a parent (Snodgrass & Meadan, 2018). In the early years, and when AAC is first being introduced, parents or caregivers are generally viewed as the key communication partners (Barrett, 2021; Goldbart & Marshall, 2004; Starble et al., 2005).

Kent-Walsh, Binger and Malani (2010) differentiated between the skills and strategies that are taught to communication partners. They defined a skill as an ability that is acquired over time, such as learning to wait for a child to take a turn. In contrast, they defined a strategy as a combination of skills that are used in a predictable fashion, such as a prompt

hierarchy. They also highlighted the importance of identifying exactly what child behaviours are being targeted and ensuring that the skill or strategy that is taught will lead to the desired change.

Other authors (Shire & Jones, 2015) have emphasised the importance of teaching communication partners to recognise the difference between the child responding to their cues and initiating spontaneously. They recommended working towards more spontaneous communication from the child and using a wider range of communicative functions. They also recommended the use of multiple environments and contexts for communication partner training to ensure generalisation of strategies throughout the child's day. This is often not the case in research studies involving coaching for communication partners. These often focus on a limited number of routines such as storybook reading (Binger et al., 2008; Binger et al., 2010; Kent-Walsh, Binger, & Hasham, 2010; Rosa-Lugo & Kent-Walsh, 2008) or pre-planned play routines (Ganz et al., 2013), often carried out in the same environment each time.

Some researchers have managed to include a wider range of routines and take a more naturalistic approach. Nunes and Hanline (2007) worked with the mother of an autistic child in the home. They worked collaboratively with the parent to decide on four play and care routines for practise of the strategies. Snodgrass and Meadan (2018) worked with a team of home and school-based communication partners together and taught them to use a set of strategies across a range of natural routines. Another researcher (Stiebel, 1999) taught parents a set of strategies, and then encouraged them to use a problem solving technique in order to generalise these strategies to a range of other situations, including both home routines and going out to a cafe. Starble et al. (2005) took a family centred approach when working with one family of a child who uses AAC and taught a range of strategies to be used across most

home routines, in collaboration with the family, building the intervention around their priorities.

Most studies that described communication partner interventions for children who use AAC used a combination of training and coaching. Some had a group training component (Ganz et al., 2013; Kent-Walsh, Binger, & Malani, 2010; Snodgrass & Meadan, 2018), and others delivered the training component on an individual basis (Binger et al., 2008; Binger et al., 2010; Nunes & Hanline, 2007; Stiebel, 1999). All reported using some degree of one-on-one practice and feedback in real life contexts. In their qualitative investigation of what families want from AAC professionals, Parette et al. (2000) found that parents often wanted professionals to act as trainers and educators. They expressed a need to be taught how to use the AAC system and preferred this educator role over a collaborator role.

Training and Coaching Summary

With parents and caregivers identified as the most important communication partners during the implementation of an AAC system with pre-school children, the need to support parents in this complex role has been emphasised both in research and practice literature. Parents and caregivers need support to learn the strategies that help make AAC implementation successful. The differences between training and coaching, with emphasis on adult learning styles and the effective practices to influence behaviour change, can inform how parent support interventions are developed. This literature strongly contributed to the design of the EP-AAC intervention used in this study, with its use of initial instructional group workshops and ongoing, collaborative, and family-centred coaching sessions. Findings in the literature that coaching needs to be ongoing over time to be effective were also accounted for when developing the intervention. The next section will examine the literature that describes specific supportive strategies for communication partners, which formed the basis of the instructional component of the EP-AAC intervention in this study.

Communication Partner Strategies

There is some consensus across the AAC literature with regards to strategies and supports that help children to learn and use their AAC systems. Gevarter and Zamora (2018) carried out a systematic review of single-subject studies that examined the effectiveness of a range of natural interventions for teaching the expressive use of speech generating devices. Across the 19 studies identified, they found that the most used intervention strategies were: 1) creating opportunities for communication, 2) using specific response strategies when a child attempts to communicate, 3) prompting, and 4) aided language modelling. Most of the studies that reported successful outcomes used at least three different strategies. Many also included communication partner training. Similarly, Biggs et al. (2018), in their systematic review of 48 studies found that similar combinations of strategies led to successful outcomes, although their particular focus was on ALM.

Aided Language Modelling (ALM)

The strategy of using a person's AAC system in a natural way when communicating with them has rapidly gained popularity over the past 15 years (Barker et al., 2013; Dodd & Gorey, 2014; Jonsson et al., 2011; Sennott et al., 2016). However, it is not a new concept, and has been practised and recommended by professionals working in the field of AAC for many years (e.g., Carlson, 1981). Although there are several different terms used in the scientific literature for this strategy, such as 'augmented input' (Ronski & Sevcik, 1996), or 'aided language stimulation' (Harris & Reichle, 2004), the descriptions all refer to similar processes that result in the child who uses AAC being able to see and experience their own AAC system being used for communication. Sennott et al. (2016) acknowledged the different terminologies that are used, but summarised AAC modelling interventions as all containing two key features: firstly, the communication partner points to the relevant symbols on the

AAC system as they speak, and secondly, this is carried out during naturalistic communication interactions.

In their systematic review, Biggs et al. (2018) noted that ALM can be defined in to three broad categories. The first category is modelling of the AAC system in naturalistic settings. The purpose of this is primarily to increase the child's awareness and understanding of the system and to help with language mapping, with no direct expectation that the child will copy the model. In the second category, modelling is used with the intention of being a prompt for the child to copy. This strategy is often used as part of a prompting hierarchy. The third category is described as an instructional tool, used for a limited time to show a child how their system works, or to model a new way to use it.

The use of aided language modelling (ALM) as a supportive strategy has been well researched, with evidence stretching back over more than three decades. The earliest paper to document this strategy in the literature was a retrospective case study about a single child with severe spastic-athetoid cerebral palsy (Goossens, 1989). Over a 7-month period, both clinicians and parents modelled an increasingly complex eye gaze system with a robust vocabulary by pointing to symbols as they talked. The 6-year-old child, who had English as a second language, made rapid progress with her eye gaze AAC system and eventually developed functional spoken language. Following this, there have been several single subject design studies that have examined the effects of ALM as a supportive strategy for AAC use (e.g., Binger & Light, 2007; Dada & Alant, 2009; Drager et al., 2006; Harris & Reichle, 2004). These studies showed improvements in both receptive and expressive communication skills for children who use AAC.

Group design studies are rare in the field of AAC for a variety of reasons, but Ronski et al. (2010) carried out a rigorous, quasi-experimental study comparing different language

interventions for three groups of pre-school children with complex communication needs. Sixty-two children were randomly assigned to one of three groups, and then provided with different interventions aimed at eliciting the same target vocabulary. The first two groups involved the use of a speech generating device, and the third group focused on using spoken language. In group one, the children were exposed to aided language modelling of the target words on the AAC system. In group two, the children were prompted to use the AAC system using gestures, verbal prompts, and physical prompts. The children in group three were provided with spoken word models and then prompted to copy. All the children attended several clinic appointments, and then had continued sessions in the home, supported by their parents who had been trained in the intervention. The children in group three made little progress overall. The children in the first two groups, who had access to AAC, made significant progress in production of the target words. This progress was not only observed with the AAC device, but also in spoken productions. This study provided evidence for the use of ALM as a successful supportive strategy, as well as providing evidence that AAC has a useful role in improving communication for children in the early years.

More recently, there have been three systematic reviews that have examined the effects of aided language modelling, each with a slightly different focus and scope of interest. Sennott et al. (2016) carried out a review with a specific focus on ALM in naturalistic interactions. They examined all studies since 1989 that have included ALM as the main strategy for supporting the language acquisition of children with complex communication needs and found that the use of ALM had led to improvements in four areas: pragmatics, semantics, syntax, and morphology. The studies examined provided evidence that aided language modelling within naturalistic contexts, and sometimes in combination with other interaction strategies, led to observable gains in both receptive and expressive language. The

authors concluded that the findings of the review made a strong case for using ALM as a foundation for AAC intervention.

Allen et al. (2017) carried out a systematic review that included 19 studies. All the studies reviewed had ALM listed as an independent variable. Only studies with an experimental design were included in this review, and studies where ALM was part of a larger treatment package were excluded. The authors had a particular interest in the effects of ALM on participants' comprehension skills. They concluded that there is promising evidence that ALM improves comprehension skills for people who use AAC, but raised concerns about the variety in approaches, targeted outcomes, and in the participants' ages, diagnoses, and abilities across the studies.

Biggs et al. (2018) carried out a systematic review with a wider focus. These researchers did not discount studies that used ALM as part of a larger package of interventions, but they did group and define the studies they reviewed to state whether this was the case or not. This review examined 48 studies that researched this strategy in relation to children and young people. They identified only five studies where ALM was the only strategy used and studied as the sole independent variable. The other studies reviewed used ALM as part of a package that included strategies such as additional environmental arrangements, use of prompt hierarchies, and use of contingent reinforcement for child communication attempts. They concluded that ALM strategies were shown to have a positive impact on the communication of children who use AAC, across a range of ages, diagnoses, and abilities. Although most studies reviewed contained ALM as part of a wider package of strategies, these reviewers felt that there was sufficient evidence that ALM caused positive changes and improved communication, including increased communication attempts and initiations, increased vocabulary, and supporting children to use more complex language.

It is worth considering possible reasons why the use of ALM is a helpful strategy for children learning to use an AAC system. Several authors have identified that one of the many difficulties facing children and adults who are learning to use an AAC system, is that they are required to process a different modality (verbal language) than the one they are expected to use (symbol-based language) (Adamson et al., 1992; Binger & Light, 2007; Dodd & Gorey, 2014; Light & McNaughton, 2014; Smith & Grove, 2003). Smith and Grove (2003) referred to this as an asymmetry between input and output. Light (2014) highlighted the issue that people who use AAC very rarely get to see it modelled, and therefore must learn to code switch between the spoken language around them and the system they use. Others working in the field have pointed to the demands this must place on beginning communicators learning to use AAC, who are already struggling with language learning, and have suggested that it is likely to cause a breakdown in understanding, and their use of any kind of communication. Ultimately this could lead to frustration or passivity (Dodd & Gorey, 2014).

Additionally, it is widely accepted that aided language modelling aligns well with typical language acquisition in children. Sevcik et al. (1995) remarked that all psycholinguistic theories of language acquisition have a basis in the recognition that language input provides the model for children to develop linguistic competence. Dodd and Gorey (2014) supported this: “for typically developing children, the acquisition of language is a rapid and seemingly effortless and organic process, which occurs naturally by being immersed in the language one is learning” (p. 103). These authors felt that for aided language modelling to be truly reflective of typical language acquisition, it needed to happen at least 70% of the time when people were communicating with children who use AAC. They also pointed out that typically developing children listen to and observe language for nearly a year before attempting to produce any language themselves, and compared this with expectations placed on children who use AAC.

As many professionals working in the field of AAC will attest to, it is not an easy task to get communication partners to model aided language effectively and consistently (Bruno & Trembath, 2006; Sennott et al., 2016; Smith & Grove, 2003). It can be a difficult skill to learn and can be very time consuming (Barker et al., 2013; Van Tatenhove, 2009b). The reality is that many children who use AAC will hardly ever observe their system being modelled in a competent manner (Mirenda, 2008). If modelling does occur, it is often just the content words, and good syntactic models are rare (Bruno & Trembath, 2006). A recent study by Laher and Dada (2023) found that children with intellectual impairments and complex communication needs developed more consistent receptive representations of the target words when they were modelled at a rate of 70% of spoken words rather than 40%. Research relating to appropriate dosage of ALM is scarce overall, but if Dada and Alant (2009) are correct with their estimate of 70% of spoken words, then it is unlikely that all but the most skilled of communication partners are able to meet this goal.

Most studies exploring the effects of ALM focused on the participants who made significant gains. However, many studies reported that some participants did not make progress or made much slower progress than the others (Binger & Light, 2007; Ronski & Sevcik, 1996; Wilkinson et al., 1994). Mirenda (2008), referring particularly to autistic children with complex communication needs, agreed that ALM appears to be a promising language intervention strategy, but cautioned that it was unlikely to be a “magic bullet”. She proposed that some autistic children will need additional strategies, or more structured interventions to make progress with AAC. She suggested that professionals need to consider instructional techniques based on the principles of motor learning for these children.

Van Tatenhove (2009b) proposed that aided language stimulation needs to be used in partnership with other strategies and is more than just simple modelling. To be maximally effective, she suggested that communication partners need to ensure that the child is first

attending and looking at the AAC system. She recommended that modelling needs to be done at the correct pace for the child, depending on their level of ability. The amount of modelling should vary depending on the proficiency of the child. She suggested that beginning communicators will need just one or two key words modelling in an utterance, whereas more advanced communicators will need more words and more syntax demonstrated.

Aided language modelling is an ongoing process, rather than a one off, time limited intervention. Cafiero (2001) noted that the young man in her study lost skills over the school holidays and returned with a reduced vocabulary. She put this down to the fact that the holiday staff were not trained in aided language modelling. This finding was echoed by Beck et al. (2009) who observed that the participants in their study used less AAC in the final four weeks, when there was no aided language modelling by communication partners. Binger and Light (2007) found that the children in their study continued to use multi-symbol utterances in the maintenance phase of their study, but they still cautioned against stopping ALM as children will continue to need to see new models in different contexts to continue making progress and developing new language skills.

In summary, aided language modelling is a well-researched AAC intervention strategy that has proven results in developing AAC language skills in children with complex communication needs and aligns with theories of typical language acquisition. It is not necessarily an easy technique for communication partners to learn and use and needs to be used in combination with a range of other language intervention strategies. Successful implementation will depend on good initial training and ongoing support. This strategy may not be helpful for some children, and further research is needed to explore the reasons for this, as well as alternative interventions for these children.

Creating Opportunities for Communication

The practice of setting up and enhancing communication opportunities for children with delayed language skills or complex communication needs has a firm base in the scientific literature stretching back over many years (Kaiser & Roberts, 2013). These strategies are often referred to as milieu or enhanced milieu teaching. This strategy group is not unique to the field of AAC, and has been commonly used by professionals working in the field of communication difficulties for some time (e.g., Prizant & Wetherby, 1985; Sussman, 1999). A recent systematic review of naturalistic intervention strategies for children who use AAC found that the use of milieu teaching strategies was both commonly used and associated with positive outcomes (Gevarter & Zamora, 2018).

Kaiser and Roberts (2013) describe a range of strategies that fall under the auspices of milieu teaching, including several that directly relate to increasing the likelihood that the child will attempt to communicate. These include choosing preferred play items, joining in with the play, environmental arrangement strategies such as toys that need assistance, or inadequate portions, expectant delay, and providing choices. These strategies have been used successfully with children to increase their communication attempts and taught to parents and other communication partners for many years.

Children who require AAC to communicate may present as reluctant communicators for a number of underlying reasons, including their diagnosis, or a sense of helplessness from many failed communication attempts (Light et al., 1992; Light & McNaughton, 2014; Mirenda, 2008). Additionally, communicating using AAC usually requires more effort than natural speech (Dukhovny & Thistle, 2017; Light et al., 1985). Children with complex communication needs who are provided access to an AAC device will usually require additional supports to communicate, as with other children who have developmental language delays and disorders, and there are several studies that have achieved successful outcomes

when combining these strategies with the implementation of an AAC system (Gevarter & Zamora, 2018).

Prompting

Another aspect of milieu communication strategies described by Kaiser and Roberts (2013) is the use of prompting. They describe a range of prompts from an expectant wait, a strategic question, or an instruction to communicate. The use of prompting in AAC can be controversial, because of associations with a lack of autonomy, or the use of compliance, which does not fit well with the concept of natural communication (Roberts, 2020). Some widely used AAC systems have advocated the use of physical prompting combined with withholding and error correction, which may have caused frustration for children, and do not reflect natural communication development. This type of prompting has often been associated with AAC for autistic children (Roberts, 2020). Other experts in the field of AAC remain cautious about some forms of prompting, expressing concerns that it may lead to prompt dependence (Porter & Cafiero, 2009; Zangari, 2017b). However, when used sensitively, prompting is a naturalistic strategy that has been shown as an effective way to encourage children who are learning to use AAC to communicate (Gevarter & Zamora, 2018; Holyfield et al., 2017).

Romski et al. (2010) carried out one of the few randomised control trials within the field of AAC, examining the effects of different AAC instructional techniques. Two of the three groups of young children in their study were introduced to a speech generating device, and then exposed to either adults using aided language modelling, or adults prompting them to use the device to communicate. The children who were prompted experienced prompts such as gestures to the device, instructions to use the device to communicate, or physical prompts. Both groups of children learned to use the AAC device to communicate target

words, but the group of children who were prompted activated the target words more frequently than those who were only exposed to modelling.

Several other studies have used prompting as a successful strategy for encouraging children to use AAC. Marra and Micco (2019) described a case study where a mother was taught to use supportive strategies, including prompting, leading to increased communication by her son. Chavers et al. (2021) described a multiple baseline study where three autistic children were taught to use AAC using a least to most prompting strategy, alongside other strategies. The children in this study all increased their use of the AAC devices. Nigam et al. (2006) used prompting alongside other milieu strategies to successfully increase autistic children's ability to combine symbols using AAC. Tönsing (2016) also used prompting strategies successfully to increase the use of multi-symbol combinations in their study of children with limited speech during story reading sessions. In their meta-analysis of AAC strategies taught to communication partners, Kent-Walsh et al. (2015) found that open-ended question asking was one of the most frequent strategies used, alongside aided language modelling and expectant delay.

Many professionals working in the field of AAC, and writing about prompting, refer to a 'hierarchy' of prompts (e.g., Chavers et al., 2021). Van Tatenhove (2009b) describes a comprehensive prompting hierarchy that starts with expectant delay. This is followed by an open question, then a direct verbal cue to use the AAC system, then a model used as a prompt, followed by a physical prompt if the child is still not responding. She advises using wait time between each of these prompt levels. Bean (2022) breaks down the levels of physical assistance that can be used if a physical prompt is necessary. Some experts take a more pragmatic approach to prompting, and suggest using whichever level of prompt is most likely to be successful with the child at the time (Halloran & Halloran, 2006).

The use of prompting remains a controversial topic, with some AAC experts now cautioning against the use of physical prompting altogether (e.g., Richards, 2022). However, careful use of prompting remains an evidence-based strategy that has proved to be effective for children who use AAC when employed by communication partners, particularly when they are learning how to use the system (Gevarter & Zamora, 2018). Most researchers use this strategy combined with the other supportive strategies described in this section, including contingent responses, which will be considered next.

Response Strategies

The outline of milieu teaching from Kaiser and Roberts (2013) also covers aspects of the response strategies that support children using AAC systems. They advise communication partners to respond to all communication attempts, to expand on the child's communication by adding in words or symbols, and to respond with comments that build on the interaction. People who need to use AAC often have negative experiences associated with their attempts to communicate (Light et al., 1992), so it is very important to respond to all their communication attempts in a contingent and responsive manner (Wandin et al., 2022).

In their systematic review of communication partner strategies, Gevarter and Zamora (2018) identified that commonly used responsive strategies are rewarding the communication, praise, and expanding on the communication attempt. In their paper documenting the history of AAC, Hourcade et al. (2004) list effective naturalistic teaching practices that include the use of natural consequences in response to communication attempts as well as maintaining the interaction with the child. Several researchers have examined the effects of different types of language building response strategies (Clarke et al., 2017; Nigam et al., 2006; Soto et al., 2020; Tönsing et al., 2014), and recommended using strategies such as recasting, repairing and prompting for more information. Van Tatenhove (2009b)

suggested that communication partners can expand, connect to other words, correct errors, or reword the utterance to show the child a different way to express themselves.

Clarke et al. (2017) highlight the importance of using the child's AAC system when responding, especially when attempting to develop their language skills in any way. This advice is repeated by Van Tatenhove (2009b) and used in the interventions described by Soto et al. (2020) and Nigam et al. (2006) among others.

In summary, using contingent responses that either reward the communication attempt, build on the child's language, or maintain the interaction have been shown to be another essential communication partner strategy. Responses will benefit the child more if they incorporate some modelling of the child's AAC system.

The EP-AAC intervention designed for this study used a comprehensive training and coaching approach for parents of children learning to use an AAC system, based on the evidence provided by the literature in this review. The parents were instructed on the four, evidence-based, supportive strategy groups discussed above: aided language modelling, creating opportunities for communication, using prompts, and responding to communication attempts, and then coached to help them integrate the strategies into familiar, home-based routines. The next section in this literature review will consider factors relating to the AAC system used in this research: a core board with fringe vocabulary.

Choosing the Vocabulary in an AAC System

Until relatively recently, not all children with complex communication needs would have been considered a good fit for AAC, for reasons such as concerns about inhibiting the development of spoken language and beliefs that some children did not have the necessary pre-requisite attention or cognitive skills to use AAC (Hourcade et al., 2004). When the approach to AAC implementation became more inclusive, initially unaided AAC methods

were favoured for children with intellectual disabilities (Zangari et al., 1994). Later came the introduction of aided AAC systems, however these often only offered a limited vocabulary of mainly nouns (Mirenda, 2008; Zangari et al., 1994). AAC systems were often composed of mainly concrete content words and were primarily set up to enable requesting (Yorkston et al., 1988). AAC practice has continued to evolve rapidly, and it is now increasingly common for young children with complex communication needs to use AAC systems that have a much larger and richer initial vocabulary (Farrell, 2015; Porter & Cafiero, 2009; Ronski & Sevcik, 2005; Zangari, 2015). One of the most notable changes has been the inclusion of core vocabulary words in beginning AAC systems (Bean et al., 2019; van Tilborg & Deckers, 2016), however this has not been without controversy.

Choosing an initial vocabulary for an AAC system is a multifactorial process, and it can be difficult for practitioners to incorporate all the recommended considerations, as experts and researchers prioritise different components that are sometimes in conflict with each other (Laubscher & Light, 2020). Bean et al. (2019) provided a tutorial for practitioners that laid out some of the important considerations when choosing AAC vocabulary for children whose literacy skills are emergent. They recommended the following: including a variety of word classes, using developmentally appropriate vocabulary, including vocabulary that allows for modelling by the communication partner, including vocabulary that supports a range of communicative functions and can support social interactions, including vocabulary that allows for the development of grammatical structures, and considering factors related to layout and access.

The Inclusion of Core Vocabulary in AAC Systems

The use of aided AAC systems with early communicators who have complex communication needs has increased since the end of the last century, and the nature of the typical vocabulary has changed in that time (Hourcade et al., 2004). Whilst earlier systems

favoured smaller vocabularies of mainly nouns (Mirenda, 2008; Yorkston et al., 1988), more recent systems have favoured larger initial vocabularies, with a strong emphasis on the inclusion of core vocabulary (Zangari, 2015). Many practitioners now prioritise core vocabulary over fringe vocabulary, as it has been promoted as universal and flexible (Frick Semmler et al., 2023; Laubscher & Light, 2020; van Tilborg & Deckers, 2016). This has been a cause for concern amongst proponents of a balanced approach to vocabulary selection, or those who are concerned that it may not be developmentally appropriate for early symbolic communicators (Laubscher & Light, 2020; Light et al., 2019). This section will consider factors relating to the inclusion of core vocabulary in AAC systems for children.

Core vocabulary, by definition, consists of the highest frequency words used by a group of people. Deckers et al. (2017) proposed that core vocabularies account for up to 80% of all words used in different communication contexts. Core vocabulary lists contain most of the words that perform specific syntactic functions such as pronouns, conjunctions, prepositions, auxiliary verbs, modals, determiners, interjections, and adverbs, alongside other high frequency words. Deckers et al. found that for young children, the core vocabulary is often described in the literature as containing approximately 20-50 words, rising to between 200-400 words for adults. Core vocabularies are comparatively small, change little over time, contain structural words and provide the grammatical framework for language (Balandin & Iacono, 1998; Boenisch & Soto, 2015; Yorkston et al., 1988).

In recent years, the use of core vocabulary words has become increasingly common as a basis for vocabulary selection in AAC systems, and many commercially available AAC apps feature a home page containing mainly core vocabulary words, with links to pages of fringe vocabulary (Boenisch & Soto, 2015; Laubscher & Light, 2020; McCarthy et al., 2017). A variety of low-tech, core-based, communication boards are now used with children with complex communication needs. Core vocabulary is not new in the world of AAC, but its use

is now more widely established. In 1975, Holland wrote about the development of a “core lexicon” for beginning verbal communicators with language disorders, and advocated for the early introduction of certain concept words (Holland, 1975). Early advocates for more robust AAC vocabularies such as Faith Carlson detailed the inclusion of core words (Carlson, 1981).

Beukelman et al. (1989) suggested that the core vocabulary samples of pre-school children could form a useful basis for the initial vocabularies of AAC systems for children with complex communication needs of a similar age. Following this piece of research, over the next two decades, there were several studies looking at the language use of different groups of typically developing children to provide more appropriate vocabulary for age-matched children using AAC (e.g., Banajee et al., 2003; Fallon et al., 2001; Trembath et al., 2007). These studies led to the production of several core vocabulary lists that are used as a basis for language selection in current AAC systems (Laubscher & Light, 2020).

Many practitioners working in the field of AAC today see these core vocabulary lists as essential when developing initial AAC lexicons. A survey of speech-language therapists in the United States regarding the choices they make when designing an AAC system found that many of them identified core vocabulary as an important source for the initial lexicon (Thistle & Wilkinson, 2015). More recently, van Tilborg and Deckers (2016) have recommended that core words be a high priority for AAC systems because they can be used so flexibly.

Surprisingly, for an area that has found such popularity across a range of different AAC approaches, there is little research that directly looks at the effects of using core vocabulary as part of an AAC system (Light et al., 2019; Mirenda, 2014). There is a wide field of research that identifies the core vocabulary of people from a range of different demographic groups (e.g., Amery et al., 2022; Boenisch & Soto, 2015; Deckers et al., 2017; Fallon et al., 2001; Mein & O'Connor, 1960; Trembath et al., 2007; van Tilborg & Deckers,

2016) and this is often used to justify its inclusion in AAC vocabularies (van Tilborg & Deckers, 2016), but there is little specific research to look at the effects of core vocabulary inclusion for children or adults who require AAC.

One of the most frequently cited reasons for including core vocabulary in an AAC system is that the words are found in every speaking population, including children and adults with physical and intellectual disabilities. van Tilborg and Deckers (2016) reviewed a range of core vocabulary studies and concluded that a core vocabulary is found in the language of toddlers, pre-schoolers, school aged children, adults, older people, second language learners, and children and adults with a range of physical and intellectual disabilities. They stated that core vocabulary is comparable across all populations. This finding was echoed by Deckers et al. (2017), who reported that core vocabulary across diverse populations overlaps considerably.

However, Laubscher and Light (2020) reported that there is one key population who use very few core words. This population is early symbolic communicators, that is, children who are just starting to use spoken language. Laubscher and Light's paper compared the words on popular core lists used for children's AAC vocabulary selection with the words on a developmental language list for early symbolic communicators and found that there was little overlap. Children who are just learning to speak tend to use mainly nouns that refer to people, objects and activities that are important to them, alongside sound effects and social words that allow them to connect with the people in their lives. Frick Semmler et al. (2023) extended this research with similar findings. Both sets of researchers expressed concern regarding the current prioritisation of core words in AAC systems aimed at beginning communicators, when the population that is arguably the most similar does not actually use these words. However, neither of these articles provide guidance on how the transition is made to a more complex vocabulary as the child develops linguistic skills, which would be a

key consideration if a beginning AAC system were only to include developmentally appropriate words.

Other experts have also questioned whether core vocabulary is the best choice for early communicators - children with complex communication needs who are at the start of their AAC journey (Franco et al., 2017; Light et al., 2019). Franco et al. (2017), in their paper reviewing the universality of nine core word lists for children, disputed that core vocabulary is useful for very early communicators. They suggested that structure words are acquired later by children because of their abstract nature, although they did acknowledge that core words are needed if the child is to progress to more complex syntactic structures. Light et al. (2019) cautioned against relying on core vocabulary for early communicators who are using AAC, because it is not developmentally appropriate and does not convey enough meaning.

However, other professionals in the field of AAC do support the idea that children need core vocabulary right from the start (Halloran & Halloran, 2006; Porter & Cafiero, 2009; Van Tatenhove, 2009b; Zangari, 2017a). Some have pointed out that young children without disabilities who are starting to acquire language still use predominantly core words (Dodd & Gorey, 2014). Findings from van Tilborg and Deckers (2016) indicated that while some core words may be less motivating or appropriate for early communicators, if careful consideration is given, some appropriate core words should be included in a beginning system. Core words that have an immediate impact such as 'more', 'stop', and 'out' could be useful, especially if the vocabulary on the system needs to be limited due to the sensory, cognitive, or physical disabilities of the user. They reminded professionals that this must be balanced with the future needs of the child and must still provide language for learning.

Deckers et al. (2017) sampled both the spoken language and manual signs and gestures of 30 Dutch children with Down Syndrome. The children were aged between 2 and 7

years, with a developmental age below 4 years old. They were all considered to be early communicators. They found that these children did have a distinctive core vocabulary. The core vocabulary for this group contained more nouns than a typical core vocabulary. Deckers et al. suggested two possible reasons for this: firstly, the children were at a very early stage of communication and mainly used one-word utterances, and secondly, because Dutch supported sign promotes the teaching of a higher number of nouns. Fifty of the most frequently used signs accounted for 67% of the total sample, indicating a clear use of core vocabulary by these early communicators with additional needs.

Other researchers have proposed that using core vocabulary in AAC can mirror typical language development. Adamson et al. (1992) suggested that having core and fringe words available from the start is more in line with typical language acquisition and could make the system more tempting for new users. Banajee et al. (2003) pointed out that using core vocabulary lists fits with a developmental approach to vocabulary selection, as the vocabulary is chosen from developmental language inventories created from knowledge of language acquisition principles. The children that provided the core words list in Banajee's study were 24-36 months; Laubscher and Light (2020) argued that this age range represented children that had moved beyond early symbolic communicator stage.

Another potential difficulty with using core vocabularies in the AAC systems of early communicators is that many core words are abstract and conceptual, and therefore difficult to teach, especially to children who may, by the nature of their disability, have a very concrete view of the world. As well as syntactic function words, many core vocabularies contain basic concepts relating to colours, sizes, weight, comparisons, directions, position, self-social awareness, texture, material, quantities, time, and sequence (McCarthy et al., 2017). Boenisch and Soto (2015) acknowledged that content words are easier to teach through labelling and paired association, but pointed out that function words generally become meaningful when

they are used frequently by communication partners in natural discourse situations and combined with more concrete words.

These findings were verified by Snodgrass et al. (2013) who carried out a single subject study on a young person with complex intellectual, physical, and sensory disabilities. They assessed whether this young person could learn concept words and generalise their use to other environments and stimuli. They used tactile symbols and taught him to exchange symbols representing the words 'more', 'done' and 'new'. The participant in this study was able to learn these symbols and exchange them for a range of items and activities in different environments. The use of more general concept words ensured that he could use a very small vocabulary for a relatively large number of functions.

Including Both Core and Fringe Vocabulary

Whilst it is reported that practitioners may be prioritising core vocabulary words at the expense of fringe words (Frick Semmler et al., 2023), this does not reflect most recommendations in current scientific literature. Most experts writing about vocabulary selection for AAC systems recommend using a range of word classes that will allow children to communicate for a range of purposes across environments (Bean et al., 2019; Halloran & Halloran, 2006; Light et al., 2019; Porter & Cafiero, 2009; Sanders & Blakeley, 2021). Typically, this means using a combination of appropriate core and fringe words in an AAC system.

Whilst core words make up approximately 80% of typical language, the other 20% consists of fringe words. These are words that provide content and specific meaning. There are vast numbers of fringe words in every language, and it is generally not possible or desirable to represent all of them on symbolic AAC systems. Fringe word vocabularies mainly consist of nouns, and they tend to be specific to people, contexts, and activities (Bean

et al., 2019). For early communicators, they can be easier to learn because they can represent favourite objects, food, activities, and people (Laubscher & Light, 2020). Fringe words often have a concrete meaning and are easier to represent symbolically (van Tilborg & Deckers, 2016).

In order to allow a full range of communication, core words must be combined with a large, personalised fringe vocabulary (Bedwani et al., 2015; Franco et al., 2017; Fried-Oken & More, 1992; Sanders & Blakeley, 2021; Smith, 2015; Van Tatenhove, 2009; van Tilborg & Deckers, 2016). This is supported by Boenisch and Soto (2015) who agreed that a focus on core vocabulary alone is not sufficient as it will create a deficit in the breadth of words needed for full community participation. This view is also supported by the research carried out by Jonsson et al. (2011), who trialled communication boards and asked for feedback from parents. Many of the parents commented that they wanted more personalised fringe vocabulary. Deckers et al. (2017) proposed that not only is fringe vocabulary required for a breadth of topics but is also essential so that children can develop their own personal style of communication.

Fringe vocabulary is also required to give clarity and meaning to messages. Although core vocabulary is flexible and provides a framework for communication, it can lack any real content and meaning without fringe vocabulary (Trembath et al., 2007). Yorkston et al. (1988) referred to content words as the words needed for “linguistic survival”. Many core vocabulary studies have found evidence of a significant fringe vocabulary in their cohorts (van Tilborg & Deckers, 2016). Interestingly, the participants in the Mein and O'Connor (1960) study of adults with severe intellectual disabilities in a special hospital in the UK had the smallest amount of fringe vocabulary as a percentage of the sample size. This was felt to reflect their limited experiences in a closed hospital ward at the time.

AAC vocabularies that contain only one word class make word combinations difficult to achieve (Adamson et al., 1992; Bean et al., 2019; Boenisch & Soto, 2015). The inclusion of core words has increased the opportunities for children who use AAC to learn to combine words and develop grammatical skills and knowledge (Bedwani et al., 2015; Binger & Light, 2007). This finding was supported by the research of Wilkinson et al. (1994), who carried out a 2-year study of the System for Augmenting Language, involving 13 young people with developmental disabilities. For the first 6 months of the research period, the participants only had access to referent symbols, and in this time, they did not make any symbol combinations. After 6 months, several core words were added to the participants' devices. Over the next 18 months, seven of the young people began to combine symbols on a regular basis, to express many requests as well as a range of other communicative functions. Wilkinson et al. hypothesized that the students needed these crucial function words, such as 'more', 'no', and 'big', to serve as the foundation for symbol combinations. They recommended that these words are represented on AAC systems for beginning communicators, so that the initial vocabulary can serve as a starting block for the next stage of language development.

Boenisch and Soto (2015) also advocated for core words in children's AAC vocabularies, suggesting that their presence may prompt professionals working with the child to focus more on language development such as word combinations and syntax. This can then change the AAC language intervention from identification, labelling, and requesting, to more of a focus on discourse. Conversely, Frick Semmler et al. (2023) cautioned that the inclusion of core words for early communicators could lead to communication partners having unrealistic expectations for the child.

Another consideration when choosing the vocabulary for an AAC system is the role of aided language modelling. As described in a previous section, ALM is an evidence based strategy used by communication partners that has been shown to help children learn to use

their AAC system (Biggs et al., 2018). Communication partners will typically model more language than the child is currently using, and in order to do this, they will need a vocabulary that exceeds the current abilities of the child. Porter and Cafiero (2009) recommended the use of large, well organised vocabularies to facilitate aided language modelling. They proposed that the vocabulary must be large enough to express a full range of intents, messages and topics that happen naturally across contexts. Quick et al. (2019) also recognised the importance of vocabulary for ALM; this study compiled a core vocabulary list from language used by mothers with babies and toddlers, with the idea that this should be considered for inclusion in AAC systems for early communicators.

Dodd and Gorey (2014) described an intervention model for AAC systems that included a vocabulary with both core and fringe words. They recommended continual use of ALM by communication partners, modelling both core and fringe. This is echoed by Deckers et al. (2017), who pointed out that children manage to learn conceptually more difficult words because they are used so frequently by the communication partners across all environments. If children are to learn to use these words on their AAC system, they need to see them modelled frequently, and not just hear them spoken. If they are not available on the system, it seems likely that the adults will model less consistently using the AAC device.

In their tutorial on vocabulary selection, Bean et al. (2019) recommend a balanced approach to vocabulary selection, one that takes account of the developmental stage of the child, but also includes a range of core and fringe vocabulary that reflects natural language acquisition. They remind practitioners of the importance of including verbs and other word classes so that early word combinations are possible. This balanced approach will allow children to develop and maintain social interactions and lead to communication for a range of different purposes.

Cultural Considerations for AAC in the Aotearoa New Zealand Context

Whilst Māori children with additional needs have a right to culturally responsive and effective services under the principles of Te Tiriti o Waitangi, a founding document of Aotearoa New Zealand, this is currently very difficult to achieve for children who require AAC. Collin Stone (2019) explored this troubling gap in her thesis, highlighting the lack of culturally appropriate AAC systems at the current time. She argued that the lack of evidence-based, te reo Māori AAC vocabularies and systems could further disable Māori children with complex communication needs by hindering their identity formation and participation in their culture and community. Collin Stone explained that it is not simply a matter of directly translating available core-based systems into te reo Māori. Whilst various translated core boards are available for use, and have even been displayed in some public places (e.g., Gisborne District Council, 2022), these still use the same western-based symbols, and are founded on western concepts of language learning and expression with no recognition of te ao Māori. The core vocabularies used as a basis for most AAC systems are developed from research gathered on mainly English-speaking populations and are organised and displayed according to principles of English grammar. Whilst some countries are beginning to gather information around core vocabularies of their indigenous peoples, for example the work of Amery et al. (2022) in Australia, this work is in its infancy in Aotearoa New Zealand.

One of the difficulties in addressing the lack of culturally responsive AAC solutions is the lack of expertise and knowledge in the speech language therapy population. Māori are under-represented in this population: in 2020, 4% of registered speech language therapists identified as Māori, compared to 16.5% of the population (Eustace et al., 2023). Few speech language therapists have significant skills in te reo Māori, or an in-depth understanding of te ao Māori (Māori worldview) (Collin Stone, 2019). Whilst it is possible to offer parents of Māori children supportive services that uphold values such as collaboration and self-

determination when introducing AAC, currently the AAC systems available are not developed for Māori, in language, vocabulary, symbol use, or layout. The TalkLink Trust, the major provider of AAC services in Aotearoa New Zealand instigated a national survey in 2022 to canvas the opinions of Māori AAC users and their whānau about the development of te reo Māori AAC, which may start the process of this important work.

Communicative Functions and AAC

Children's use of communicative functions is an area that has often been overlooked in research relating to children with complex communication needs and the use of AAC, with many studies exclusively focusing on the communicative function of regulating behaviour, particularly making requests (Holyfield et al., 2017; Logan et al., 2017; Mirenda, 2008). This bias towards requesting, usually of highly preferred items, is particularly evident in research carried out with autistic participants (Holyfield et al., 2017; Iacono et al., 2016; Logan et al., 2017). However, children who use AAC to communicate need to be able to express a much wider range of functions than simply requesting if they are to achieve their full communicative potential (Light & McNaughton, 2014; Light et al., 2002).

Wetherby et al. (1988) outlined three main categories of communicative functions in young children: regulating behaviour, social interaction, and joint attention. According to their classification, communication that has the purpose of regulating the behaviour of others includes requesting objects, requesting actions, or protesting. Social interaction includes behaviours such as greeting, calling to get the attention of another person, or requesting another turn in a social game. Joint attention includes communicative behaviours such as commenting or asking questions. These are all important functions of communication that children need to be able to carry out using AAC if it is to remain relevant and motivating to them (Logan et al., 2017).

The inclusion of core vocabulary in an AAC system may support the use of different communicative functions. Fallon et al. (2001), in their work to establish a core vocabulary for pre-schoolers, noted that an initial vocabulary must be meaningful, motivating, functional, and should support a broad range of communicative functions. They suggested a robust core with fringe vocabulary for beginning AAC communicators. Dodd and Gorey (2014) described an intervention model to provide language teaching for children who use AAC, with a goal to increase communicative functions. In the discussion, they identified that an AAC system based primarily on fringe vocabulary restricts children to mostly requesting and proposed that making core vocabulary available will allow a child to communicate for a variety of purposes.

Adamson et al. (1992) studied 12 young people with intellectual disabilities over the course of 2 years. Initially, their AAC devices contained only nouns, but as the time progressed, other symbols were added. The researchers described these symbols as ‘social-regulative’ symbols; many of them were core vocabulary words. Adamson et al. observed an immediate change when these symbols were added and taught to the participants. The young people started to use a range of communicative functions that had previously been unavailable, due to the sole presence of nouns in their systems. The young people did not communicate more frequently after the core words were added, but they were able to express a wider range of ideas, including greetings, feelings, affirmation and denial, and politeness markers.

Whilst a larger vocabulary that contains a range of word classes is important for the development of different communicative functions, so are the teaching strategies that are used with children who use AAC to communicate. In Dodd and Gorey’s intervention, not only did the children have access to a robust vocabulary, but they were also exposed to adults who modelled a range of communicative functions using their AAC systems. Another case

study by Cafiero (2001) observed that the child copied different communicative functions when these were modelled by the adults around them. Chavers et al. (2021) found that prompting was a useful teaching strategy for encouraging autistic children to use AAC for social purposes. Bourque and Goldstein (2020) carried out a study that taught children to use modelling and prompting to encourage their autistic peers to communicate. This led to the autistic children using their AAC devices to communicate beyond simple requesting.

Layout, Design, and Motor Planning

The design and layout of an optimal AAC system for children with complex communication needs has been the subject of debate for several years within the scientific literature (Light et al., 2004; Light et al., 2019; Wilkinson & Jagaroo, 2004). Some experts in the field advocate for systems that present consistent symbols fixed in place, usually in a grid formation and preferably unchanging over time in order to increase the role of motor planning and memory (Halloran & Halloran, 2006; Van Tatenhove, 2009). Other AAC experts feel that early symbolic communicators need a different approach and benefit from contextual information provided by visual scene displays such as line drawings or photos that contain familiar items and situations (Drager et al., 2003; Light et al., 2004; Light et al., 2019). AAC systems that integrate larger amounts of core vocabulary, particularly low tech versions, almost always favour a grid layout (Zangari, 2013).

Children who use AAC ideally need to learn the location of all the symbols on an AAC system to use it to its full potential. Boenisch and Soto (2015) suggested that one benefit of core vocabulary is that it is stable and unchanging. This means that it is usually displayed consistently on an AAC system, helping with fluency and automaticity through learned motor plans. This should benefit both the AAC users and their communication partners when they are modelling (Dukhovny & Gahl, 2014; Halloran & Halloran, 2006).

The role of motor planning when accessing a core vocabulary that is fixed in position is worth considering further. The communication partners of a child who uses AAC can often feel daunted by the larger vocabulary sizes associated with an AAC system that uses core vocabulary (Jonsson et al., 2011). However, the stability of core vocabulary words that do not change over time provide the benefit of specific motor patterns associated with accessing familiar, high frequency symbols or word combinations. This ability to learn motor patterning is exploited by AAC apps such as LAMP Words for Life, which helps children build up a repertoire of specific motor patterns to access a stable, core vocabulary alongside fringe words that can be personalised (Bedwani et al., 2015). Children using this app to communicate eventually learn a series of unique motor plans, one for each word that they access, with the idea that visual scanning and recognition of individual symbols will be unnecessary for many of the high frequency words (Halloran & Halloran, 2006).

Van Tatenhove (2009) also supported the importance of motor skills and the development of automatic patterns. In her manual for the Pixon Project, which relates to core communication boards, she highlighted how, through repetition of use, children can learn a range of phrases without having to seek out and find individual symbols through visual recognition. In addition, Thistle and Wilkinson (2015), proposed that consistent location and motor planning play an important role in learning to access a symbol on an AAC system alongside symbol recognition. These ideas of consistency in motor plans on AAC systems over time are somewhat at odds with the idea that early symbolic communicators require a specific, developmentally appropriate vocabulary displayed in contextually relevant pictures, as suggested by Drager et al. (2003) for example, as this layout would presumably have to change as the child requires more language, requiring the learning of different motor plans.

Many AAC systems that employ a grid format, use an adaptation of the Fitzgerald Key, a colour coding of grammatical functions that was originally used with deaf children

(Thistle & Wilkinson, 2009). Wilkinson et al. (2022) considered design features of grid based AAC systems in a recent study involving 10 people with Down Syndrome. Their results suggest that background colours on symbols can help with visual location. They also found that having space between symbols was helpful for faster and accurate visual location, but this would come at the cost of vocabulary size due to space limitations in low tech AAC. They acknowledged that this feature may be mitigated as a person becomes more familiar with the layout of an AAC system.

Bean et al. (2019) acknowledged that some children may find the presence of many symbols distracting initially, and questioned whether masking symbols could be an effective way to deal with this. This would allow for just the target symbols to be displayed in the grid, until the child gains more confidence and competence with their AAC system. The authors present case studies of children using LAMP Words for Life, which has a large core and fringe vocabulary that can be masked while the child is learning. This method provides access to a large vocabulary over time with symbols that stay in place for the learning of consistent motor plans.

In summary, the process of choosing and organising the vocabulary for an AAC system for beginning communicators is complex and involves many factors, some of which seemingly conflict with each other. The vocabulary needs to be developmentally appropriate, but also contain language for communication partner modelling and for learning. A variety of word classes will allow for a range of communicative functions and the development of grammar and word combinations, but this may also overwhelm an early symbolic communicator. Colour coded, grid-based layouts with consistent vocabulary that does not change over time will allow the development of automatic motor plans but will also provide vocabulary that is not required initially in a format that may be inappropriate for very young

learners. There are often additional factors relating to cost, availability, and professional knowledge.

The 77-cell core board with fringe vocabulary used in this study is used widely across Aotearoa New Zealand as a beginning AAC system. It has the core words arranged on a grid system grouped together with colour coding according to grammatical parts of speech. The core symbols are fixed in place and do not change over time. The extensive fringe vocabulary is attached at the top of the board in layered strips organised by semantic categories, with tabs to help with navigation. The fringe vocabulary was personalised over time for each family in this study. This layout allowed for the learning of motor plans for the high frequency core words on the main board but did mean that access to fringe vocabulary could be slow and inefficient.

Opportunities for Further Research

The use of AAC interventions, particularly with children with complex communication needs, is a challenging research area because of the heterogeneity and low incidence of the population involved (Light & Drager, 2007). One of the most commonly identified areas for more research is the use of communication partner strategies across a wider range of activities and routines in a variety of naturalistic contexts (Binger et al., 2010; Kent-Walsh, Binger, & Malani, 2010; Rosa-Lugo & Kent-Walsh, 2008). Other authors (Light & Drager, 2007; Nunes & Hanline, 2007; Shire & Jones, 2015) have highlighted the need for further research involving pre-school children who use AAC, and particularly children who have had no prior experience of AAC. In their systematic review, Shire & Jones only found two studies that included children with no prior AAC use. Light & Drager stated that future research needed to look at better support for parents implementing AAC systems with young children and beginning communicators.

Fried-Oken and More (1992) identified that more research was needed to validate the use of core vocabularies in AAC systems. They pointed out that research was still required to determine whether core vocabulary words are truly important for children with complex communication needs, via a process of social validation. This might involve getting the AAC users or their communication partners to rate the words available on their system, or measuring the number of times that core words are used over a set time. More recently Light et al. (2019) identified that the research is still sparse for AAC systems based upon core vocabularies. Thistle and Wilkinson (2015) also highlighted the lack of research in this area, pointing out that although there is a solid body of research describing the typical vocabulary development and core vocabularies of a range of children, there has been no direct research to look at the effects of providing core vocabulary on the language development of children who use AAC to communicate.

Future studies also need to report more thoroughly on maintenance and generalisation of the strategies learned, particularly over longer time frames (Kent-Walsh et al., 2015; Schlosser & Lee, 2000; Shire & Jones, 2015). Systematic reviews have also highlighted the need for researchers to present more information about the exact training procedures and methods used in their interventions (Biggs et al., 2019; Logan et al., 2017; Roberts & Kaiser, 2011; Wright & Kaiser, 2017). Other reviewers (Shire & Jones, 2015) have requested more information about the effects on the child's use of spontaneous communication and communicative functions after intervention. Ganz et al. (2012) and Logan et al. (2017) both identified that the majority of AAC interventions in the studies they reviewed focused solely on requesting as a communicative function, and appealed for future researchers to look at a wider range of communicative functions, particularly in relation to autistic children.

Literature Review Summary

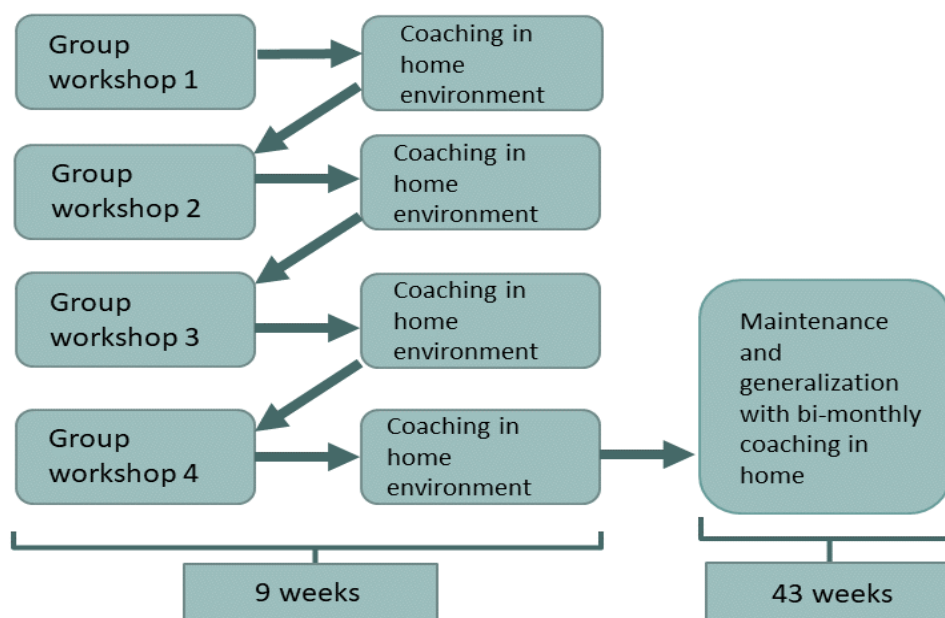
This literature review started by examining the evidence for the use of AAC in early intervention. There is strong evidence that AAC is beneficial to the development of communication skills in young children with complex communication needs, which is why pre-school children were the focus of this intervention. The review considered the factors required for successful implementation of AAC and found that involvement of key communication partners is extremely important. The literature about parent training and coaching was considered in detail, and this helped to inform the design of the EP-AAC intervention used in this study. This study is centred around a comprehensive training and coaching intervention for parents, using collaborative, family-centred coaching based on the evidence provided in the current literature. Next, the strategies required to support AAC were explored; the evidence from this analysis formed the basis of the instructional content of the intervention in this study. The review then moved on to consider the complex and sometimes conflicting evidence relating to AAC systems, both vocabulary and design. This information is relevant to the choice of AAC system used in this study. Finally, the review described the gaps in the current research in these areas. Having considered this body of literature, I used the information to form a research design that would address many of the areas that are lacking in research, and I designed an AAC intervention that was grounded in evidence. The next chapter will describe this intervention in more detail.

3. The Empowering Parents for AAC (EP-AAC) Intervention

This chapter will provide a detailed description of the intervention that was designed and carried out during this research. This was the activity around which each individual case study was based. This intervention, named *Empowering Parents for AAC (EP-AAC)*, was grounded in the literature reviewed in the previous chapter, particularly with reference to supportive AAC strategies, the role of parents in implementation, using a naturalistic approach, and coaching over a longer period. The EP-AAC intervention started with a more intensive 9-week training and coaching programme for the parents; this consisted of four group workshops and four coaching sessions. This was followed by an extended maintenance phase that continued to the end of a year, see Figure 3.1 below.

Figure 3.1

Diagram Showing Structure of EP-AAC Intervention



At the start of the EP-AAC intervention, each family received a 77-cell core board with a comprehensive, general fringe vocabulary. The parents were encouraged to complete lists for fringe vocabulary relevant to their child, so this vocabulary was fully personalised by the end of the first 9 weeks. One parent from each family then received training and coaching with the aim that they would learn a specific set of evidence-based strategies that they could use to help their child learn to communicate with the core board.

EP-AAC Workshop Presentations and Resources

This intervention provided four group workshops that were set up primarily for initial information sharing and instruction. For the workshop content, information from the current literature described in the previous chapter was combined with professional experience; this led to the inclusion of four groups of evidence-based strategies that have been found to support children to use AAC to communicate. These strategy groups were taught separately in workshops of approximately 2 hours each, delivered fortnightly over 8 weeks. The workshops were designed to be engaging and interactive, with a balance between information sharing, discussion, demonstration, practice and planning for home, which aligned with recommendations made by Trivette et al. (2009) from their research synthesis on successful adult learning methods. Each workshop concluded with time and support to write up an action plan for home practice, which formed the basis for the next coaching session. Refreshments were provided at each workshop, and there was a 20-minute comfort break halfway through. The content of each workshop will be presented in detail in the next sections.

Workshop Resources

At the start of the first workshop, all the parents received a folder to store paper resources in. These included a paper copy of each slide show, with space for note taking, a personal fringe list prompt sheet, and action plans. The personal fringe list had prompts in the

form of categories such as people, places, toys, activities, tv and movies, food. There were four action plans over the time of the EP-AAC intervention; these were customised for the four different strategy groups. Examples can be viewed in Appendix 2. Additionally, parents were asked to complete a home journal and core tally in between each workshop as part of the data collection for the study; these are described in more detail in the following chapter, in the section covering data collection.

Workshop One

The first workshop covered an introduction to AAC, information about core and fringe vocabulary and then introduced the first AAC strategy: aided language modelling (ALM). The workshop included time for introductions and for parents to get to know each other. The presentation contained videos of communication partners using the strategy of ALM with children. A distinction was made between general, ‘conversational’ modelling and targeted modelling (pointing to the symbols that the parent perceives the child needs in that moment); this was explained and demonstrated. There were two separate practice activities included so parents could try using the strategy. Towards the end of the first workshop, there was a slide that explained the coaching process, and after this the parents were supported to write their first action plan. Each parent also received a core board.

Workshop Two

This workshop covered a set of strategies named ‘creating opportunities for communication’. The workshop started with a recap of the content from workshop one, and a chance for parents to share how things had been going at home. The content for this workshop covered: using motivating toys or activities, using items that need assistance, withholding, giving choices, doing the unexpected, and people games. As before, it included videos that illustrated the strategies, and there were opportunities for the parents to practice

some of the strategies during role plays. The workshop concluded with support to write up the next action plan, with a focus on creating communication opportunities.

Workshop Three

This workshop covered the strategy of prompting and introduced the parents to the idea of a prompting hierarchy. The workshop started with a recap of the strategies introduced so far, and a chance to share good news or challenges. The workshop covered different types of prompts, when to prompt and when to model or wait, and included several videos and opportunities to practise. The workshop concluded with support to write up the next action plan, with a focus on prompting.

Workshop Four

This was the final workshop and covered the strategy group of responses: different ways to respond when a child uses AAC to communicate. As before, this workshop started with a recap of the strategies so far, and a chance to share news from home. The workshop covered three different ways of responding to children and provided guidelines for when to use each type of response strategy (see Figure 3.2). These strategies were demonstrated in videos, and the parents had opportunities to practise through role play. The workshop concluded with support to write up the fourth action plan, with a focus on response strategies. A summary sheet describing all four strategy groups was supplied; see Figure 3.3. The parents were also provided with the end of intervention survey to take away and complete at home. The four PowerPoint presentations for the group workshops can be viewed in the addendum under the headings EP-AAC Workshop 1-4.

Figure 3.2

Response Strategies

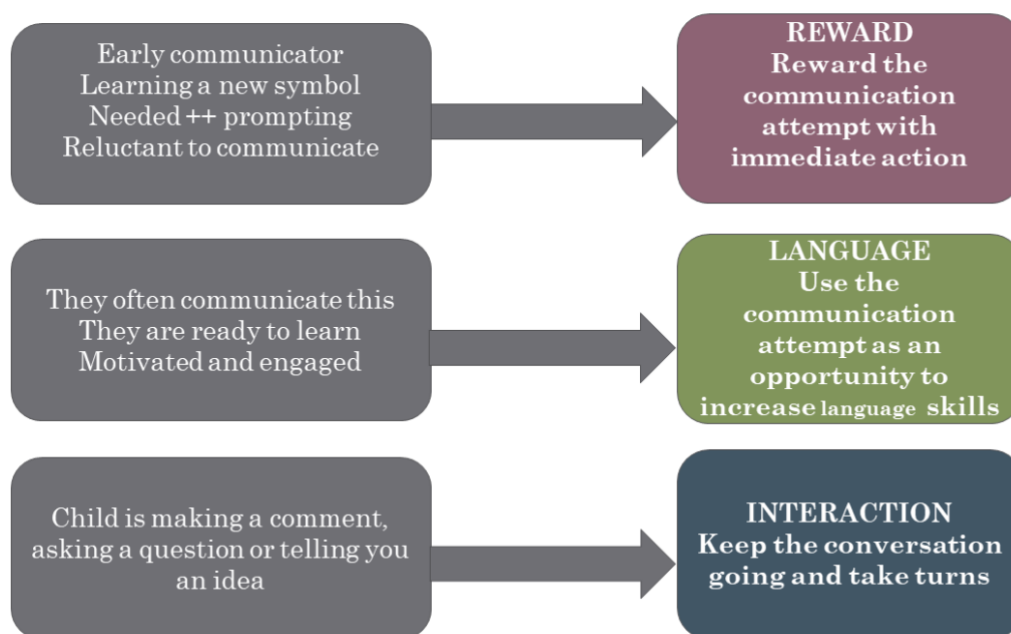


Figure 3.3

Strategy Summary Sheet

Workshop 1	Workshop 2	Workshop 3	Workshop 4
Aided Language Modelling: <ul style="list-style-type: none"> • Core vocabulary / fringe (4:1) • General modelling • Targeted modelling 	Creating opportunities for communication <ul style="list-style-type: none"> • Introduce motivating toy • Introduce motivating activity • Using items that need assistance • Withholding • Give choices • Doing the unexpected • People games 	Prompting <ul style="list-style-type: none"> • Expectant wait • Gesture • Question • Cue • Sentence completion • Verbal • Model • Physical 	Responding to communication <ul style="list-style-type: none"> • Always respond • Natural consequences • Repeat back and ACT • Repeat, correct and ACT • Expand • Prompt for more information • Correct word order • Show a different way • Take a turn

The AAC System

The 77-cell core board with fringe vocabulary used in this study is adapted from the original Pixon core board (Van Tatenhove, 2009), and is the standard core board used widely across Aotearoa New Zealand (Bell & Thomas, 2017). The core boards were provided to the parents with a strap so they could be worn across the body, and the fringe was attached at the top by split rings for ease of use. A masked core board simplified down to 12 pictograms was attached to the back. This was intended for use in the early stages of implementation if the parents were feeling overwhelmed by the amount of potential vocabulary to model. The parents were encouraged to bring the core board with them for each workshop for use in practice activities. The core board and masked core board used can be viewed in Figures 3.4 and 3.5 below.

Figure 3.4

The Core Board used in the Intervention



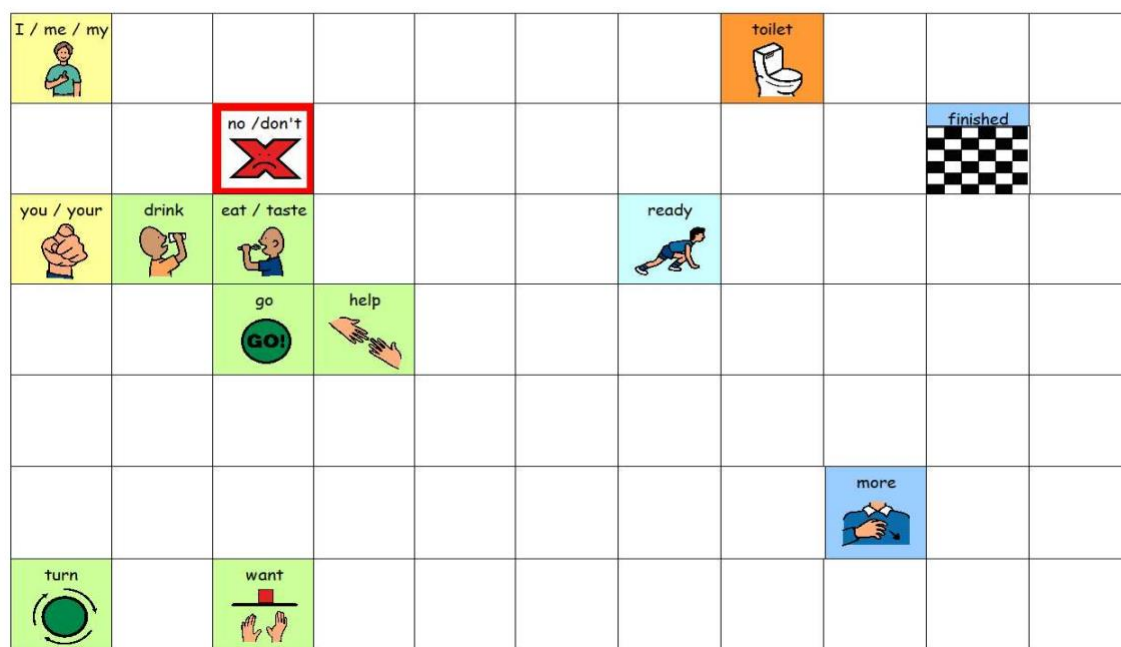
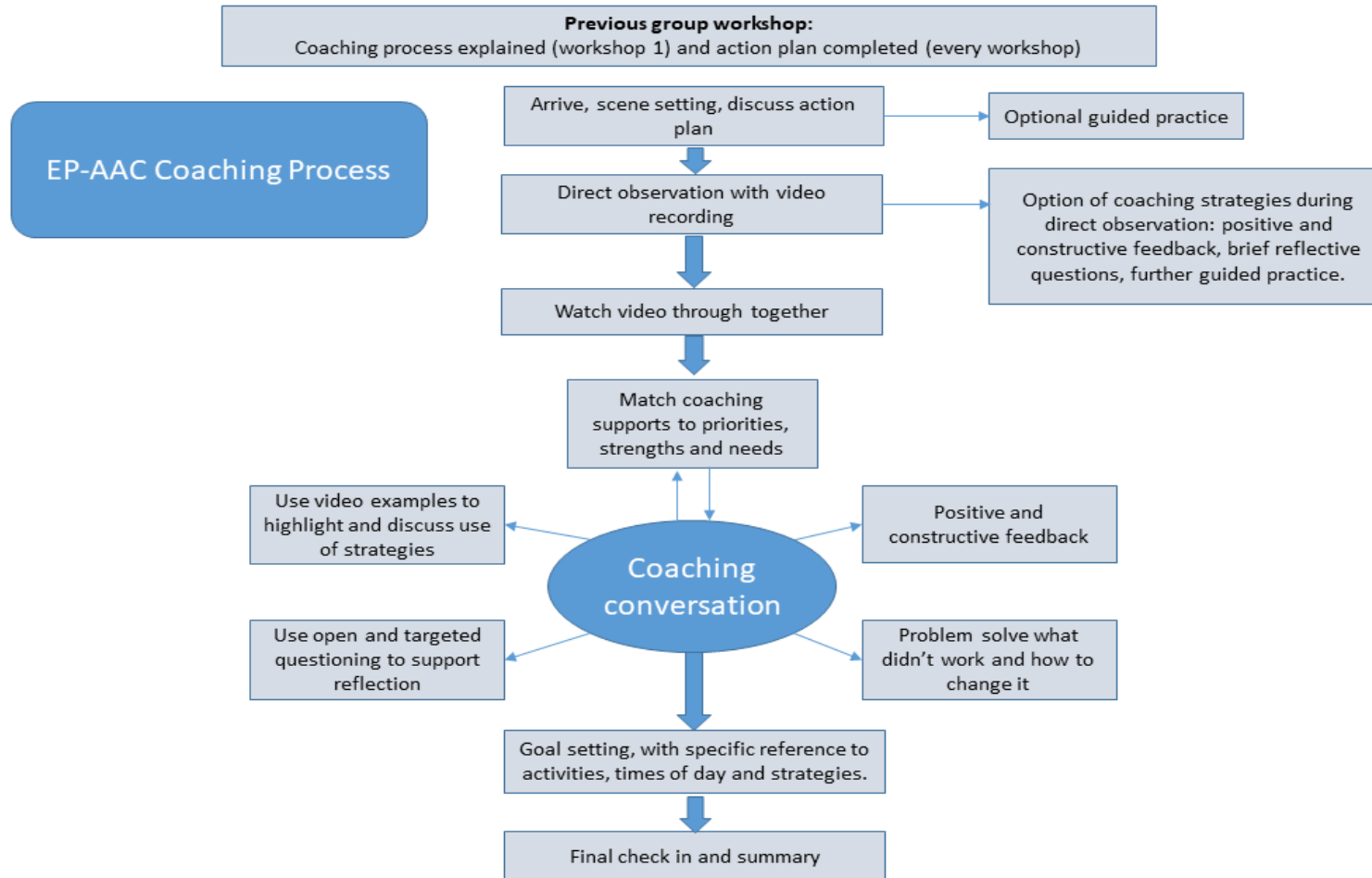
I / me / my 	it 	who 	what 	am / is are / be 	when 	be careful 	all 	some 	that 	this 
he / she 	we/ they/us 	not / don't 	come 	do / does / did 	again 	now / it's time 	how 	why 	finished all done 	problem 
you / your 	drink 	eat / taste 	feel 	get / got 	late / later 	ready 	all gone 	bad 	big 	clean 
give / gave 	go 	hear / listen 	help 	like 	where 	away 	cold 	different 	dirty 	fast 
look / see 	make/made 	open/close 	play 	put 	here 	there 	good 	happy 	hot 	little 
read 	say / tell 	sit 	stand 	stop 	in 	out 	more 	sad 	same 	sick / sore 
take 	turn 	wait 	want 	work 	up 	down 	on 	off 	silly 	slow 
yes 	1	2	3	4	5	no 	toilet 			

Figure 3.5*Masked Core Board***The EP-AAC Coaching Protocol**

Coaching was a central component of the EP-AAC intervention, providing an opportunity for parents to practise the new strategies with feedback. During the intervention phase, there was a coaching session either in the home or another preferred location within a week after each workshop. The parents completed the action plan for these coaching sessions at the end of each workshop, with support if required. Each coaching session focused on the strategy group that had been covered in the previous workshop, although other strategies may have been practised at the same time. During the maintenance phase, there was more flexibility about which strategies to focus on for coaching, and these coaching sessions often looked at integrating different strategies together, or generalising skills across a range of activities. An overview of the coaching process can be viewed in Figure 3.6 below.

Figure 3.6

Overview of the EP-AAC Coaching Process



The EP-AAC Coaching Protocol (Brydon, McLaughlin, et al., 2021) can be found in the addendum. The coaching protocol is unique to the EP-AAC intervention but is informed by the work and coaching models associated with Friedman and Woods (2012); Rush and Shelden (2011); Snyder et al. (2015) and Woods (2008). The protocol was also influenced by a workshop on the Practice Based Coaching approach (Snyder et al., 2015) held at Massey University and run by Associate Professor Tara McLaughlin, particularly around the way feedback was delivered, how the action plans were used, and the use of video reflection and feedback. The protocol provides a detailed set of instructions to ensure that the coaching process was replicated over all six cases and over time. Coaching is intended to be personalised, flexible, and to meet the needs of each individual parent; the protocol was designed to allow for variation and flexibility within a set framework. This framework included action planning, observation (usually video recording), reviewing the video whilst focussing on specific strategy use, positive and constructive feedback, reflective conversation, and problem-solving conversations.

It was anticipated that parents would arrive with different skills and abilities and have different needs during the coaching process. In anticipation of these differences, the coaching protocol addressed how to gauge the confidence and awareness of the parents at the start of each coaching conversation, and then adapt the responses; see Table 3.1 below for examples. This insight aimed to shape the response of the coach and tailor the coaching in terms of how much positive feedback was required in comparison to constructive feedback, and also the specificity of the questions to be used (Conklin et al., 2018; Kaiser et al., 2007; Rush & Shelden, 2011). The term confidence in this situation referred to how the parent was responding to the coaching process, including being observed and receiving feedback. If they appeared to be anxious or hesitant, this might indicate lower confidence, and the coach would respond with higher levels of positive feedback. Awareness referred to their ability to

articulate the strategies they were working on and their ability to accurately assess their performance after reviewing the video. This is explained in more detail in the EP-AAC Coaching Protocol in the addendum.

Table 3.1

Examples of Different Ways to Adapt the Coaching Conversation According to Parent Confidence and Awareness

	Higher levels of awareness	Lower levels of awareness
Higher confidence	<ul style="list-style-type: none"> • What strategies could you see yourself using? • How engaged was X? • Which strategy did you feel was the most effective at getting X to communicate? 	<ul style="list-style-type: none"> • Have a look at the list of strategies here, and now watch this section. What strategies do you see yourself using in this clip? • Have a look at how X responds here. What does he do? I think if you had (name strategy), he might have ...
Lower confidence	<ul style="list-style-type: none"> • What strategies could you see yourself using during the video? • I like the way X responded to this. What was it about this activity that engaged him so well? 	<ul style="list-style-type: none"> • In this section of the video (play it), I see you using these strategies • Look how you moved the core board towards X there. What effect did that have?

Summary

This chapter has provided a detailed description of the EP-AAC intervention, which included the provision of a core board for each family, with supportive training and coaching for one parent from each family. This intervention was the activity around which each case was based. The next chapter will describe the methods and materials used in this research study.

4. Methods

“Its reasoning should not form a chain which is no stronger than its weakest link, but a cable whose fibers may be ever so slender, provided they are sufficiently numerous and intimately connected.” Charles S. Peirce in Roberts (1978)

The above quote was selected because it illustrates how multiple data sources were gathered during this research, and then woven together to enable the telling of six detailed case studies. The selection of the methods and materials used to structure and implement this research study will be described in detail in this chapter. The chapter will start by introducing the four research questions, then describe the research design, rationale, and underpinning theory. There will be an overview of the full study, followed by details about how the study was planned and carried out. The methods of data collection and the materials used will be described, followed by information on the process of data analysis.

Research Questions

This study set out to answer the following four research questions:

1. What are the individual experiences of each family as they participate in the journey of introducing a core board with their child?
2. What are the effects of a comprehensive training and coaching intervention on parents' use of communication strategies to support their child to use a core board?
3. What are the effects of the introduction of a core board, combined with parent training and coaching, on the communication skills of pre-school children with complex communication needs?

4. What factors influence the success of implementing a core board as an AAC system for pre-school children with complex communication needs?

Overview of the Research Study

This research employed a mixed methods multiple case study design. Both quantitative and qualitative data were collected over the period of a year. The quantitative data collection sought to measure the effects of the EP-AAC intervention on the parent and child. The intervention components were the simultaneous implementation of 1) the training and coaching intervention for the parents and 2) the introduction of a core board as an AAC system for the child. The quantitative data provided a means to measure the outcomes, which were 1) the parents' use of the strategies they were taught, and 2) the children's communication behaviours in relation to the core board or spoken language. The qualitative data contributed to an understanding of what helped to make the implementation of AAC successful or not, and to describe the journey for each family as they engaged with the intervention.

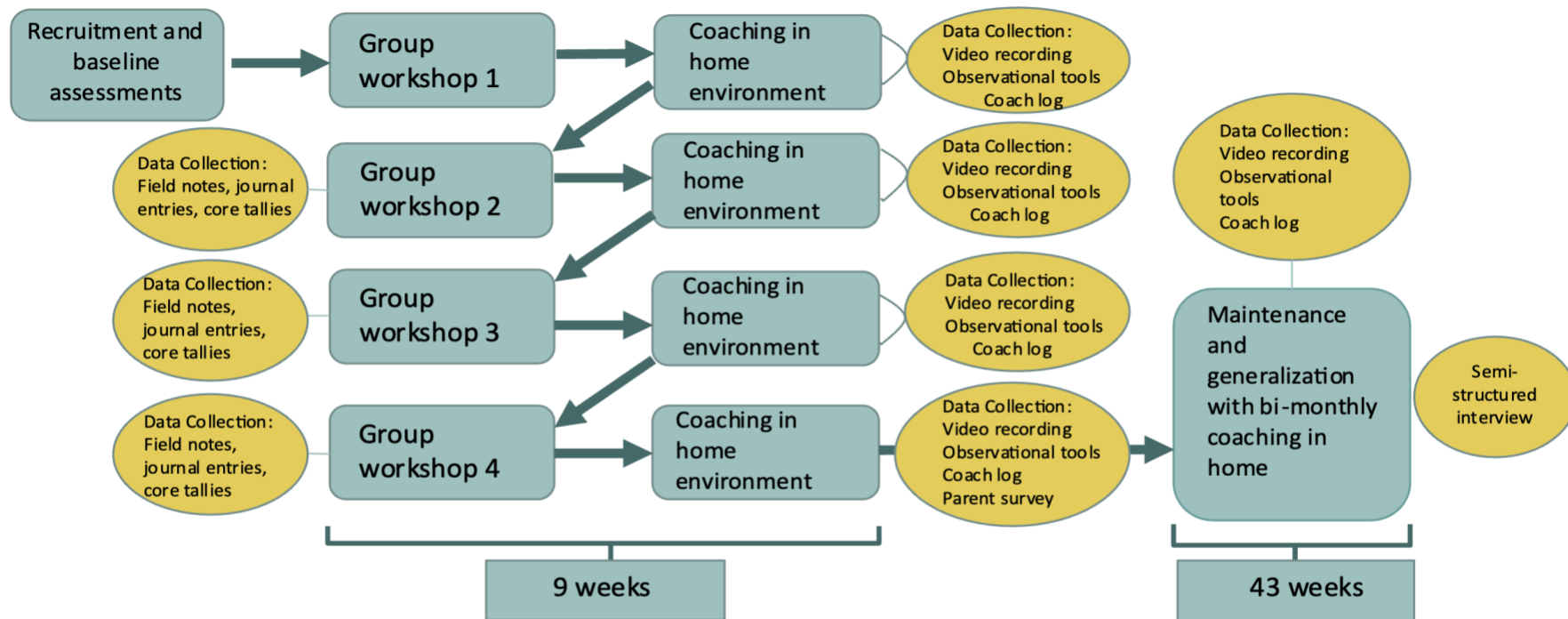
I selected this approach because the focus of the present study required a research design that would capture, explore, and explain a complex event: a parent supporting a child to learn how to communicate with a symbol based AAC system. This research set out to answer a diverse range of research questions that required an in-depth, holistic approach. Using this research design would enable the gathering of data from multiple sources over an extended period to produce a nuanced account for each case. As described in the introduction, an experimental design was originally considered, but then discounted due to the limited focus that it would bring to this complex topic. A mixed methods multiple case study design would enable the combination of many strands of data to produce detailed case studies, alongside an intervention that sets families up for success (Plano Clark et al., 2018).

Figure 4.1 below is a diagram that illustrates the key components of the main study. As can be seen in the figure, the study was conducted over the course of a full year and included baseline, intervention, post-intervention, and maintenance phases. Six pre-school children with complex communication needs and their parents participated in the EP-AAC intervention during the main study, which involved a 9-week intervention phase followed by a 43-week maintenance phase lasting until the end of the year. Quantitative and qualitative data was collected throughout the study year, starting at baseline.

To ensure the EP-AAC intervention was fit for purpose, it was developed following a thorough review of the literature. After the EP-AAC intervention and data collection materials were created, they were trialled in a small pilot study involving two parent and child dyads. Feedback and experience from the pilot study allowed for further development of these materials. Following on from the pilot, the main study (as outlined above) was conducted. Further details about case study design, the EP-AAC intervention and data collection materials, pilot study, and main study are presented in the sections that follow.

Figure 4.1

Overview of Key Components of Main Study



Case Study Research Design

Case study research allows the understanding of a phenomenon in its real world context, and is particularly suitable when there are many variables of interest, as in this piece of research (Yin, 2014). Gerring (2017) proposed that case studies can be rigorous, systematic, replicable, and the results can be generalised. Simons (2009) emphasised that case studies can and should be rigorous: “It is research-based, inclusive of different methods and is evidence led” (p. 10). Carrying out a multiple case study offers the opportunity for replication of methods and results and further increases the rigour of the findings (Yin, 2014). Case studies often involve the collection of detailed information over a longer time period (Creswell, 2014), which in this study allowed for the continued collection of data over an extended maintenance phase. Case studies also allow for an in-depth study, using multiple data sources and mixed methods data collection and analysis (Creswell & Plano Clark, 2017; Gerring, 2017). Following these principles ensured that this study captured more information about each case and allowed for triangulation of results from different data sources, leading to a more comprehensive and nuanced description of each case.

In case study design, “Cases are bounded by time and activity” (Creswell, 2014, p. 14). This is a multiple case study design with six individual cases. Each case is an in-depth study of one parent-child dyad. The activity for each case is the introduction of a core board to be used for communication by the child, alongside a training with coaching intervention for each parent to learn skills to support the child to use the core board: the EP-AAC intervention. The time for each case is one year; the first 9 weeks covered the introduction of the core board and a training and coaching intervention for the parent, and the rest of the year covered maintenance support through personalised coaching. The borders of each case started

with the case history taking and baseline assessment at the start of the year and finished with the semi-structured interview at the end of the year.

This case study used mixed methods data collection and analysis. Both quantitative and qualitative data were collected throughout the duration of the study, and the results and analysis were then used to provide in-depth evidence for comparative analysis (Creswell & Plano Clark, 2017). Mixed methods research is underpinned by the theory of pragmatism, which supports the belief that a valid design is one that works in a particular context and will also provide benefits to the participants. Johnson and Onwuegbuzie (2004) explained that pragmatism places a high regard for the reality of human experience, and therefore supports a naturalistic and flexible approach to research that align with my own values when approaching this research, as described in the introduction. Combining the flexibility of mixed methods and the in-depth nature of case study research has provided unique methodological advantages to address the complexity of the research problems and issues (Plano Clark et al., 2018).

Learning to communicate, either using spoken language or AAC, is a deeply complex event that requires examination from many and varied perspectives (Light, 1999). The families in this research were very diverse but had one thing in common: their children had complex communication needs. The children were either not speaking or were using very little spoken language at ages three or four, but that is where their similarities ended. They had different diagnoses, different home environments, different day care arrangements and very different personalities. Their parents were equally diverse. This study required a research design that was rooted in pragmatism, allowed for flexibility and change, whilst remaining rigorous and replicable. A mixed method, multiple case study allowed the flexible structure that provided a positive and supportive experience for the participants as well as

capturing the rich detail and nuance involved when a young child learns to communicate using AAC.

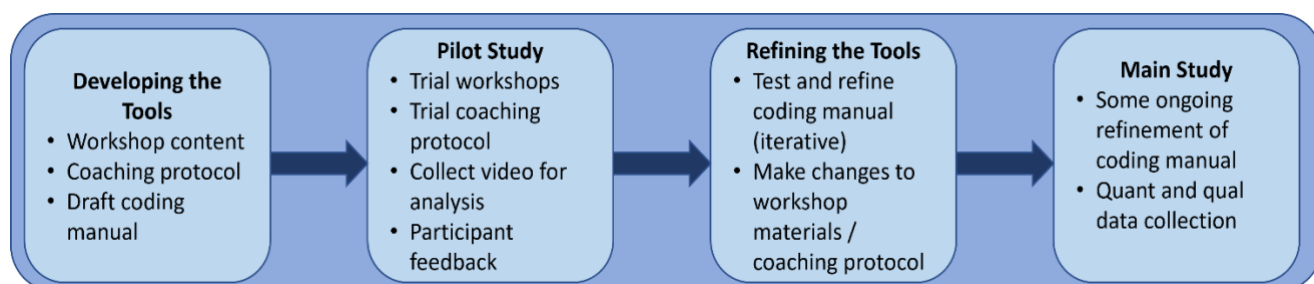
Preparation and Development of the EP-AAC Intervention, Resources, and Data

Collection Tools

The materials used for the EP-AAC intervention and data collection in the main study were developed, tested, and refined over a period of 18 months. This required the development of the group workshops and accompanying materials. A coaching protocol was developed, as well as a systematic observation coding manual to ensure accurate coding of the quantitative data. Once these materials were drafted and prepared, a pilot study of the EP-AAC intervention was carried out and the materials were tested and refined after this. The entire process of development is outlined in Figure 4.2 below.

Figure 4.2

Development of the Tools and Resources for the EP-AAC



The Pilot Study

The pilot study was intended as an opportunity to trial the EP-AAC intervention (without the maintenance phase), including the four workshops with two coaching sessions, alongside the second survey, paper resources, coaching protocol, and the observational tools for coding. The participants for the pilot study were recruited from the special school where I was working at the time and consisted of two parents of children in the new entrant class who had complex communication needs. The parents attended four workshops at school and

received two coaching visits at home. One family had to drop out of the intervention halfway through due to other commitments. They attended three of the workshops and had one coaching session in total.

At the end of the intervention, both parents completed the second survey, which collected information about the usefulness of the workshops, the coaching sessions, and the supportive strategies that they had learned. This provided useful feedback which allowed for improvements in the content and timing of the workshops as well as the resources provided. It also allowed for a practice run of the four workshops which gave valuable information about clarity of content and timings. The in-home coaching sessions provided a trial for the coaching protocol and the action plans. Video footage was obtained from the coaching sessions which was used for refining the systematic observation measurement tools and used as examples in the main study EP-AAC workshops (with the parents' permission).

The Main Study

Recruitment of the Participating Families

Participating families were recruited from the waiting list of one specific region of the Ministry of Education. After permission was gained from the Ministry's Wellington head office to approach the regional office, I initially met with specialist team leaders to talk through the project and provide information about what would be involved. Shortly after this, I made presentations to the speech language therapists and the early intervention teachers in the regional office to describe the study and give them a clear idea of suitable families for referral. Next, individual speech language therapists and early intervention teachers approached potential families, asked them if they would like to be involved and passed on the preliminary information sheets and consent forms produced for this purpose (Appendices 9 and 10). I was then provided with details of each potential family. Altogether, 12 families were referred as potential participants over a period of 5 months. After receiving each

referral, I contacted the family by phone and asked some screening questions, mainly to ensure that they had not had any prior AAC used with their child, and to check that the child had little or no spoken language. Of the 12 families who were suggested for the study, six were not suitable or decided not to participate. This left six suitable families for the study.

The six families who remained interested in participating were diverse across a range of factors. The children presented with different diagnoses, which was ideal for the purposes of this study. There were two girls and four boys. The families also had different cultural backgrounds. Table 4.1 below outlines some key features of the child participants.

Table 4.1

Key Information re Child Participants

Name (pseudonym chosen by family)	Sex	Age	Ethnicity	Parent (pseudonym chosen by family)	Diagnosis or Description of Difficulties
Blaine	M	3;6	NZ European	Emma	Very few words, severe speech difficulties
Grace	F	3;7	Māori / NZ European	Kate	Spina Bifida with complications, no spoken language
Eli	M	4;2	Samoan / Māori / Hawaiian / US	Sarah	Chromosome deletion and autism. Used some signs, no spoken language
Regan	M	3;7	Māori / NZ European	Ashley	Autism, a few spoken words
Tina	F	3;4	Indian	Puja	Global developmental delay, no spoken language
Dallas	M	3;11	NZ European	Jo	Very few words, severe speech difficulties

In all six cases, the mothers elected to be the participating parent in the study. Five of the mothers worked full time, and one mother (Sarah from case 3) was a full-time law student. All the children had both parents living at home at the start of the study year. Emma, the mother from case 1, was pregnant at the start of the study year.

Ethical Considerations

This was a complex and lengthy study that generated many points to consider in terms of ethics. My understanding of the nature of the ethical considerations evolved and deepened as the study progressed. This study demanded a high level of commitment from the participants over a considerable time, and even though it was made clear that they could leave the study at any time, the parents demonstrated a high level of investment in completing the research, even if it was challenging for them. Even after their involvement in the study was completed, it was necessary to maintain contact to check for video consents, and to provide them with drafts of the case studies for checking. I am extremely grateful to all the participants in this study for their persistence and investment in the research over what was a very challenging time in the middle of the COVID-19 pandemic.

Before the start of this study, I completed a full ethics application and gained approval from the Massey University Human Ethics Committee. A copy of the Human Ethics Committee approval letter is available in Appendix 14. This approval covered the considerations of informed consent, risk of harm, Te Tiriti o Waitangi, privacy and confidentiality, and conflicts of interest. These areas will be examined in more detail below.

Informed Consent. The children in this study were of pre-school age and had complex communication needs, so were not able to provide informed consent. Their parents were supplied with detailed information sheets at the start of their involvement (see Appendix

5) and given opportunities to ask further questions before signing the consent forms for both them and their children (Appendix 6). During the study, careful consideration was given to the children's observable communication. If they were showing signs of being distressed, uncomfortable or that they did not want to participate, this was responded to; the activity would be halted so that their needs could be met. For the most part, the children appeared to enjoy the increased opportunities to play and interact with their parents, but there were times when the parents were learning to use the strategies that the children appeared to be frustrated by the level of prompting or withholding used. This was addressed as soon as possible in coaching conversations and did not appear to cause any lasting harm to the parent / child relationship.

Risk of Harm. Overall, the parents expressed that they found the intervention provided as part of this study was supportive and beneficial, based on their survey and interview data. It helped to develop their skills and confidence and led to positive communication outcomes for their children. There were ongoing risks of fatigue and inconvenience which were addressed by offering home visits at any time during the week, including evenings and weekends, as well as keeping the focus on every day, naturally occurring routines. For one of the cases, there were times when the use of a core board appeared to contribute to tension between the parents. This was addressed by providing the family with information about other AAC systems that might work for their child, opportunities to leave the study, and by ensuring that coaching conversations happened in a separate room.

Some of the home visits occurred during a COVID-19 outbreak, so extra precautions were needed to ensure that home visits did not increase the risk of infection. Items in the observation boxes were sterilised between visits, and I wore a mask and practised good hand hygiene during these times. I contacted parents before each visit to check that no one in the

family was displaying any cold-like symptoms before visiting. I kept fully up to date with COVID-19 vaccinations.

Te Tiriti o Waitangi. Before starting the study, I read the Te Ara Tika Guidelines for Māori Research Ethics (Hudson et al., 2010) and sought advice and consultation with a cultural advisor through my place of work. The cultural advisor reviewed the recruitment process, intervention phase procedures, the content of the intervention, the documentation, and the data collection processes, to ensure that they were culturally sensitive and appropriate for the target audience. Three of my participating families described themselves as Māori alongside other cultural/ethnic heritages. During the baseline visit, I talked to them about the nature of the intervention, and whether the core board was a good fit for their culture. Although no concerns were raised at this time, it is worth noting that the core board used in this study is underpinned by western concepts around language. It is based on studies that have measured the core vocabularies in western populations, for example Banajee et al. (2003). There is currently no data available on a Māori core vocabulary, although there are moves to start this process. The presentation of the core vocabulary in a uniform, colour-coded grid is based on western ideas of syntax and semantics (Collin Stone, 2019; Fallon et al., 2003). The written text on each symbol is presented in English only. So, whilst the family centred approach used in this intervention was a good fit with the principles of Te Tiriti, the AAC system could not be described as culturally appropriate.

Privacy and Confidentiality. The research assistant involved in this study signed a confidentiality agreement (Appendix 8). Participants were de-identified on transcripts, written records, and then renamed according to their wishes on the presentation of findings to ensure confidentiality. All information gathered was stored securely. Consent forms and the code documents were stored separately from other documentation. While parents and children could be identified from likeness on video, all videos were stored securely on

password protected online storage files. All the parents had the opportunity to read their case studies to check they were happy with the amount of information given.

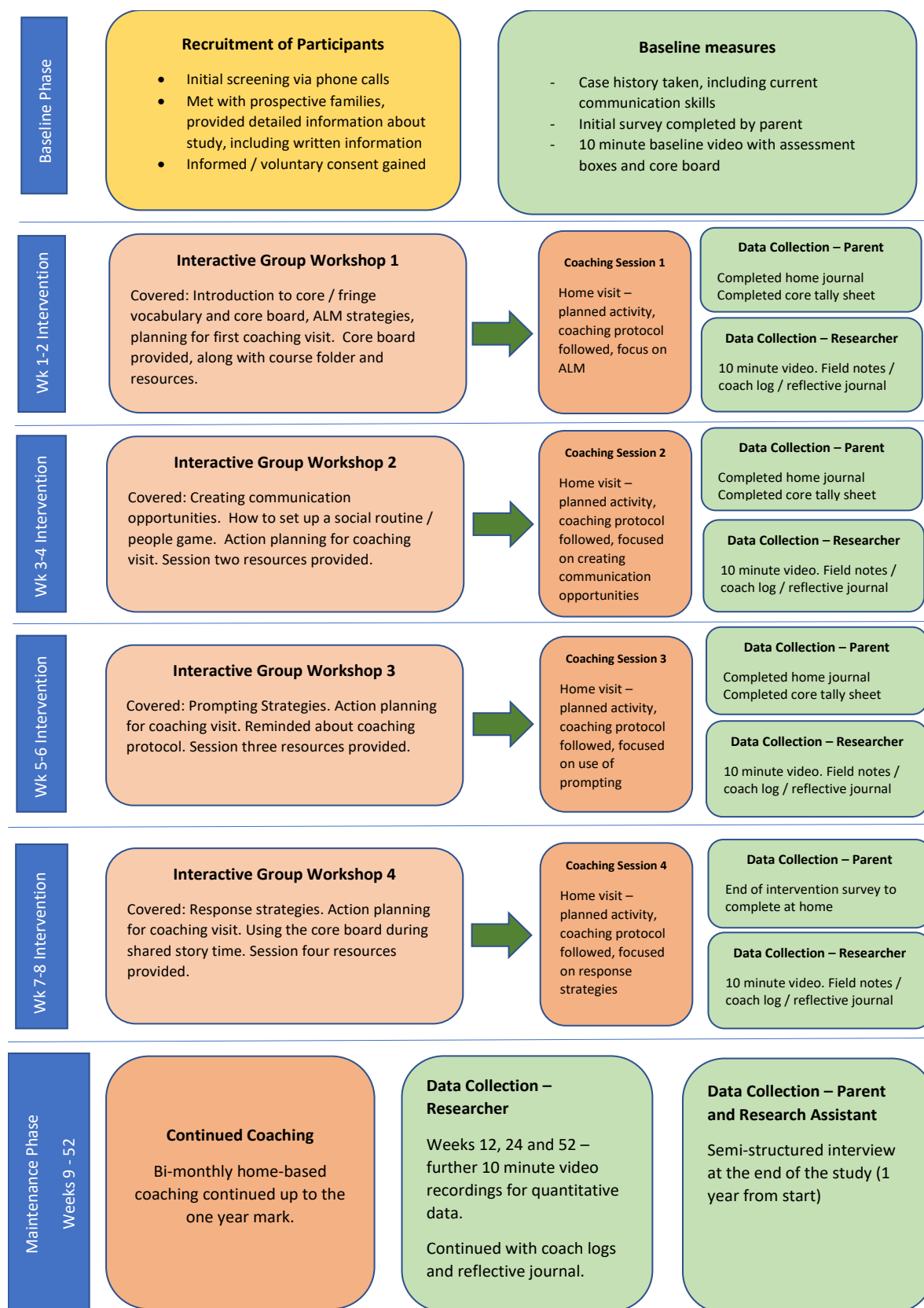
Conflicts of Interest. The participants were recommended to the study by the local Ministry of Education (MOE) office. The families were waiting to receive a service from a speech language therapist at the time. It was important that their participation in this study did not affect the provision of this service from MOE, and I discussed this beforehand when I met with professionals from MOE during the recruitment phase. During the intervention, speech language therapists were assigned to all the families from MOE. The speech language therapists were aware of my involvement and were in most cases keen to support it by providing a core board for the day care centres if needed as well as offering training to staff there. In all six cases, speech language therapy involvement was limited. I kept in touch with MOE professionals throughout the study to keep them informed about each family's progress, with the parents' permission. Two of the families planned to send their children to the school that I worked at. In anticipation of this, I removed myself as the speech language therapist for the new entrants' class at the start of the study. In the event, I had terminated my employment at the school by the time the children started there. There were no other conflicts of interest identified.

Main Study Preparation and Baseline Visits

Following an initial phone call made for screening purposes, I arranged a time to meet the families at home to describe the intervention in more detail, share information sheets and sign consent forms (Appendices 5 and 6). The baseline visits followed in the 2 weeks before the start of the intervention phase and were the first opportunity for data collection, including the case history interview, the initial survey and the first systematic observation. These are described in detail in the data collection section. Figure 4.3 below shows a detailed overview of the main study.

Figure 4.3

Overview of the Main Study, Including Data Collection



Intervention Phase of the Main Study

The core board was provided to each family at the start of the EP-AAC intervention. The parents attended four group workshops and had four coaching sessions in the home, or at a place of their choice. Multiple sources of quantitative and qualitative data were collected throughout.

End of the Intervention Phase

The intervention phase concluded after four workshops and four coaching sessions. By this time, there had been five systematic observations, including the baseline observation. The parents were supplied with the second survey to complete at the end of the intervention phase. This is described in the data collection section below.

The Maintenance Phase

After completion of the intervention phase, individual coaching continued until a year had passed from the start of the intervention. Coaching was delivered on a bi-monthly basis and focused on parent led goals and practice of strategies in routines of importance to the family. The child participants in this study were going through a period of rapid development and change, and the intervention introduced several strategies to be used over a range of contexts and routines, so ongoing coaching was necessary to support maintenance.

During the maintenance phase, COVID-19 reappeared in Aotearoa New Zealand, and there were many disruptions during this time. The families involved in the research also experienced life events such as birth, marriage, bereavement, separations, and a house move. There were some disruptions to the timing of coaching sessions due to COVID-19, and the 6-month systematic observation took place later than planned. All the families remained in the study until 8 months, and five families maintained their involvement until the end of the year.

The maintenance phase concluded with a final systematic observation visit, and then a semi-structured interview. This will be described in more detail in the next section.

Data Collection

This section will describe the process of data collection in detail. This study used multiple sources of data, which allowed for data triangulation and strengthened the understanding of each individual case (Yin, 2014). Implementation and data collection ran concurrently throughout the study. A decision was made to not carry out any direct assessment with the children at any point during the study, as this study aimed to empower the parents to carry out the intervention themselves. I was concerned that carrying out assessments on the children at the baseline visit might have had the consequence of setting me in the role of ‘communication expert’ in the eyes of the parents, so I relied on a detailed case history instead. Table 4.2 below summarises data collection sources.

Table 4.2

Data Collection over Course of Study

	Parent-Data	Child-Data	Researcher-Data
Quantitative Data	<ul style="list-style-type: none"> • Systematic observations of parents’ use of strategies • Core / fringe tallies • Scaled questions in second survey 	<ul style="list-style-type: none"> • Systematic observations of child communication behaviours 	

Qualitative Data	<ul style="list-style-type: none"> • Case history interviews • Initial survey • Home journals • Open questions in the second survey • Semi-structured interview 		Field notes in the form of: <ul style="list-style-type: none"> • Coach logs • Reflective journals • Workshop notes • Communication data
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The Systematic Observations

The main quantitative data collection in this study took the form of systematic observation followed by count coding as part of the analysis (Yoder & Symons, 2010). The observational data was collected in the form of 10-minute video observations of the parent and child interacting in their home environment. Recording the observations allowed for multiple pass coding, which was necessary as it was a complex coding system. There were eight of these recorded observations for each family during the study, one at baseline, four during the intervention phase (spaced 2 weeks apart) and three in the maintenance phase at 3 months, 6 months and 1 year. Parents were made aware of the general behaviours being observed from the start. The purpose of these data collection observations was to obtain quantitative information about the parents' use of AAC strategies, and the children's communication behaviours in terms of core board use and their use of spoken language.

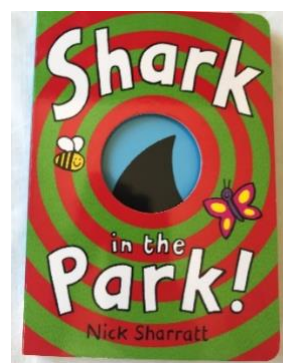
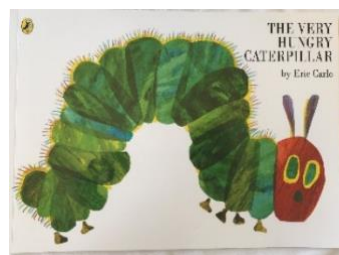
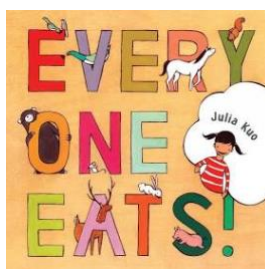
Although this study aimed for high ecological validity by carrying out the observations in a natural setting (the home), during a normal routine (play or snack time), and with a familiar communication partner (the parent), several steps were taken to ensure that the observations also allowed for optimal conditions to increase the reliability of the results

(Yoder & Symons, 2010). This meant addressing issues of consistency and stability, which can be hard to achieve in a home environment with a young child. Parents were made aware from the start of their involvement that they would need to have a quiet area in the house for these recordings and have an additional person on hand to look after any other children. When each data collection visit was planned with the parent, consideration was made for the time of day, whether the child would be tired or hungry and whether support would be available. It was planned that if the child was distressed or uncooperative, the data collection would be postponed. In the event, this was never necessary, although on some occasions the child needed a little time to settle before the recording began.

Whilst the coaching sessions gave parents the opportunity to try using the strategies in any environment and in any daily routine, the data collection observations needed to be more tightly controlled to maintain consistency over time (Yoder & Symons, 2010). It was intended that the parents would carry out a similar activity with their child every time over the eight observations. For this to be successful, the activities needed to be highly motivating to keep the child reliably engaged for 10 minutes. This led to the development of two observation boxes prior to the study year. Originally it was intended that each parent would select one of the two boxes and stick with this box over the study year, but it transpired that items were mixed across boxes according to child preference. The two boxes were transparent storage containers and contained items that are often highly preferred by pre-school children. The first box contained toys and books and the second box contained favourite snacks, drinks, and books. The toy box contained a range of fun toys, including some that were likely to require help from an adult and some toys that were more suited to imaginative play. The snack box had favourite foods and drinks that were personalised to each child, and presented in containers that were difficult for children to open. Figure 4.4 below illustrates some of the items contained in the two boxes.

Figure 4.4

Examples of Contents of Observation Boxes



Over the course of the study, all six children developed a high regard for these boxes, which they only had limited access to. They proved to be highly motivating for all the children and therefore contributed to the unexpected outcome that I was able to obtain uninterrupted, 10-minute video clips on nearly every data collection visit across all six cases. Over the course of the year, the items in the boxes remained the same, although food and drink changed according to the current preferences of the children.

For the baseline data collection, both boxes were made available to the parents, and a core board was laid on the floor near the parent and child as they explored the boxes. The parents all had the option to examine the boxes beforehand, and pre-select what they wanted to make available to the child, but five out of six of them allowed their children to explore both boxes without restriction. By data collection one (DC1), most parents had started to request that only certain items were made available. By later data collection visits, parents usually made requests ahead of time about what they wanted to have available, and these items were then combined into one storage box that parents had control over. Most parents were able to find a quiet space for data collection, with siblings removed and entertained. The exception was case 4, Ashley sometimes had Regan's younger sibling present during the observations.

For each data collection visit, the boxes were fully prepared according to the parents' requests, and the box would remain out of reach of the child until the recording began. At the start of the data collection visit, the environment was checked, including ensuring that the television was switched off, siblings were occupied elsewhere, and toys and distractions were put out of sight. Conversation before the recording was kept to a minimum and the recording would start as soon as both parent and child were ready. As the study continued, this was usually very soon after arrival, because the children were always keen to get access to the observation boxes. If the parents were using snack items, they had often ensured that the

child was hungry, so timing was of the essence. As soon as the parent and child started to interact with the box, video recording began. Once 10 minutes of video was obtained, with no breaks if possible, the parent was alerted that the time was over. The box would remain available, and the child was given warnings that the activity was going to finish to avoid any unnecessary distress. As well as the items in the boxes, the parents were also able to engage the child in people games during the observations, as this was a component of the strategy group 'Creating Opportunities for Communication'.

Case History

This was conducted at the baseline visit and played an important part in initial relationship building with the parent. There were specific questions and categories to cover (see Appendix 11) but it was conducted in an informal manner which allowed the parent to describe their child, tell stories and provide any information that they thought was relevant. Written notes were made as they talked; this interview was not recorded. The case history data provided information for the introduction of each case study and helped with planning for personalised advice during coaching sessions.

The Surveys

The initial survey was completed by the parent at the baseline visit. This collected information about factors that research has identified may affect the outcome of AAC implementation (Moorcroft et al., 2019b), including the child's diagnosis, parental level of concern, parental education level, family networks and supports, and parents' attitudes towards the core board at this time. This paper survey was designed to be completed quickly, and mainly consisted of short answer questions or a list of statements to be ticked if applicable. This survey can be viewed in Appendix 3.

The second survey was completed by parents after the intervention phase and sought to canvas their opinions about the core board and the intervention at that point. The first part contained 10 Likert scale questions, followed by some open-ended questions. The scaled questions canvassed the parents' opinions about the usefulness of the intervention including: the group workshops, the coaching, the individual strategy groups, the core board, their confidence and skills, and their feelings about their children's communication. The parents were asked to rate items on a five-point scale. Following on from the scaled questions were eight open questions which parents were encouraged to complete as fully as possible. The answers from these questions were added to the data from the interview for thematic analysis at the end of the study. This survey can be viewed in Appendix 4.

Core/Fringe Tally

The core/fringe tally was provided for parents to complete between workshops during the intervention phase. It was anticipated that this would not be accurate but would give a sense of the amount and type of symbols used by the child during the intervention phase and might help to highlight any discrepancies between observations and parent report. It was also intended as a way of reminding the parents to support the use of the core board between workshops. Each tally consisted of a paper copy of the core board with the pictograms removed (written label remaining). Parents were asked to place a tally mark in the square for a symbol every time their child used it on the core board. If the child used fringe vocabulary, parents were asked to write this on the back and then use tally marks next to the written word to record the number of times their child pointed to this symbol. Five of the six parents maintained these tallies, but it was observed that they sometimes completed them at the start of the workshops and noted that symbols were sometimes not tallied when their children had been pointing to them during either coaching sessions or data collection sessions. Therefore,

these tallies probably represented a rough approximation of the children's use of the core board over the time between workshops.

The Parents' Home Journal Records

During the time of the intervention phase, parents were asked to note down some reflections between the time of each workshop. This was a single sheet of paper with some prompt questions; the template can be viewed in Appendix 1. The parents were asked what had worked well, what challenges they encountered, what strategies they had used, and to describe a memorable incident. Part of the purpose of these journals was to add additional motivation to using the core board, but they also provided valuable information about what was happening at home during the intervention phase. Not all the parents completed these journals, and sometimes they were completed hurriedly at the start of the workshop. One parent found them particularly onerous and did not complete more than the first one.

Field Notes

A variety of field notes were kept during this study, including coach logs, reflective journals, and other ad hoc notes. During the time of the group workshops, notes and reflections were completed after each workshop to keep an accurate record of group dynamics, specific conversations that had occurred, whether any parents appeared to be struggling with the content in any way, reflections on my performance as a facilitator, and any changes that needed to be made. These reflections enabled the accurate recall of details for the case study write ups.

A detailed coach log was completed soon after every coaching visit. These were always completed on the same day of the visit to ensure accurate recall. If more than one coaching session occurred on a single day, the coach log was completed in the car between visits to ensure that details were not confused between families. The coach log template can

be viewed in the appendix of the EP-AAC Coaching Protocol (Brydon, McLaughlin, et al., 2021) in the Addendum. The coach log contained information about the length of the visit and how much time was spent on different activities, what the activity for observation was, the parent's apparent confidence and awareness levels, and detail about the coaching conversation and action planning. These logs provided invaluable detail when writing up the individual case studies.

Each case had a separate reflective journal, where information was logged that was extraneous to the coach logs. These included details from personal conversations that took place, information about significant events for each family, and reflections on ways to improve my own practice in relation to each family. This information provided important background detail to the case studies, although personal information that would compromise the families' privacy was not included in the case studies.

Communication Data

During the study, regular contact was maintained with the parents by text messages, and occasionally by email. Text messages were used to set up appointments, and to post reminders one week before and one day before the visit. Parents often used text messages to contact to confirm appointments, reschedule dates, and occasionally to ask questions and share news. If a text message contained useful qualitative data, a screenshot was taken, and it was saved with other data relating to that case. With parents' permission, I sometimes communicated with their early intervention teacher or speech language therapist at MOE, to inform them about progress, or to pass on information about ways they could help support the intervention at the children's day care. Copies of all these emails were saved, and helped with accurate recall when the case studies were written up.

The Semi-Structured Interview

Five of the six parents took part in a semi-structured interview at the end of the study year. One family, case 4, had left the study by this time and did not participate in the interview. By the end of the study year, I had formed close, working relationships with the five remaining families, and I was concerned that the parents would not feel able to speak freely about any of the negative aspects of the intervention if I conducted the interviews myself. The research assistant who had assisted with the IOA testing was an experienced speech language therapist who had a good understanding of the nature of the research and was therefore suitable to conduct the interviews. To prepare for them, she carried out some suggested reading, watched some videos on interview techniques, and then practised through role plays with feedback. She then contacted the parents to make times that were convenient for them. The parents had been reminded of the importance of a quiet room for the interviews beforehand, and they all arranged times where their children were not present. Two parents chose to use meeting rooms at their places of work, and one parent travelled to the research assistant's home. The rest of the interviews took place in the parents' homes. The interviews were recorded on a digital recorder.

The interview questions were a set of open questions on a range of topics relating to the research questions, followed by probes to obtain further information. The full set of questions can be viewed in Appendix 12. The parents were encouraged to recall significant memories from the intervention, as well as talk through what had worked, what had been challenging, and what the outcomes were. A significant section of the interview explored the supports and barriers they had experienced with implementing the core board. The length of time of the interviews ranged from 25 minutes to 90 minutes. The research assistant had been instructed to allow the parents to say as much as they needed to say on each topic.

Data Analysis

Data analysis occurred throughout the time of the study and continued afterwards. There was a continual flow of data being recorded, both qualitative and quantitative. These data were analysed separately in the first instance, and then integrated during cross case analysis after the end of the data collection period (Plano Clark et al., 2018). The numerical data obtained after coding the systematic observations were summarised using descriptive statistics and presented graphically. Qualitative data via surveys and interviews were analysed using a general inductive approach (Thomas, 2006) and through the process of thematic analysis (Bazeley, 2013). This section will describe how each data source was processed and analysed, and then explain the process of integration.

Some data sources did not require further processing, and simply provided accurate and detailed information or reflections to enable a rich source of detail for the case studies as well as reliable triangulation of results (Gerring, 2017). Data sources that did not undergo further processing were:

- the case history interviews
- the initial survey
- coach logs
- reflective journals
- other field notes
- correspondence
- parents' core / fringe tallies
- parents' home journals.

Data that required further processing and analysis included the systematic observations, the second survey and the interviews. These processes will be described below.

Systematic Observations

Each case had eight systematic observations of 10 minutes each, recorded over the year. The first stage in the analysis of this data was a full transcription of the video, and the assignation of communication turns to help with the coding process. Many coded behaviours could only be counted once during a single turn according to the manual; therefore, it was necessary to clearly show the turns in the transcript for each observation. A typical communication turn started with the adult providing an invitation for the child to communicate (e.g., asking a question), followed by some form of intentional communication from the child, and concluded by a response from the adult. There were many variations on this, but each turn had to contain an intentional communication attempt by the child. Some turns started with a spontaneous communication attempt by the child, whilst other turns contained several attempts to get the child to communicate on the part of the adult. An example of a transcript is shown below in Figure 4.5.

Figure 4.5

Example of Observation Transcript

Turn 1

C: (moves chairs. Vocalises and points at box)

A: You need to show me

Turn 2

C: (vocalising) MUESLI BAR

A: Muesli bar?

Turn 3

C: affirmative vocalisator

(A Gets container out but hesitates)

Turn 4

C: PLEASE

A: Please. Good boy. (hands him container)

Certain agreed conventions were used in these transcripts, such as capital letters to denote communications made on the core board. Once the recordings were transcribed, they were coded according to the observational coding manual.

The EP-AAC Systematic Observation Coding Manual. “A coding manual is a set of rules, definitions, examples, and near nonexamples that guide observers in the counting and/or classifying the behaviours of interest” (Yoder & Symons, 2010, p. 61). A full copy of the EP-AAC Systematic Observation Coding Manual (Brydon, Gibbs-Harker, et al., 2021) is available in the Addendum. This manual was developed using an iterative process before and during the time of the pilot study. It contains two observational tools, one for adult use of strategies (EP-AAC 1) and one for child communication behaviours (EP-AAC 2). Small adjustments were made to the manual after the start of the main research study, based on discussions following early inter-observer agreement testing. Examples of the exact coding instructions for both observational tools are shown in Figures 4.6 and 4.7 below.

EP-AAC 1 contains a comprehensive set of instructions for observing and coding adult behaviours. These behaviours corresponded to the strategy groups taught in the four workshops. Within each strategy group, the coding manual describes subsets of behaviours that can be observed. These are described in detail, including information on timing, frequency and how often each behaviour can be scored within a conversational turn. In addition to the four strategy groups, four counter behaviours were described: unresponsive, lack of wait time, mismatched responses, and overuse of physical prompting. Unlike the four strategy groups, these counter behaviours were not tallied throughout the observation, but a yes/no decision was made after watching the entire video recording. For example, the parent did not provide wait time for the child at least 20% of the time when prompting. A breakdown of the four strategy groups is shown in Table 4.3 below.

Figure 4.6*Example from Adult Observation Tool*

Strategy Group 1 – Aided Language Modelling						
Strategy Group / Strategy		Description	Code	Frequency / duration	Other	Scoring
Aided language modelling		The adult points to a symbol on the core board at or close to the same time as they say a word when they are communicating with the child. Aided language modelling can be general or targeted.	A1	No limits - count every time the adult points to a symbol and says the word.	Count all instances, even if immediately repeated. Do not count double or multiple taps on the same symbol if the word is only said once. If the spoken word is repeated, then the repeated model also counts.	Every time the adult points to a word on the core board and says it out loud at the same time.
Strategy Group 2 – Creating Opportunities for Communication						
Strategy Group	Strategy	Description	Code	Frequency / duration	Other	Scoring
Easy access to AAC	Puts core board in proximity	The adult deliberately moves the core board to be within reach of the child, and within their field of vision. This can include fairly small movements from the lap to make it easier for the child to reach, and also when the adult deliberately flips through the fringes to the one that they anticipate the child needs at that time.	B1	At least 10 seconds gap before next one is tallied. It is possible for more than one to occur within a turn.	If core board is already situated in proximity at start of video clip, assume the adult put it there and count as one instance.	Tally one for each occurrence.

Figure 4.7*Example from Child Observation Tool*

Behaviour Group	Behaviour	Description	Code	Frequency / Duration	Other	Scoring
Regulating behaviour	Request item	The child points to a symbol or a sequence of symbols on the core board to request an object (noun) such as a toy, food or a drink. E.g. 'I want ball' , or 'my turn' (with a toy), or 'drink' .	F1	Repeated taps on the same symbol for one request are counted as one.	Decision to be made on items available, the context and the adult's response, as well as child's non-verbal signals.	Tally one for each occurrence, either single symbol or a sequence of symbols.
	Request action	The child points to a symbol or sequence of symbols on the core board to request an action, such as help to open a container, a push on a swing, a hug or for the adult to blow some bubbles. E.g. 'push me' , or 'help' .		Repeated taps on the same symbol for one request are counted as one.	Decision to be made based on the context and the adult's response, as well as child's non-verbal signals. If child is observed to scan core board but points to an incorrect symbol, this is still counted.	Tally one for each occurrence, either single symbol or a sequence of symbols.
	Request recurrence	The child points to a symbol or a sequence of symbols on the core board to request a repeat of something that has just happened, such as more bubbles, another turn of row your boat or more lollies. E.g. 'want more' , or 'again' .		Repeated taps on the same symbol for one request are counted as one.	Decision to be made based on the context and the adult's response, as well as child's non-verbal signals. Item or action must have been provided in at least the previous 1 minute for it to count as a recurrence. If the video starts with an apparent request for a recurrence, count as an original request.	Tally one for each occurrence, either single symbol or a sequence of symbols.

Table 4.3*Breakdown of Adult Strategies Described in EP-AAC 1*

1	Aided Language Modelling	<ul style="list-style-type: none"> • This is one complete strategy that describes pointing to symbols whilst saying the words.
2	Creating Opportunities for Communication	<ul style="list-style-type: none"> • Easy access to AAC • Using preferred items / activities / people games • Sabotage • Using surprise
3	Prompting	<ul style="list-style-type: none"> • Expectant waiting • Gesture prompt • Verbal prompt • Model prompt • Physical prompt
4	Response Strategies	<ul style="list-style-type: none"> • Simple / reward • Language building • Maintain interaction

EP-AAC 2 describes child communication behaviours in detail for coding. This observational tool breaks down each instance of the child's core board use during the recorded videos into different categories, as detailed in Table 4.4 below. The communication function categories were adapted from Wetherby et al. (1988).

Table 4.4*Child Communication Behaviours Described in EP-AAC 2*

Communication function	<ul style="list-style-type: none"> • Exploration and learning • Regulating behaviour • Social interaction or joint attention
Level of prompting	<ul style="list-style-type: none"> • Spontaneous • Prompted
Number of symbols in sequence	<ul style="list-style-type: none"> • One • Two • Three • Four or more
Type of vocabulary used	<ul style="list-style-type: none"> • Core • Fringe

The recorded observation allowed for multiple passes, and for stop-and-go coding, which was often necessary because the coding was highly complex and required some social judgement (Yoder & Symons, 2010). Stop-and-go coding involves stopping the recording when a potentially codable behaviour occurs, then replaying the section several times, including use of slow-motion play, if necessary, while consulting the coding manual. This was frequently required when coding during this study, as codable behaviours often happened very quickly, or were difficult to pick out, or relied on other contextual events. For example, the children in the study often made very quick movements towards the core board, and it was not immediately obvious whether they had pointed to a specific symbol or just tapped on the board. Some codable behaviours relied on a particular amount of time passing, for example, the codable behaviour ‘expectant waiting’ required the adult to cease all other activity for at least 3 seconds, so this required stop-and-go coding techniques.

Coding decisions were entered on to specific coding forms – one for adult observations and one for child observations (see addendum). Coded behaviours were organised according to each communication turn on this form, as some behaviours could only be coded once per turn, even if they occurred more than once (e.g., verbal prompts). Once the coding was complete for a recorded observation, the number of occurrences for each codable behaviour were counted and added to spreadsheet summaries for each case. Graph templates were set up in Excel to represent different codable behaviours for the adults and children, and these were updated periodically as data was processed. These graphs enabled visual representation of the changes of behaviours during the study and allowed for the process of descriptive statistics during the writing of the individual case studies, as well as aiding the process of cross case analysis.

Inter-Observer Agreement

Twenty percent of the observations were selected for the process of Inter-Observer Agreement (IOA) testing. Two recordings were selected from the baseline observations, then one from every data collection after this except the final data collection, where two were selected again. These recordings were then coded by a trained research assistant and results were compared. IOA testing was carried out after each data collection round was complete. After I had coded all the observations from that data collection, I used a random number generator to select the case, and then supplied the research assistant with the relevant recording and the transcript.

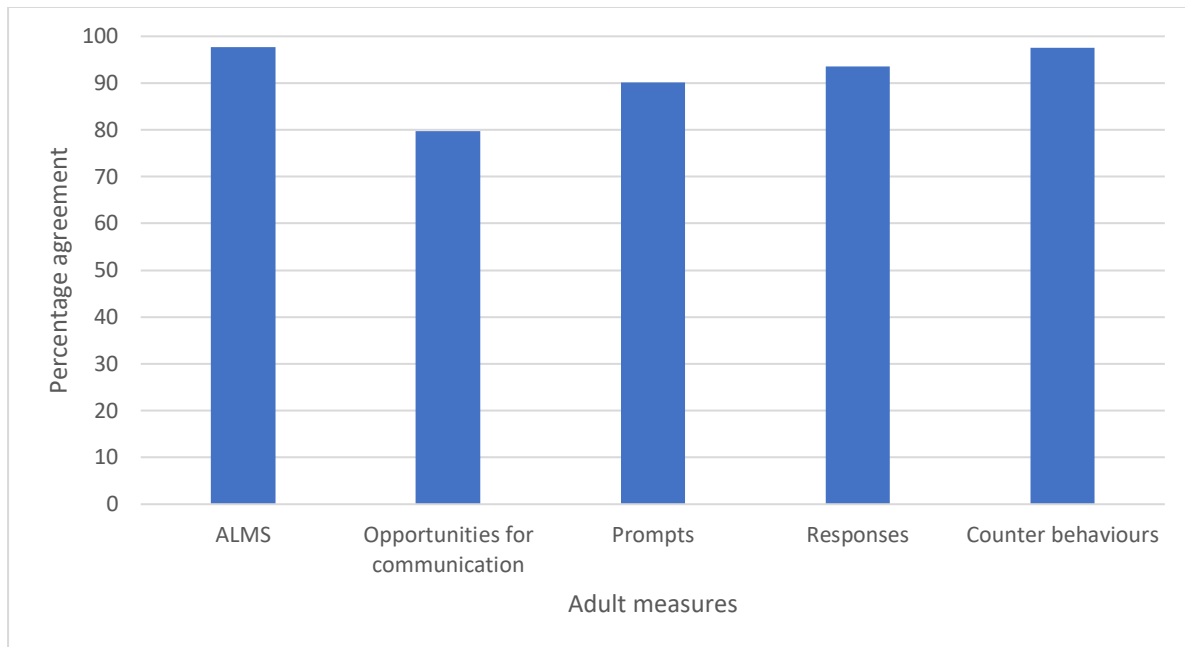
Some IOA tests had higher levels of discrepancies between coders, especially around some of the more complex behaviours to code, such as children's communicative functions. After separately coding for each IOA testing, we met for a discrepancy discussion (Yoder & Symons, 2010). We looked at codable behaviours where agreement was less than 80% and went through each instance on the recording, discussing why we had made our coding

decisions. This sometimes led to a small update of definitions in the coding manual, up until data collection point two, when there were less discrepancies. After the discrepancy discussions we would either update our coding because we had reached a joint agreement, or we would agree to disagree, and the coding would remain the same. We continued to hold discrepancy discussions after every IOA testing, to prevent any observer drift.

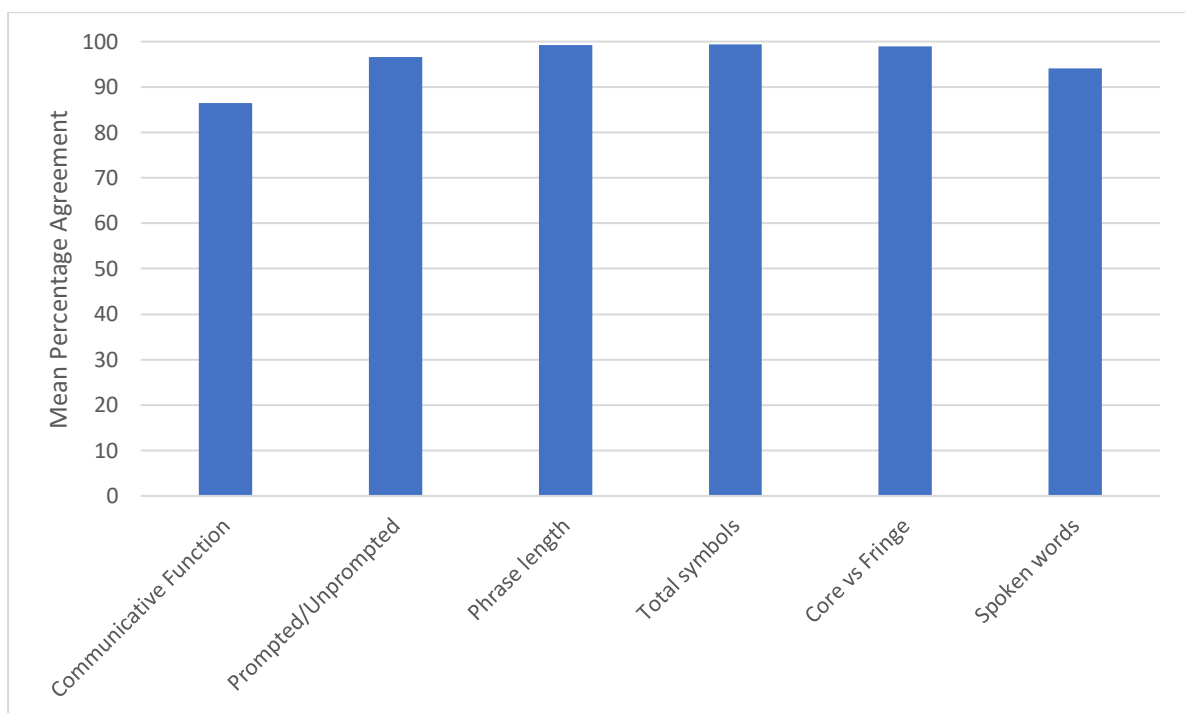
As the study progressed, there were fewer discrepancies, and we were usually over 80% agreement for all codable behaviours after the first round. However, children's use of communicative functions continued to be an area where it was harder to always achieve 80% agreement, particularly for the social function. It can be challenging to accurately code the true intention of a child's communication attempts, so if in doubt we agreed to consider how the parent appeared to interpret the communication attempt. As the researcher, I often knew more about the family dynamics, and the contextual cues meant more to me. This led to me coding social behaviours more frequently than the research assistant. For example, when the child in case 6 pointed to the symbol for 'chips' and then pointed to the door, I knew that his father had gone to fetch a takeaway and he was making a comment about this. The research assistant did not have this background knowledge, and therefore assumed that he was simply requesting his mum to get him some chips. Another more challenging codable behaviour was the 'creating opportunities for communication' adult strategy group, as it was difficult to know the adult's intention behind an action at times. Figures 4.8 and 4.9 below show the percentage agreement achieved in total throughout the IOA testing during the study.

Figure 4.8

Percentage of Agreement for Adult Behaviour Coding

**Figure 4.9**

Percentage of Agreement for Child Behaviour Coding



Interview and Survey Data

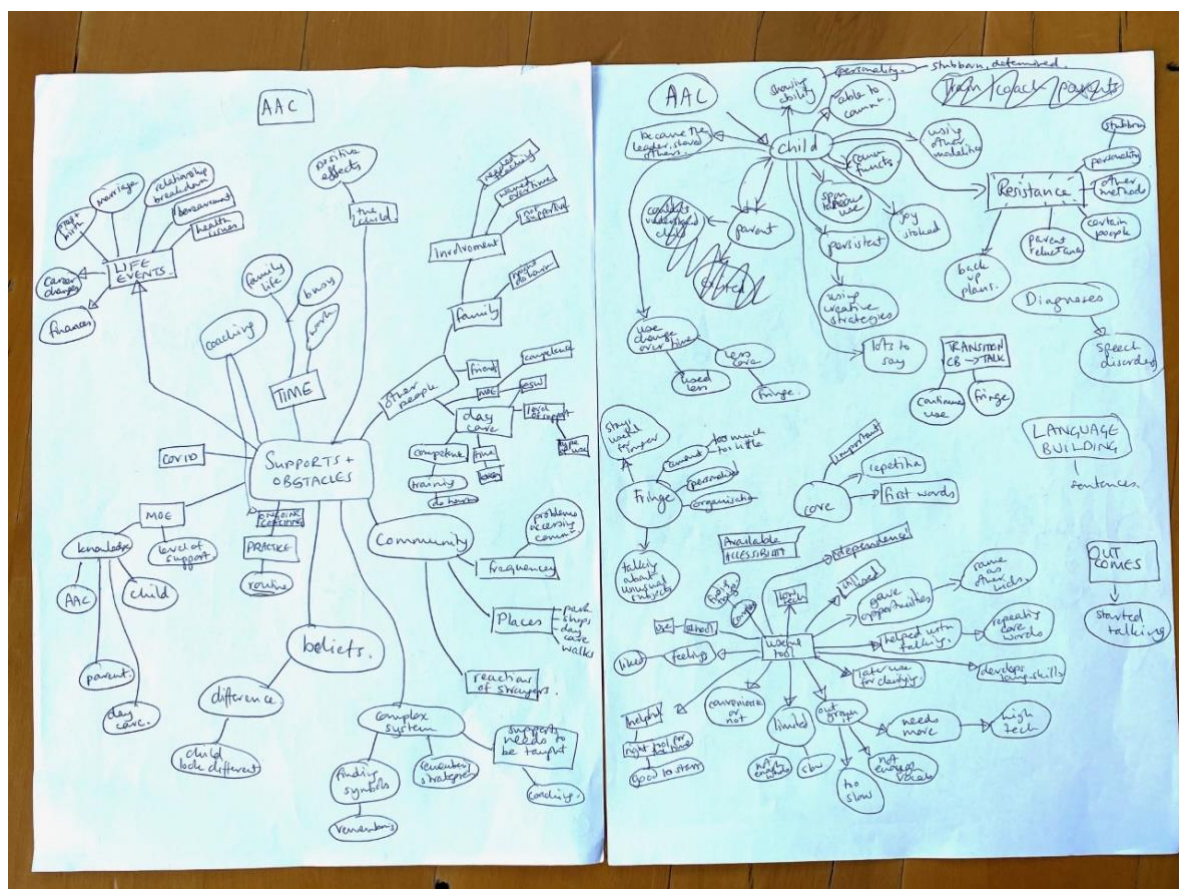
Castleberry and Nolen (2018) describes five steps in the process of thematic analysis: compiling, disassembling, reassembling, interpreting, and concluding. These steps will be used to describe the process of thematic analysis employed in this study. Thematic analysis of the interview and survey data was supportive of both individual case analysis and write up as well as the cross-case analysis described in the sections following the steps of thematic analysis.

Compiling. This is the process of preparing the data for analysis. The interview recordings were transferred to a hard drive and were initially run through some transcribing software to elicit rough transcriptions. I then transcribed the interview data myself, using the transcriptions produced by the software as a starting point. Transcribing the interview data provided the opportunity to become familiar with it before starting the process of thematic analysis.

Disassembling. This involves separating out the data. Once the interviews were accurately transcribed, I printed out the transcripts, and added the open question answers from the second surveys. I read through these scripts several times until they were highly familiar. I then started to highlight sections of text that stood out as important and made notes in the margins about the meanings that I was reading in the text. I was starting to develop a sense of emerging ideas and categories, and it was helpful for me at this point to represent this in hand drawn diagrams; an example of one of these is shown in Figure 4.10 below. I planned to use NVivo software to help with the process of thematic analysis, but I have always found it helpful to represent complex ideas in the form of mind maps initially.

Figure 4.10

Hand Drawn Diagram



After this, I used NVivo software to help me disassemble the data further. At this point I went through the texts line by line and coded every piece of text, creating over 200 different codes. Although I had some preconceived ideas about what I expected to find in this data, based on my reading of the scientific literature, my own clinical experience, and my knowledge of the parents, I used an inductive process to create these codes; that is, I allowed the meaning to emerge from the data. At this point I took phrases, sentences or paragraphs that represented a concept, and assigned them to codes that were descriptive labels of that concept. As the coding process continued, the number of examples in each code grew. Some became very well represented, whilst other codes remained quite small. It is important to note that the interview questions were set up to capture the parents' ideas specifically in relation to

my research questions, so many of their answers related to their children's progress, the intervention, and to the supports and barriers they experienced along the way. However, some parents also shared thoughts that were off topic from these specific subjects. At this point, I coded everything in the text. I used "in vivo" coding (assigning direct quotes to codes), as I wanted to represent the parents' voices and use their words.

Reassembling. This is the process of putting the codes into context to create themes. Once I had assigned most of the interview and survey text to codes, I started the process of refining and grouping these codes. Many of the codes were highly similar or overlapped, so within the NVivo software, I started to merge codes together. I then clustered the codes to form higher order code groups, and eventually through this process, themes started to emerge. Using this process, I was able to analyse the restructured data at multiple levels of granularity. The higher-order codes provided me with an idea of themes across the data. The lower order codes allowed me to examine fine distinctions across examples. Figures 4.11 and 4.12 illustrate the categories and themes after thematic analysis. As the interview questions had been based around my research questions, it was not surprising that the themes mainly fell under these areas of investigation. To ensure the trustworthiness of my data analysis, I discussed my thought processes both within supervision, and with my research assistant, who had a high level of insight into my research and had conducted the interviews.

Figure 4.11

Diagrammatic Representation of Thematic Analysis

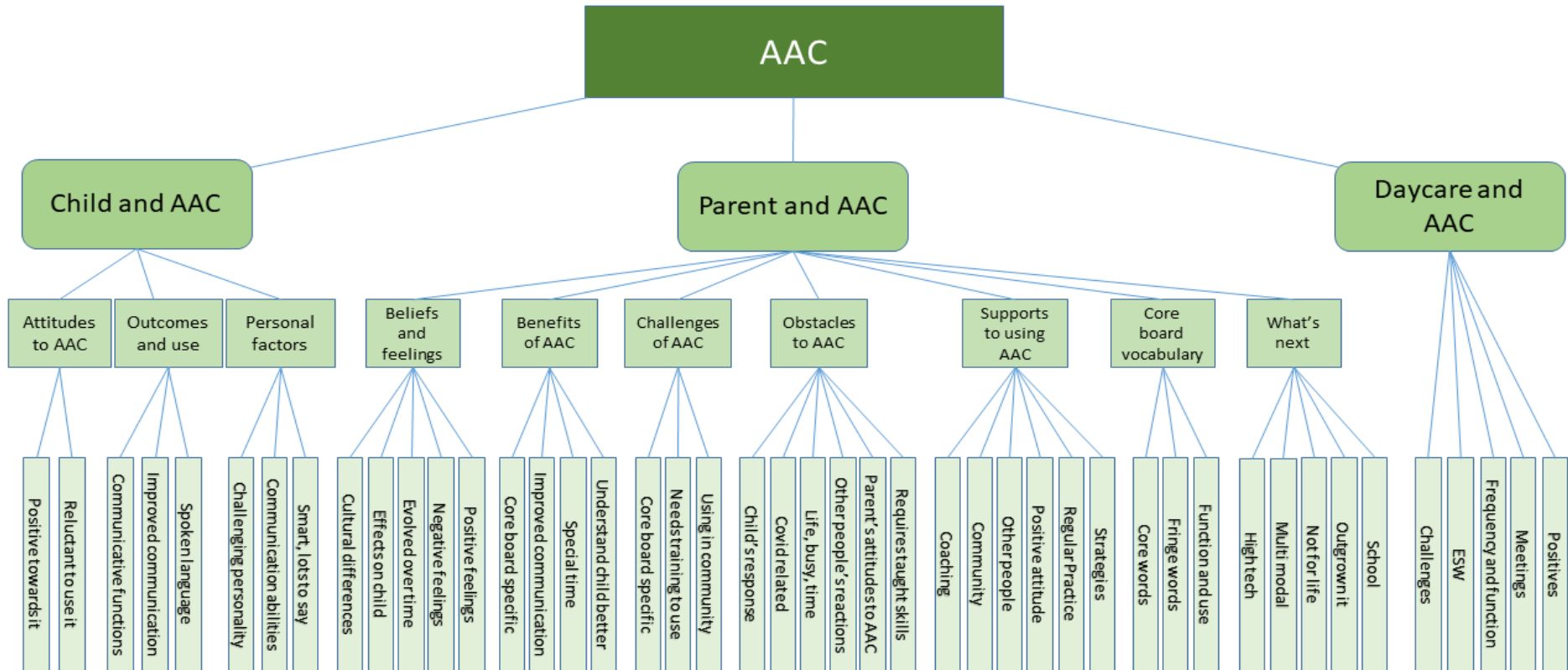
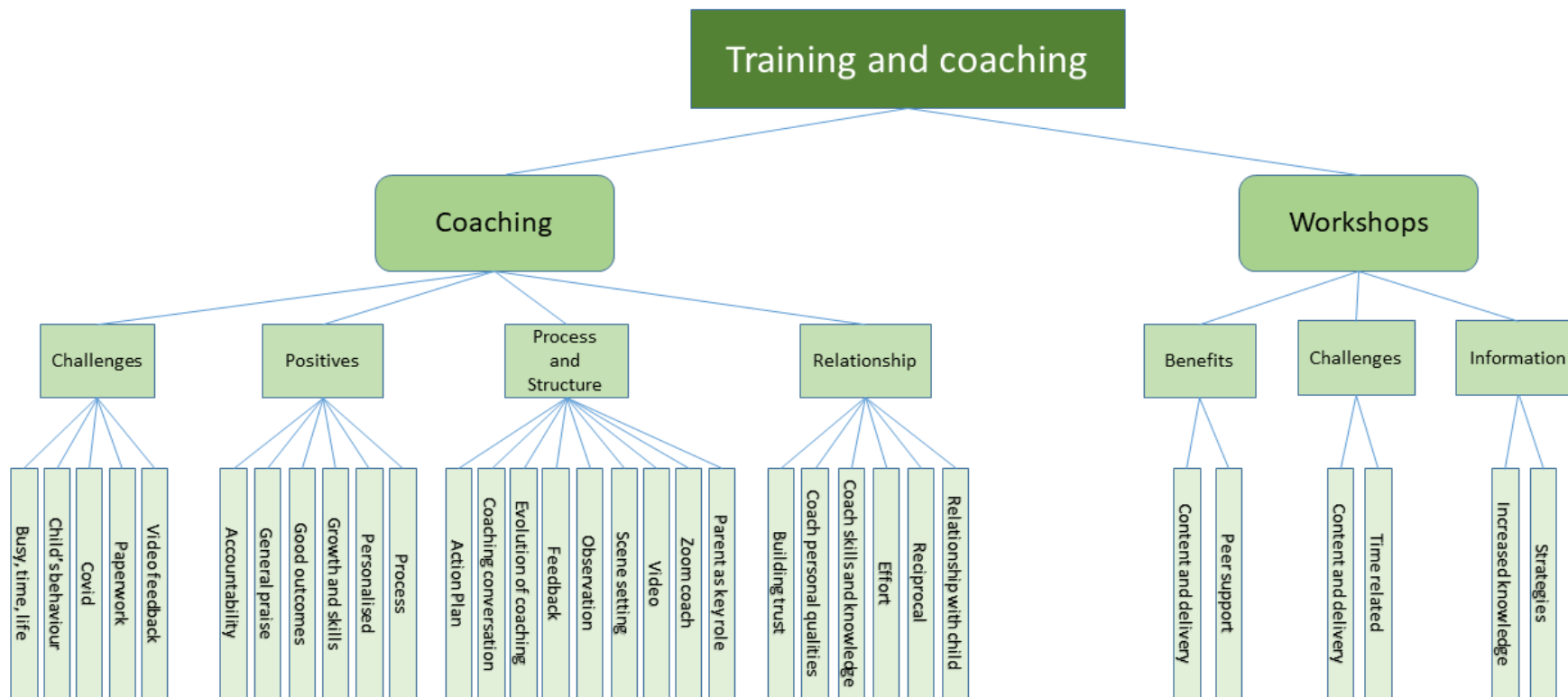


Figure 4.12

Diagrammatic Representation of Thematic Analysis Continued



Interpreting. This is the process of drawing analytical conclusions from the codes and themes. Using NVivo assisted the process of identifying patterns across the grouped codes and highlighted where there were large amounts of data to support a particular concept. Additionally, by this point, I had an in-depth understanding of the data and how it related to my research questions. I was able to pull out over-arching themes, particularly in relation to how the parents experienced their time in the study, how they viewed their children's progress, and what supports and barriers they experienced in relation to implementing AAC. Some supports and barriers were consistent across all six cases. A coding book was created using the NVivo software; a copy of this can be found in Appendix 13.

Concluding. My research questions had remained the same over the course of this study, other than a change of order to reflect the importance placed on the individual journey that each family experienced. My research questions were as follows:

1. What are the individual experiences of each family as they participate in the journey of introducing a core board with their child?
2. What are the effects of a comprehensive training and coaching intervention on parents' use of communication strategies to support their child to use a core board?
3. What are the effects of the introduction of a core board, combined with parent training and coaching, on the communication skills of pre-school children with complex communication needs?
4. What factors influence the success of implementing a core board as an AAC system for pre-school children with complex communication needs?

The process of survey and interview data analysis was completed as the six individual case studies were written up in response to the first research question, and the cross-case analysis was completed to address more fully the second, third, and fourth questions. Within

the context of my mixed method case design, part of this process involved integrating the qualitative data with the quantitative results and presenting these outcomes in a holistic manner. The process of writing up individual cases and cross-case analysis integrating across the data sources is described in the following sections.

Writing the Individual Case Studies

Before writing up each case study, I immersed myself in the data collected for that case. I started by rewatching all the video recordings I had collected from the observations and any videos I had saved from the coaching sessions. I then read through every piece of written data, including correspondence, the case history, all the field notes, the transcripts from the video observations, the surveys, the quantitative results and associated graphs, and the full interview transcript. I kept all this data open and available whilst I wrote up the case study. I started by drawing out a mind map containing all the key thoughts relating to this case, and then wrote the case study in chronological order. As I wrote, I continually cross-checked my thoughts and words against the many data that I had collected. My aim was to tell each family's story with integrity and humanity. After each case study was completed, I checked it through again, and then shared it with the parent. I asked them for feedback and assured them I could make changes if there was anything they felt uncomfortable with.

Cross Case Analysis

Throughout the time of the study, I had a growing awareness of emerging similarities and differences between the six cases, particularly as I started the process of quantitative data analysis after the baseline observations and continued this analysis after each round of observations. I also completed the thematic analysis on the survey and interview data before writing up the individual cases, so I had an awareness of patterns and similarities in qualitative findings across cases. However, at the start of the process of writing up the six case studies, my aim was to gain intimate knowledge of the individual cases, so that each

could be understood on its own terms first. After this, cross case analysis was comprehensively applied to further explore and confirm the relationships between cases. The use of visual representations of the quantitative and qualitative data in the form of graphs and diagrams allowed for interpretations across cases based on the commonalities and differences that emerged (Bazeley, 2013). This process began with the thematic analysis of the qualitative data using NVivo, which highlighted patterns in the qualitative data across cases. This analysis continued as I wrote up the individual cases and continued to observe and synthesise patterns across the cases. By this time, I was highly familiar with both the quantitative and qualitative outcomes and was already aware of patterns within the quantitative data. I based the cross-case analysis around three of my research questions. The first research question, pertaining to the individual journey for each family had been comprehensively addressed in the case study write-up. The second and third research questions addressed the quantitative outcomes for the parents and children, while the fourth research question mainly drew on the qualitative data obtained from the surveys, interviews, and field notes.

Summary

This chapter has covered the background and choice of research design for the study. It outlined the main phases of the study, and the resources and materials that were developed for it. It provided details about the pilot study and how this contributed to the development of the main study. The main study was described in detail, including participants, recruitment, ethical considerations, data collection, and analysis. The process of writing the case studies and the method for cross case analysis was described. The next chapter will describe the individual journeys experienced by the six families presented as case studies.

5. The Case Studies

This chapter will tell the stories of the six families who I had the privilege to work with during this study. Each story will be told as an individual case study, with quantitative and qualitative data integrated throughout the narrative. These stories illuminate the experiences of families consistent with first my research question: 1) What are the individual experiences of each family as they participate in the journey of introducing a core board with their child? The case studies will mainly tell the stories of the parent and child and their journey with introducing and using AAC, but they also contain my own reflections, thoughts, and feelings where appropriate. Throughout the year of the intervention, I maintained detailed field notes in the form of coach logs, reflective journals and saved notes, emails, and texts; I drew on all these sources alongside the other quantitative and qualitative data whilst writing these case studies. I formed close relationships with the six families over the year and had many extended conversations with the parents over the course of the home visits. Details of these were recorded in my notes afterwards and were drawn on in the writing of these case studies, in a way that aimed to be respectful to each family's privacy. After writing each case study, I shared it with the relevant parent and asked for them to provide feedback and let me know about any changes that they would like me to make. Each parent responded, and none of them required any changes. This was the response from Emma (case 1) after reading her case study:

I've read six books this year so far, this is the best read. I laughed, cried, and cringed at how many times I say the word "like" 😊. All together though, it's amazing. Was surreal to see mine and Blaine's journey with his communication. You have my approval, for sure 😊

The names in these case studies are pseudonyms chosen by the parents.

Case Study 1 – Emma and Blaine

“Yeah, it’s been a big year, but ... the core board just kind of became part of like a routine...”

Background Information

Blaine and his mother, Emma, were referred to the research project by their Ministry of Education speech language therapist. At this time, Blaine was 3 years and 6 months old and was described as having a few spoken words, but these were unintelligible. He did not have a specific diagnosis. Emma was enthusiastic about participating in the study from the initial phone call to make contact.

Blaine lives with his mum and dad, Emma and Will, and his two-year-old brother, Finn. The family live rurally in a large complex that includes Emma and Will’s small home as well as a larger dwelling where Emma’s parents and maternal grandmother live. Will’s family live overseas, but Emma’s family are close-knit, with her siblings visiting regularly and the boys enjoying frequent contact with a range of family members. Emma and Will both work out of the home, and the boys attend a local pre-school four days each week, as well as being cared for by Emma’s mum on a regular basis. Emma described the family ethnicity as “white” and the family culture as “cruisy”. At the start of the study, younger brother Finn had just turned 2 years old, and only had a few spoken words. Emma was pregnant with her third child, who was due in four months.

In the baseline case history discussion, Emma described Blaine as an energetic and sociable 3-year-old, who enjoyed meeting new people, had friends at day care and was smart and curious. Blaine already had good number, shape, and colour knowledge, and was described as independent and good at problem-solving. He was still in the process of learning to use the toilet consistently. He was an active child who moved quickly between activities. Emma felt that Blaine could understand most language used with him and was able to follow

simple instructions. She felt that he compared to other children his age for comprehension. She estimated that he had about 10 spoken words that she could recognise, but acknowledged that he might have more, but no one could understand him. He also had a sign that he used to indicate 'stop' and communicated by hand leading and using a range of gestures, facial expressions, and vocalisations. He had never had any access to AAC or direct speech therapy input. Emma described his gross motor skills as well developed. She reported that he avoided most activities that specifically target fine motor skills, but she had not observed any difficulties in this area. His behaviour was described as placid and friendly; he did not seem overly frustrated by his difficulties with communication.

At the time, Blaine enjoyed playing with a range of technology, outdoor play, water play as well as watching television and movies. He liked transport toys including cars and trains. Emma reported that Blaine was a picky eater who dislikes all vegetables and does not like to try new foods. In the community, Emma used a restraint strap with Blaine, due to his tendency to run off and explore in new places.

In the initial survey, completed by Emma during the baseline visit, Emma rated herself as "moderately concerned" about Blaine's communication difficulties. Her attitude towards using a core board was positive at this point, and she ticked the following statements from a selection that described different perspectives about using a core board:

I'll try anything to help my child

I think this might suit my child

I think this could relieve their frustration.

Emma also indicated that she was excited to be the key person assisting Blaine with the core board but expressed anxiety about having the time to do it and added: "I'm worried I won't communicate properly to the other people in Blaine's life what I've learnt". This concern

about passing on the learning along with the belief that other people might support the core board incorrectly continued to be a theme for Emma throughout the time of the intervention.

Baseline Data Collection

I first met Emma in March 2021 for a brief meeting to provide her with more information about the project. I then visited the family again for the case history interview and baseline data collection, and this is when I met Blaine for the first time. Blaine was next door with his grandparents for most of the visit but came through to join us for the 10-minute data collection video. Blaine was presented with both boxes of assessment toys and snacks, and he and Emma sat on the floor to explore them together for the video.

During the baseline video, Emma appeared to struggle to gain or maintain joint engagement with Blaine. Although Emma made several attempts to draw Blaine's attention to various toys and other items, Blaine tended to explore on his own agenda. I observed what I described as a "disconnect in communication" in my reflective journal, between child and adult. Blaine often ignored what Emma said or presented to him, and Emma often did not follow Blaine's lead or comment on what held his interest in that moment, particularly during the first 5 minutes of recording. Emma did not appear confident in how to engage Blaine and initiate communication with him successfully, and she sometimes talked to herself to express mild frustration about his lack of interest in her communication attempts. Emma often talked very fast, rolling her words into each other.

Faced with so many exciting new things, Blaine tended to move quickly between items. Emma frequently asked him to name items or tell her what they do, which he was unable or unwilling to respond to. In the latter half of the video, Emma started to name items that Blaine held up, and there was increasing amounts of joint engagement as Emma helped Blaine to wind up toy animals.

The core board was available and situated near them, but they both ignored it in favour of exploring the two boxes. Blaine was mostly silent, but he used a few single words, including ‘no’, ‘oday’ (for okay) and ‘bawa’ (for car), and some longer vocalisations that were unintelligible but intonated like phrases. I realised later in the intervention stage that Blaine was talking more at this point than either I or his parents had realised, but it sounded like jargon. Emma did not use any specific AAC strategies, nor did she use any strategies from ‘creating opportunities for communication’. She did consistently respond to all of Blaine’s attempts to communicate with her.

Overview of the Intervention

Emma and Blaine remained in the study for the full year. Emma learned to use the taught strategies quickly (Figure 5.1 and 5.2) and with increasing skill, and maintained them throughout the study until Blaine stopped needing the core board to communicate. Blaine was enthusiastic about using the core board from the start, and quickly learned to point to symbols to communicate (Figure 5.3). He started to develop more spoken language within a week of the core board being introduced, starting with the specific core words that Emma was modelling on the core board. Blaine continued to develop more spoken language throughout the year (Figure 5.3), although his intelligibility remained a significant issue and his family frequently could not understand him. Emma particularly worked on Blaine’s ability to form phrases and sentences using the core board during the early maintenance phase. After around 6 months of the intervention, the core board became increasingly redundant as Blaine could talk more, and he switched to using it only as a communication aid when he could not make himself understood. By the final data collection, Emma and Blaine were both struggling to find symbols on the core board that had previously been very familiar to them.

Figure 5.1

Frequency of Emma’s Use of Taught Strategies

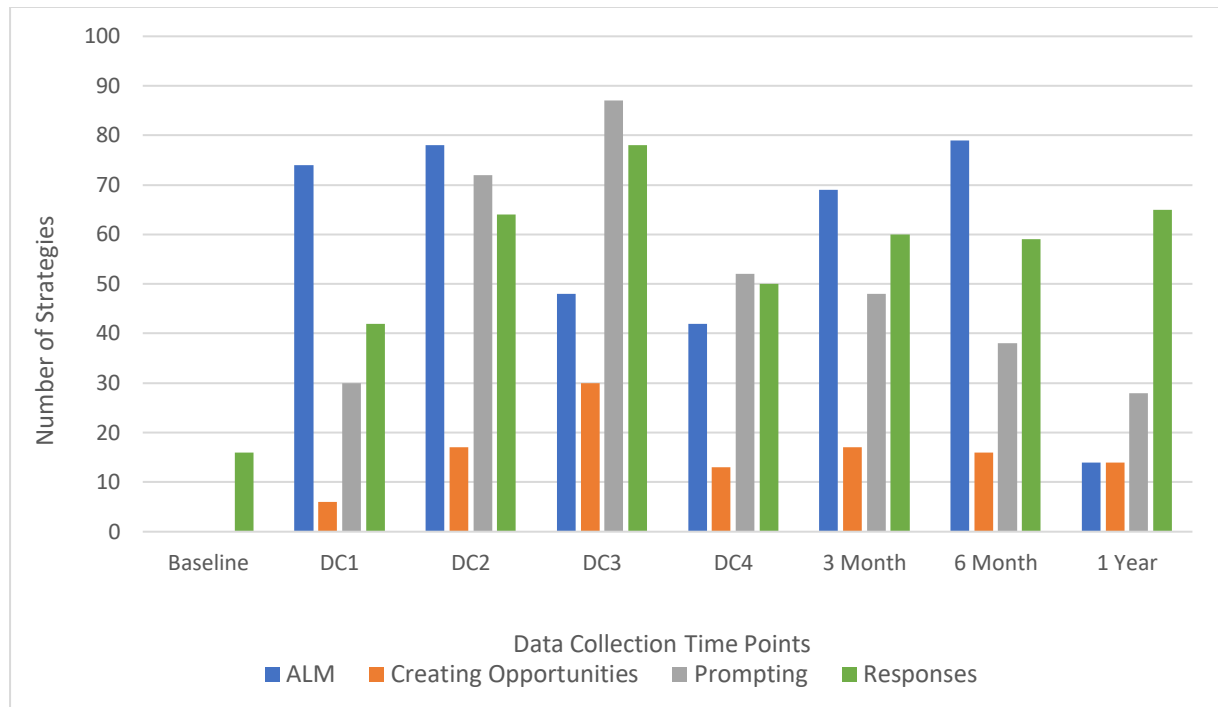


Figure 5.2

Percentage of Words Modelled on Core Board by Emma

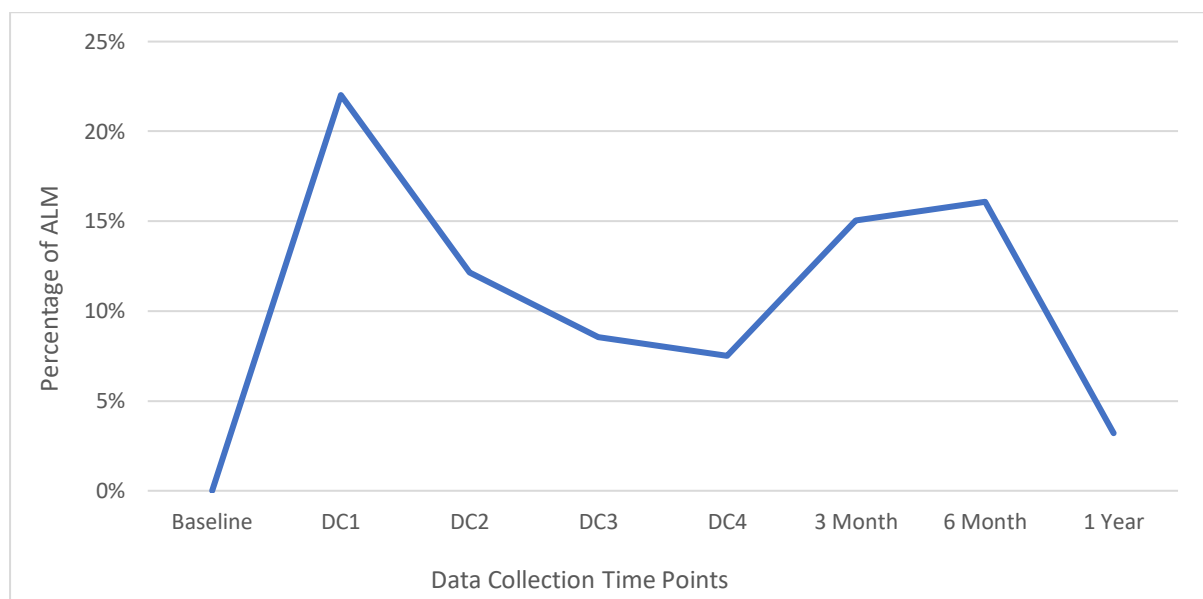
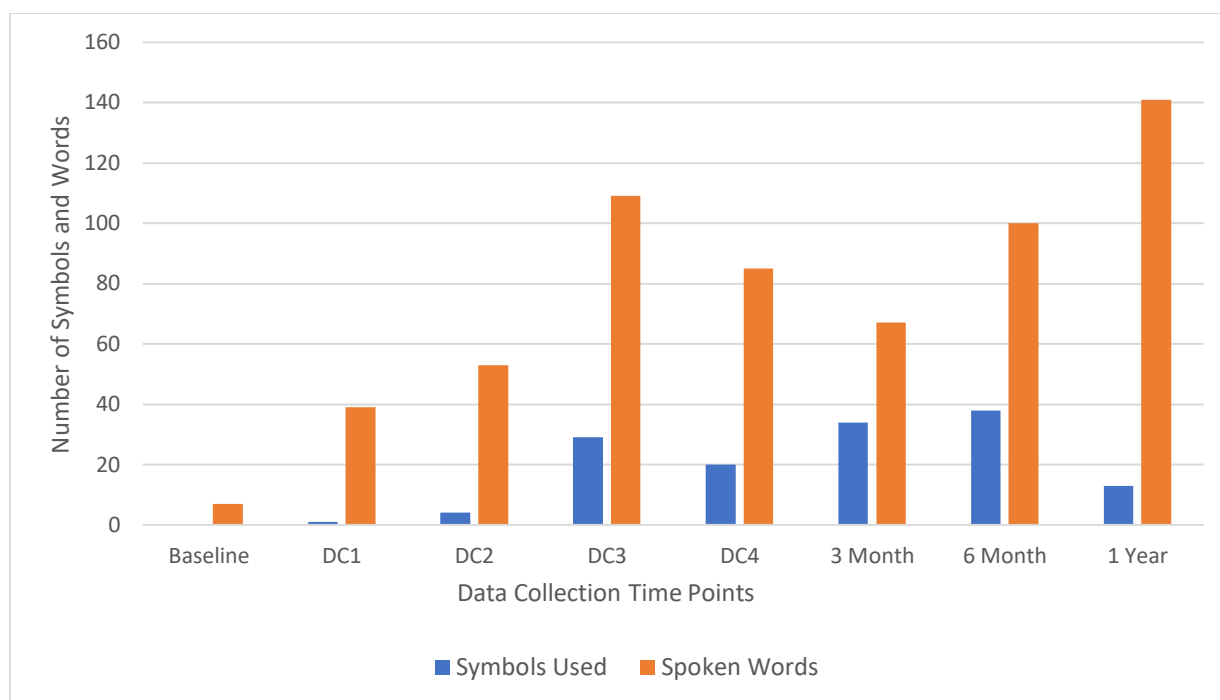


Figure 5.3*Blaine's Use of Spoken Words and Core Board Symbols****The First Eight Weeks – The Intervention***

Emma was working full time during the third trimester of her pregnancy in a demanding job, as well as juggling the demands of her young family and attending antenatal appointments. It wasn't easy for her to get time off work for the four workshops, and she had to arrive late to one, and sometimes had to leave the room to take work calls during the workshops. In my reflective journal, I noted that Emma was usually the most distracted of the group, especially during information-giving sessions. Emma stated that she found it hard to find the time to complete the paper-based personal journal and symbol tally, and sometimes completed these at the start of the workshop. Over time, I learned that Emma disliked paper-based resources in general and found them unnecessary and unhelpful. In her interview at the end of the year she explained "I'm too much of a millennial to do with pen and paper. So things with pen and paper just don't really work for me". Other than this, Emma appeared to

grasp the different concepts quickly and did not require help to complete her action plan during the workshops.

My first opportunity to see Blaine with his new core board was at the first coaching session, two days after the first workshop. It was evening, Emma and Will had just got home from work, and Emma was busy preparing the dinner, whilst Will was setting the table and attending to Finn. Blaine saw that I was wearing a core board, and excitedly fetched his to show me. He then pointed to two symbols “you fast”, dropped the board and took off at speed to demonstrate. It was exciting for me to see how quickly he had picked up how to communicate with it. Emma had planned for the video to be taken over dinner time, and it was evident during this time that she was already modelling a range of core and fringe words, and Blaine was responding and learning new symbols as she modelled. Emma said that she was nervous during this first coaching session, but her confidence grew as we reviewed the video. She was able to identify where she had used aided language modelling effectively and she also noticed how it slowed down her speech rate, which she recognised was very fast normally. Emma was an equal participant in coaching right from this first session. She was able to identify missed opportunities and readily came up with ideas as well as questions.

I remember experiencing strong emotions as I drove away after Emma and Blaine’s first data collection visit. The difference in communication behaviours between the baseline video and the first data collection after the intervention started was startling. Emma appeared far more confident. She had put thought into what items to make available for Blaine. She modelled fluently on the core board, 22% of the words she said during the video were modelled on the core board, (Figure 5.2) and she followed Blaine’s lead consistently. Although Blaine only pointed to one symbol on the core board during this data collection, there was consistent joint engagement and turn taking throughout, and he used 39 spoken

words, mostly variations of “okay” (Figure 5.3). As we walked to the car after I had packed up the toys, Emma informed me she was “obsessed with modelling on the core board”.

Although the first workshop only covered the first strategy group, aided language modelling, Emma used significant amounts of strategies from all four strategy groups in this first data collection (Figure 5.1). Her use of aided language modelling exceeded my expectations at 22% of all spoken words, and she was able to continue modelling even when something unexpected happened. For example, the bubble gun broke, and Emma immediately modelled “OH NO, there’s a PROBLEM”. Although Emma hadn’t been taught any specific strategies from the second strategy group, making opportunities for communication, the toys she had selected for the data collection needed help to operate, and she was starting to initiate people games with the wind-up toys. What is possibly more surprising, is that Emma used 30 prompts over the 10 minutes to try and encourage Blaine to use the core board. During the workshop, I had emphasised modelling without any expectation that the child copies, but Emma, like all the families in the study, started using prompts immediately. These prompts were not effective, as they were mostly phrased as yes/no questions, for example, “do you WANT HELP?”, to which Blaine responded to by either saying a variation of ‘yeah’ or ‘okay’. The increase in use of response strategies is not surprising, as Blaine interacted more frequently than the baseline recording, and Emma continued to be responsive to all his direct communication attempts. At the end of the video recording, Emma expressed frustration that Blaine had not used the core board more, as he had been using it frequently over the past 2 weeks. She attributed this to the toys being too exciting and decided to concentrate on snacks next time. Like all the parents in the study, Emma was very invested in the success of the data collection visits.

After the second workshop, which focused on creating opportunities for communication, Emma began to use more people games with Blaine, as he responded very

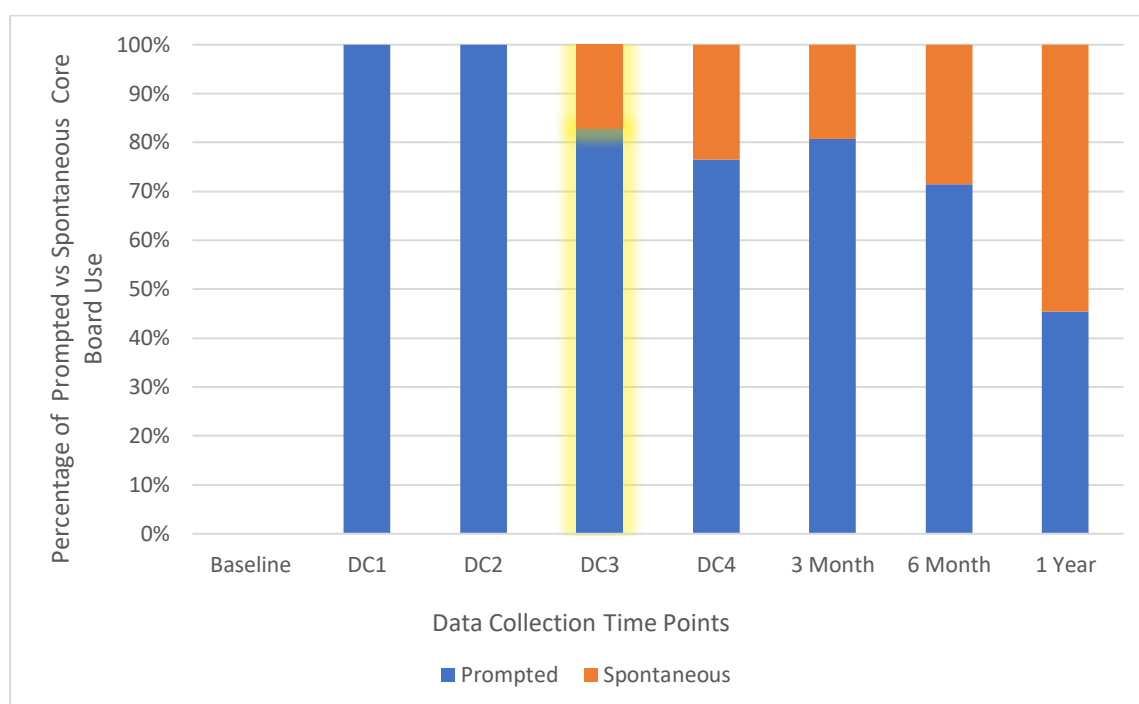
well to these. She stuck to her plan of using snacks for the second data collection and increased her use of the strategies from the second group to 17 in the 10 minutes of recording (Figure 5.1). However, Blaine saw the snack containers as a challenge, and managed to open most of the containers himself instead of asking for help as planned. By this time, Blaine was using many spoken words, including variations of ‘help’, ‘more’, ‘open’, ‘yummy’, as well as ‘yes’, ‘no’, and ‘okay’. These were words that Emma had planned to target for the data collection recording, so she frequently ended up prompting him to use the core board for words that he had already said. This caused mild frustration for Blaine and meant that Emma overused prompting. We were yet to cover how and when to use prompting in the workshops, so Emma continued to use a high proportion of yes/no questions. After the second data collection, Emma again expressed frustration that Blaine had not used the core board as much as he usually does. She acknowledged how much more he was talking, and that many of these words had been targeted on the core board by her over the past 4 weeks. She referenced his sudden development of spoken core words in the interview at the end of the study and attributed it to the intervention: “By doing that repetitive core words, he's kind of got the sounds and everything on those core words.”

It was a relief for me to deliver the workshop covering the strategy of prompting, as I could see it would be helpful for all the participants, including Emma. At the next coaching session, Emma played a fun balloon people game with Blaine. My coach log from this time noted that Emma had planned the game carefully and had confidence in her abilities as well as good awareness of how she was using the strategies. We used this coaching session to refine her use of prompting and discussed how to react if Blaine said the words instead of pointing to symbols. He was now producing some core words quite consistently, so we talked about using the core board only for clarification, or to add on to what he had said. The third data collection visit illustrated that Emma had improved her skills, with Emma using prompts

more appropriately, and Blaine responding by using 29 symbols on the core board, including some phrases, and 109 recognisable spoken words (Figure 5.3). As Emma refined her skills and used prompts more thoughtfully, it can be observed that Blaine increased the number of times he used the core board spontaneously during the data collection sessions, with the first spontaneous use occurring in the third data collection (Figure 5.4).

Figure 5.4

Blaine's Prompted Versus Spontaneous Core Board Use



The final workshop covered the fourth strategy group: response strategies. Emma had already identified in previous coaching sessions that she would like to build on Blaine's language by getting him to use symbols in sequence, so this was a good opportunity for her to learn about how to use responses to build his language. The subsequent coaching session occurred later than usual, nearly two weeks after the workshop. Emma had told me on previous occasions that she preferred the coaching to take place soon after the workshops, as it helped her to put the new strategies into practice. This time, the course folder and action

plan were still in her car, and she needed a complete revision of the learning from the fourth workshop. It was increasingly clear to me that Emma found the coaching sessions more useful than the group sessions and additionally did not find paper-based resources useful.

By this time, Emma's use of the aided language modelling strategy was dropping off according to the data gathered during the data collection visits and her own reports (Figure 5.2). Emma reported that the family had got into the habit of always leaving the core board accessible, and Blaine would find and use it to make requests. Emma recognised that this was limiting for language development and identified that she needed to return to modelling more, especially general modelling of different communicative functions. She also planned to work more on using the core board during imaginative play with Blaine, something which she found difficult. During this coaching session, Emma watched the video and considered how she could respond differently to encourage more use of two and three symbol phrases for Blaine. We also talked about using the core board outside the home. I was quite surprised to hear that Emma had not introduced the core board at Blaine's pre-school, considering how proficiently he was using it at home. Emma said there was an IEP meeting coming up soon and she planned to discuss it then. Later in the study, I came to understand that Emma's belief that other people may not use the core board correctly influenced her decision to hold back on introducing it at pre-school.

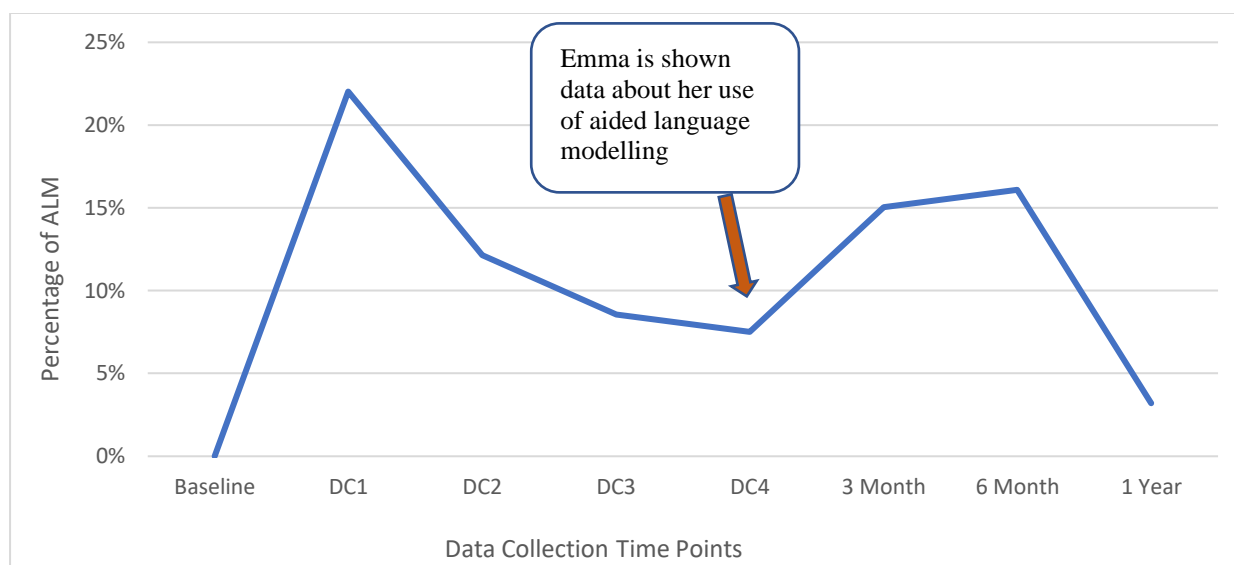
For the fourth and final data collection for the intervention phase, Emma decided to try imaginative play with the microwave toy. Emma found it more difficult to remember and use the strategies whilst also trying to engage Blaine in the play, and he lost interest and went to look for different toys at the halfway mark. Emma was flexible and coped with the change of plan, but the data reflects that this was a more challenging activity to fully integrate core board strategies into (Figure 5.1). Emma used less strategies overall, and Blaine used less spoken words or symbols than the previous data collection (Figure 5.3).

End of the Intervention Phase

Emma and Blaine had both made very significant amounts of progress by the end of the main intervention. In the end of intervention survey, Emma indicated that she felt more confident to use the core board, she felt her skills had increased and her child's communication had improved significantly. She identified that the most helpful strategies that she had learned were using motivating activities, withholding items, offering choices, and using prompting. As expected, she rated the workshops as less useful than the coaching, but she stated that she had found it useful to hear about other parents' experiences. She indicated that she particularly valued how the coaching was personalised. When asked to list two ways she had changed her communication, she wrote "*I've slowed down my communication with him – the core board makes me. I'm more predictable.*" As a final comment, Emma wrote "*My son's communication has come along in leaps and bounds and he loves his core board.*"

Early Maintenance Phase (three to six months)

At the first maintenance coach, shortly after the main intervention ended, I was able to show Emma the graphs that represented the data from the baseline and first four data collections. These clearly showed how she had developed and maintained her use of supportive AAC strategies, and the positive effects these had had on Blaine's use of spoken words and the core board. The graph that represented Emma's percentage use of aided language modelling showed a gradual and steady decline from an initially impressive 22% (Figure 5.2). I did not pass comment as I showed this graph, but Emma paused and then made a drawn out "oh". It was a powerful way to represent an issue that we had discussed at previous coaching sessions, and the effect can be seen in Figure 5.5 below.

Figure 5.5*Change in Percentage of Words Modelled After Viewing Data*

This coaching activity focused on building Emma's confidence with play. My observations in the coach log noted the following:

Emma is very competent at using core board strategies but has ongoing issues with keeping Blaine engaged in play activities. He has a very short attention span, and she sometimes misses opportunities to follow his lead or make it exciting enough to hold his interest.

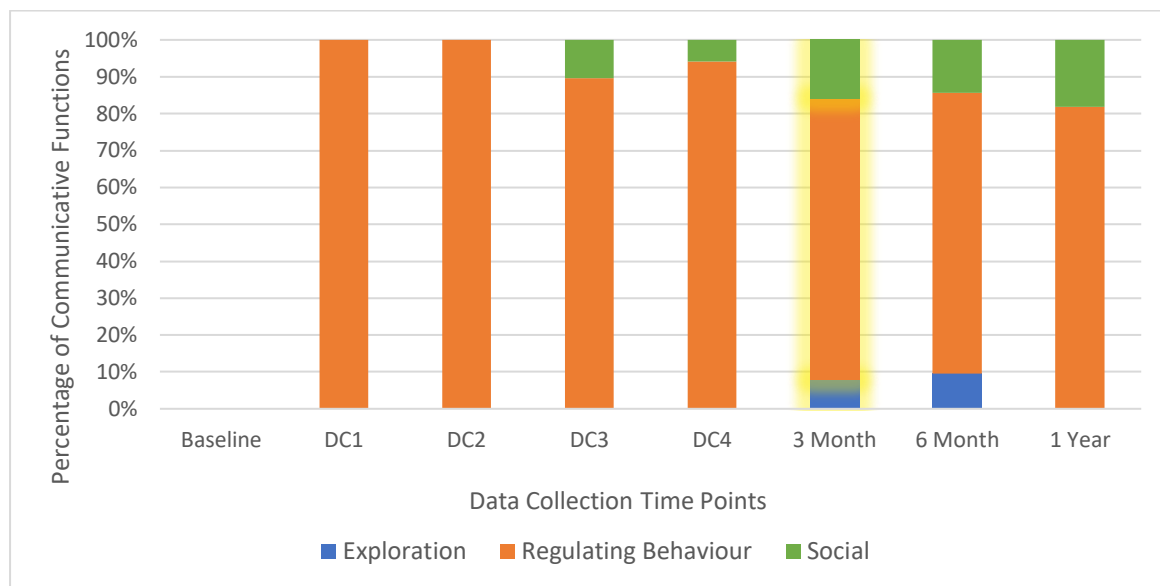
We talked through different strategies to keep him engaged for longer, including how to arrange the environment.

The 3-month data collection, shortly after this first maintenance coach, shows a marked increase in the percentage of words that Emma modelled on the core board (Figure 5.5). She used all four strategy groups with skill, resulting in Blaine using the core board more than any previous data collection (Figure 5.3). Blaine was also starting to use the core

board for more social purposes, which may have been in response to Emma modelling a broader range of communicative functions on the core board (Figure 5.6).

Figure 5.6

Different Communicative Functions Used by Blaine



Shortly after this data collection visit, I received an excited text from Emma, (Figure 5.7).

Figure 5.7

Text Message from Emma



Emma's hard work and increased use of general aided language modelling was paying off, and Blaine was now using the core board for more than just requesting.

The following 3 months contained several significant life events for Emma. She gave birth to her third child, who had some initial health concerns, she had a family bereavement and she got married. There was also a second COVID-19 lockdown towards the end of this time. The second maintenance coach was postponed because of the lockdown, and I was concerned that it would be too difficult for Emma to maintain core board use or communication strategies during this time. I sent her a text to check in after the birth of her baby and was surprised to hear that she was still managing to maintain and build on their progress (Figure 5.8).

Figure 5.8

Text Message from Emma



After three attempts to meet in person were cancelled, the next two coaching sessions took place via Zoom. This worked well for Emma, as she was very comfortable with technology, and she was able to schedule the meetings for after the children were in bed. She took the videos herself beforehand and shared them with me ahead of time. This gave me time to watch them and edit them beforehand, and we then watched them together at the start of the coaching session. Emma refers to how well this worked for her in her interview:

It's kind of better, it made more sense because it will get him also in his natural environment of using it, like how we actually use it. Because I mean, we could set up an activity like say, if he was right here and do it, he would use it. But that's not how he would use it in everyday life. So to me, it made more sense, and also to Sam, to do the coaching in a way that fitted in with how he uses the core board in everyday life.

Emma preferred to use naturalistic activities that fit with her family routines, so often focused on using the core board with Blaine when he was watching programmes on television. Whilst some children would find it hard to share their attention between television and AAC, Blaine enjoyed talking about what he was watching with his mum.

During this time before the 6-month data collection, Emma continued to focus on extending her aided language modelling. She also set a goal to focus on Blaine putting more symbols together. By now, Emma was a confident participant in coaching. In my coach log, I noted:

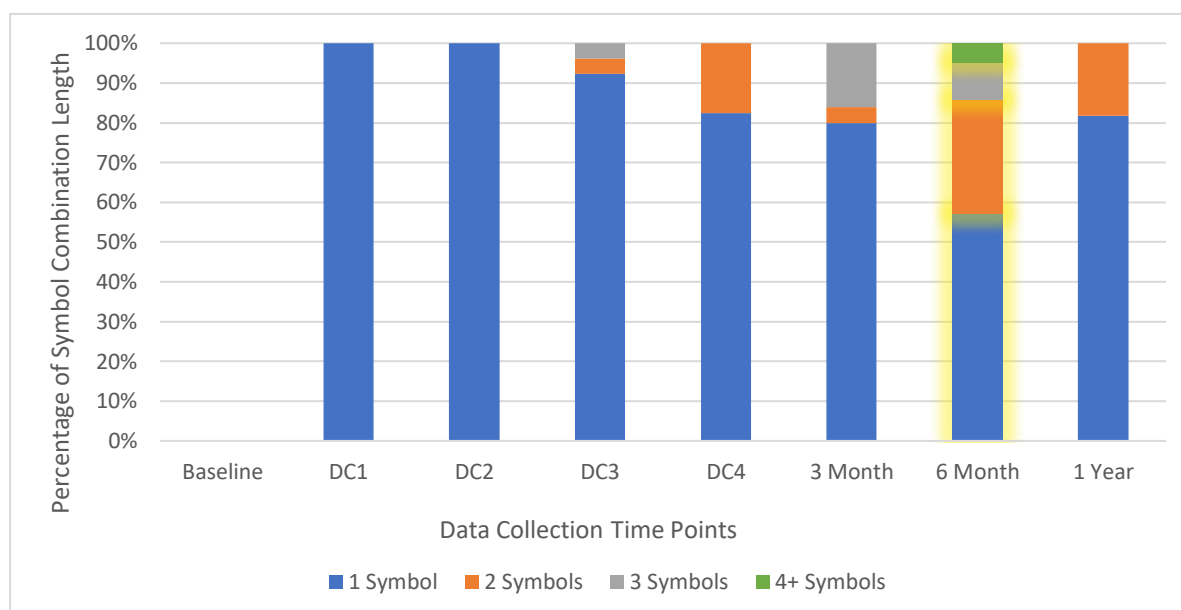
I suggested a sentence she could model when she can't understand what he's trying to say. Emma felt that this sentence was too long and confusing and came up with a better one for Blaine. She also said that she only wants to model core words because she feels like Blaine knows the fringe well and uses it too much. This was very

insightful, and I agreed. Emma has the confidence now to disagree with me at times and use the strategies to suit her situation.

In the time leading up to the 6-month data collection, Blaine continued to increase his use of spoken language. Although some high frequency core words were produced accurately now, Blaine became harder to understand as his vocabulary grew and he put more words together. He had a diverse range of interests that he liked to talk about, and many of the words he needed were not available on the fringe strips. Blaine had already started to use symbols creatively to try to explain what he meant, and in these maintenance coaching sessions, Emma and I talked through ways to help him to do this more, including using shapes, colours, feelings, describing words, and the first letter in the word on the alphabet fringe strip. The 6-month data collection was slightly delayed until the end of the COVID-19 lockdown. Emma chose to stick with snack time elements. She continued to maintain the taught strategies, again improving her percentage of modelled words. Blaine used the core board frequently, including more multi-symbol utterances (Figure 5.9)

Figure 5.9

Number of Symbols Blaine Used in Sequence



Later Maintenance Phase (6 months to one year)

The final 6 months of the study saw Emma return to work from her maternity leave, and a rapid growth in Blaine's spoken language and his general intelligibility. There were three coaching sessions in this time, one via Zoom, and two in person. There was a gradual shift away from core board use as Blaine used more intelligible speech. He continued to use the core board as a tool to help people understand him. Using the symbols on the core board creatively to help people interpret his speech became a familiar strategy for Blaine during this time. My reflective journal refers to an instance that Emma shared with me in the final months: "he was trying to say the word 'monster', so he acted out roaring, then pointed to 'black', 'scared' and other things on the core board until they got it". Emma also referenced this occasion in the final interview:

One was 'monster', like he recently ... became quite obsessed with like zombies and monsters and werewolves and stuff. ... And he was trying to tell me about a monster, and he was adamant ... But I still just couldn't understand what it was, like at all. So, he went and got the core board, and we spent maybe like, probably about close to 5 minutes with the core board with him trying to show it. He was like determined to tell me, but eventually got there like and because monster's not on the core board, so we had to use like those different strategies that we'd already learned to be able to communicate that with him. And he was just so stoked when he can get his word across.

In the final coaching session, I observed Blaine point to 'yellow', 'triangle' and 'chip' off the fringe strips to request Doritos. He tried to identify the first sound in the word on the alphabet strip but was unable to do this because he did not use the correct sound in his own spoken attempt. He also pointed to the star symbol on the shapes strip to describe Patrick the

starfish from Spongebob Squarepants. Emma reported that Blaine uses the core board innovatively in this way to help people understand what he is saying. As Blaine developed more language, his communication revealed that he had many complex and interesting ideas to communicate. He became more persistent about wanting people to understand him. Emma reflects on this in the final interview:

I always knew he was smart, but the kid can name every single planet and order... So that's been the coolest thing I think about hearing him start to communicate more... I can hear the personality coming out in his words. And like him making weird little jokes and stuff, you know, like normal 3-year-olds.

A problem with only using a core board infrequently to help repair communication is that it becomes harder to remember where to find symbols without frequent practice. This was evident in the final data collection at one year. Emma and Blaine could not find the core symbol 'open', a symbol that they had used with high frequency in the early days of the study. They searched for several seconds, and Blaine was delighted when Emma eventually located it; he used it several more times despite being able to say 'open' clearly. Emma also had difficulties navigating and finding different fringe strips that were previously well used, and when Blaine couldn't make himself understood, he was unable to find the symbols he needed to clarify on the core board. Blaine had effectively outgrown the core board by this time, something which Emma confirmed in the interview:

My feelings like that changed a bit because I was like, yeah, it's not a forever thing for him. It's not the right tool for him to go into school with. But it's the perfect tool for the time that he needed it. It was the perfect starting tool.

In the final data collection, Blaine used 141 spoken words, many combined into phrases, and although he still had significant speech errors, most of his spoken language was intelligible within context.

Barriers and Supports

There were many issues and events over the time of the study that could have caused Emma to abandon using the core board with Blaine. In her interview, Emma underlines that this was a very eventful year in general:

Yeah, it's been big year mate (laughs). I mean, the pandemic was obviously a hit. That just felt like the gift that keeps on giving (laughs). And then I obviously I had my baby. My baby has a heart condition, so there was a lot of stress in the pregnancy as well. She's fine ... And then my grandfather passed away, and we got married.

Information about the barriers and supports for this family was gained informally over the year through observations, informal conversations, and the coaching conversations. Many of these observations and notes were reinforced by Emma in her interview at the end of the study (Table 5.1).

Table 5.1

Supports and Barriers for Using AAC Experienced by Emma

	Supports	Barriers
Interview or survey data	<ul style="list-style-type: none"> • Receiving training on how to support the core board • Coaching • Making it part of the routine 	<ul style="list-style-type: none"> • Life events • Time / busy • Reluctance to delegate to others because of a belief that

	<ul style="list-style-type: none"> • Parental attitude to AAC • Strong coaching relationship • Seeing child make progress • Seeing effects on child • Supportive day care 	<p>there was a wrong way to implement AAC and it may do harm</p> <ul style="list-style-type: none"> • Limited support from significant others • COVID-19 • Core board design
<p>Informal conversation or observations</p>	<ul style="list-style-type: none"> • Emma’s critical thinking skills • Emma’s confidence • Equal partnership in goal setting • Child’s quick uptake of the core board / immediate results • Child’s personality – easy-going and motivated to communicate • Supportive family 	<ul style="list-style-type: none"> • Family have strong preference for tech

One of the interesting beliefs that Emma expressed, and which became more apparent over the study, was that the skills needed to support a child to use a core board were difficult to communicate to others. Her concerns that if support from adults was done incorrectly, it may do harm, meant that she remained the only person to fully use the core board with Blaine over the course of the study. Emma did not specifically identify this as a barrier, but I have

interpreted it as a potential barrier, because it meant that, despite have a close-knit extended family and a supportive day care, the onus fell on Emma to do most of the work of implementation. Emma first mentioned these concerns in her initial survey at the start of the study. In her interview, she explains that she showed her mum and her partner “the really basics, but I also was aware that I didn't want them to learn badly, to teach him how to do it badly.” Eventually, Blaine was able to use the core board to the point where he involved his dad and showed him what to do; in the interview, Emma gives an example of how he taught his dad to do a people game with him, showing him what words to point to on the core board. Emma reports that Will continued to use the core board with Blaine throughout the course of the study, although mainly with Blaine initiating the communication, but Emma’s mum, who provided significant amounts of childcare, did not remain invested and stopped using it with him: “my mum probably stopped using it as much. She was just like “ugh”.” Emma herself identified that “training is pretty vital on how to use it” in her post-intervention survey, so it is interesting that she did not try to pass the knowledge on to others.

Core board use in the day care followed a similar pattern. In her interview, Emma talks about how supportive the day care staff are towards Blaine, however she delayed sending the core board to day care with Blaine until after an IEP eight weeks into the intervention, even though he was using the board competently by this time, again because of her concerns that it may be misused.

So but we kind of introduced it to day care once again, he was already really familiar with it, and he knew when to use it and how to use it. So it was kind of used for the same thing that it is *now* in our house, so he used it at a daycare when he needed it, not to develop his language. So we used it at home to develop his like skills of the core board at that time. We were doing the nightly ones to use it properly and develop his language. At daycare it was there as a tool for understanding him.

Despite this and other significant barriers during the year, Emma established a consistent routine to ensure that the core board was practised and used regularly, ensuring that this fitted with her family's culture and daily routines:

we would do 20 minutes, but it would always be like when he was watching TV or something, because he always wanted to chat about stuff that he was watching on TV. So it made just more sense for it to be in an environment that was comfortable and relaxed for him.

These core board practice times in the evenings were enjoyed by Blaine and seen as special time where he had his mum's undivided attention: "he kind of just got that one-on-one undivided attention, and he liked that and he needed that." Blaine's ready acceptance of the core board, the quick progress that he made, and his obvious delight when he used it successfully to make himself understood would have provided strong motivation to continue through several planned and unexpected life events. Emma recalls this in her interview:

But he had all this stuff that he wanted to say, like more than just like, eat, drink ... He didn't just want stuff. He wanted to be able to, like, chat with us about all this stuff that he knew ... it's cool as a parent for him to see that he's able to be able to communicate, what interests him and get that knowledge out somehow, because he just didn't.

Emma recognised that the training provided during the intervention, and the ongoing support, was a strong factor in the success they experienced: "But I think, yeah, it'd be so weird if you just like got it and didn't have any training ... I would literally never use it like." Additionally, Emma appeared to enjoy her new knowledge, and was able to apply her strong critical thinking skills to adapt it for her family situation. In the first coaching session, she talked about how interested she was to learn about core words and why they would be

important for communication. She learned new strategies quickly and her confidence grew so that she became an equal partner in the coaching relationship and took a lead role in goal setting. Emma comments in the interview about how the coaching relationship developed over time:

I just became more relaxed by the end of it. I just didn't really have any... like, Sam was just like normal by then (laughs), no, like, I just didn't really have any concerns. I wasn't like: oh, I haven't done this right or anything, because I was like, okay, so it was just really "a learning experience".

Emma also talks about how coaching, particularly watching herself on video, helped to improve her self-awareness: "oh, the amount of times I asked ... closed questions. Like I was asking so many closed questions." Also:

I think watching the video back was probably the first time I've realised how fast I talk ... But watching how I was like speaking to Blaine at the beginning ... I would talk really fast like. So for a kid who was already having communication difficulties with his sounds and everything, it probably didn't help. So, but then, you know, it did force me to slow down as the time went on.

Ultimately, Emma and Blaine used the core board on a regular basis throughout the study period, until it was no longer useful for them because Blaine had enough spoken language to communicate. Despite a number of significant barriers, Emma had enough supports and motivation to continue to use the strategies she had been taught, and the data shows that this was a successful implementation of AAC.

The End of the Study

By the end of the study, Blaine was mainly using spoken language to communicate at home, and Emma reported that he was only using the core board once a day, if that. She also

noticed that he was starting to find it slow and frustrating, especially as he was less familiar with the location of different symbols now. Emma considered whether a high tech AAC option might be more appropriate for him in the final interview:

so probably the next logical step for us is to move to like something like ... TouchChat, or something like that, because he's already got an iPad, he has like a certain amount of iPad time each night. And he picks up that stuff sort of like super, super, super quickly. So that would be the logical next step for us. Because it would just be easier for him going forward with like, talking faster. Because he thinks fast. He thinks fast, he acts fast, unless it's really, really important and he's going to continue talking about that one thing until you understand it.

Emma felt he had outgrown the core board by this point, but acknowledged its importance in moving his communication forward:

Like do I think it would be the right tool for Blaine moving forward as he gets older? No, I don't believe it's the ideal tool for him. I think something along the similar lines that's like on a piece of technology would be better for him. But I think it took him really far in his communication this year. Like to get to where he *was* to where he is now.

After the study ended, I completed a comprehensive report which detailed all aspects of the intervention. This included information about the progress that Emma and Blaine had made and recommendations for next steps. I suggested that specific therapy working on speech sounds could be useful at this point, as well as exploring options for high tech AAC. This was shared with the family and their team at the Ministry of Education. Blaine continued to receive support from this team after the study, including input from a speech language therapist.

I caught up with Emma 8 months after the study finished. Blaine was due to start school soon, and Emma had concerns that people would not understand him at school. He had continued to develop spoken language, but intelligibility was still an issue. The baby was now 18 months old, and Emma had noticed that she had not started babbling and had no words. Emma said she wasn't too worried, because she knew what she was doing this time, and was ready to do it all over again.

Case Study 2 – Kate and Grace

“The hard work is worth it, child and parent, as each child has a voice and we need to hear it in any form!” (Source: post-intervention survey)

Background Information

Grace and her mother, Kate, were recommended to the research project by their Ministry of Education speech language therapist. At the start of the study, Grace was 3 years and 9 months old and was not using any spoken language. Grace has complex physical needs with a diagnosis of Spina Bifida with several complications. Kate is an experienced early childhood kaiako (teacher), and Grace attends the centre where Kate works.

Grace has a Māori and NZ European cultural background; Kate describes the family culture as “Kiwi”. She lives at home with her parents and teenage brother. She has lots of contact with her grandparents on both sides, as well as with Kate’s sister (her aunt). The family also have a large friendly dog, and a cat who liked to make regular appearances during data collection videos. There is usually a pet insect or two in the living room, as Grace is fascinated by the natural world, especially bugs and fish. Grace’s dad is a truck driver and was not present during any of my visits. He opted not to use the core board as he had his own ways of communicating with Grace.

At the start of the study, Kate had recently changed jobs to another day care facility, and Grace had moved with her. Kate worked in the same room as Grace at the time, and Grace’s education support worker (ESW), John, had continued to provide support in the new setting for 2 hours each day. Kate described Grace’s relationship with John as very strong and stated that Grace would do more for John than she would for her, particularly when in the day care setting. The MOE speech language therapist had introduced Makaton signing, and Grace

was using a few signs with John, but Kate told me that she usually refused to use them at home.

During the information gathering discussion, Kate described Grace as having a big personality, with a well-developed sense of humour and a strong stubborn streak. She reported that Grace could be fearful of new things and new situations and had a strong dislike of “contraptions”. This was not surprising, as Grace had already had numerous medical procedures and surgeries and had many more to come. She was due to have hip surgery imminently (it ended up being postponed several times until well after the study ended) and wore AFOs on her legs for much of the day and night. Grace had a standing frame which she also didn’t enjoy, as she disliked the feeling of being restrained. Kate expressed concerns that Grace would reject the core board as another unwelcome contraption.

Kate informed me that Grace had many play interests, but dinosaurs and animal toys were her favourite, as well as a range of story books. Kate felt that Grace had good understanding of spoken language, along with well-developed problem-solving skills. Grace could answer questions with head shakes or nods, or by pointing. At the start of the study, Grace communicated by using intonated vowel sounds, facial expressions, some signs, some iconic gestures such as an exaggerated shrug to indicate a question, as well as pointing, hand leading, and clear head movements for yes and no. Kate reported that Grace had some words around the age of 2 years but stopped using these after a previous hip surgery. Despite her lack of spoken language, Kate reported that Grace was a persistent communicator and used the skills she had to communicate a range of needs and ideas. At this time, Grace was described as sociable with adults. She tolerated children playing near her but would become upset if they tried to play with or take her toys. She relied on adults to help with this and would get their attention by making noise or screaming.

Grace was able to move around the room by rolling, crawling, and pulling herself up on furniture. She could not independently weight bear through her legs or walk. Her fine motor skills were reported to be slightly delayed, although she enjoyed a range of fine motor play activities. She relied on adults for most self-care activities, such as washing and dressing, and was not continent. She was able to feed herself independently and enjoyed a range of foods. Kate reported that she liked to do things for herself but was also able to indicate when she needed help. Despite her physical limitations, there was no clear reason why Grace was not using spoken language as she appeared to have age-appropriate eating and drinking skills and was highly motivated to communicate. Grace had several professionals involved in her care, including a physiotherapist, orthopaedic surgeon, and the Ministry of Education professionals. My case history notes record that these people were important to the family, and Kate felt they were part of her team.

Of all the families involved in the study, Kate appeared the least worried about her child's communication delays. In the initial survey, which she completed during the baseline visit, she rated herself as between "slightly" and "moderately concerned" about Grace's communication difficulties. She added in conversation that she felt that Grace "would get there in her own time". Her attitude towards using a core board was positive at this point, and she ticked the following statements from a selection representing perspectives about using a core board with her child:

I'm excited to try something new

I'll try anything to help my child

I think this could relieve their frustration.

Kate also indicated in the survey that she was excited to be the key person assisting Grace to use a core board and felt that it made sense as she is with her most of the time. Her only concern (expressed during conversation) was that Grace would refuse to use it.

Baseline Data Collection

Throughout the study, whenever I met with Kate, Grace was always present, including the initial consent visit, and during the case history taking interview. Kate did not have easy access to childcare and tended to have Grace in the same room, watching favourite clips on her iPad if we were talking. Therefore, I had already had opportunities to meet Grace and observe her interacting with her mother before the baseline video. Kate had indicated that she was anxious about being videoed prior to the data collection, but in the event, she appeared relaxed and confident.

Kate is an experienced kaiako, and that was immediately evident in the baseline video. She handled the toys confidently and knew how to set up interactive games that would keep Grace engaged. For example, when Grace showed interest in a bubble machine, Kate immediately took control, set up the machine, and then used it in timed bursts so that Grace had time to pop the bubbles and then request another turn. For her part, Grace had strong attention skills, was able to wait patiently as her mum loaded the bubble machine, followed instructions, and reacted with delight to Kate's turns. There was consistent joint engagement for the 10 minutes of video. Kate skilfully used language enrichment strategies such as labelling and repeating a range of nouns, verbs, and adjectives, using carefully paced language with pauses for Grace to respond. She also used several of the strategies to be covered in the second workshop – creating opportunities for communication. Kate consistently followed Grace's lead and tended to use more comments than questions.

I observed that Grace communicated for a range of communicative functions: requesting, protesting, expressing interest, sharing attention, responding to questions, and giving instructions, all achieved through vocalisations, gestures, and facial expressions. She was a persistent and skilled non-verbal communicator. Kate tended to ask yes/no questions to ascertain whether she had interpreted correctly, and Grace responded with an intonated vocalisation and corresponding head movement. During this time, the core board lay to one side, and neither Kate nor Grace paid it any attention. In my reflective journal I noted that Kate already demonstrated many of the strategies I was going to cover in the workshops, apart from the specific ones for supporting the use of AAC.

Overview of the Intervention

Kate and Grace remained in the study for the full year. Despite Kate's concerns, Grace started to use the core board to communicate within the first week of the study, although she often appeared reluctant or mildly frustrated when reminded to use it and would sometimes refuse. Kate learned to use the specific AAC strategies and added these to her already considerable skill base (Figure 5.10 and 5.11). Grace enjoyed using personalised fringe strips that gave her more scope to communicate about her special interests and favourite people. Grace's strong personality and determined nature meant that both coaching sessions and data collection visits required careful planning in order to create a low-pressure environment, and the data collected was affected by her mood on the day (Figure 5.12). For the first few months of the study, Grace learned to use the core board to communicate a range of ideas on her terms.

Although she occasionally whispered approximations of spoken words, Grace remained mainly non-speaking until the 5th month of the study, when she suddenly started using spoken language during a COVID-19 lockdown. Once she started, she developed

language skills very fast, and by 6 months into the study, she no longer needed to use the core board. By this time, she was using phrases and a range of vocabulary, and was easy to understand. This was completely unexpected for both Kate and me, and the focus of coaching changed by necessity to language enrichment strategies. By the end of the year, Grace was talking in sentences and was a full partner in conversation (Figure 5.12).

Figure 5.10

Frequency of Kate's Use of Taught Strategies

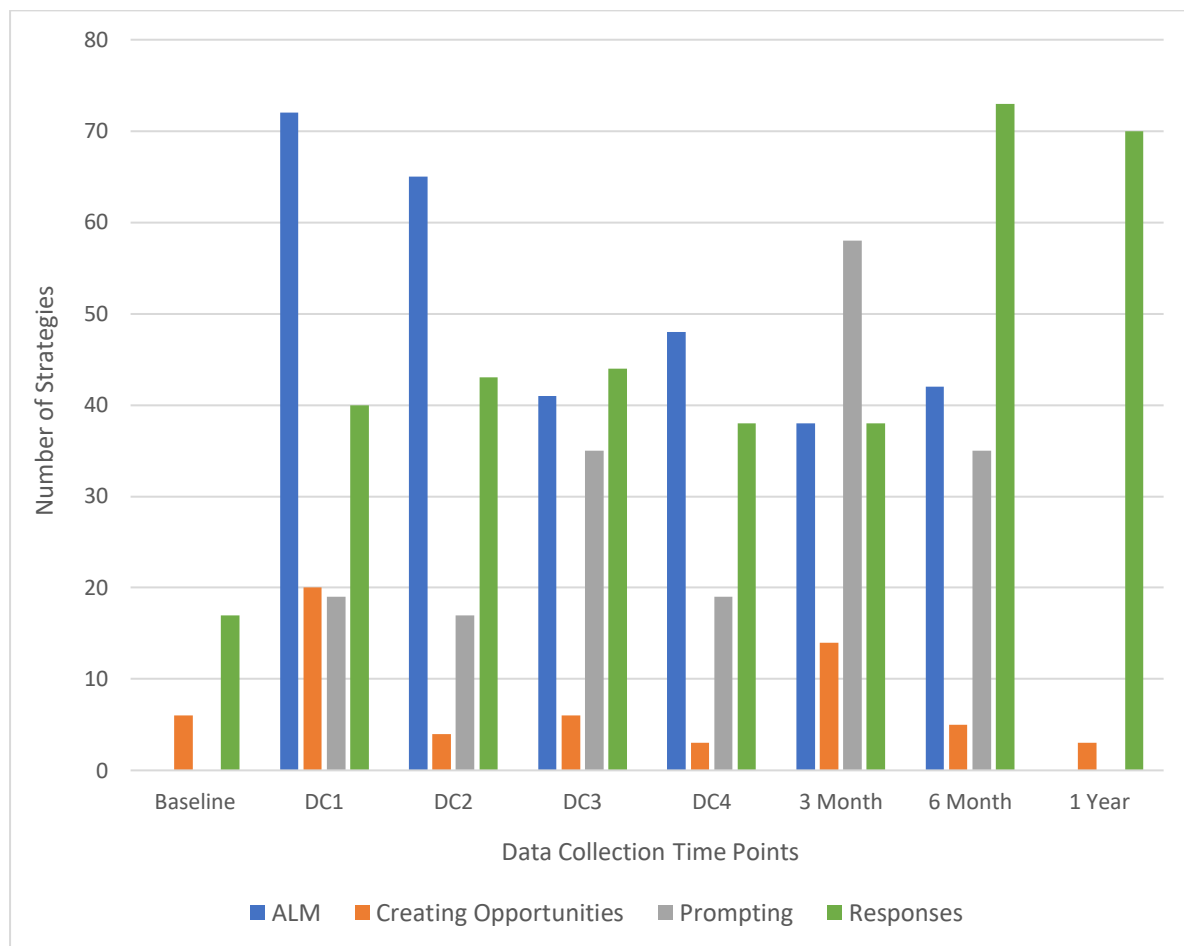


Figure 5.11

Percentage of Words Modelled on Core Board by Kate

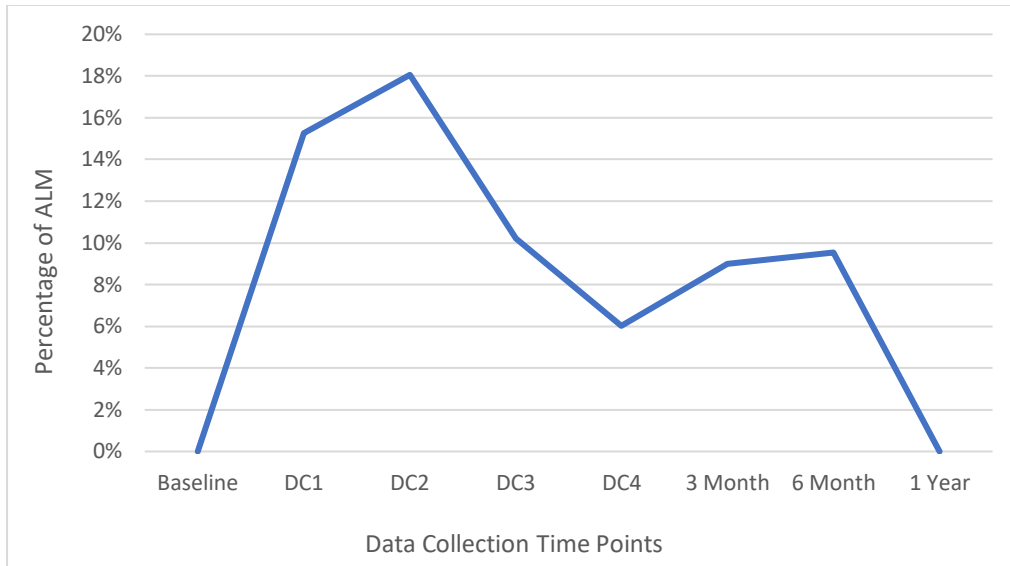
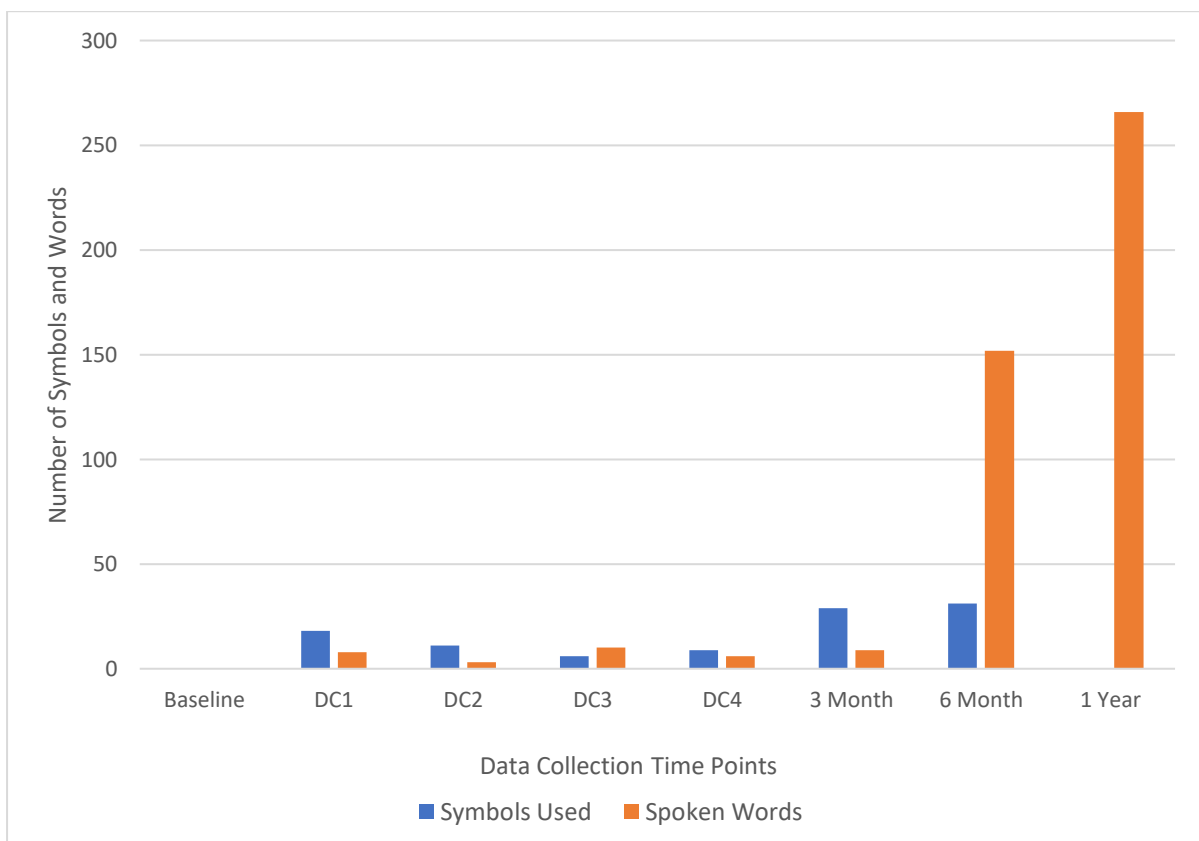


Figure 5.12

Grace's Use of Spoken Words and Core Board Symbols



The First Eight Weeks – The Intervention

Kate works full-time but managed to negotiate time off for the workshops. She was an active participant in all the workshops, contributing regularly to the group discussions and making efforts to get to know the other parents in the break times. In my reflective journal, I noted that Kate often approached the learning in the workshops in her role as a kaiako, especially in the first workshop. She often referred to how the core board would work in a childcare setting and was interested in the references I had quoted on different slides. While she was working on her action plan at the end of the first session, she brought up that it would be John, the ESW, who would be using the core board with Grace, so I reminded her that the action plan was intended for planning activities for her to do with Grace. In my reflective journal at the time, I noted concerns that Kate might view the core board as an educational tool rather than an AAC system.

Coaching with Kate was a journey that required considerable reflection on my part and helped me to develop my coaching skills further over the time of the study. Grace is a sensitive child who showed a high level of awareness that she was being observed or ‘set up’ for an activity, and often responded by refusing to participate. This was evident from the first coaching session, where she eyed me with suspicion from the moment I arrived, then refused to co-operate with any activity that involved the core board. Kate’s carefully written action plan was abandoned, and she had to spend some time calming Grace down with a soothing story, with the core board hidden out of sight. Eventually we abandoned any attempt at a video observation, and instead talked through the planned play activity and considered how Kate might have modelled on the core board during this. Kate had planned to model quite complex sentences on the core board, which matched Grace’s receptive language skills, but would have been too complex for her to attempt to copy. I made some suggestions for how to simplify this, and how to incorporate the board into some everyday activities where Grace

makes requests. At this point, Grace became hungry, and Kate was able to put this idea into practice by modelling EAT, BISCUIT, and MORE, which Grace copied. We adjusted the plan together and I drove away reflecting on how to make future coaching sessions less intrusive for Grace.

In contrast to the difficulties experienced during the first coaching session, the first data collection was successful. Grace selected a giant bubble machine and was captivated for the entire 10 minutes as Kate played a highly engaging people game involving big bubbles. Kate had taken on the suggestion to keep the initial modelling quite targeted and simple, and Grace appeared happy to use the core board to request more turns. Kate was already skilled at using strategies from group two – creating opportunities for communication, but she was also using prompting and response strategies with some success (Figure 5.10). Grace pointed to 18 symbols on the core board during the 10 minutes, and additionally was more vocal than previously, babbling with consonant sounds and attempting to copy some of Kate's words (Figure 5.12). I observed that Kate continued to use yes/no questions to affirm what Grace was communicating, even though this was much clearer now she was using the core board. For example, Grace would point to 'MORE', then Kate would ask "do you want more?" At this point, Grace would nod and vocalise, but Kate now additionally prompted her to use the core board to confirm yes, which caused Grace to make frustrated noises. However, she was having so much fun, that in this instance, she used the board when prompted by her mother.

Kate was diligent about completing the parent data collection for the workshops, and always arrived with a completed tally chart and home journal. Her first core board tally chart recorded that Grace had used many symbols, both core and fringe, over the past 2 weeks (Figure 5.13). Kate's journal reflected that letting John take the lead at day care had been a successful strategy for encouraging Grace to use it more, although she also reported that Grace was determined to use it on her own terms.

The second workshop covered a set of strategies that Kate was already skilled at using in the main. One aspect that may have been novel for Kate was the idea of toys that need help to operate. Kate was keen to improve Grace’s independence and fine motor skills, so tended to encourage Grace to keep trying rather than request help. Under normal circumstances, this would be a beneficial parenting strategy, but many of the toys and containers in the data collection boxes were chosen deliberately to be too difficult for children to use, to create an opportunity to ask for help.

Figure 5.13

Kate’s Core Board Tally for First 2 Weeks

I / me / my	it	who	what	am / is are / be	when	be careful 	all	some	that	this
he / she	we/ they/us	not / don't	come	do / does / did	again	now / it's time	how	why	finished all done	problem
you / your	drink	eat / taste	feel	get / got	late / later	ready 	all gone	bad	big	clean
give / gave	go 	hear / listen	help	like	where	away	cold	different	dirty	fast
look / see	make/made 	open/close 	play	put	here	there	good	happy	hot	little
read	say / tell	sit 	stand	stop	in	out	more 	sad	same	sick / sore
take	turn	wait	want	work	up 	down 	on	off	silly	slow
Fam 2 1	yes 	1	2	3	4	5	no 	toilet		

fringe words - dinosaur - Lots!
 - water play LOTS!
 - Sand play LOTS!
 - Bubbles LOTS!
 - Playdough - LOTS - Ball/Snake.
 - PETS - LOTS
 - Bugs - LOTS
 - ANIMALS x3 - LOTS
 - Helicopter/Car/Bus/Plane/Train/Truck - LOTS

Kate continued to be a confident participant in the workshops and often took on the role of providing support to other less confident parents. She shared willingly about aspects of using the core board that she found difficult, and in the second workshop, this led to a discussion about using the core board in public. Kate shared that she felt people were looking at her and judging her child. She reflected on this in the interview at the end of the study:

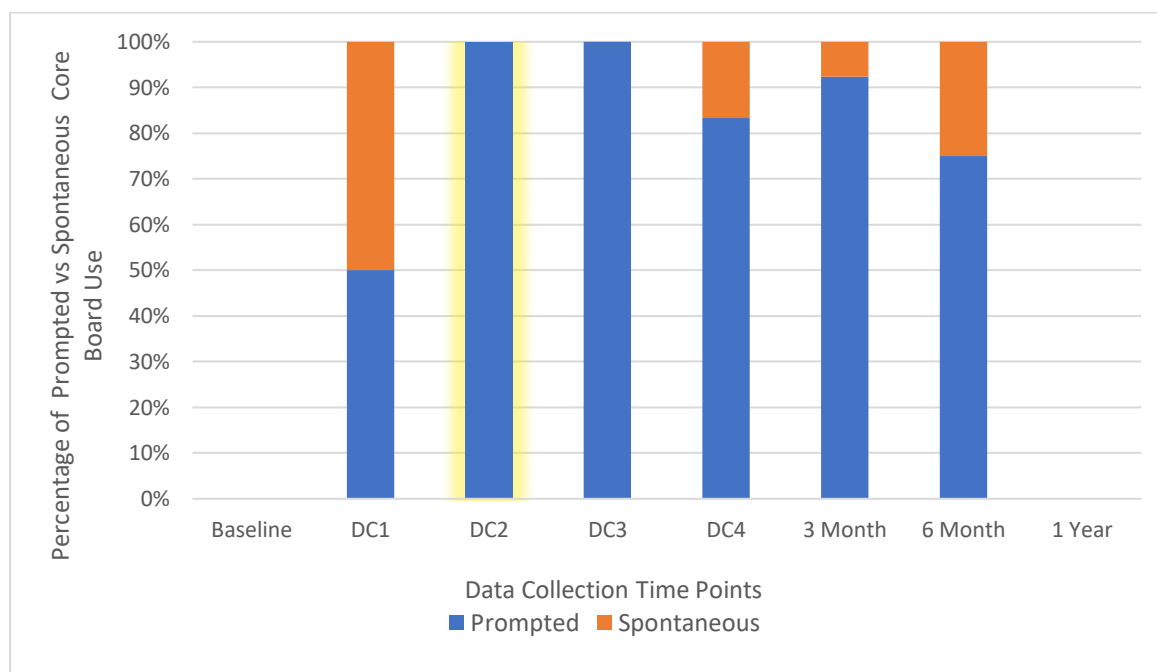
I think that was the hardest part and being out in the community with it. I don't know, it's probably me, but the looks I felt that I would get because it's something different that other people don't see. So, you always feel like all eyes are on me because I have this child that is different and I'm holding this thing, trying to get her to communicate. Because it's not known out there, and it should be.

The second coaching session presented more challenges. It was late afternoon and Kate had just got home from work with Grace, who was tired and hungry. Kate was trying to cook dinner and participate in coaching at the same time. Kate had planned some fun people games, but Grace was adamant that she wanted to watch videos on her tablet. Eventually I suggested that we use the video from the first data collection as an observation. However, even then it was difficult to get Kate's undivided attention. She was multi-tasking between meeting occasional demands from Grace, checking on dinner, and watching the video. Additionally, she frequently interrupted the video to talk to me about unrelated topics. I considered the possible reasons for this in my coach log: "I don't think she really likes looking at videos of herself, so often looks away or starts chatting." In between these distractions, we managed to have some discussion about her existing knowledge and skills, and how these could be adapted to integrate more AAC use. I drove away feeling quite frustrated and concerned that I was not following my coaching protocol, with the result that coaching sessions were not going to be useful for Kate. In the meantime, she had burned the potatoes and had to start cooking dinner again.

Kate decided to exclude the bubble machine from the second data collection, as she wanted Grace to explore different toys and activities. Although Grace explored the items available, she appeared to be in a more oppositional mood, and sometimes refused to use the core board when prompted. Kate tried to introduce a colour identification and matching game when Grace selected coloured lollies; Grace responded by rejecting the lollies and moving on to a different item. Kate tended to prompt her to use the core board when she communicated non-verbally, and this had the effect of frustrating Grace on this occasion. Kate also wanted Grace to try to open some lollipops for herself, so a significant amount of time passed whilst Grace struggled with the wrapper. These factors meant that Grace pointed to less symbols than last time (Figure 5.12) and all of these were prompted (Figure 5.14).

Figure 5.14

Grace's Prompted Versus Spontaneous Core Board Use



Kate increased the amount that she modelled on the core board (Figure 5.11) but used less strategies from the second strategy group (Figure 5.10). After the data collection was finished, Grace’s mood improved. I had a conversation about coaching with Kate, raising my concerns around Grace’s reluctance to participate in any activities under pressure, and the lack of time for any coaching conversation. Kate suggested that we meet in the supermarket for the next coaching session, as this is a place they visit daily, and is an activity that Grace enjoys and tends to be more willing to communicate in. Grace became very upset when I packed the toys up, and it took some time to persuade her to put the wind-up toys back in the box.

Kate provided more self-recorded data at the third workshop. She had stopped recording Grace’s use of fringe symbols but continued to tally core words (Figure 5.15). Her core tally showed that Grace was using a range of words, some with high frequency.

Figure 5.15

Kate’s Second Core Board Tally



Her home journal records that Grace was more willing to communicate with the core board when out and about, and that she was more accepting of it in general. On the other hand, John the ESW was away having surgery, and Kate noted that other staff at day care were not using the core board with Grace. Kate had been trying to get Grace to use the core board to talk about emotions, but this had been difficult. Grace was not keen to use the core board when upset or tired. Kate was happy that Grace was using the core board for 'please' and 'thankyou', stating that she had always refused to use these Makaton signs. Kate shared with the group that it was difficult for her to continue to use the strategies at home after she had been using them at work with Grace and other children all day.

The third coaching session took place at Kate's local supermarket; I met them there straight after work. Grace did not look pleased to see me, but I remained in the background as they perused the aisles, and overall, she was more relaxed and co-operative. I managed to get some video footage of Kate using the core board with Grace as they shopped, mainly Grace requesting items that she could see on the shelves. Afterwards we met back at the house, and this time Kate watched the video through and took a more active role in identifying the strategies she could see herself using. I noted in my coach log that Kate had a tendency to be overly self-critical when watching herself on video, so I guided her to see how effectively she had used prompting as a strategy and encouraged her to look at the effects this had on Grace's core board use. I had made a social story about the toys and data collection for Kate to keep and share with Grace, to try and avoid the distress caused when I take the toys away, and I left this with them.

For the third data collection, Kate decided to try drink choices with Grace, rather than toys. Grace used a range of effective non-verbal communications to indicate which drink, and which cups she preferred, such as pointing, reaching, and vocalising, but Kate redirected her each time to use the core board. When Grace did use the core board, Kate pushed her to point

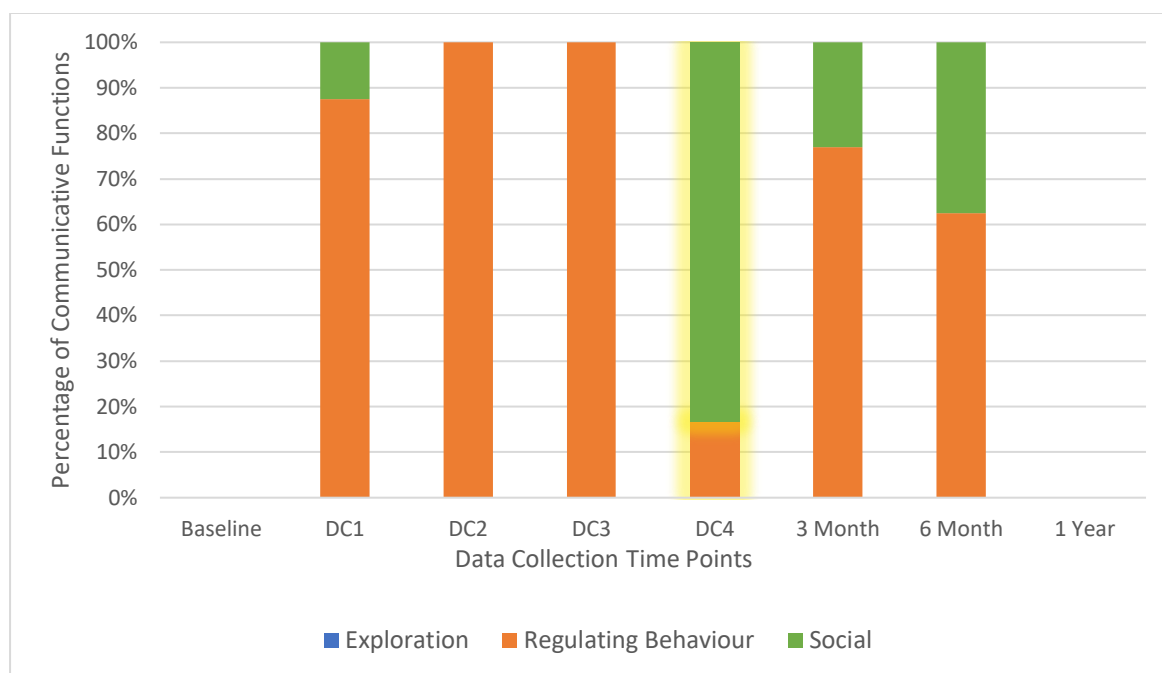
to two symbols in sequence. Grace was already in a precarious mood, and this level of prompting caused her to become frustrated and oppositional. She used the core board a few times after several prompts (Figure 4.2.3), but eventually stopped interacting, found a toy and refused to engage with Kate for the latter half of the recording. She is a very sensitive child and may have disliked being put under pressure, especially as the activity was not particularly motivating or fun. This was her lowest use of symbols to date (six) and although she did say 10 spoken words, all of these were an attempt at 'no'. Kate used less modelling than previously (Figure 5.11) but did maintain the other strategies (Figure 5.10). However, the use of prompting in this situation was probably counterproductive. Grace immediately cheered up after the recording finished and engaged in a game with me for the first time since the start of the study. The social story seemed to have had an effect, because she accepted me packing up the toys without obvious distress.

Kate arrived at the fourth and final workshop with more self-recorded data. Her core board tally (Figure 5.16) showed that Grace was still using a range of core words on the core board over the week (Kate had stopped noting down fringe words, possibly because there were too many to record). Kate's home journal reported that taking the core board to the supermarket had been going well, as well as using the prompting strategies from the previous workshop. Grace was starting to use the core board to join in with favourite rhymes and songs and had also started to point to feeling words such as 'sad'. She also noted that Grace is unwilling to use the core board when she is overwhelmed, such as at her recent birthday party.

Grace's most consistent form of communication. I needed to remind Kate to ask more open questions as I observed, and it was still difficult for her to think of open questions on the spot. Afterwards, we met back at the home to review the footage. Kate made time for the coaching conversation and watched the video without distraction. I noted in my coach log that she was showing more awareness of the strategies she was using successfully, as well as what she could improve on. We identified each time she asked a closed question and problem solved together to come up with an alternative open question.

The fourth data collection looked set to be another difficult one, as Grace initially refused to engage in any activity that was introduced. This time, I stopped recording, and Kate and I had a relaxed chat while Grace settled and got used to me being there. Then Kate tried again, this time with one of the storybooks – *This is not my hat*. Grace was immediately captivated by this story. Kate read the text and then used the core board to model some of the words, or make a comment, or ask a question. It's a difficult skill to read a story in an engaging manner and incorporate AAC use, but Kate seemed to do this without difficulty. Grace joined in with sounds, facial expressions, and pointing to relevant symbols on the core board. When the story was finished, Grace indicated that she wanted it again by passing the book to her mum and vocalising. Kate prompted her to use the core board to make this request. Whereas this would have caused frustration at other times, Grace happily pointed to 'DO AGAIN'. It was a privilege to watch such skilled use of AAC alongside a shared story.

The data collected shows that Kate maintained her use of the strategies during this data collection (Figure 5.10). Her percentage of words modelled is lower than previous times at 6%, but this was because she was reading quite large chunks of text and then modelling when she made comments or asked questions (Figure 5.11). Although Grace only pointed to nine symbols in the 10 minutes, she was fully engaged (Figure 5.12). Most of her communication in this data collection was social in nature, as shown in Figure 5.17.

Figure 5.17*Grace's use of different communicative functions****End of the Intervention Phase***

By the end of the 8 weeks of workshops and coaching, Grace was using the core board to communicate across day care and home on her terms. Kate reported that she was accessing a range of symbols from the core and fringe and it is likely that the data collection was not capturing the extent of her use because she often reacted to being observed by me. In the post intervention survey, Kate indicated that she felt her skills and confidence had increased, and she found all the strategies useful. She scored the workshops and coaching as both 'extremely useful', but recognised the difficulties with coaching, citing "Being in the child's environment, distraction, 'home life' ... Grace having moments where she just wanted me" as problems with at-home coaching.

I recall that I had concerns early on that Kate would find the workshops too basic, because she already had most of the skills, albeit not centred around AAC use. However, in

this survey, Kate rated the workshops highly and stated that she wished they were longer. She reinforced this feedback in her interview at the end of the study year: “I feel ... like the workshops could have been longer. But they helped in the way, because you're learning alongside the other parents” and “Sometimes it felt rushed just to be able to get through everything, and then you'd have questions later on.” In my reflective journal, I noted more than once that Kate often contributed during the workshops with her professional lens as a kaiako. It's possible that Kate was considering the information provided from both of her roles, teacher and mother, so needed more time to process this. It's also possible that she found the workshops more useful because they served a dual purpose. She was the only participant who expressed the view that the workshops needed extending.

Early Maintenance Phase

Kate was now using all the supportive strategies with skill. The first maintenance coaching session took place on a Saturday at a large supermarket with a fish department which Grace loved. The trip took over an hour because there was so much for Grace to communicate about, and Kate used a range of open questions and sensitive prompts to keep the interactions going. Afterwards, Kate identified the strategies she used and could see how these affected the interaction with Grace. In my coach log, I noted the growth in her confidence:

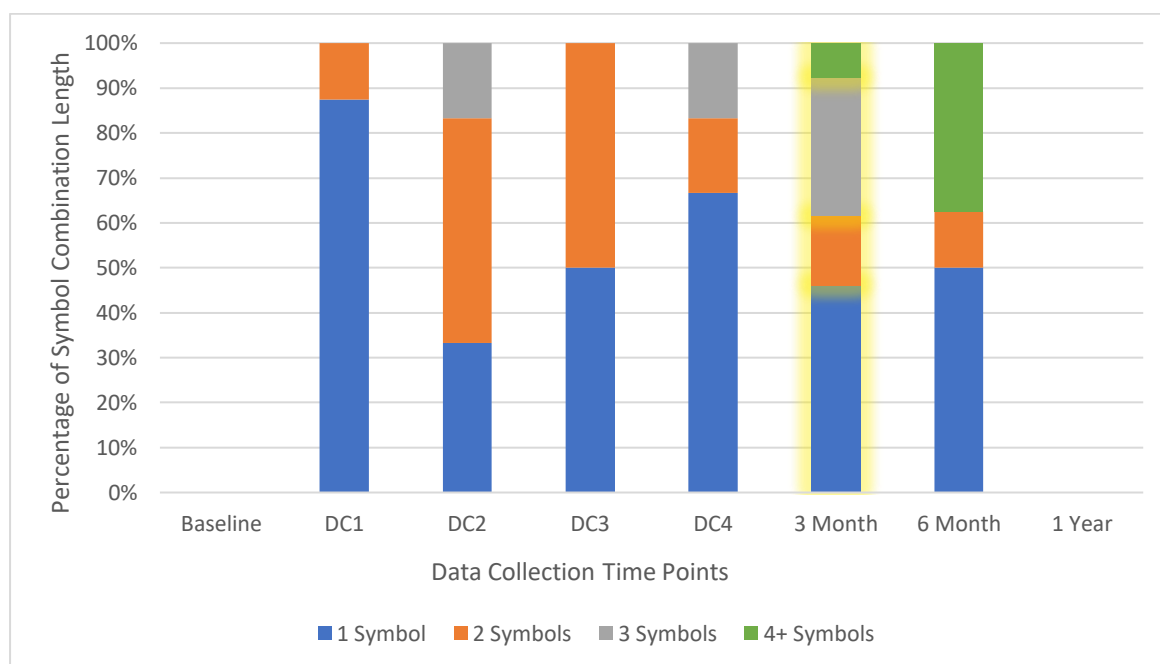
Kate stated that she is going to get people to video her at day care so she can look back and reflect on these videos during the maintenance phase. This represents a considerable move for her as she was not comfortable with video feedback initially.

The data collection at 3 months felt like a more accurate reflection of the progress that Grace was making. I waited and chatted with Kate for a while so Grace could settle. Kate set up some fun, repetitive people games with the wind-up dinosaur toys, and then used

prompting skillfully to encourage Grace to use the core board to make phrases to request another turn (Figure 5.10). Grace had been putting symbols together for some time but was often reluctant to do this during data collection videos. This time she used a range of phrases, as shown in Figure 5.18.

Figure 5.18

Grace's Use of Multi-Symbol Phrases



I had noticed at the previous data collection that accessing the core board could be effortful for Grace when she was sitting on the floor, as she needed to support her body with one arm and think carefully about her balance. I noticed this again today; she was having to put more thought and effort into accessing symbols than any of the other children in the study. During a 'ready steady go' game, Grace began to whisper "go" instead of accessing the core board, and Kate accepted this. This was the first time I had observed Grace intentionally use a spoken word to make a request, and I could see that it was much less effortful for her than accessing the core board, which required her to shift her weight, roll and prop before she could even start the scanning process.

Later Maintenance Phase (after 3 months)

Not long after this 3-month data collection, there was a COVID-19 lockdown and Kate and Grace had more time together at home. Kate began to send me videos of Grace saying words, including “mum”. By the time I visited for the next maintenance coaching visit 2 months later, Grace was using a range of spoken words and combining them into phrases. She was learning new vocabulary rapidly, and her speech sounds were surprisingly well developed considering the short time she had been talking. This was completely unexpected, and as I observed them sharing a storybook together, I could see that Grace had already outgrown the need for a core board. She was copying every new word she heard, and she also looked more relaxed than previously. Kate described this in her interview: “She started talking! (Laughs) Like that’s the only thing, it just randomly happened, and it started from ‘mum’ and then it just, in the space of two weeks it just, you couldn’t shut her up.”

Kate and I talked through where to go next. Kate wanted to continue with the study, so we looked at options for coaching, and decided that we would work on language building strategies together, including asking more challenging questions during story sharing. There were three more coaching sessions during the year-long study, and these were all held in the home. Kate and I had developed a relaxed partnership in coaching by this time, and we used the remaining coaching to work on extending Grace’s rapidly growing language skills, and Kate’s ability to support her during imaginative play. There was no further need to work on the strategies to support AAC. Kate reflected on these coaching sessions in her interview:

Sam made it easy because she was able to explain, like even though I know I know it all, when you're on the spot you forget. And like you do it in everyday life and everything like that, but it's just ... So I don't do dramatic play or imaginary play very well, even in my teaching. And so I've always known the importance of it and why

it's amazing, but Sam made it so easy, and so I use that more, and it seemed to get more of a positive response from Grace.

Grace's spoken language continued to develop quickly. At the 6-month data collection she said 152 words, including 'triceratops', 'dinosaurs', 'moving' and several three- and four-word phrases (Figure 5.12). Kate prompted her to use the core board occasionally, but it wasn't necessary. By the 1-year data collection, Grace was talking in sentences and the core board was only used as a flat surface for the wind-up toys that she still loved. She used 266 words in this recording (Figure 5.12). Once the core board was no longer necessary, Grace was noticeably more relaxed during coaching activities and data collection, and we developed a happy friendship. It is not clear to me why Grace developed spoken language so late, how she caught up so fast, or whether the core board was a catalyst for spoken language. In my reflective journal, I mused on whether it was a form of selective mutism based on trauma from her hip operation. It is possible that the focus on communication during the study was a factor in her quick acquisition of spoken language, plus the frustration of having to use a tool that was slow and physically effortful for her. Kate attributes the communication success to the core board in the interview: "Grace is proof of the benefit".

Barriers and Supports

Kate and Grace remained in the study for the full year and used the core board consistently both in and out the home until Grace was able to use spoken language. Table 5.2 shows both the supports and barriers that Kate experienced during the year, either explicitly outlined by her in her interview, or discussed or observed over the study year.

Table 5.2*Supports and Barriers to AAC Use Experienced by Kate*

	Supports	Barriers
Interview or survey data	<ul style="list-style-type: none"> • Training / strategies • Personalised, flexible coaching • Making it part of the routine • Parental attitude to AAC – a belief that it was “her voice” • Support from ESW • Support from sister • Being present at day care • Meeting and learning with other parents 	<ul style="list-style-type: none"> • Child’s personality and determination • Child’s reaction to “contraptions” / refusal • Reactions of people in the community • Attitudes / support from other day care staff • Core board design • COVID-19
Informal conversation or observations	<ul style="list-style-type: none"> • Prior knowledge and experience • Kate’s love of learning • Child’s progress • Personalised fringe strips • Core board useful for both professional / personal • Using while out in community 	<ul style="list-style-type: none"> • Busy life with many demands • Burnout from using both at work and home • Limited family support • Grace’s physical and medical needs

Kate has a busy life, working full-time in a demanding job as well as running a home with two children at different life stages. Grace's disability involves many medical and therapy appointments, use of equipment and regular therapy programmes. Although Kate has a good family network, she provides most of the care for Grace herself, apart from support from her sister. However, Kate very rarely complained that she was too busy or short of time either during the study informally, or during the interview. The most consistent barrier to using the core board, and one that Kate talks about frequently in her interview, was Grace's reaction to it and her strong, determined personality:

she's so determined, and very independent and has her own mind that she's like, "well, I don't need to do this, because if I just do this and action it out, you know what I mean and I know that I'm gonna get what I want".

Kate had already identified from the start that Grace may view the core board as yet another 'contraption' in her life, and her initial reaction to it seemed to back this up. Kate had to manage the core board implementation with more planning and consideration of Grace's sensitivities than any other parent in the study; she had to put time and thought into how to handle Grace's reactions, how to make it seem low pressure and fun. This affected coaching sessions and data collections. Kate had good support from Grace's ESW, who was an asset for getting Grace to use it initially, but who also had a long absence near the start of the study.

Working in the same day care as Grace was mainly a supportive factor, but Kate shared with the other parents during the workshops that it was hard to use the strategies all day with Grace and other children and then come home and continue there. The risk of burnout must have been high. Additionally, apart from John the ESW, other staff were not as supportive of the core board at day care, possibly because they saw this as Kate and John's

role, but also because some described it as “too much” and “too busy”. Kate’s prior skills, knowledge, and experience were undoubtedly an asset to the introduction of AAC, and Kate could see the benefit to other children that she worked with, not just Grace. This meant that Kate approached the learning involved in the study with a dual purpose, both for work and for her own child, which may have helped her to remain so dedicated. Kate could see the benefit of the core board for other children when it was made accessible at day care. Kate is a dedicated kaiako and has a love of learning and professional development that was undoubtedly a factor in keeping her engaged with the study. This, combined with her belief that the core board was her daughter’s voice, meant that I never felt concern that the system would be abandoned while it was still needed.

The End of the Study

By the end of the study year, Grace was talking in sentences and telling stories. Although she continued to need support from the Ministry of Education in relation to her ongoing physical needs, she no longer required the input of a speech language therapist. Her language was slightly delayed but continuing to develop at an accelerated rate. I provided a comprehensive report about the intervention and both Kate and Grace’s progress over the year for Kate to share with MOE and other professionals involved in Grace’s care. Kate continues to update me on Grace’s progress from time to time.

Case Study 3 – Sarah and Eli

“He likes when he sees that we understand what he’s saying. So, we’re like, “yay, I know what you’re saying”. And we can re-emphasise to him and talk back on the board. He tends to enjoy that.”

Background Information

Eli was the oldest of all the child participants in the study at 4 years and 6 months at the start. He lived with his parents in a ground-floor apartment. Sarah described the family as having mixed heritage, mostly Pacific Island, including Samoan, Hawaiian, and Māori. Sarah told me that both family and religion were important in their lives. Eli had regular contact with his wider family. Eli has a chromosome micro-deletion and autism. The family were referred by their speech language therapist from the Ministry of Education. They had been provided with a core board a year before but had not used it. Sarah was using some signing with Eli, and he was reported to be using a few signs to communicate at the start of the study.

Sarah was partway through a law degree, and Eli attended a local day care part time. Eli’s dad worked full time; he was present for the baseline visit, but I rarely saw him after this. Sarah described Eli as a calm, patient, and gentle child, who likes to do things for himself and persists with difficult tasks rather than asking for help. His special interests were animals, particularly marine animals, and insects, and he also enjoyed doing puzzles. Sarah reported that Eli was well-liked at his day care and had no problems with sharing toys. He could get overwhelmed by loud noises and was wary of unfamiliar people. On my first visit to the house, to provide information about the study, he stayed in the bedroom for the duration. Sarah also shared that she had to watch him carefully, because he tended to wander off and had little safety awareness. Eli was supported part-time at day care by an education support worker.

Sarah felt that Eli's understanding of language was delayed. He did not always respond to his name and needed instructions to be short and simple. He understood a few basic concept words. When she described Eli's expressive communication, it sounded mainly non-symbolic: for example, if he wanted something to eat, he would stand in front of the fridge and wait for his parents to interpret what he meant. Sarah did not have concerns about his fine or gross motor skills, although I observed that he appeared to have some difficulties with initiating movements and motor planning in general which became more evident over the time of the study. Eli was able to feed himself and complete some elements of dressing. He was in the process of learning to use the toilet.

In the initial survey, Sarah rated herself as 'extremely concerned' about Eli's communication difficulties. When asked about her feelings about taking the lead role in the therapy, she ticked that she was worried that she did not have the time, and additionally stated that her studies were very time-consuming. Her feelings towards using AAC appeared to be positive; she ticked the following statements from a mixed selection that represented different perspectives about using a core board:

I am excited to try something new

I'll try anything to help my child.

The core board they had been provided with previously by MOE was on a shelf. Sarah said they had not used it at all.

Baseline Data Collection

Eli's dad was present for the baseline visit and was able to entertain Eli while I chatted to Sarah. Eli then joined us for the data collection video. Sarah sat him on her knee, facing away from her and allowed him to explore the toys and snacks in the assessment boxes. She had a calm, quiet demeanour and appeared to be very tuned in to Eli's focus of

attention. She did not attempt to use the core board or any strategies to support AAC, but she followed Eli's lead, commenting on each item that he touched, labelling objects, showing interest, and providing help when it was needed. She modelled the sign for 'help' when Eli was struggling to open a box. Her language was simple, and she used a slow pace that matched Eli's reported level of comprehension.

During the 10 minutes, Eli did not turn to look at Sarah, nor did he noticeably appear to respond to any of her language. If he needed help, he sometimes held an object out to her, but she usually had to initiate offering him help. He appeared motivated by the toys, holding them up to his eyes and smiling, and then carefully putting them beside him. He particularly liked the wind-up animals but did not attempt to get his mum to wind them up, even after she had demonstrated she could do this. He was not able to wind them up himself. If he could not manage something, he tended to put it to one side and move on to the next thing, rather than seek out an interaction. I observed that Sarah was already using many natural parent/child interaction strategies that would usually be effective for promoting communication with a child, but these were not enough to encourage Eli to interact with her on this occasion. Eli appeared to be very self-contained, and happy to entertain himself. He was mostly quiet, with just the occasional quiet vocalisation. His movements were slow and careful.

Overview of the Intervention

Sarah and Eli remained in the study for the full year. Sarah learned the strategies quickly and maintained them throughout the year, becoming a skilled AAC communication partner for Eli (Figures 5.19 and 5.20). Eli was sometimes reluctant to use the core board to communicate, especially initially, but he used it within the first 2 weeks to some extent and continued to develop his communication skills from there (Figure 5.21). He was often resistant to prompting or feeling pressured to communicate. His communication became more

intentional over the course of the study, but he always required a skilled communication partner because he did not fully develop the strategic skills of making sure that he had the communication partner's attention before pointing to symbols. During the maintenance phase, his core board use dropped off at one point, although he continued using some signs. Sarah was busy with her studies and about to have a baby. With support, Sarah renewed her efforts to encourage him to use the core board and this was successful. By the end of the study, he was using the core board to communicate daily across a range of everyday routines.

Figure 5.19

Frequency of Sarah's Use of Taught Strategies

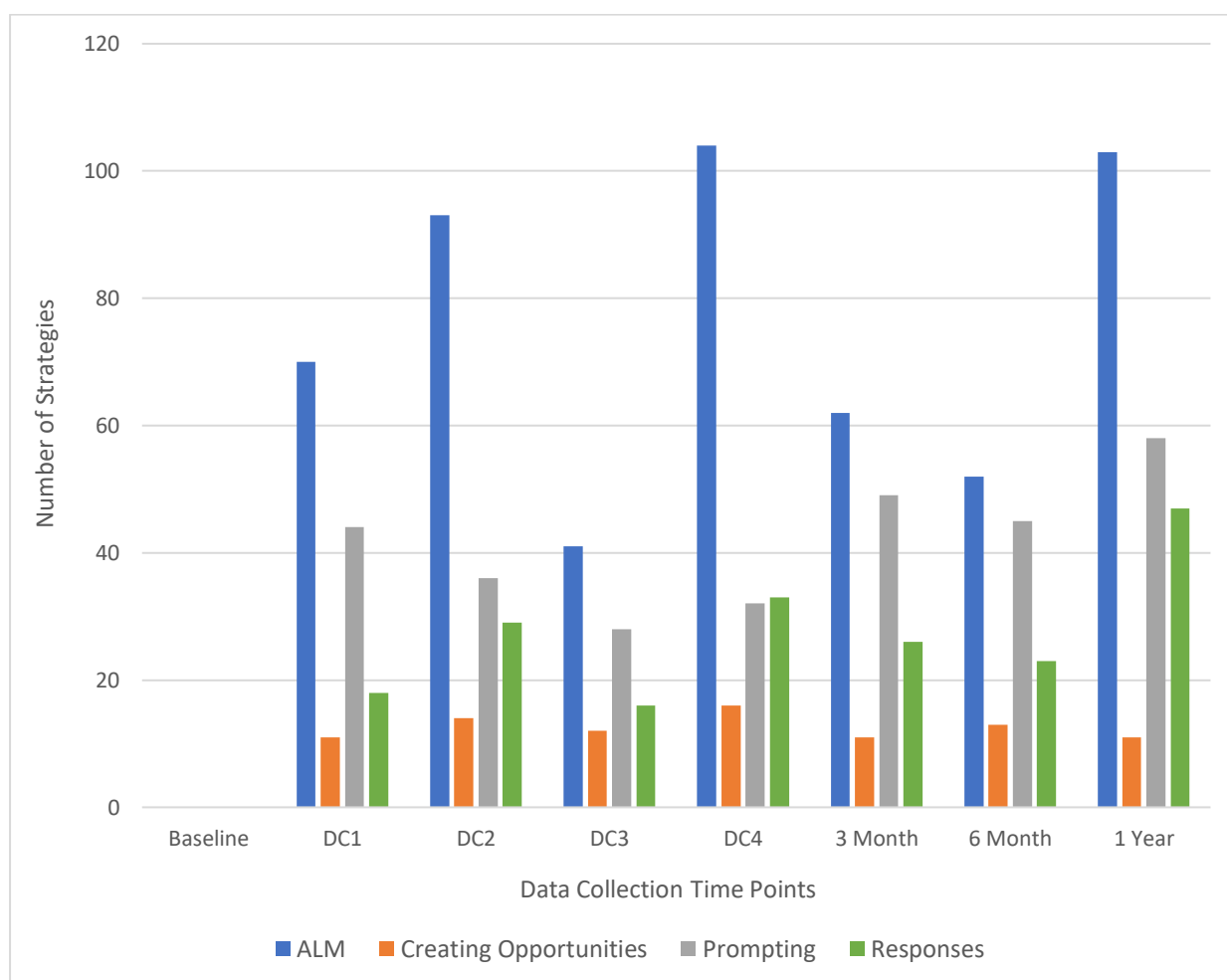


Figure 5.20

Percentage of Words Modelled by Sarah on Core Board

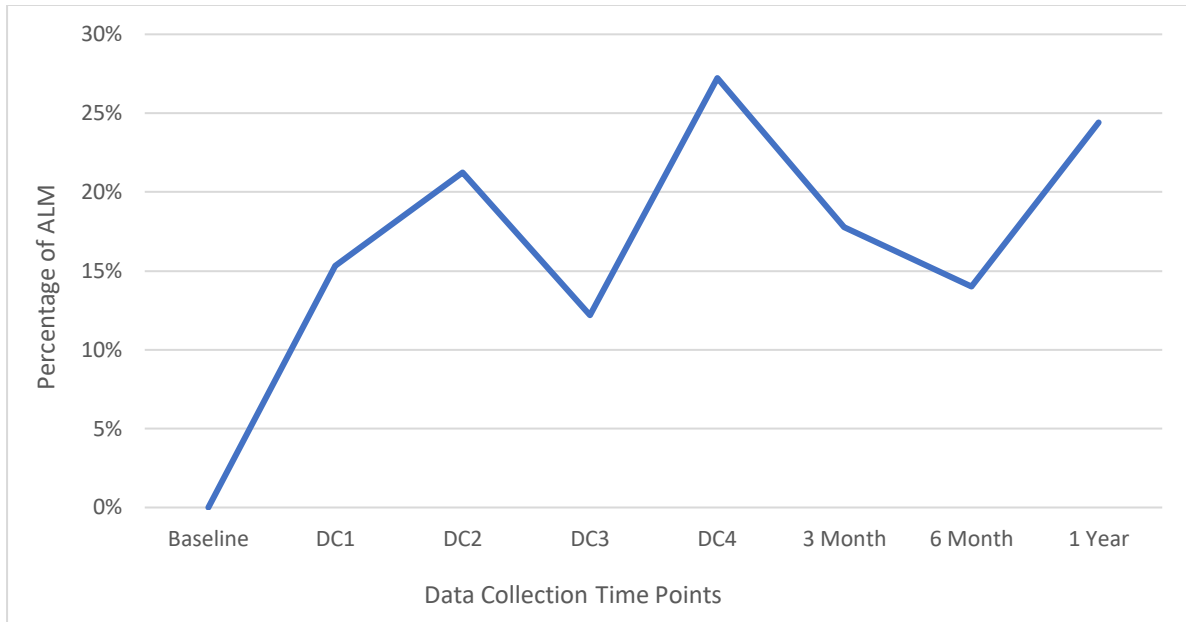
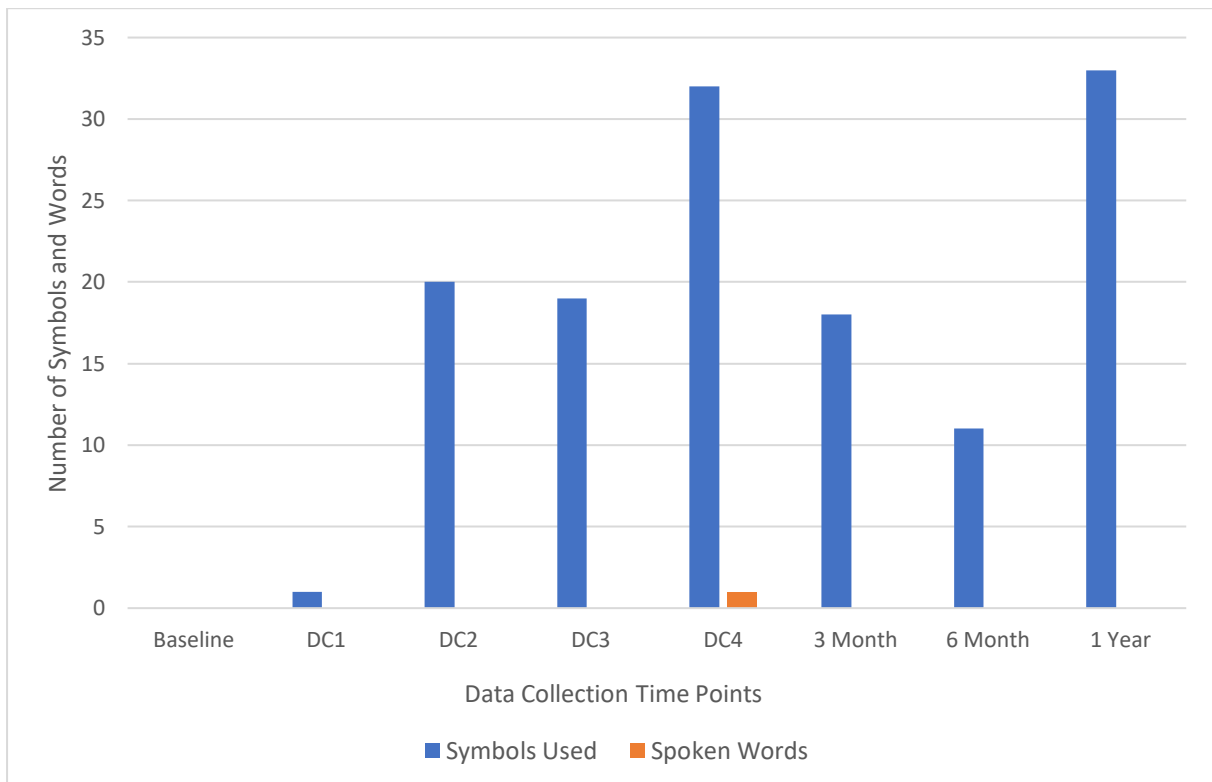


Figure 5.21

Eli's Use of Symbols and Spoken Words



The First Eight Weeks – The Intervention

Sarah was generally quiet and attentive in the workshops. She contributed in the group discussions and also shared information about her son with the other participants. She had to miss the second workshop because Eli was sick, but she requested a catch up at home, which I delivered the next day. The first workshop covered some background information about AAC and covered the first strategy of aided language modelling (ALM).

I visited the home soon after for the first coaching session. Sarah had planned to join in and model while Eli played with toy animals. As I observed, I could see that Sarah was modelling quite long phrases that did not necessarily match Eli's focus at the time. Eli was engrossed in play and did not appear to notice Sarah's modelling or comments. I stopped videoing and made some suggestions for how Sarah could involve herself in the game more, get Eli's attention and use more targeted models on the core board. Sarah took these suggestions on board, but it was still difficult for her to get and sustain joint engagement with Eli. After a while, I joined in the play with them and modelled different ways to get his attention and become part of the game. I needed to use a range of communication strategies with a high level of skill to achieve this.

During the coaching conversation, we talked about using simple targeted models in response to Eli's requests throughout the day. I thought this might be more successful initially for getting short periods of joint engagement rather than during his play, when he seemed to have quite rigid focus. Eli remained in the room during the coaching conversation, either watching the video over our shoulders, or playing quietly. At one point he wanted a snack, so Sarah had the opportunity to try a targeted model 'eat'. Eli looked, smiled, signed eat and then pointed to the symbol. I encouraged Sarah to continue with both general modelling and some simple targeted modelling and we completed her action plan together.

Sarah selected snack time as the activity for the first data collection and opted to use her own snack foods in my containers. This meant that snack food that Eli was used to having access to was suddenly in a container that he couldn't open. Sarah used an impressive amount of modelling during this data collection, modelling 15% of all words spoken; this is a strategy that she used with a high level of skill throughout the study year (Figure 5.20). Most of this modelling was simple, targeted modelling that matched what Eli might have wanted to communicate. However, Sarah also used this modelling as a prompt for Eli to copy on the core board and did this quite persistently. For example, she tried to prompt Eli to use the core board to communicate 'open' for over 2 minutes, using 27 different prompts, mainly targeted modelling, but with an expectation that he would copy. Eli resisted the prompting and would not touch the core board. He showed some awareness that he was being observed and videoed, but he also seemed to dislike having pressure put on him to point to symbols. An additional factor may have been that he was used to having access to these snacks without all this work.

Eventually Sarah opened the container and gave Eli the chips inside it. However, these were in an unopened packet, and so Sarah started to prompt for 'open' again. Eli appeared to be confused and unimpressed by the amount of work involved in trying to get access to his snack; he tried to hand the chips to me instead. Shortly after this, Eli signed 'eat' but Sarah still prompted him a few more times to use the core board, before finally opening the chips. During the previous workshop, I had tried to convey that the parents should model on the core board with no expectation that the children would use it during these early weeks, however all the parents started to prompt to some extent. My suggestion that Sarah use more targeted models during the coaching session may have accidentally promoted the idea of prompting. I could see that Eli was going to need more subtle encouragement to use the core

board. He pointed to one symbol during the 10 minutes (open), and this was when Sarah was distracted and looking in the box.

Sarah was unable to attend the second workshop, because Eli was sick, so I delivered the content at home. She had completed her home journal and outlined in this that Eli was starting to use the core board when he needs something in the home, such as turning the television on. She wrote “He pointed to the sign ‘on’ without much persuasion from me, which signals to me that he is learning that he gets things faster using the board rather than waiting for me to guess what he wants”. However, she also noted that “sometimes he gets annoyed at having to use the board and prefers to sign or try and talk”. Throughout the study, Sarah often referred to Eli talking, but I only heard him say one word during the year, which was an indistinct “no” during the fourth data collection. Sarah explained that he only tended to talk in front of very familiar people, and it was quite difficult to understand.

In the second coaching session, Sarah had planned to try people games with Eli, but in the event, he refused to join in. It was difficult to get any usable video footage, so I stopped and joined in, helping Sarah to try different games, including the bubble machine, to explore what would work for Eli. In my coach log I recorded:

We tried a few different people games, mainly working together and then me making suggestions on the spot or guided practice with feedback or using descriptive praise as things happened or just after. This worked best, because it was quite hard to engage Eli in any game for long, as he resisted any attempts to get him to communicate.

During each game, I observed that Eli was expected to communicate twice for his turn, both ‘more’ and then ‘go’, so after we had finished trying out games, I suggested to Sarah that for the time being, she could focus on just one symbol, either ‘more’ or ‘go’ and then start the game immediately. We discussed other possible people games. Sarah reported that Eli was

using the core board more; he likes exploring it and getting adults to name symbols and he will also use it for more, go, eat, drink, and on. He was reluctant to use it under pressure, so I talked through how to make it instantly rewarding for him. It was apparent to me that Eli resisted any pressure to communicate using the board, and additionally needed a range of strategies to encourage joint engagement during play.

Eli was starting to become quite sensitive to any pressure to communicate, and this was evident in the second data collection, when he started to cry early on, which coincided with the realisation that he needed to use the core board to ask to open his snacks again. I stopped recording, and we spent time calming him down. There was the additional pressure that his father was also watching this data collection, so Eli may have felt quite observed. The previous workshop had covered ‘sabotage’ strategies such as difficult containers, and giving items bit by bit, and Sarah was using these strategies during the data collection (Figure 5.19). These strategies need to be used carefully with any child, and Eli seemed particularly sensitive to the injustice of having his snacks withheld. Once he had a drink and had calmed down, I restarted the recording. Eli pointed to symbols quite frequently, but he did it quickly and without checking that Sarah was watching, which led to this communication breakdown:

Sarah: LOOK! LOOK! (*speaking and modelling*)

Eli: OPEN

Sarah: Yeah, look.

Eli: DON'T

Sarah: Oh, don't, hmmm

Eli: DON'T (*angry vocalisation*)

Sarah: DON'T, aww.

My interpretation of this was: as far as Eli was concerned, he'd asked for the drink to be opened. Sarah saw that he had pointed to a symbol, but missed which one it was, and made the wrong assumption. When his mother did not respond to his request and open the drink, he became angry, and showed this by pointing to 'don't'. However, because Sarah had missed the initial request, she did not understand why he was reacting this way. After this, he resisted making the request again. This was a pattern I frequently observed with Eli; he became angry and reluctant to communicate with the core board if he felt he was having to communicate for the same thing more than once.

Sarah modelled 21% of the words she spoke in this data collection (Figure 5.20), which is remarkably high. She used strategies from the second workshop – creating opportunities for communication – but they would need refining for Eli. She continued to use prompting, but not to the same extent as the previous data collection. She remained a very responsive partner to Eli, but his communication was so subtle at times that her responses mismatched his intent. Eli pointed to 20 symbols in all (Figure 5.21), and his use of 'don't' to indicate that his mother had misunderstood him showed that he could go beyond simple requesting and use symbols flexibly.

Because the use of persistent prompting had such a negative effect on Eli, I had already talked to Sarah during previous coaching sessions about reducing it before the third workshop, which covered prompting in detail. Sarah tended to use repeated model prompts to try to get Eli to use the core board before this, or the occasional direct verbal prompt to point to a symbol. I thought that Eli might respond better to more minimal prompts such as waiting, or moving the core board closer, so it was a relief for me to be able to provide all the information about the prompting hierarchy and how to adapt it to different children's needs. Sarah's home journal indicated that she had had exams and therefore less time to support core board use at home over the past two weeks.

When I visited for the subsequent coaching session, Eli was having a snack and Sarah had already taken a video of her using the core board with Eli. This meant there was less pressure to try and get Eli to interact while I was there. My coach log recorded the following interaction as we watched the video together:

I pointed out that she tends to move up through the prompts quite fast, and quickly goes to a model prompt without much waiting. She said that she feels Eli loses interest with excessive waiting, and that he generally needs this level of prompting if he has not used the board spontaneously. At this point, Eli needed a container opening, so she trialed using more waiting and gesture prompts. Eli did not respond well to this and lost interest.

Sarah was correct, and this was a good reminder for me that parents know their children better than I do.

During this coaching session, we also talked through strategies that seem to be counterproductive for Eli. He appeared to be very sensitive to any form of sabotage, particularly around food, and I suggested using less of these strategies. We also talked about how long to prompt for. Eli sometimes responded to prompts quite quickly, but sometimes ignored prompts. I suggested only prompting a couple of times, and then moving on, either just completing the action or moving away to reduce the pressure. After this we tried a people game with a balloon. Eli enjoyed the game but resisted prompts to communicate on the core board. Eli often required nuanced application of the strategies to support AAC, and coaching sessions tended to be longer than for other participants as I needed to trial different approaches to see what would work for him and Sarah.

Sarah's hard work was paying off, and the third data collection was a more enjoyable and less pressured occasion for Eli. This time, Sarah opted for a play dough activity that was

motivating for Eli. Although there were some elements of sabotage, as the play dough containers were difficult to open, Eli was less resistant to asking for help in the context of a fun, play activity. Sarah used more waiting and less persistent prompting, and Eli used the core board to make several requests (Figure 5.21). Although it appears from the data that Sarah used less strategies during this data collection, this is because there were quite long periods where Eli was engrossed in manipulating play dough, and Sarah waited for him to be ready to communicate again (Figures 5.19 and 5.20).

The final workshop covered response strategies. Sarah's home journal recorded that they had had success with using the core board to choose animals for the Old MacDonald song and a balloon game. She also remarked that expectant waiting was not working with Eli and they sometimes experienced a "battle of wills" over using the core board. I had encouraged parents to provide me with lists and photos for personalised fringe strips, but Sarah opted not to have additional fringe strips made up for Eli's board. During the snack break, Sarah shared with the other parents that she was 12 weeks pregnant.

The following coaching session took place over Eli's snack time. Eli continued to point to symbols quickly and without warning, and Sarah sometimes missed his communication attempts. When we watched the video back, I paused on each missed communication attempt, and together we looked at the effect it had on Eli if he pointed to a symbol, and it was not responded to. Some of his attempts were very quick and subtle, and I also missed them until we watched the video together. We talked about the best ways to respond to Eli when he communicates, and Sarah planned to label every symbol he points to so he felt heard. Sarah remembers this in her interview at the end of the year:

It was helpful to go back over through the videos ... because in the moment, you can kind of just get caught up on trying to respond to what Eli is doing. But going back, I

saw that he was actually trying to communicate more than what they saw in the moment. But I was missing it because he was too fast for me.

This strategy of labelling every symbol paid off, and in the fourth data collection, Sarah was extremely responsive to every communication attempt made by Eli. This meant that she was able to interpret the following interaction, which happened quickly and could easily have been missed. Eli had just asked for help with a packet, Sarah opened his packet, and he was eating chips. Sarah was leafing through the fringe strips preparing to make a comment, when Eli suddenly pointed to symbols:

Sarah: Look, you're eating ...

Eli: TURN SAY+ HELP

Sarah: Oh turn, so tell, turn tell, turn say, help. Yes, you did take a turn and say help.

Sarah initially repeated the name of the symbols, and then interpreted the message, which could easily have been missed. Additionally, this was a social comment that Eli was unable to make before having access to the core board.

This responsiveness and skillful interpretation had a clear effect on Eli's communication during this data collection; he pointed to 32 symbols during the 10-minute recording (Figure 5.21). He also used more multi-symbol phrases than previously (Figure 5.22). He had more instances of spontaneous core board use (Figure 5.23), and he used a wider range of communicative functions (Figure 5.24).

Figure 5.22

Eli's Use of Multi-Symbol Phrases

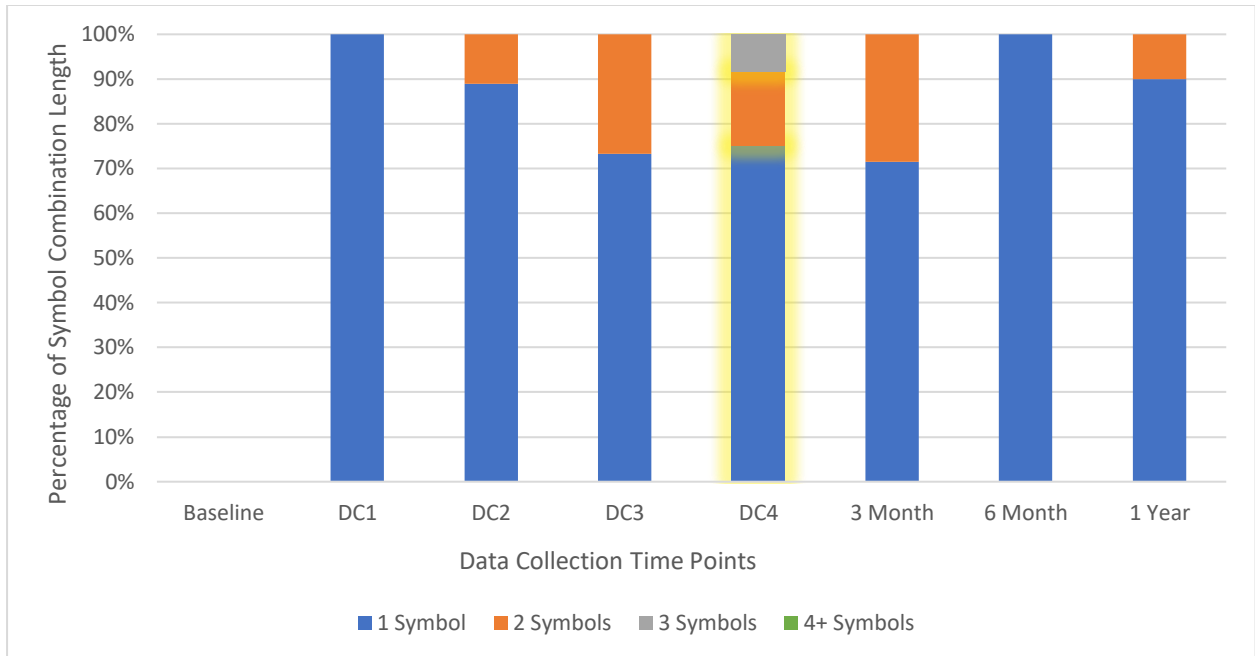


Figure 5.23

Eli's Prompted Versus Spontaneous Core Board Use

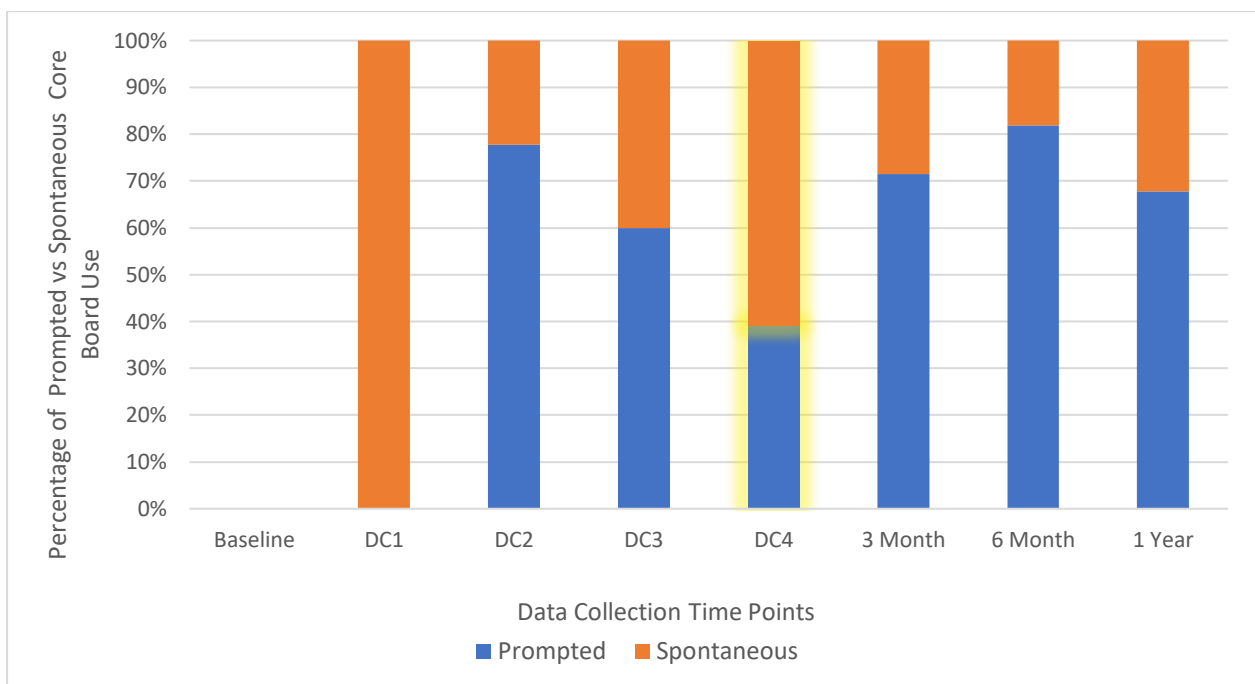
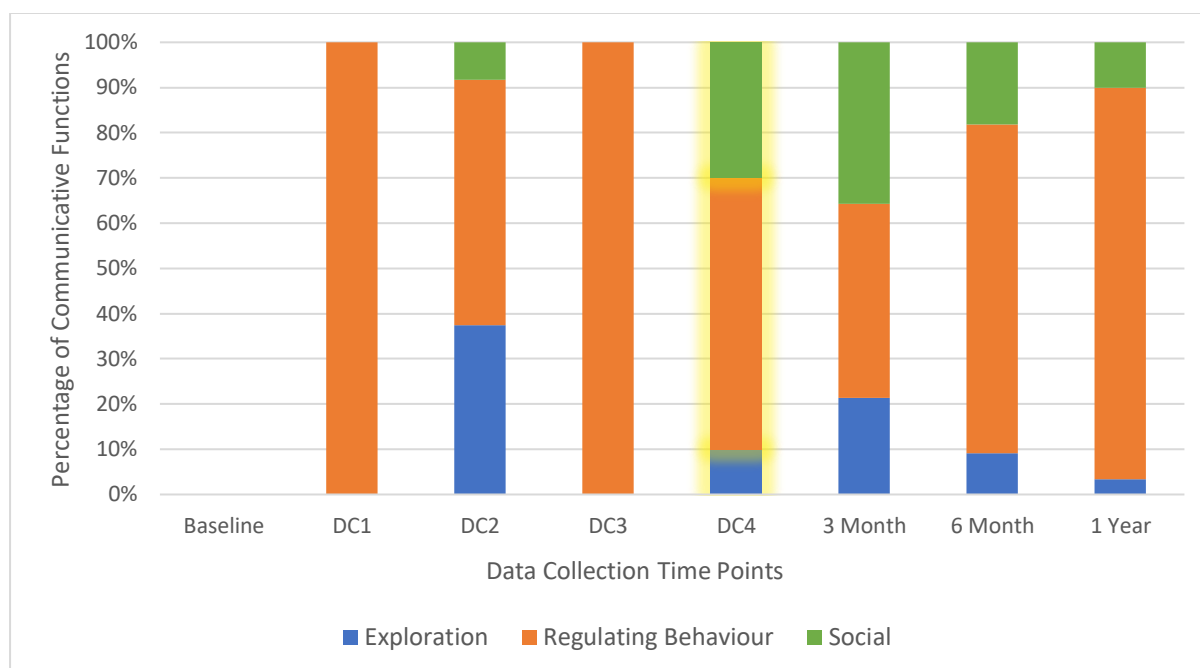


Figure 5.24*Eli's Range of Communicative Functions****End of the Intervention Phase***

By the end of the intervention phase, Sarah had become a skilled AAC communication partner, and Eli was using the core board to express a range of needs and ideas. In the end of intervention survey, Sarah commented on Eli's "amazing progress". She indicated that her confidence and skills had increased when supporting the core board and 'strongly agreed' that Eli's communication had improved. She rated both the workshops and coaching as 'very useful'. Like all the parents, she stated that meeting other parents who had similar children was helpful.

Although Sarah stated that she found the personalised coaching helpful "it helped me practise while I was being observed", she did comment that the coaching sessions were quite lengthy at times. Making time for the intervention and the support for Eli was not easy for Sarah at this busy time in her life. She also commented in the survey that she would have

found it easier if the workshops were “condensed in its timeframe”. One of the benefits of the intervention that Sarah listed was that she now “approached communication with my child as something that is enjoyable and fun.”

I was pleased with the progress that Eli had made with the core board, but I was aware by this point that if I was his speech and language therapist, I would be looking to move him on to a system with voice output. His communication style meant that he needed a skilled communication partner who watched him closely and knew him well. Sarah was able to provide this level of support, but it was unlikely that other people would. I also felt that Eli would find voice output quite reinforcing. He was developing his vocabulary and syntax quite quickly, and a high-tech app could be more suitable at this point.

Early Maintenance Phase (three to six months)

At the first maintenance coaching session, Sarah had planned a nursery rhyme activity with Eli, but he was not cooperative. We used some video from the previous data collection to look back on the strategies she was using. Sarah was using all the strategies very competently now, so I brought the discussion round to using the core board outside of the home environment. Sarah explained that Eli would not let them take the core board out of the house. He had a different core board at day care, so this had not been a big issue. I asked Sarah if we could try a walk with the core board now, to see if we could help Eli to accept it leaving the home. Eli was happy to walk up and down the road and use the core board with us. Sarah said she would be happy to try using the core board on walks, so we made an action plan for this.

Sarah had maintained all the strategies and continued to use them with skill at the 3-month data collection (Figures 5.19 and 5.20). Eli was a little more resistant to using the core board this time, and mostly copied symbols that Sarah had just pointed to, rather than

communicating new ideas like he had previously. After this, there was a COVID-19 lockdown, and it was a full 2 months until I was able to visit the family at home again for another maintenance coach.

When I visited after the COVID-19 lockdown, it was apparent that things had changed. Sarah appeared less enthusiastic about using the core board and stated that Eli had not been using it much, as he prefers to sign or talk. I was surprised, because I had never heard Eli talk, and I explored this with Sarah. She explained that he only talked with her or with his teachers, and it tended to be occasional single words such as “ouch” if something hurt. I could see that Sarah had a lot on her plate. She was tired from her pregnancy, she was about to take more exams for her law degree, she had been trying to study at home with Eli off day care because of the lockdown. I did not want to add to the pressure she was under, but I also wanted to remind her of the progress that Eli had made. He was able to communicate considerably more on the core board than he could without it, from what she was telling me.

At this point, I decided it might be useful to show her the graphs representing her and Eli’s data from the first 3 months of the study. These showed how well she had learned and used the strategies, and the effects this had had on Eli’s communication, including the range of communicative functions he was able to use, and his use of multi-symbol phrases. This data seemed to be effective at rekindling Sarah’s motivation to use the core board. Together, we made an action plan that allowed for low pressure communication in activities that she was already doing with Eli. I acknowledged how busy she was and reminded her that she could leave the study, but she decided to continue. We also discussed high-tech AAC options for the first time. Sarah felt this would be a more motivating option for Eli and was keen to explore this. I got her permission to contact her MOE SLT to suggest they assess Eli for AAC apps, and I emailed the SLT straight after the visit. In my coach log, I reflected that this

family would almost certainly have stopped using the core board at this point if I had not continued with maintenance coaching.

The 6-month data collection was postponed by another COVID-19 lockdown, but when it went ahead, Sarah informed me that they were back to using the core board, and Eli had used it on a recent walk to make a comment to his dad: “MUM SLOW”. In her interview at the end of the year, Sarah explains that this second lockdown helped Eli’s core board use:

It actually worked out for us because, you know, I was at home with him full time. And yeah, he really started using it a lot more within that time. Just because I was always with him, and he knew that I’d respond if he used it.

Sarah had again maintained all the supportive strategies, and her level of modelling continued to be impressive (Figures 5.19 and 5.20). Eli copied some symbols to make requests, but also explored symbols and made some comments (Figure 5.24).

Later Maintenance Phase (6 months to one year)

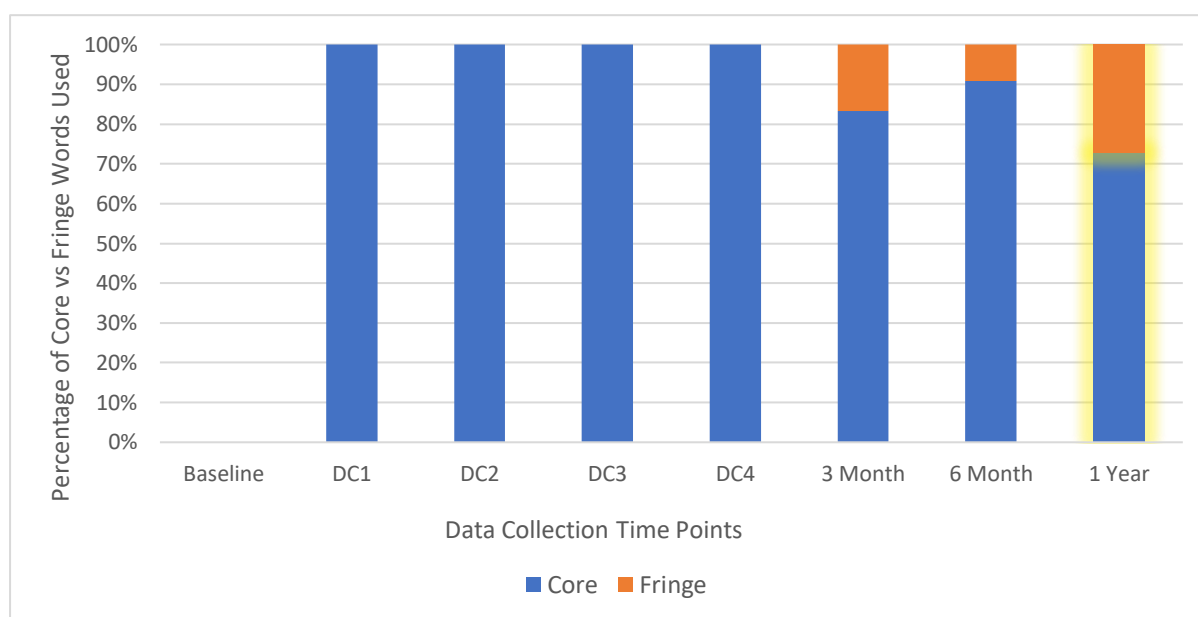
Sarah had two more coaching sessions before the end of the year, one before she had her baby, and then one close to the end of her study. Despite having exams, undertaking a summer school course, giving birth, and caring for two children, she managed to keep supporting Eli to use the core board with skill and sensitivity. Eli continued to use the board both in the home and out of the house, including using it to tell Sarah what he had done at day care some days. Towards the end of the intervention, Sarah focused on language building strategies where she added on to what Eli had communicated to her and modelled back with more symbols. Sarah took video before these coaching sessions, so Eli was not under pressure to participate on the spot. In my final coach log, I note “Sarah has embedded most of the strategies and uses them automatically.” Whereas in earlier coaching sessions she had

needed some scaffolding to help her identify the strategies she was using, Sarah was now able to lead the coaching conversation more and recognised what she was doing that helped Eli.

In the final data collection, Sarah continued to demonstrate a high level of skill at using all the strategy groups (Figure 5.19). She had always maintained a high level of aided language modelling, and this time was no exception at 24% of all words spoken (Figure 5.20). Sarah had told me that Eli usually performs differently when he is filmed and was using the core board more in day-to-day life. However, he still used 33 symbols in the 10 minutes (Figure 5.21), including different communicative functions and a range of core and fringe vocabulary, as shown in Figure 5.25.

Figure 5.25

Eli's Use of Core and Fringe Vocabulary



Barriers and Supports

Sarah expressed concerns from the start that she would not have the time needed to support Eli to learn to use a core board. This was a year with many significant events for the family, and it was during the pandemic. However, Sarah persevered, and Eli finished the

study year using the core board as his main communication tool. Information about the barriers and supports for this family was gained informally over the year through observations, informal conversations, and coaching conversations. Some of these observations and notes were reinforced by Sarah in her interview at the end of the study. Table 5.3 lays out the main barriers and supports identified and their primary source.

Table 5.3*Supports and Barriers to AAC Use Experienced by Sarah*

	Supports	Barriers
Interview or survey data	<ul style="list-style-type: none"> • Receiving training on how to support the core board • Coaching • Second COVID-19 lockdown (more time together) • Seeing child make progress • Supportive ESW 	<ul style="list-style-type: none"> • Reactions of people in the community • Law studies • Family / childcare • Child has outgrown core board / bored of it • Lack of voice output • Signing is less effort • Child not keen to use core board out of home.
Informal conversation or observations	<ul style="list-style-type: none"> • Good family networks • Making core board use part of routines • Sarah's high skill level 	<ul style="list-style-type: none"> • Child's reaction to core board and reluctance to use it • Child's reaction to sabotage • Child preferring to use sign • Study commitments

		<ul style="list-style-type: none"> • Pregnancy / birth / new baby • First COVID-19 lockdown
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Overall, Sarah and Eli had many factors that made it difficult to continue with using the core board for communication, despite their success. Eli often found it to be hard work, and with his reluctant communication style, sometimes preferred communication methods that required less effort, even if they did not give him as much communicative autonomy. It is likely that this family would have stopped using the core board after the initial intervention if there had not been ongoing coaching support. Additionally, the core board was not a suitable long-term tool for a child who did not understand the importance of securing the attention of the communication partner, and this family would probably have benefitted from the earlier introduction of a speech generating device for communication.

The End of the Study

At the end of the study year, Eli was continuing to use the core board to communicate daily, and Sarah seemed positive about his progress. Sarah indicated in her interview that she was still keen to explore high-tech AAC options for Eli. I wrote a comprehensive report listing Sarah and Eli's progress and making recommendations for the future. I was aware that Eli had not yet been assessed for high-tech options and I suggested this was the next step for this family. With Sarah's permission, I shared this with his team at MOE. I have not had direct contact with Sarah since the end of the study, but I understand that they are currently using sign language as the main way for Eli to communicate.

Case Study 4 – Ashley and Regan

“I think education is empowerment and your child’s development is something that will blossom in its own time, so when it’s that time you have these skills in your parenting tool box.” – (source: post-intervention survey)

Background Information

Ashley and Regan were the first family to be referred for the study - 6 months before it started. During the recruitment phase, Regan’s early intervention worker at the Ministry of Education, contacted me twice to let me know how keen Ashley, his mum, was to hear from me and be included in the study. I kept in touch with her with occasional phone calls during this time. Regan was 3 years and 7 months old at the start of the study and was diagnosed with autism. He lived with his parents and younger sister, Megan, who was 19 months old. Both his parents worked full time and both children attended day care full time. Ashley described the family as half Māori, half European. Ashley has a younger sister who is also autistic.

At the information gathering meeting at the start of the study, Ashley described Regan as an active boy who particularly liked music, singing and dancing, and was learning to play the ukelele. He was kind to his sister but did not show much interest in other children. Ashley was concerned that he had a tendency to run away; he had already escaped from day care, and she kept her doors locked and the garden gate closed at all times. She reported that they did not take him out much because of this behaviour. She stated that he was good at problem solving (especially around how to escape from places), creative and interested in how things work.

At the start of the study, Regan was still wearing nappies, although he was showing awareness of when he needed changing. He often resisted getting dressed and needed help. He was a good eater, but a poor sleeper. He liked to drink milk out of a bottle to help soothe

himself to sleep, and his parents were trying to move him on from this habit. Regan presented with a mixed sensory profile; he disliked loud noises and busy environments, but he loved seeking out movement and visual stimulation. He also enjoyed deep pressure. Ashley told me that he sometimes “shut down” when he was overwhelmed.

Ashley informed me that Regan understood some words and simple instructions in context; it appeared that his comprehension of language was delayed. Regan had a few spoken words that he used inconsistently. Ashley told me he could count to five, he sometimes said “you okay?” and he would request KFC by saying “kay ki ki”. He had a consistent ‘no’ and could sometimes name favourite food items that he wanted. I observed that his words were difficult to understand with many omitted consonants. More frequently, Regan communicated by hand leading or putting items into an adult’s hand to indicate that he wanted them. He often engaged in tuneful babble which did not appear to have a communicative function. Regan had not received any input from a speech language therapist at this point.

In the initial survey, completed by Ashley during the baseline visit, Ashley rated herself as “very concerned” about Regan’s communication difficulties. Her attitude towards using a core board was mostly positive at this point, and she ticked the following from a list of statements presenting different perspectives about using a core board with her child:

It might stop my child from learning to talk

I am excited to try something new

I’ll try anything to help my child

I think this might suit my child

I think this could relieve their frustration.

Ashley also indicated that she was excited to be the key person assisting Regan with the core board, and that it made sense as she was with him the most but expressed concern about having the time to do it.

Baseline Data Collection

The living area was quite busy with other adults and children when time came to take the baseline video recording, so I asked if we could move to a quieter room. Regan did not settle immediately, but eventually started to explore the two assessment boxes which Ashley opted to have open and available. The core board was available on the floor but not used. Regan remained mostly silent during the 10 minutes, solemnly exploring the toys on his own agenda, and eating the snacks. He licked the flavour off each chip before eating it in a thoughtful manner. He was unable to open the food containers and passed them to Ashley without looking at her or commenting. Ashley sat beside Regan and was mostly quiet. She occasionally attempted to draw his attention to a toy in an unobtrusive way, but Regan always ignored these attempts and did his own thing. He smiled briefly when she made the whoopee cushion work but did not look at her or request a repeat. When he passed Ashley containers, she made some attempts to get him to make a clearer request, by holding the container and asking him if he wanted help, then waiting. Regan did not respond to these prompts, and eventually Ashley opened each container. There was no clear, intentional communication from Regan during these 10 minutes, and Ashley mainly sat back and allowed him to explore.

Overview of the Intervention

Ashley and Regan remained in the study for 8 months. Ashley completed the intervention phase and part of the maintenance phase, then a series of challenging life events eventually made it too difficult for her to continue. The 6-month data collection was

postponed until 8 months, and then she was unable to take part in any further coaching sessions, the final data collection, or the post-study interview.

Ashley learned all the supportive strategies quickly and used these with skill (Figures 5.26 and 5.27). Regan started to use the core board almost immediately and continued to use it throughout their involvement in the study, on his own terms. He also increased the amount of spoken language that he used, and his communication became more intentional (Figure 5.28). He developed a love of repetitive, fun people games. Regan's autism meant that he had different sensory processing abilities and sometimes had issues managing his arousal levels, so Ashley learned to recognise when he was in the right space to practise using the core board. She also had to learn to use the AAC strategies in a nuanced way that worked for Regan, as he was sensitive and often resistant to prompting, and needed communication to be fun and motivating.

Figure 5.26

Frequency of Ashley's Use of Taught Strategies

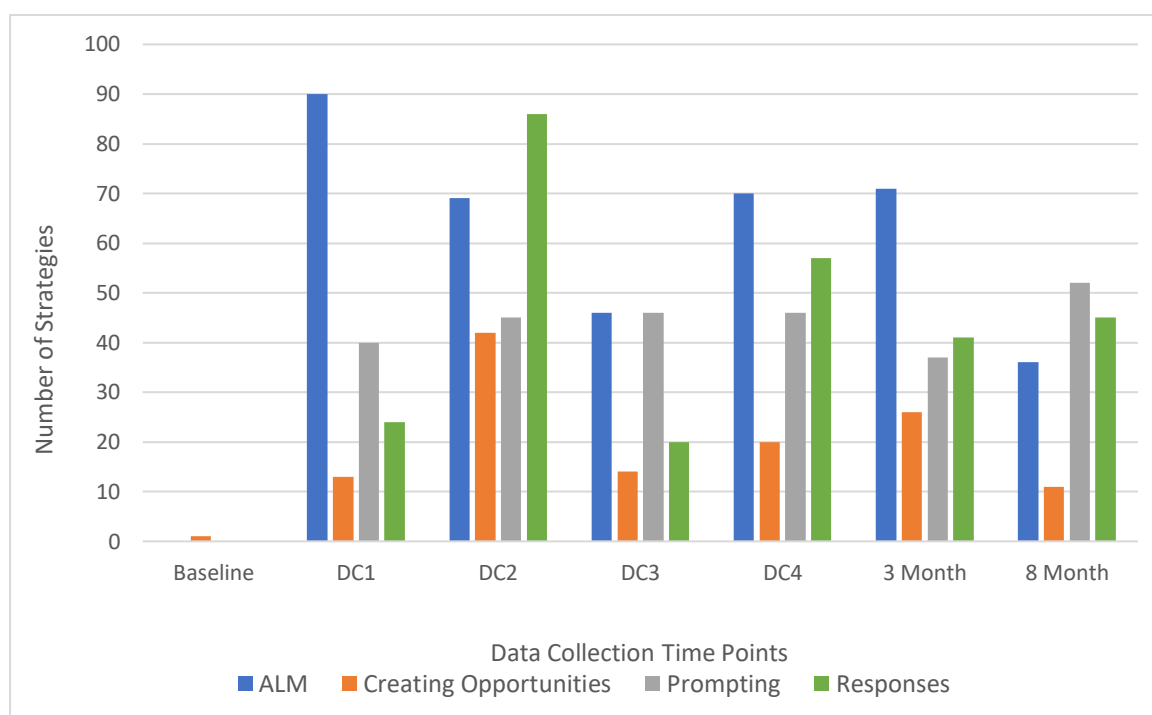


Figure 5.27

Percentage of Words Modelled by Ashley on Core Board

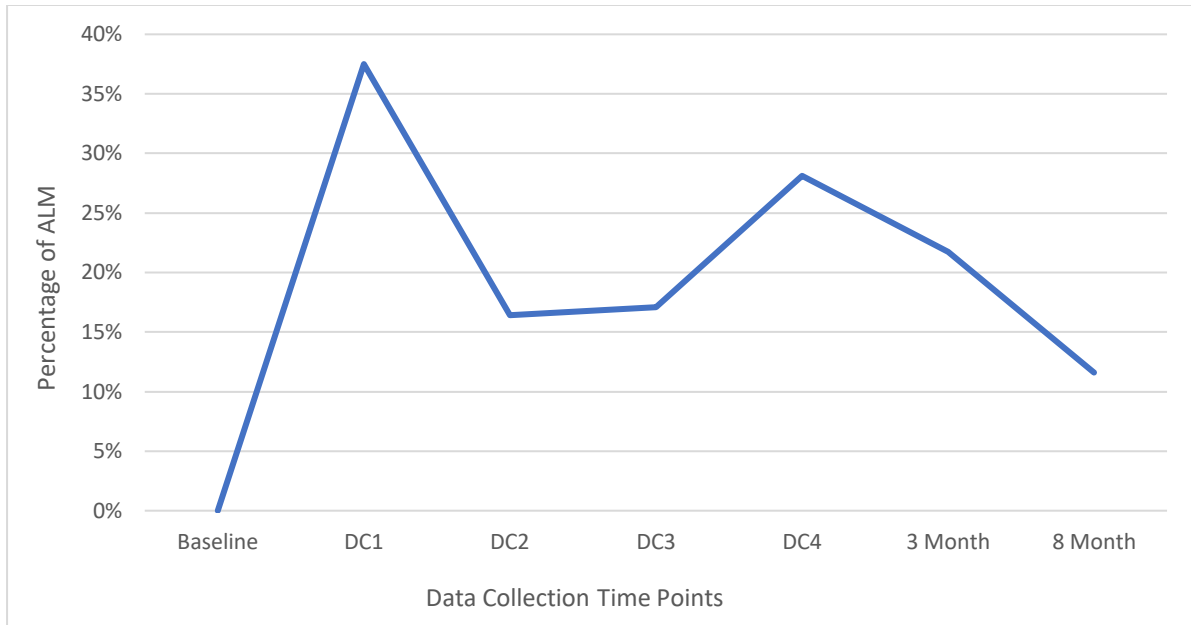
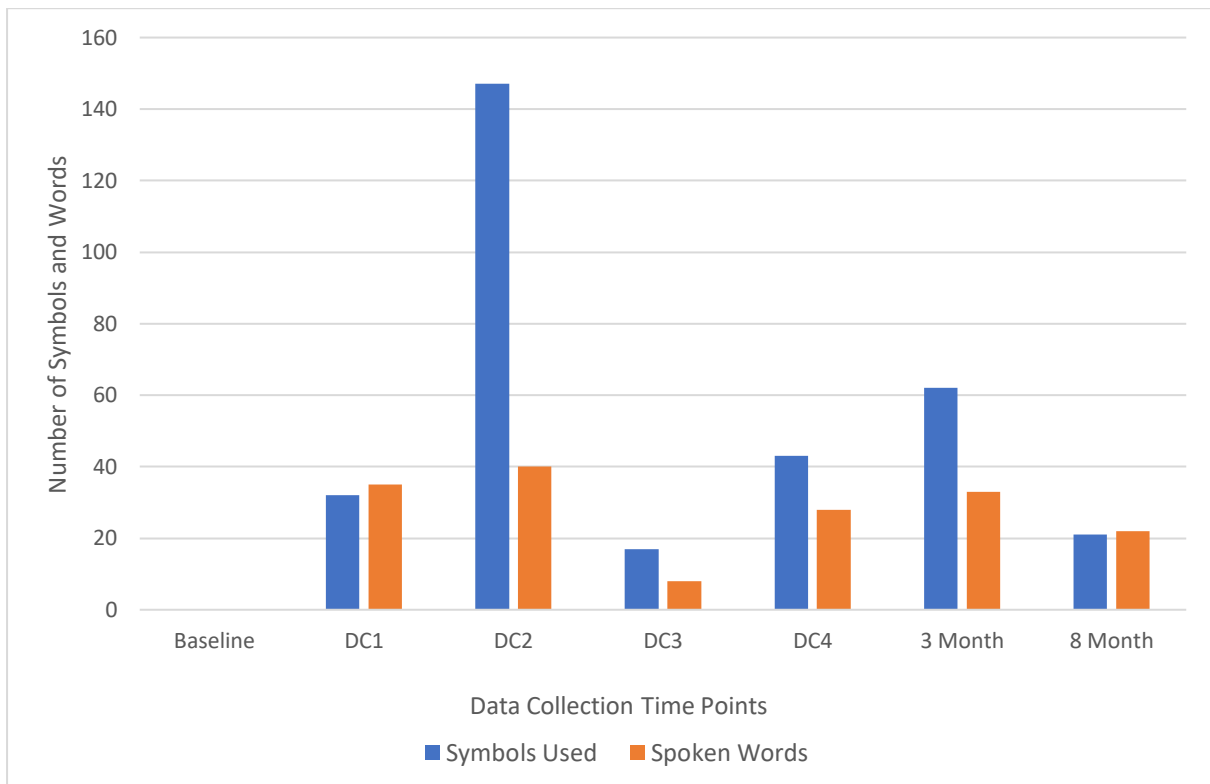


Figure 5.28

Regan's Use of Symbols and Spoken Words



Of all the child participants, Regan was the most variable during data collection recordings in his core board use, and this was dependent on his mood, his arousal levels, whether he wanted to engage, and how motivating the activity was for him.

The First Eight Weeks – The Intervention

Ashley arranged to have time off work to attend the workshops. She always arrived early and came prepared with her core board tally and home journal completed. She was attentive and thoughtful during information sharing sections, contributed to the group discussions and shared information with the other parents. The first coaching session took place just after Ashley got home with both children after work. The children were tired and hungry, and there was no one else home to help. Ashley had planned to model with the core board over snack time. She had thought ahead and put food for Regan into a container, so he would need to ask for help, but Regan bypassed this by taking his sister's food off her plate. Ashley was already modelling a range of words on the core board, and Regan was exploring by pointing to words and waiting for his mother to name them. He also enjoyed pointing to numbers and colours and would sometimes attempt to say these words too. He resisted any attempts to prompt him to ask for help with the food however, preferring to communicate on his own terms.

It was a difficult environment to have a productive coaching conversation; both the children wanted their mum's attention after a day at day care, the television was on, and there were multiple distractions. Ashley was able to identify that she had modelled a range of words in the video, and that her pacing was appropriate for Regan. She already had ideas about how she would like to personalise the fringe strips, including changing some of the symbols on the current strips to make them more appropriate for their family. We had a brief talk about Regan's apparent dislike of being prompted to communicate for specific things. At

the end of the session, Ashley seemed confident and had some good ideas about new activities to try, saying “I just have to get used to having it with me and using it”.

When I arrived for the first data collection, Regan greeted me by saying ‘hello’. Ashley was home alone with both children, so Megan joined in with the activity; Ashley selected a bubble machine with lights and music. This turned out to be highly motivating for Regan, and he remained engaged for the whole 10 minutes. The contrast between the baseline video and this data collection was compelling. Ashley maintained control of the bubble machine to make a fun people game, starting and stopping to keep Regan’s attention. She used a mix of general and targeted aided language models that used a mix of core and fringe vocabulary, including questions, comments, and simple model prompts. This, combined with the repetitive, fun activity, meant that Regan was motivated to communicate and interact throughout. He pointed to 32 symbols on the core board during the 10 minutes and said 35 spoken words, usually naming the symbols he was pointing to (Figure 5.28). His words had several speech sound errors and would have been difficult to understand out of context.

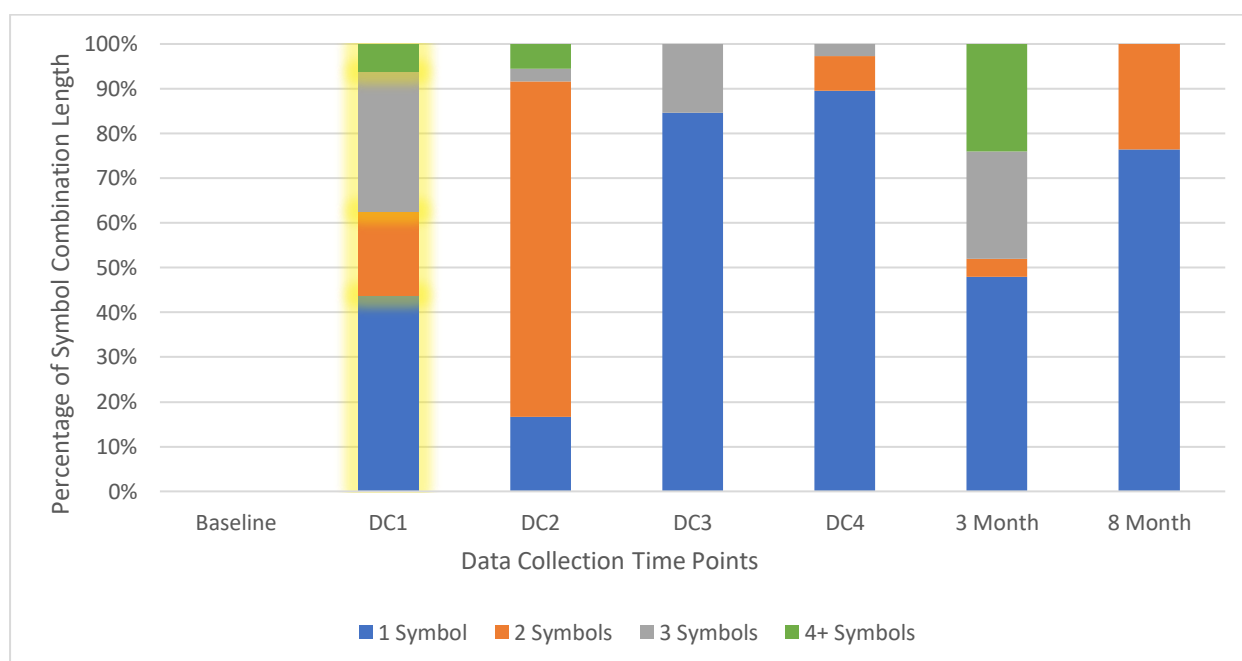
Ashley looked comfortable and relaxed. She wore the core board on her body and had no difficulties locating several different symbols, indicating that she had practised regularly beforehand. She modelled an impressive 38% of all the words that she said in this time, the highest single percentage point achieved by any of the participants in the study (Figure 5.27). Additionally, she also used strategies that we had not yet covered, from workshops two, three and four (Figure 5.26). Like all the parent participants, she used some prompting. She mainly used the prompts quite sensitively, including lots of waiting. She was very attuned to how far she could push Regan to communicate, and when she needed to step in and complete the model for him. She followed his lead, commenting on what he was doing, quickly flipping between fringe strips to comment about him jumping. The children laughed and danced, and Regan used the core board to request more turns by pointing to ‘ready steady go’. Although

Ashley modelled this phrase by pointing to ‘ready ready go’, tapping twice on the ready symbol, Regan was not convinced by this, and instead pointed to different symbols close to ‘ready’ to indicate ‘steady’. He continued to do this throughout the study.

Regan appeared very different to the child in the baseline video. He smiled, laughed, and babbled constantly throughout in an excited voice. This was the first time I noticed how quickly Regan learned the position of symbols on the core board. He usually only needed to see a symbol modelled once to learn it and seemed to be able to locate it again without any apparent scanning. He appeared to have strong visual skills and was quick to learn new motor plans. His mum modelled ‘ready steady go’ once, and he copied it. After this, he was able to use this phrase quickly and without scanning. Regan’s data shows that he used a range of multi-symbol phrases from the first data collection, as shown in Figure 5.29 below. These were nearly always rote-learned phrases such as ‘ready, steady, go’ or sequences of numbers. He tended to use these favourite phrases repeatedly.

Figure 5.29

Regan’s Use of Multi-Symbol Phrases



This workshop focused on creating opportunities for communication, including people games. I had already mentioned to Ashley at the previous coaching session that I thought people games would work well for Regan, particularly if they met his sensory preferences.

The second coaching session was in the afternoon again, after work and day care. Ashley had planned to do a people game, which she said had been going very well. However, Regan was hungry, so she changed to snack time on the spot. This was harder for Ashley to practise the strategies, so I intervened frequently, and used some guided practice with feedback. I described what the issue was – Regan did not want to use the core board to make choices because he did not know what was available. Once I had described this, Ashley immediately came up with the idea of re-arranging the food cupboard and having all the main snacks in containers that he can't open while leaving them in sight. Ashley also identified she was modelling too many words when asking questions. I suggested turning them from yes/no questions to an open question "what do you want?" Ashley could see that the snack fringe needed to be personalised. During this time, Regan approached for help with packets, and Ashley used this as an opportunity to encourage him to point to 'open' on the core board. Later, when he had eaten, we tried out a couple of people games. As I had expected, Regan loved people games that involved movement, but was quite stuck on using the phrase 'ready steady go'. Ashley and I problem-solved ways to get him to extend to different symbols. Ashley was quick to pick up on new ideas and showed a good understanding of the strategies.

The second data collection represents how powerful people games were as a motivating communication opportunity for Regan; he used 147 symbols in 10 minutes and 40 spoken words (Figure 5.28). Ashley started by introducing a game where she spun him on an office chair, and then later in the recording, Regan initiated a people game where he pointed rapidly to the 'yes' and 'no' symbols to get his mum to say "yes no yes no yes no" whilst moving her head towards him. This caused him to laugh and squeal with delight. However,

the data does not tell the full story. Regan's arousal levels were high from the excitement of the game. Ashley was keen for him to extend the symbols he pointed to and repeatedly prompted him to do more. However, in this data collection and throughout the study, Regan tended to be quite rigid in the way he used the core board, and once he had settled on a symbol sequence to start a game, it was very hard to persuade him to change this in any way. He used 'FAST' for the chair game, but Ashley was keen for him to extend this to 'go fast'. She modelled this repeatedly and then started to use some physical prompting to get him to extend. Regan was just focused on the game and showed signs of getting annoyed. A similar pattern of events happened in the second people game, and Regan was often on the verge of frustration.

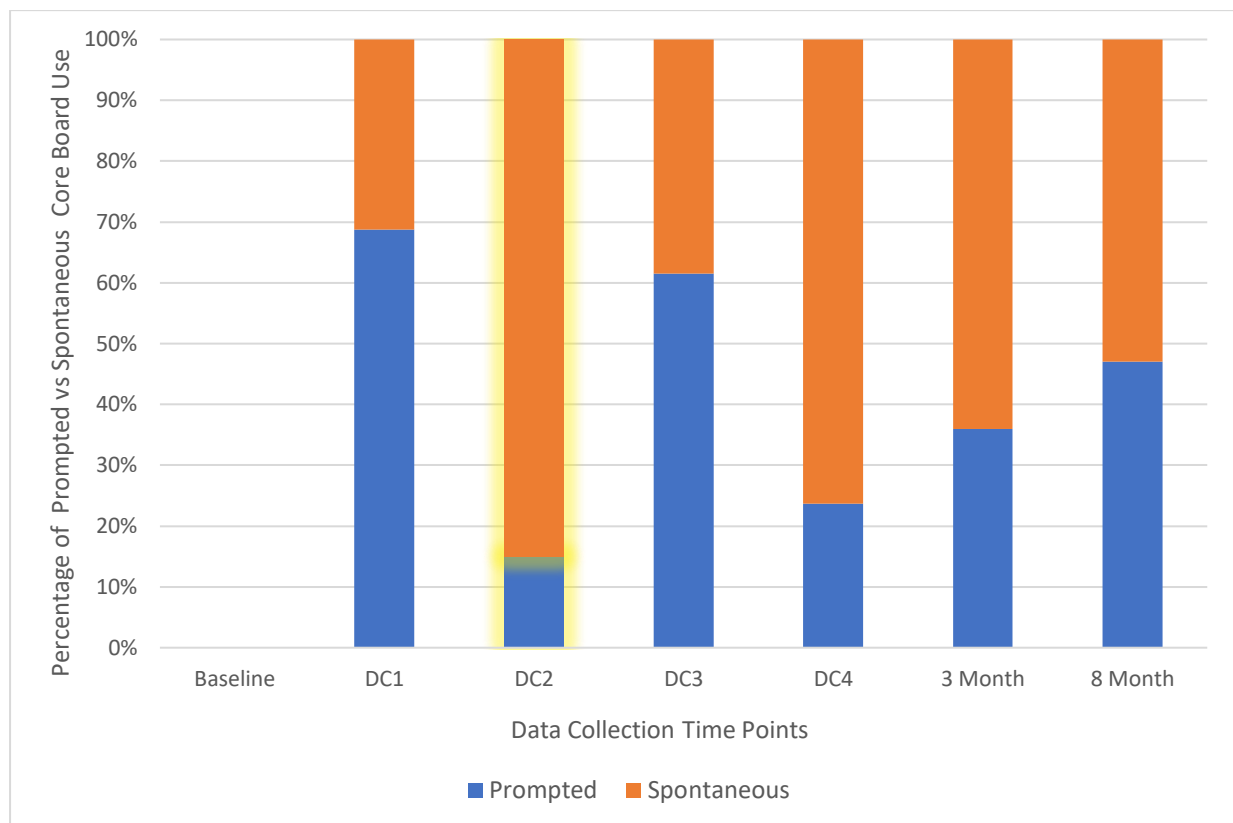
Although the prompt strategies had not been covered in the workshops yet, Ashley continued to use a range of prompts, including some physical prompting (Figure 5.26). Regan mainly ignored all attempts at prompting. He was very focused on the games and used the core board spontaneously to point to symbols on his agenda. Figure 5.31 below shows the high number of symbols that were used spontaneously in this data collection. Throughout the time Regan was involved in the study, he continued to mainly use the core board to communicate on his agenda, often resisting attempts to prompt him.

Workshop three covered prompting strategies. Ashley was already using these strategies with some success, but was starting to overuse physical prompting when she became frustrated with Regan's reluctance to add on new symbols. In her home journal, Ashley recorded the challenges she was experiencing: "Breaking patterns with games etc. E.g. Using 'ready steady, go' instead of new words because he already knows them. His refusal to even look at the board can be frustrating." However, she also recalled a memorable moment:

I dropped him at daycare and he grabbed the board, pointed to and said ‘I’ which we haven’t used yet, then found ‘HOME’ and ‘BED’ to tell me he wanted to go back home to bed. We haven’t used any of those at all so I was amazed.

Figure 5.31

Regan’s Prompted Versus Spontaneous Core Board Use



Ashley’s completed core tally sheet showed that Regan was increasing both the range and frequency of the symbols that he was using (Figure 5.32).

Figure 5.32

Ashley's Second Core Tally Chart



Numbers 1 - 30 ||| ||| ||| ||
 Colours - 1st full strip ||| |||
 Home |
 Bed |
 hungry ||

At the third workshop, I talked to the group about how to make coaching more useful, including different ways to ensure there was some video to watch, and also making time for the coaching conversation. Ashley responded to this by suggesting that the next coaching session was held on the weekend, so the children's dad was around to help with looking after

them. This time Ashley tried to introduce a people game with a balloon, but Regan became agitated and dysregulated, wanting control of the balloon and resisting her prompts to use the core board. I talked to Ashley about arousal levels and how many autistic children need help to manage their arousal levels before they can focus on new learning. In my coach log, I recorded the insight that Ashley showed when she watched the video:

Ashley was able to identify what prompts she had used with ease and was also able to reflect on which ones are more effective with Regan. She has found waiting to be very effective and reported that she has been aware that she has been over-prompting for a long time, and now is working on reining this in and giving him time to communicate first.

We spent time problem solving how to set up a people game that will work for Regan and also introduce new language. Ashley continued to be quick to grasp new concepts and provided insight into Regan's behaviour and how to manage him successfully. She was able to focus on the coaching conversation without distraction because the children were being supervised by their father.

In contrast to the second data collection, Regan was quiet and fairly withdrawn for the third data collection, preferring to explore items by himself. At the start of the recording, he spontaneously navigated to the personal care fringe strip and pointed to 'NAPPY' to indicate he needed changing. The video was paused and then restarted. He was not particularly motivated to communicate for drink choices, but communicated more later on in the recording when Ashley introduced a people game. Megan was also present, and Ashley had to manage both children while also using the AAC strategies, which she did with some skill. It was a difficult 10 minutes however, and Ashley seemed a little disappointed afterwards.

Despite this, when Regan did communicate, he used a range of communicative functions, such as declaring the drink ‘YUCKY’, as illustrated in Figure 5.33 below.

Figure 5.33

Regan’s range of communicative functions



At the final workshop, Ashley shared that she was struggling with Regan’s lack of progress. Her home journal recorded that she was frustrated by his unwillingness to communicate outside of people games. She felt that this was due to him building up communication habits over 3 years that were difficult to change. At the bottom of her journal sheet, she had written “Is it normal / usual that the child can go days without wanting to use the board?” However, her core board tally, kept diligently as usual, showed a wider range of core and fringe vocabulary use than previously (Figure 5.34).

Figure 5.34

Ashley's Third Core Tally

I / me / my 	it	who	what	am / is are / be	when	be careful	all	some	that	this
he / she	we / they / us	not / don't	come	do / does / did	again 	now / it's time 	how	why 	finished all done	problem
you / your	drink 	eat / taste 	feel	get / got	late / later 	ready 	all gone 	bad 	big	clean
give / gave 	go	hear / listen	help 	like 	where	away	cold 	different	dirty	fast
look / see 	make / made	open / close 	play 	put	here 	there 	good 	happy 	hot	little
read	say / tell	sit	stand	stop 	in 	out 	more	sad	same	sick / sore
take 	turn	wait 	want 	work 	up	down	on 	off 	silly	slow

yes 1 2 3 4 5 no toilet

Banana |||
 Yucky ||| ||
 Good morning ||| ||| |
 Hello ||| |||
 Goodbye ||| ||| |||
 Please |||
 That's awesome ||| ||
 Yummy ||| |||
 Yes/no game (heaps)
 Bed |||
 tired |||
 Pull up (nappy change) ||| |||
 Angry |||
 Need hug |
 Sleep |

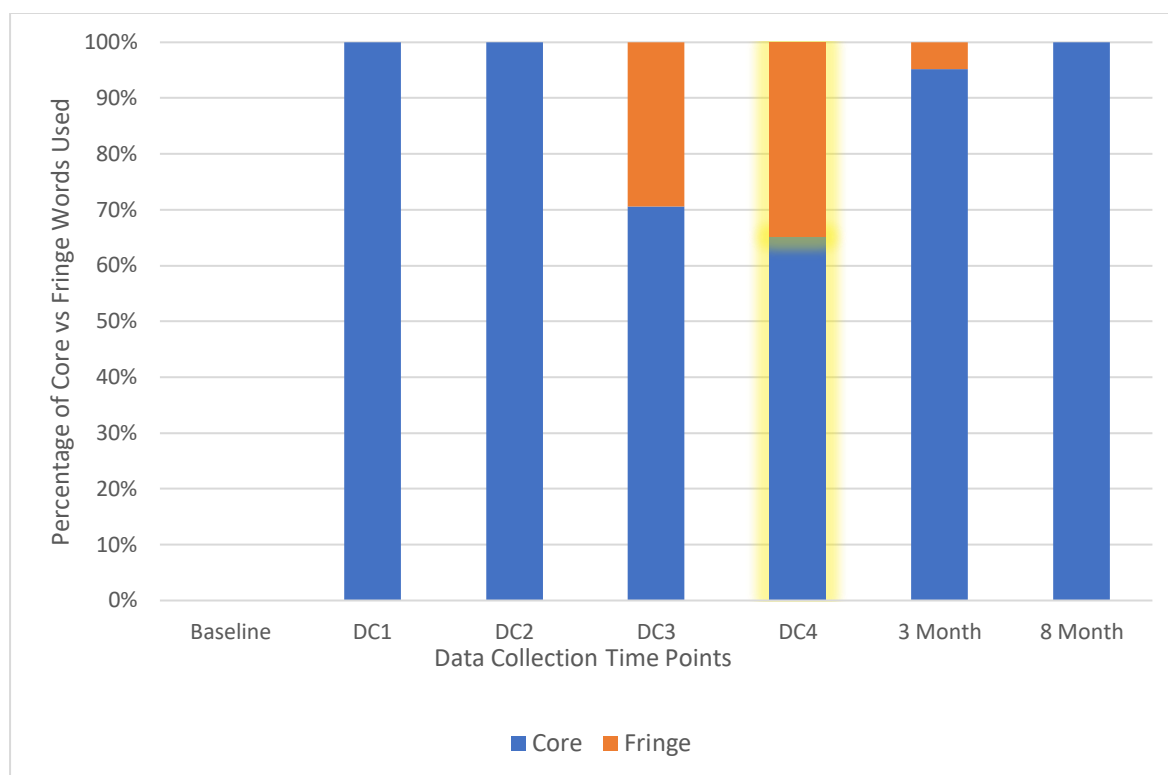
Milk |
 Orange |
 Pear |
 Numbers 1-30 (heaps)
 before ||| ||| } these are at
 after ||| ||| } the end of the
 alphabet (heaps) number strips.
 egg ||
 Poo |||
 wee |||
 wipe |||
 Soap |||
 wash hands |||
 dry hands |||
 shower |||
 wash |||
 pull-up |||

We talked through Ashley's concerns at the start of the next coaching session. My coach log stated:

Ashley feels that progress has slowed down, but also reported that he uses the core board frequently to make spontaneous requests. He is resistant to turn-taking games or being put under pressure to communicate. We talked through how much progress he has made since the start, and how his autism diagnosis will affect the way he communicates. I gently suggested that she may have raised her expectations too high, as he has continued to make progress and is now talking frequently.

Ashley seemed reassured by this conversation. She practiced her prompting and response strategies using a people game and some treat foods and showed her usual high level of insight and understanding during the coaching conversation.

By the fourth data collection, Ashley was able to use strategies from all four groups with skill and sensitivity (Figure 5.26). She was particularly tuned in to how far she could prompt Regan, and when to move on. She used modelling to expand what he communicated. Regan started out reluctant to communicate with the core board, but Ashley's nuanced application of the communication strategies soon had him interacting with her. When Regan initiated a new people game by pointing to 'QUIET', Ashley responded by whispering, then Regan shouted, and Ashley modelled 'loud' on the board. They built on this game together, until Regan was requesting her to do different actions either loudly or quietly, pointing to two symbols in sequence, for example, "QUIET OPEN". Ashley continued to model a high percentage of her language on the core board (Figure 5.27). Regan pointed to 43 symbols and said 28 words (Figure 5.28). His speech remained unclear. He used a balance of core and fringe vocabulary as illustrated in the Figure 5.35 below.

Figure 5.35*Regan's Use of Core Versus Fringe Vocabulary****End of the Intervention Phase***

By the end of the intervention phase, Regan had made significant progress in his ability to communicate with both the core board and spoken language. The core board was used across home and day care. Ashley was supporting his core board use with skilled use of all the taught strategies. In her post-intervention survey, Ashley rated herself at the top of the scale (strongly agree) for all questions relating to her confidence and skills, and Regan's ability to use the core board to communicate. She indicated that she found all the strategies either very or extremely useful. She found the group workshops very useful and the coaching sessions extremely useful. Like all the parents in the study, she expressed that she enjoyed meeting other parents who had children with similar difficulties. Her reflection on the coaching sessions matched my experience of working with Ashley over the past 8 weeks:

Sam has the education experience and I'm an expert in my child so it's always really useful and practical. Like ASD, not everything will always work for your child and their needs, so it's personalised.

She also noted the difficulties finding coaching times that worked well for Regan and finished with the observation that "It's been a big commitment but it's already so worth it."

Maintenance Phase

The next coaching session took place a few weeks after the intervention ended. Ashley reported that things had been going well, and Regan had continued to use the core board. She had planned a people game involving deep pressure, and Regan reacted well to this. She continued to maintain the strategies, and her high level of awareness. My coach log reported:

She identified that there is a delicate balance involved in keeping Regan engaged and not pushing him too hard, and she had demonstrated this skillfully in the video. I asked her if this was a skill she had developed during the intervention, and she said yes. It had helped her when I had explained about being 'ready to learn' in a previous coaching session and she had observed that if she pushed Regan too much when he is not ready to learn, then he refuses to engage with the core board for several days after. So, she has become very sensitive to his needs and does not push him if he is not up for it. She said she had reminded herself that he is only 3 years old, and we all have off days.

Ashley needed some support to plan goals for the next two months and decided to work on expanding his vocabulary.

The 3-month data collection continued to showcase how Ashley had embedded the strategies and used them with skill (Figure 5.26). Regan initiated another people game using

‘READY STEADY GO’ and Ashley expanded on his request by giving options for ‘fast’ and ‘slow’. This led to Regan using a four-symbol request for ‘READY STEADY GO FAST’.

Later in the recording, Regan spontaneously used the core board to point to symbols representing his father and Megan to ask where they were. The personalised fringe strips worked well for him. Regan used 62 symbols and 33 spoken words during this data collection (Figure 5.28).

The next coaching session 2 months later found the family in a very different place. There had been a COVID-19 lockdown, and Ashley had had to juggle working from home with managing the children. She retrieved the core board from her car, where it had been since the previous weekend. She informed me that they had been using the core board less. Regan had struggled with the loss of routine over lockdown, his behaviour had been difficult, and he had become more resistant to using the core board. Additionally, Ashley told me she was separating from her partner (the children’s father) and planned to move out of the house in the next month or two. Regan appeared to be in an oppositional mood and would not cooperate with the planned activity, so we used the video from the 3-month data collection for the coaching conversation. Ashley needed more scaffolding than usual to identify what strategies she was using. The family were under a high level of stress, and the extra pressure of supporting the core board was too much. Ashley decided to continue with her involvement in the study at this point, and we worked on a low-pressure action plan together that I hoped would be manageable for her and Regan.

After this, there was another COVID-19 lockdown. The 6-month data collection was postponed, as was Ashley’s house move. Time passed and Ashley became more difficult to contact. Eventually she let me know that she was moving before Christmas but would not be able to fit in any coaching or data collection until after Christmas. This meant she missed a coaching session, and when I eventually caught up with her and Regan in their new house, it

was 8 months after the start of the study. We arranged for me to visit for a joint coaching / data collection visit.

I was happy to catch up with the family again and see them settled in their new home. Ashley asked to start with the data collection first and then continue with coaching afterwards. She selected some wind-up toys for Regan to play with, and he found these highly motivating. This is an activity that would have been difficult earlier in the study, as Regan would have found it difficult to share a toy like this with another person and take turns. Ashley had remembered the strategies and used them appropriately. Regan used the core board to request help 'TURN ON' and 'TURN FAST', combining symbols in novel combinations and responding well to Ashley's language expanding strategies. His spoken words were clearer and contained more accurate consonants. The data shown in Figures 5.26, 5.27 and 5.28 may appear to indicate that Ashley used less strategies, and Regan communicated less frequently than usual. This can be explained by the change in activity, as Regan was playing with toys rather than engaged in a people game. This represented a step forward in his ability to share attention whilst playing.

After the data collection, we spent time watching a previous video and revising the strategies. Ashley needed some scaffolding to recall the names of the different strategies she was using. It was quite challenging to plan activities for the next 2 months. My coach log recorded:

It was not easy to find two activities that Ashley would have plenty of time to practise core board skills in. Daily activities tend to be quite fraught, and she has limited time in the morning. Regan does not sit to eat, and they do limited stuff in the community because he runs away.

Ashley was now having to manage the children with less support and was continuing with full-time work. Eventually we managed to find two activities that could work for them both.

This was to be the last time that I saw Ashley and Regan during the study year. After this, the family caught COVID-19 and were unwell for a while. It became more difficult to get in touch with Ashley, and eventually I received a text to say that she would not be able to continue as a participant. I was very sorry to lose them from the study but appreciated how hard she had worked to continue as far as she did at such a difficult time.

Barriers and Supports

Ashley did not take part in an interview at the end of the study, so the information about what helped her to support and maintain the core board with Regan, and what obstacles they encountered, is gleaned from her survey data, and from our many in-person conversations and is represented in Table 5.4 below. Ashley was a dedicated participant during the initial intervention who embedded the strategies and used them without the need for conscious thought by the end of the intervention phase. She continued to make progress and support the core board daily until a combination of a family break up, moving house and COVID-19 lockdowns and illness, made it too difficult to continue. It is likely that these unexpected and difficult circumstances are the main reasons why this family left the study and may not have continued to use AAC. Ashley has had the opportunity to read this case story and agreed that it is an accurate representation of what happened.

Table 5.4*Supports and Barriers to AAC Use Experienced by Ashley*

	Supports	Barriers
Survey data	<ul style="list-style-type: none"> • Receiving training on how to support the core board • Coaching • Seeing child's progress • Enthusiasm for learning • Positive attitude towards AAC 	<ul style="list-style-type: none"> • Fitting coaching around Regan's 'moods'
Informal conversation or observations	<ul style="list-style-type: none"> • Ashley's knowledge and understanding of her child • Ashley's commitment to learning and growth • Equal partnership in goal setting • Regan's quick uptake of the core board • Regan's strong visual skills and possible decoding abilities 	<ul style="list-style-type: none"> • Significant life events – separation, moving house • COVID-19 lockdowns • Illness • Managing Regan's behaviour in the community • Regan started using more spoken language • Regan's reluctance to use core board to communicate at times

Case Study 5 – Puja and Tina

“To accept the core board, that’s the most challenging thing for me. To use it, and to accept that Tina is not talking, and Tina needs something else to communicate. That was the most challenging thing for me to do and accept it”.

Background Information

Tina was 3 years and 5 months at the start of the study. The family were informed about the project by their early intervention teacher at the Ministry of Education (MOE). I spoke on the phone to Tina’s mum, Puja, several times before I met the family in person because Puja was not decided about being involved in the study. She wanted specific information about confidentiality and what the study would involve. She asked if it would be possible for her and her husband, Rahul, to alternate attending the workshops, and sounded disappointed when I informed her it had to be one consistent parent throughout the study. She also asked if she would have to share any information about Tina with other parents at the workshop; she said she was uncomfortable sharing information about her child’s identity or difficulties. I considered this and how it would change the dynamic of the workshops as I had planned them, then explained that the workshops were intended to be supportive, and it would not be appropriate for one parent to refuse to share any information with the others. After this conversation, Puja agreed to meet me at her home to get more information and possibly sign up to be a participant.

I then visited the family at home and met Rahul, Puja, and Tina. I spent time explaining the research in more detail, and particularly how their confidentiality would be protected. This was meant to be a short visit, but took longer than usual, because Rahul and Puja had many questions, both about the research, but also about Tina’s difficulties with development. Eventually they said they would like to participate. I had some concerns at this point that the family were still processing Tina’s diagnosis of global developmental delay,

and might struggle with the idea of using AAC, but I was also keen to help them and interested to see how they would progress.

My next visit was to collect case history information and to take the baseline data collection recording. This visit was another lengthy one. Rahul had many questions that went beyond the remit of the research, particularly around Tina's diagnosis and prognosis. Puja was visibly upset during the case history taking; her mood appeared to be very low in general and she cried often as she talked about Tina and how she was developing. Tina was present throughout both meetings, and was generally quiet, although she frequently sought out interactions with her parents and with me. She appeared to be a sociable child who was happy to be around people.

Puja informed me that she had first started to notice Tina's delays around 2 years of age. Since then, the parents had been looking for answers as to why she had difficulties and appeared very frustrated by their dealings with health services. They explained that they found it difficult to accept the diagnosis they had been given and had asked for further investigations to try and find the cause. They had switched special education providers recently and this had led to further delay in them receiving services. Tina did not have a speech language therapist to date.

The family had moved to New Zealand from India, and Tina was born in New Zealand. Both Rahul and Puja spoke good English but used Punjabi mainly at home. Both parents worked full time, and Tina attended a local day care centre. Puja indicated that she was not entirely happy with the care Tina was receiving there. Although Rahul's brother, wife, and children also lived in New Zealand, Puja indicated that she felt isolated from her family. She spoke to her parents frequently on the phone. Puja and Rahul appeared to be quite isolated and had no network of family or friends to help with childcare. Puja was in the

process of a career change. There appeared to be high levels of stress within the family, and during this meeting, Rahul sometimes appeared impatient with Puja's sadness about Tina. I was concerned about Puja's level of distress and asked if she had considered counselling. She replied that it was enough to talk to her family on the phone.

Tina appeared to be a happy, affectionate child and Puja described her as kind and empathic towards others. Her parents reported that she had delays in most areas, including fine and gross motor skills, self-care, and communication. She crawled and walked late and was not yet running or jumping independently. She could feed herself but tended to be messy with this. She enjoyed a range of foods and ate a variety of fruit and savoury foods during the meeting. She was not toilet trained and showed little awareness of when she needed changing. Puja informed me that her favourite activities were playing with dolls and toy food, as well as helping with cooking, but she disliked hearing her parents fighting. I noticed that Tina was able to help herself to some things from the kitchen, but also that her parents tended to anticipate her needs and often provided what she wanted before she needed to communicate.

Puja felt that Tina understood at least 50 words in both Punjabi and English, as well as some simple instructions in context. She also showed understanding of some simple questions like "where's Daddy?" At this time, Tina communicated by touch, gesture, pointing, hand leading, holding things out, vocalising, whining, facial expressions, smiling and laughing. She had social gestures such as waving and high fives. During our meeting, she communicated for a range of purposes, including to greet, request and protest, and to get attention. At this time, her parents reported that she was not particularly frustrated, and there were few concerns about her behaviour.

Puja completed the initial survey at this visit and indicated that she was “extremely concerned” about Tina’s communication. The survey also highlighted that she had no avenues of support outside of Rahul. She indicated that she had mixed feelings of excitement and worry about being the main support person in the study. She also indicated that she had mixed feelings about introducing the core board, ticking the following statements from a selection of perspectives about using AAC:

It might stop my child from learning to talk

I’ll try anything to help my child

I just want my child to talk

I think this could relieve their frustration.

Baseline Data Collection

Puja opted to just use the snack box with Tina for the baseline video, and to have Tina seated at the table. She maintained control over the snack box and offered different items to Tina. The core board was available but neither of them attempted to use it. Tina was very aware of my presence and kept looking and smiling at me. Rahul was also watching, and this may have added further pressure on Puja, who appeared anxious. Puja checked with me several times during the video to make sure she was allowed to touch or use things, and also to seek reassurance.

Tina was mainly quiet during the video, although she sometimes vocalised quietly to get her mother’s attention. She also used touch, pointing, looking and facial expressions to communicate for a variety of reasons, including to draw her mother’s attention to something. She was able to clearly communicate all her needs using non-verbal communication. Puja was consistently responsive to every communication attempt made by Tina. There was a sense of urgency in Puja’s communication with Tina; she talked fast and repeated herself

frequently. Tina was hesitant to eat and was distracted by the people watching her; Puja responded by urging her to eat “quickly, quickly”, “c’mon, c’mon” and “take a bite”. Tina tends to dribble and have some food loss from her mouth when she eats, and Puja reacted by getting paper towels, and wiping her mouth frequently. I could sense that the whole process of being videoed in an assessment activity was stressful for Puja but was unable to provide much reassurance because I did not want to interrupt. I noticed that Tina tried to put a small square lid on a larger round container and wondered if it might indicate some underlying visual perceptual difficulties.

Overview of the Intervention

Puja and Tina completed the full year of the study. Their involvement in this research was a journey of growth for this family, and for me. In the interview at the end of the study, Puja outlined how their participation had helped her accept Tina’s communication difficulties to some extent, plus the need to use some form of AAC, and it had helped her to be more open about Tina’s developmental delays. Although Puja and I discussed the possibility of her leaving the study during the first 8 weeks, she decided to persevere, and both her and Tina made significant progress with using AAC and communication in general.

Puja was able to use the supportive communication strategies skilfully by the end of the intervention phase (see Figures 5.36 and 5.37), although it was evident from discussions with her that the family were not really using the core board outside of the coaching and data collection visits. Tina started off by showing an initial interest in the core board and understanding that touching it would make something happen. She learned to hit it or point to it in random places to make requests. Halfway through the intervention phase, Tina became increasingly reluctant to use the core board, especially if she felt she was being prompted to

use it. By the end of the intervention phase, Tina was no longer using the core board at all, and the core board was only brought out for use in the home, at specific times (Figure 5.38).

During the maintenance phase, after a significant event where Tina could not get her message across and became very upset, Puja had the realisation that Tina would benefit from some form of alternative communication, and her feelings towards using the core board changed. The family still only used the core board in the home, but Puja used it more frequently outside of coaching and data collection visits. Tina became less reluctant to use it and began to point to some high frequency symbols accurately, as well as exploring other symbols (Figure 5.38). Puja also began to use some sign with Tina. By the end of the year, Puja was confident and highly skilled at using all the supportive AAC strategies and Tina was using the core board to communicate at home some of the time.

Figure 5.36

Frequency of Puja's Use of Taught Strategies

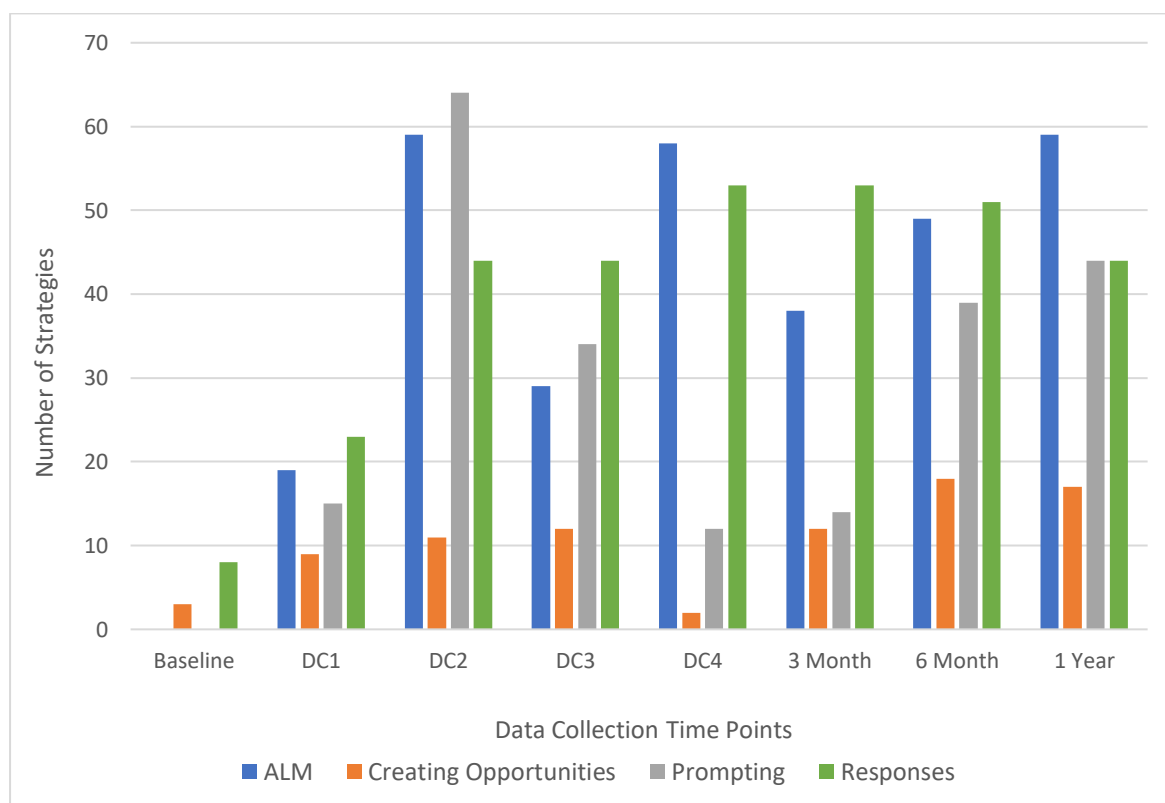


Figure 5.37

Percentage of Words Modelled on Core Board by Puja

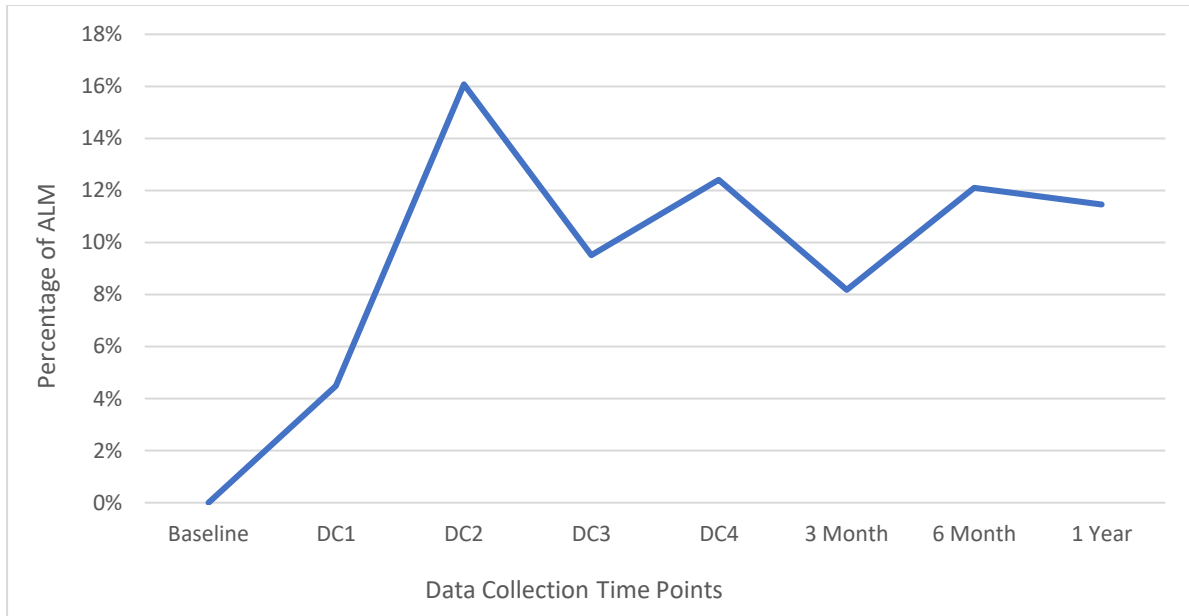
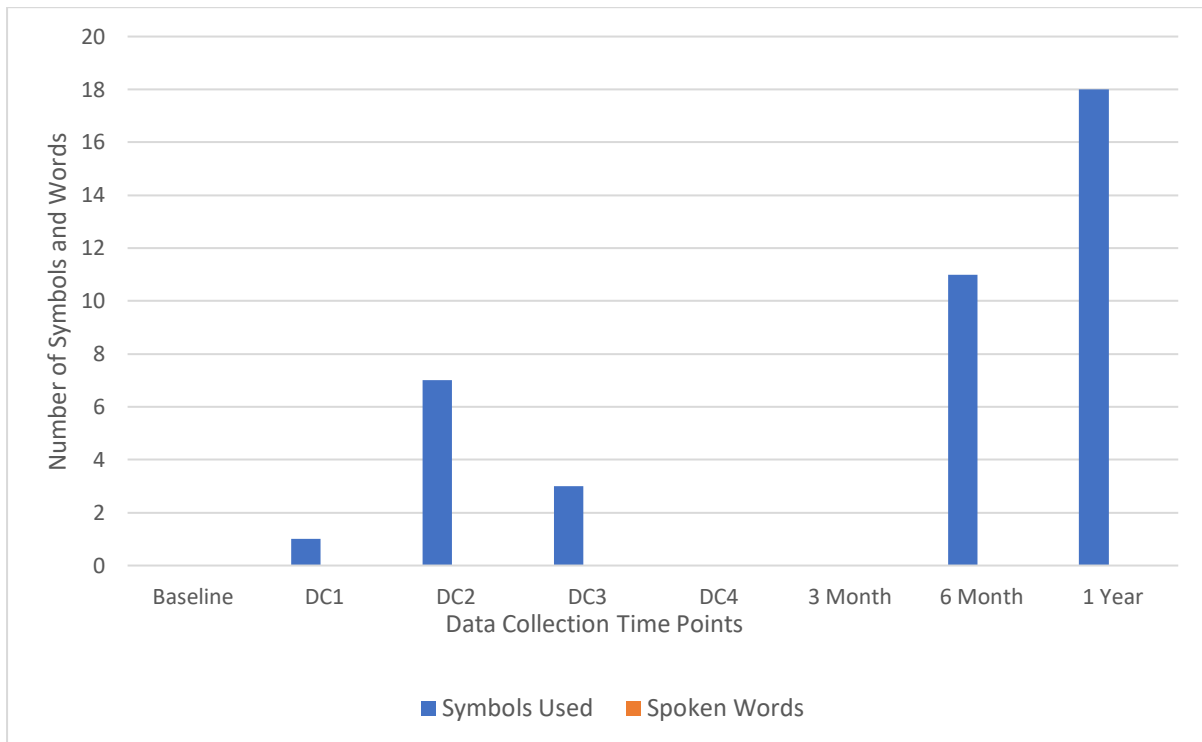


Figure 5.38

Tina's Use of Spoken Words and Core Board Symbols



The First Eight Weeks – The Intervention

Based on my initial telephone calls with Puja, where she appeared to have concerns about the workshops and sharing information, I was apprehensive about how she would manage them. However, Puja seemed to really enjoy the first workshop. She readily socialised with the other parents and asked them questions about their children during the break. She appeared to understand the concepts I introduced and asked relevant questions. She needed a little guidance with the action plan to help her decide on appropriate words to model during a mealtime. She stayed afterwards to talk to me, and it was apparent that she had enjoyed herself. Puja was in the last week of employment before changing jobs and had arranged to have the time off to attend.

The first coaching session was in the evening, over dinner time. Although in these early coaching sessions, I expected the parent participants to need more guidance, Puja appeared to see me in the role of an “expert” and expected me to tell her what to do. When watching the video back, she was able to identify that she had modelled frequently on the core board. I brought up the subject of her language pacing, as she continued to talk fast and repeat her comments and instructions several times before Tina had a chance to process them. Puja seemed unaware of this, even after watching the video back, so I talked through how this might be affecting Tina’s ability to respond. In my coach log, I also recorded that “Puja tends to anticipate all of Tina’s needs and seems very reluctant to allow her to get even slightly frustrated, so we had a gentle conversation about this, how frustration can be useful for communication.” At this point, Rahul arrived home from work. As in previous visits, he wanted to be involved and had many questions for me that went beyond the scope of the research. We completed the action plan together, including a trampoline activity that Rahul could be involved in.

When I arrived for the first data collection, the core board was nowhere in sight. I asked where it was and Puja asked if she needed it, which surprised me. It took a while to locate the board in another part of the house. Rahul was also present, and I asked him how the trampoline activity that we planned together had gone. He said they hadn't done it. Puja decided to try the box of toys for this data collection. This was a difficult activity; Tina was still developing her attention skills and tended to either be rigidly fixed on a toy and ignore her mother's attempts to communicate with her, or her attention would flit from one toy to another quickly. She was very intent on exploring the toys, and she seemed unable to shift her attention between the toys, her mother, and the core board. Puja appeared unsure of how to involve herself in the play, although she did make several attempts to follow Tina's lead and talk about what she was playing with. The core board was often left to one side or used as an afterthought. Puja was still learning the placement of the core symbols, so often had to stop and scan for some time before locating the symbol that she needed. By this time, Tina had usually moved on to something else.

There were some short periods of joint engagement, particularly when Puja blew up a balloon and then let it go. Tina enjoyed this and looked at her mother for a repeat. Puja modelled "more" on the core board and blew it up again. She then tried to model "ready, steady, go", but could not locate the 'go' symbol for several seconds. In the time it took her to find it, Tina became distracted and started playing with the toy food again, so the moment was lost. Puja continued to talk quite rapidly and frequently, so overall she modelled 4% of her spoken words on the core board (Figure 5.37). She used some strategies from all four of the strategy groups (Figure 5.36), and she remained very responsive to all Tina's communication attempts. Tina tapped the core board once during the 10 minutes, during the balloon game when she wanted another turn (Figure 5.38). Rahul was observing, and

afterwards had ideas about things Puja could have done differently, which seemed to annoy her.

Puja continued to be open and sharing during the second workshop. She talked openly about her worries for Tina, telling the other parents about her concerns around how she will make friends, and how the day care staff sometimes upset her with thoughtless or possibly pointed comments about Tina’s progress. She also commented that she was worried that Tina would become “dependent” on the core board, something which took me by surprise, and I didn’t know how to respond to it in the moment. I was relieved that Puja seemed to be finding the workshops supportive and helpful. She had completed her core board tally (Figure 5.39), and her home journal recorded that she had been working on pausing more and giving Tina more time to think.

Figure 5.39

Puja’s First Core Tally

I / me / my	it	who	what	am / is are / be	when	be careful	all	some	that	this
he / she	we / they / us	not / don't	come	do / does / did	again	now / it's time	how	why	finished all done	problem
you / your	drink	eat / taste	feel	get / got	late / later	ready	all gone	bod	big	clean
give / gave	go	hear / listen	help	like	where	away	cold	different	dirty	fast
look / see	make / made	open / close	play	put	here	there	good	happy	hot	little
read	say / tell	sit	stand	stop	in	out	more	sad	same	sick / sore
take	turn	wait	want	work	up	down	on	off	silly	slow

yes
 no
 toilet

1
 2
 3
 4
 5

After the workshop I considered Puja's comment about Tina becoming dependent on the core board. My reflective journal records the following thoughts:

I reflected on this comment and realised that we are coming from different core beliefs. I would think it was a positive if a child became dependent on a core board, because it means that the system has been successful for them and is a good way for them to communicate for now. But for Puja, it is not a positive, because her belief is that she just wants Tina to learn to talk. It will be good to discuss this further maybe during the coaching visit.

The next coaching visit was in the evening again, and this time both parents were present, and Rahul wanted to be involved. Puja had planned two people games, but it was quite a high-pressure environment with both parents involved and me watching. Puja said she did not want me to take video, so I used guided practice and feedback as they played. Tina looked quite overwhelmed, and it was difficult to get her engaged. After a while, I suggested trying the bubble machine instead, and helped to set up the game. Tina was highly motivated by the bubble machine, which had lights and music, but was resistant to using the core board to request another turn. I reminded both parents to wait if she did not immediately respond, as they tended to jump in with more language and prompts. Eventually Tina started to tap the board to request more, although she did not scan or aim for any particular symbol. At this point I suggested using the masked core board which I had supplied on the back of their full board. This was masked down to 12 symbols and might make it easier for Tina to visually locate specific high-frequency symbols, as well as make it easier for Puja to model (Figure 5.40).

Figure 5.40*Picture of Masked Core Board*

After the activity, I asked to talk about Puja's concerns that Tina would become dependent on the core board. Puja explained that if Tina used it to communicate all the time, then she would be stuck if they left the house, because they were not planning to take the core board out the house. I asked why, and Puja informed me that she did not want Tina to stand out or look different. During this conversation I noticed that her body language was quite negative towards the core board. I talked about research that indicates using AAC does not stop children from learning to talk if they can, but I could tell neither parent was keen on the idea of AAC at all. Additionally, I noticed that there was tension between the parents, and I was concerned that my intervention was a catalyst for this. In my coach log, I noted my suspicions that the core board was not being used at all except during my visits. It was apparent to me that neither parent really wanted this to be an option for Tina. I reminded the family that they could leave the study at any time and suggested that they may wish to explore other communication options for Tina apart from the core board.

My reflective journal recorded that I felt quite troubled after this coaching visit. I did not want Puja's involvement in the study to cause her more distress, and I was concerned that it was causing tension between the parents as well as adding to Puja's feelings of guilt. Whilst I did not believe that learning or using the supportive strategies would cause any harm to Tina, the family did seem to be very set against using the core board. I was aware that Tina was going to need quite intensive modelling and support to learn to use the core board to communicate meaningfully, and while I believed she would be successful eventually, I could also see that she was not going to have immediate success due to her motor and visual perceptual delays. Had Tina picked up how to use the core board quickly, and shown enthusiasm for it, this may have helped her parents to see its value for her, but it was apparent that she was going to need time, patience, and frequent modelling, which was unlikely to happen given both her parents were hesitant about the intervention. I considered other options for Tina, outside of the research. In my professional judgement, she would be more suited to a simpler AAC app on an iPad, or for signing. Her parents were more likely to accept the appearance of an iPad, and she would benefit from the auditory feedback from a voice output app. Signing would be more suited to her social personality and current attention skills, although some signs would be difficult for her to attempt. However, the family did not have a speech language therapist at this point, so if they left the study, they would not have support for these options. I decided to bring this to my next supervision meeting, which was scheduled after the next data collection visit.

The second data collection alleviated some of my concerns. Rahul was not present, and Puja appeared more relaxed and used several strategies that we had talked about during previous coaching sessions. She selected the snack box and play dough and held the core board in a prominent position throughout. Her pacing had improved, and she waited for Tina to respond to her questions and comments. The increase in her use of strategies can be seen in

Figures 5.36 and 5.37. She modelled 16% of her spoken language on the core board, and these models were appropriate and matched Tina's focus of interest. Tina responded by showing a higher level of joint engagement with her mother. She used the core board seven times, either hitting it with her hand, or pointing in random places to make requests (Figure 5.38). Puja always responded immediately to her requests.

There were still some difficult moments; Tina disliked not having access to the assessment box and showed signs of frustration at some of the sabotage techniques employed by Puja. We had not yet covered prompting strategies in the workshops; Puja was already using prompts frequently and too persistently, causing Tina to withdraw and lose interest. However, despite these issues, it was a significant improvement compared to previous data collection recordings, and it reassured me that the family were gaining some benefit from the study. Afterwards, I provided positive and specific feedback to Puja regarding her use of the strategies, and I observed that she appeared more confident and happier than I had seen her before. I brought up this family in my next supervision session shortly afterwards and, after some discussion, it was decided that they would benefit from the support and improved communication strategies even if they decided not to use the core board, although I would need to monitor closely and continue to check that they were happy to remain in the study.

At the third workshop, Puja's completed core board tally suggested that Tina was now using the core board more frequently for a few, high-frequency symbols (Figure 5.41). The workshop covered the strategy of prompting. I also took time to talk through the coaching process again and remind participants that video feedback was an important part of this, as well as making time for the coaching conversation. For Puja, I was hoping that we could restart using video feedback, and that she would take a more active role in the coaching conversation from this point, rather than waiting for me to tell her what to do.

Figure 5.41*Puja's Second Core Tally*

I / me / my	it	who	what	am / is are / be	when	be careful	all	some	that	this
he / she	we / they / us	not / don't	come	do / does / did	again	now / it's time	how	why	finished all done	problem
you / your	drink 	eat / taste 	feel	get / got	late / later	ready 	all gone	bad	big	clean
give / gave	go 	hear / listen	help 	like	where	away	cold	different 	dirty	fast
look / see	make/made	open/close 	play	put	here	there	good	happy	hot	little
read	say / tell	sit	stand	stop	in	out	more	sad	some	sick / sore
take	turn	wait	want	work	up	down	on	off	silly	slow
(2)	yes	1	2	3	4	5	no	toilet		

The third coaching session took place over dinner time in the evening again. Puja focused on using prompts and waiting for Tina to initiate communication. Tina started by tapping the core board to make requests but soon became frustrated and showed this by pushing the core board away and protesting. This time Puja took a more active role in the coaching conversation and was able to identify the prompts that she had used. It was evident that she had really worked on waiting and this was having beneficial effects on Tina's communication. Together we problem solved how to reduce the number of times that Tina needed to ask for food and drink so it would be less frustrating for her. I recommended using less withholding and more general, low-pressure modelling and fun chat about food. Rahul was present and keen to be involved in the coaching conversation. In my reflective journal, I recorded that I sensed this involvement caused some tension for Puja. At the end of this coaching session, I asked if the core board could be introduced at day care as well, so that

Tina would be able to use it across different environments. I noticed that Puja appeared hesitant about this before agreeing that I could contact the early intervention teacher at MOE to arrange this. In retrospect, it was probably a mistake on my part to push for this.

For the third data collection, Puja opted to use the snack box and some play dough toys. She maintained control of the box and introduced items one by one. She continued to use a range of appropriate, targeted modelling on the core board (Figure 5.37), and her pacing was slower and calmer with lots of expectant waiting. She continued to be highly responsive to all of Tina's communication attempts. However, Tina was showing increasing frustration about not having free access to the assessment box and her mother's use of withholding. She presented as quite elevated in mood from the start of the data collection, and she continued to show increased levels of frustration throughout, flapping her hands, whining, and eventually dropping to the floor and crying at the end of the 10 minutes. Puja's use of prompting strategies was persistent at times and further increased Tina's frustration. Tina used the core board three times in this data collection (Figure 5.38), pointing to random symbols to indicate a request. Tina was used to her parents anticipating her needs and responding to all of her non-verbal communication. It appeared that this increased expectation on her to communicate using the core board was leading to feelings of anger and frustration.

Rahul had watched the data collection activity, and afterwards I talked to the parents about how to decrease the pressure on Tina to use the core board. I learned from talking to them that the core board was still used infrequently and was typically not used for general modelling in daily activities. They explained that it was mainly being used in specific, planned activities with a strong expectation that Tina would use it to communicate. In my reflective journal, I recorded that I thought it likely that Tina was viewing the core board as something which made her life more difficult and did not have enough experience of it being used in a fun, low-pressure way.

Puja arrived at the fourth workshop and immediately told me “It is not working using the core board when Tina is playing”. She explained that Tina pushes it away and gets cross. I suspected that Tina saw it as work that would spoil the fun of the game. With Puja’s permission, I opened this problem up to the group and they made some useful suggestions, such as only using the core board for general modelling with no pressure on Tina to respond. Later in the workshop I advised Puja to stick with reward responses for now, and to take all pressure off Tina to use the core board. Puja’s core tally sheet indicated that Tina was still using the core board occasionally (Figure 5.42). I had encouraged all the parents to supply me with lists and photos for personalised fringe strips, but Puja had not asked for any additional fringe strips at this stage.

Figure 5.42

Puja’s Third Core Tally

I / me / my	it	who	what	am / is are / be.	when	be careful	all	some	that	this
he / she	we / they / us	not / don't	come	do / does / did	again	now / it's time	how	why	finished all done	problem
you / your	drink 	eat / taste 	feel	get / got	late / later	ready	all gone	bad	big	clean
give / gave	go 	hear / listen	help	like	where	away	cold	different	dirty	fast
look / see	make / made	open / close 	play	put	here	there	good	happy	hot	little
read	say / tell	sit	stand	stop	in	out	more 	sad	some	sick / sore
take	turn	wait	want	work	up	down	on	off	silly	slow

yes	1	2	3	4	5	no	toilet
-----	---	---	---	---	---	----	--------

The next coaching session was intended for parents to work on the response strategies introduced in the previous workshop, but this was not appropriate for Tina who was reacting

negatively to any pressure to use the board. Instead, Puja planned to do play dough with Tina and use general aided language modelling in a low-pressure way. Tina was happy to play with the play dough but mostly ignored Puja's modelling on the core board, which caused Puja to urge her to look, while she repeated the model. This made the play session feel stressful, and Puja did not join in and play. When we looked back through the video I had taken, my coach log recorded that Puja appeared to focus more on what Tina was not doing rather than her own use of the strategies. She seemed frustrated that Tina did not look when she modelled. I could see that Puja's comments and modelling were mainly irrelevant to Tina as they did not match her interest at the time. We went back through the video slowly and identified times when Puja's model matched Tina's focus; Tina was more likely to pay attention when Puja managed this. Additionally, there were several times when Tina used non-verbal communication to give directions, such as telling me to sit and join in. I suggested that these are good times to model what she is trying to communicate on the core board, to show her a clearer way to send her message.

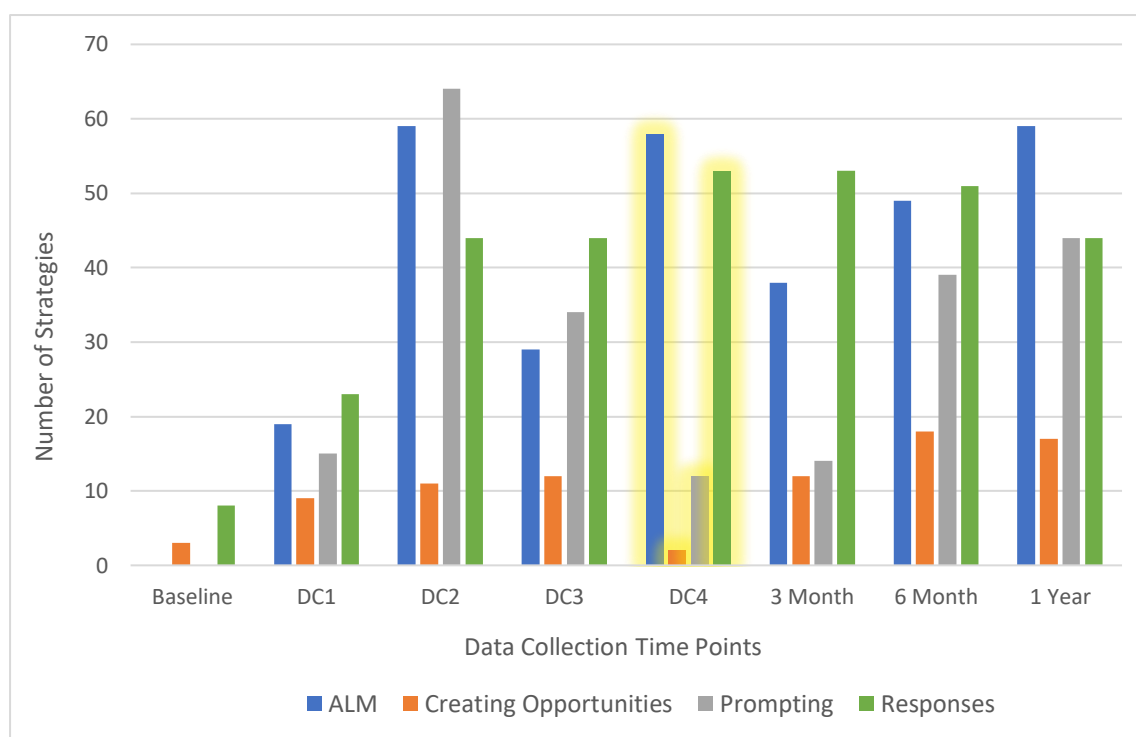
Rahul was at home and took a keen interest in our conversation. Puja had told him that the other parents were reporting that their children were using the core board more frequently and more successfully than Tina. He wanted to know why. I gave my honest opinion and told them that the other parents are using the core board more, across far more activities and outside the home, and do not have the same ambivalent feelings that Puja and Rahul have about it. I also shared that I thought it was difficult for Tina to visually discriminate and point to specific symbols, so it was taking her longer to learn to use it. At this point, I felt I had to let them know about other AAC options that might be more suitable for the family and for Tina, including signing. They listened with interest and Puja immediately downloaded the New Zealand Sign Language app on her phone. I explained that if they decided to change to a different form of AAC, they would need to leave the study, but

the strategies they had learned would remain relevant to any system. After some consideration, both parents indicated they would like to try for another month with the core board. Rahul stated that they had not really been using it much. Puja put the core board over her shoulder and started modelling while she played with Tina.

This new resolve was evident in the fourth data collection. Puja selected a microwave toy to play with Tina. This time there was no pressure for Tina to use the core board, and Puja modelled fun words that matched Tina's interests. She also joined in with the play and they both pretended to eat food together. Tina was more relaxed and enjoyed her mother's attention. Figure 5.43 shows how Puja focused on modelling language on the core board and responding to all of Tina's communication attempts, while using much less sabotage or prompting. Tina did not communicate with the core board (Figure 5.38) but appeared to enjoy herself and tolerated the board being used for modelling.

Figure 5.43

Puja's Tailored Use of Strategies in 4th Data Collection



End of the Intervention Phase

At the end of the intervention phase, Puja had made great progress with learning and using the communication strategies with Tina. Puja seemed to have improved her confidence when communicating and playing with Tina, and the family seemed resolved to give the core board a chance. I also felt comfortable with our recent discussions where I had made it clear that there were other options outside of this study's remit. Tina's communication skills appeared to be similar to where they were at the start of the intervention.

The end of intervention survey completed by Puja reflected what I was observing at the time. On a scale of 1-5, she scored the following statements:

- I feel confident to support my child to use a core board – 4 (agree)
- The core board is a useful tool for helping my child communicate – 3 (undecided)
- My child's communication has improved over the past 9 weeks – 2 (disagree)
- My skills when helping my child to communicate have improved over the past 9 weeks – 3 (undecided).

Puja scored all the strategies as useful, especially modelling. She also scored the workshops as very useful and the coaching as extremely useful. In the survey, she commented that sharing experiences with the other parents was something that she liked. Puja elaborated on this in her interview, where she stated that this was a standout experience for her about the study:

It's been a really good experience ... meeting other mums, ... they're talking openly, like in the group and sitting in there saying things about their kids. And then that gave me a little bit confident to talk to anyone, like now I'm so open about Tina. ... So I can talk and that gives me a little bit less burden on my mind ... It's a relief actually.

At this stage of the study, Puja appeared to have mixed feelings towards AAC for Tina, and she had not committed to the core board as a useful tool. In the survey, she states: “Instead of core board – I would rather prefer laptop so a person can carry anywhere and when you go out people will not judge you or look at you differently.” These concerns about how Tina would be seen and judged by people in the community remained with Puja throughout the study, but it appeared that spending time with other parents who had children with similar difficulties had helped to lessen the feelings of fear that she had carried beforehand: “I was so scared in the beginning to talk about Tina to *anyone*.”

Early Maintenance Phase

At the next coaching session shortly after the intervention finished, Puja seemed unprepared. She had not planned an activity and appeared unfamiliar with her action plan. I suggested a play dough activity, as I had some play dough with me. After the observation, I suggested that we move to a quiet room while Rahul entertained Tina, because Puja was often distracted if Tina was around, and I wanted to speak to Puja alone. This worked much better and allowed for uninterrupted conversation, and we stayed with this arrangement for future coaching sessions. Before we watched the video back, we had a chat about how things had been going. Puja told me she had been feeling very low over the past week, because she had realised that Tina was going to need some form of AAC to communicate. Up until now, Puja had usually been able to work out what Tina wanted, but it appeared there had been an event when they were out shopping where Tina could not convey what she wanted. It eventually transpired that Tina had wanted chicken and rice, but the event left Puja feeling shaken. This was to be a turning point for Puja, who until then had believed that Tina would start talking. In her interview at the end of the year, she reflected on this: “And then that day I think she needs a communication help, she needs another thing to convey her message. So then my thing lean to core board.”

Puja seemed very down, and I again brought up the subject of outside support for her. She said this wasn't necessary and she could talk to her parents. I reminded her about how we could personalise the fringe strips on the core board to make them more relevant and motivating for Tina, particularly as she had strong ideas about what she wanted to eat. Puja agreed to send me lists and photos. I asked how it was going with wearing the core board before dinner time in the evenings, when Tina tends to make several requests. Puja said she was doing this sometimes, but not if friends were round. At this point, she was still not comfortable with other people seeing the core board. Then we watched the video back and worked on how to match comments and modelling to Tina's focus at the time. Puja took a more active role in the coaching conversation than previously, identifying when she hadn't followed Tina's lead and coming up with ideas for more suitable models.

Puja informed me that Tina was about to get an education support worker (ESW) in day care. She had mixed feelings about this, because she wanted her to have extra support, but was fearful of her standing out in any way. I asked if the core board was used at day care, and Puja said she had not taken it there. I suggested that it goes so the ESW can use it with Tina. Puja agreed, but again I sensed her reluctance. When it came to setting goals for the next 2 months, Puja wanted Tina to understand and use more symbols. I helped her to choose some realistic and motivating symbols for Tina.

Puja sent me photos of family and day care staff the following week, so I was able to bring this personalised fringe strip to the 3-month data collection. Tina was immediately interested in this strip and pointed to her aunt. Puja used the snack box for this data collection, and she demonstrated consistent use of all the supportive strategies throughout the 10 minutes (Figures 5.36 and 5.37). Tina showed high levels of frustration at not having immediate access to the food and drink and was on the edge of a meltdown for much of the recording. She ignored the core board and instead used pointing, shouting, flapping, whining,

reaching and getting up to communicate her needs (Figure 5.38). Puja was doing everything I would recommend to support Tina to communicate on the core board, but Tina was resisting and communicating in the ways that had worked for her previously.

Later Maintenance Phase (after 3 months)

As we moved past the 3-month mark, I felt that Puja was finally coming on board with using a core board, but Tina was not yet convinced. However, things had changed by the next maintenance coaching session; Tina greeted me, brought her core board over and pointed to symbols. She had responded well to the addition of the family fringe strip, and enjoyed pointing to different people that she knew. Puja had planned a new game that Tina was enjoying, and I was able to get a video of them interacting together. As well as watching this back, I also showed Puja some graphs of their data so far, which showed the progress she had made with using the strategies. Puja took an active role in the coaching conversation and had a good understanding of her use of the strategies. I asked about how it was going with the core board in day care; Puja told me she was not taking it there. She was still concerned about how it would make Tina look. Puja informed me that although Tina was happier to use it, Rahul and she were still not using it enough or taking it out of the house at all. Although things were moving forward, there were still some significant obstacles for this family. Rahul joined us at the end. He wanted to talk through an upsetting appointment they had had with the paediatrician. They had been told that the medical team could find no underlying causes for Tina's difficulties and additionally they felt that the paediatrician had dismissed Tina as "severely disabled". This had been very hard for them to hear, and they disagreed with it.

By the 6-month data collection, Puja was now relaxed in front of the camera, and this was the first recording where both Puja and Tina looked like they were having fun. Puja introduced the wind-up toys and skilfully set up a people game that captured Tina's interest.

Puja used all the strategies with skill (Figures 5.36 and 5.37), and Tina pointed to the core board 11 times to request more turns (Figure 5.38). Tina was starting to point on or near the correct symbol by now, usually after watching her mother model it.

Coaching sessions were running more smoothly by now. At the next one, Puja had an activity planned, and took an active role in the coaching conversation and goal planning. She was now able to set realistic goals and think of suitable activities. She had a high level of awareness and confidence in her abilities with supporting the core board. At the end of the coaching conversation, Puja informed me that she and Rahul were separating, but would continue to live in the same house for now.

Over the next two coaching sessions, Puja continued to use the strategies with skill and Tina continued to use more symbols with greater accuracy. She seemed to enjoy exploring the core board more, and would sit next to me, pointing to symbols so I would name them for her. Puja let me know that the core board was sent into the day care a couple of times, and then she stopped sending it, as the staff weren't using it. With Puja's permission, I contacted the Ministry of Education early intervention teacher to discuss this. She had a different understanding of the situation and informed me that the core board did not get sent in and the family had told her they did not want it to be used there. Both Puja and Rahul had other concerns about the day care. They did not have good communication with the staff and were concerned about bruises and cuts that Tina got whilst she was there, which of course she could not tell them about.

During the last 6 months of the study, Tina had an MOE speech language therapist appointed, who advised both the family and the day care to use signing with Tina. A few months previously, I had also thought this would be a suitable option for Tina, but now I was

frustrated to hear this, because she was making so much progress with the core board. I kept my frustrations to myself.

At the final data collection at the end of the year, both Puja and Tina were relaxed and enjoying interacting with each other. Puja modelled some signs as well as pointing to symbols on the core board. She used all the strategies consistently and with skill (Figures 5.36 and 5.37). Tina used the core board more than any previous data collection, pointing to 18 symbols over the 10 minutes (Figure 5.38). As well as making requests, Tina spontaneously pointed to family members that had visited the day before to make a social comment as shown in Figure 5.44. She used the core board to communicate spontaneously more than any previous data collection (Figure 5.45)

Figure 5.44

Tina's Use of Different Communication Functions

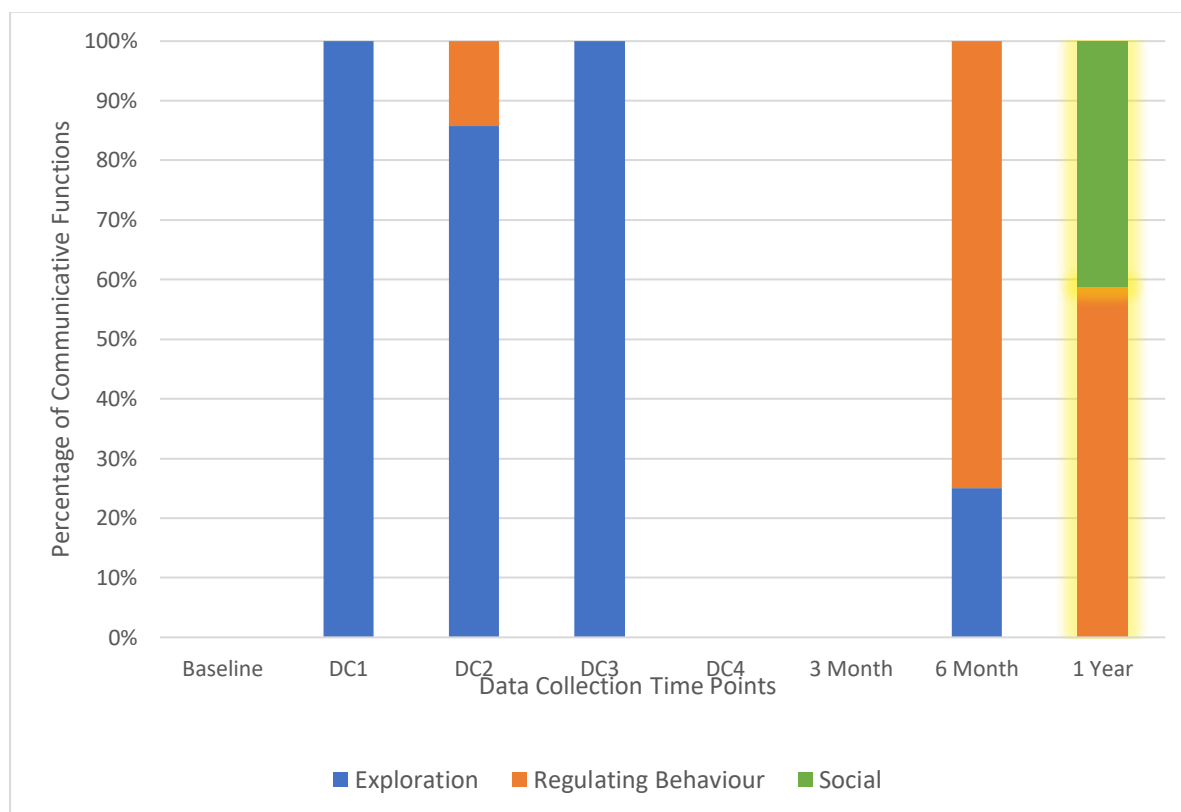
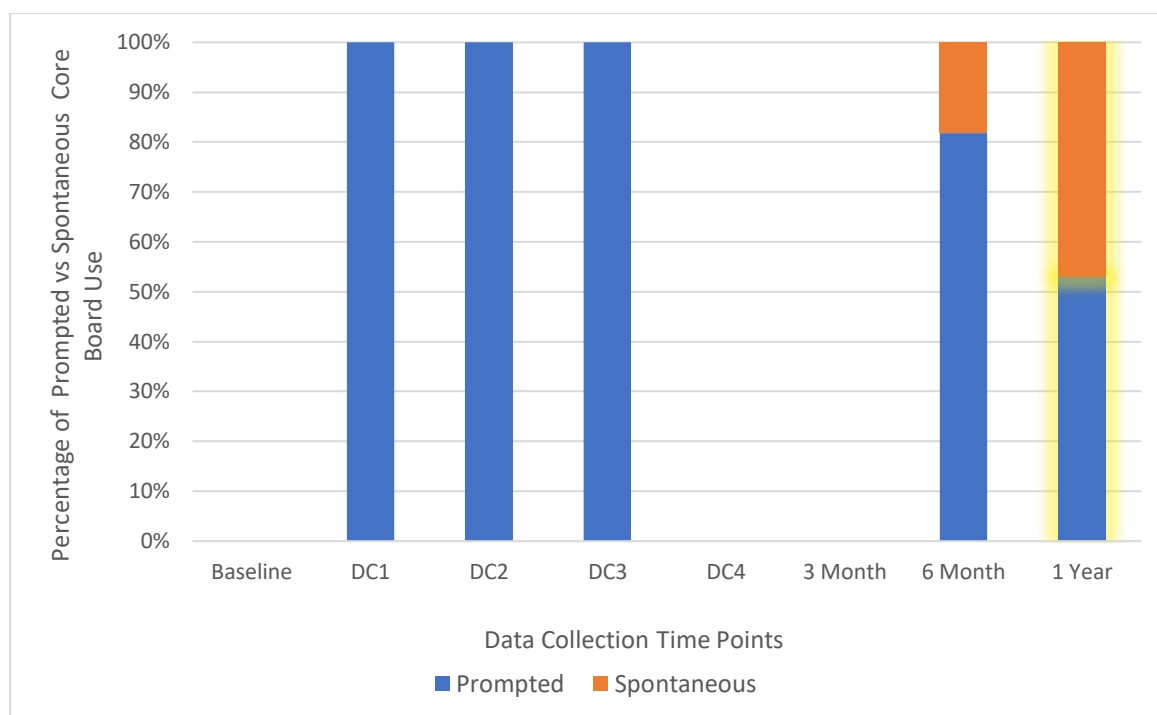


Figure 5.45

Proportion of Prompted Versus Spontaneous Core Board Use by Tina



Barriers and Supports

This was a complex and interesting case, which allowed me to gain valuable insights. Puja started the intervention with limited understanding and awareness of children with complex communication needs. She had feelings of shame and fear about Tina's difficulties, and neither parent had come to terms with their child's diagnosis. Although the family chose to be part of the study, they made it clear that they wanted their child to talk and had they had strong feelings against using AAC. However, they remained in the study until the end, Puja became a skilled AAC communication partner, and Tina learned to use the core board to communicate. Table 5.5 examines the supports and barriers identified in this family's AAC journey.

Table 5.5*Supports and Barriers to AAC Use Experienced by Puja*

	Supports	Barriers
Interview or survey data	<ul style="list-style-type: none"> • Training / strategies • Personalised, flexible coaching • On-going support over time • Lack of pressure from researcher / coach • Meeting and learning with other parents • Video feedback • Growing confidence • Flexible job • Significant event when Tina couldn't communicate her needs 	<ul style="list-style-type: none"> • Child's reluctance to use core board • Cultural background of hiding disability • Unresolved feelings about child's diagnosis / grief • Lack of support from significant others • Parents' beliefs about AAC • Fear of what others think / how child will be treated • The core board's appearance • Parents want child to talk • Unsupportive day care • Different advice from other professionals

Informal conversation or observations	<ul style="list-style-type: none"> • Personalised fringes • Increased information and knowledge • Tina’s eventual success with core board • Puja’s dedication to meeting Tina’s needs • Puja’s ability to learn and use new information and skills 	<ul style="list-style-type: none"> • Full time work / life pressures • Relationship difficulties • No available family in New Zealand • Lack of support networks • Tina’s attention, motor and visual/perceptual delays
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At the start of the study, Puja was still coming to terms with Tina’s diagnosis, which was something she was unfamiliar with: “Because this is the very first thing I have ever seen in my life ... as Tina’s not talking, and I didn’t know that it’s really common in New Zealand”. In her interview, she described the feelings of shame and fear she was experiencing, and how she tried to keep it hidden from people. Additionally, the parents felt they were not getting any answers from doctors, and they wanted to know the reasons why Tina was delayed. The parents were focused on wanting Tina to talk: “That is my thing. Like, *I want her to talk!*” They had not considered AAC as an option, and they did not like the appearance of the core board: “I wasn’t really happy with the core board.” They had strong feelings about Tina needing to fit in and felt that the core board would make her look different: “I don’t want my child to be treated differently.” Puja had strong concerns about being judged: “Like people will judge me, whenever we go to the supermarket or any other place, and I have to carry that thing.” She kept the core board at home and hid it from friends: “I used to hide my core board when other people came to my home.” This concern extended

to how Tina would be treated in day care, and she remained reluctant for Tina to use the core board in this setting.

Puja's antipathy towards the core board was probably a factor in Tina's reluctance to use it, something that Puja considers in her interview: "She can use it very efficiently, but it was *me* who was delaying the things." Adding to the difficulties, Tina's particular developmental delays meant that she needed more time and practice to learn to use a symbol based AAC system than the other child participants. She had some motor and visual-perceptual difficulties that made it harder for her to scan, locate and point to symbols accurately when she was learning to use the board. Her attention skills were at a stage where it was difficult for her to share her attention between a toy, a person and an AAC system, although these developed and improved over the year. These developmental factors meant her parents were not seeing immediate success at the start of the year, which acted as another barrier to using the core board.

Puja was quite isolated; her family were in India, she appeared unable to confide in her friends, she was experiencing relationship difficulties at home, and she perceived the day care staff to be unsupportive. The family had recently changed special education support providers and she did not have a long-standing relationship with any professional. Over the course of the intervention, she received different information and advice from other professionals that undermined the use of the core board. Additionally, Puja was trying to establish herself in her new career; she worked long hours, as did Rahul.

In short, this was a situation that most speech language therapists would think twice about before even suggesting the introduction of AAC. The family were not ready for this step on many levels, as Puja states in her interview: "it's just my mind wasn't ready". However, the combination of the workshops and coaching, and the ongoing, low-pressure

support that Puja received, helped her to come to terms with Tina's difficulties and accept the need for some form of alternative communication:

It's at the back of my mind that I know that I need something, Tina needs something to communicate ... but it took a lot of time and courage for me to accept it. And I think with this journey, and if this not happened, I wouldn't have accepted Tina like that.

This acceptance was a process that included meeting other parents in the same situation who were in a more accepting place, learning the strategies and seeing their effects, having ongoing support, and eventually realising that Tina needed some alternative communication:

And then things keep going on, Sam coming to our home and teaching us, seeing Tina, those kinds of things. And one day, what changed my mind with the core board, like Tina was so frustrated ... and she wanted to tell me something and I couldn't get it.

Once Puja started to accept the core board, Tina did too: "So then my thing lean to core board. Then Tina started liking it as well." Another helpful factor that Puja mentioned in the interview was the lack of pressure: "Sam ... always supporting me with my decisions. And she never forced anything on me. And she always keep on saying that it's your decision if you want to continue you can". Another strong factor that influenced the outcome for this family was Puja's dedication, both to her daughter and to learning and growing her own abilities to support Tina on her communication journey.

The End of the Study

By the end of the study, the core board was used at home only, and combined with some basic use of signing. Puja had integrated the strategies into the way she communicated

with Tina, and she was more confident in her overall management of Tina. In the final coaching session, she talked to me about her different way of managing Tina's behaviour; she had raised her expectations and set more boundaries. In the interview, Puja talked about her biggest take-away from the intervention: "Patience. I didn't have patience in the beginning. ... I want her to talk quickly, but that's not the thing. It's not going to happen in an eye blink ... You have to work on it."

At the end of the study year, I completed a comprehensive report outlining the content of the workshops, and the progress that Puja and Tina had made. I made recommendations that the family continue to use both the core board and signing, and I also suggested assessing the family for an AAC app on an iPad. With Puja's permission, I shared this report with the professionals involved from the MOE. I caught up recently with Puja by telephone, after I had shared this case study with her. She informed me that Tina is still not speaking, and now has a diagnosis of a rare genetic anomaly. She had read through the case study and was happy with its accuracy.

Case Study 6 – Jo and Dallas

“So like, at the start of it, we were using the core board, like basically all the time, but then as time was going on, we were using it less and less, because he’s like saying more words.”

Background Information

Jo and Dallas were informed about the study by their early intervention teacher from the Ministry of Education (MOE). Initially it was quite hard to contact the family, as Jo did not respond to my texts. I learned over the course of the study that Jo was more likely to respond to texts if they contained a direct question. I first met the family on a weekend day, when they were all at home – Jo and her partner Bob, and the two children, Dallas and Luke. Dallas had just turned 4 years old, and his younger brother, Luke, was about to turn two. Dallas had a few spoken words, but they were difficult to understand. Jo said that Luke was saying more than his older brother. Dallas did not have a diagnosis and did not appear to have other developmental delays.

As I sat at the dining table with Jo and Bob, I remember feeling concerned that Jo did not appear to be listening. The television was on, and she was looking towards it. As I got to know her better, I learned that she often looks away when she is listening. Jo and Bob both worked full time, Jo worked in a supermarket. Dallas and Luke attended day care 3 days each week, and Dallas received some support from an education support worker (ESW) in the afternoons. His parents informed me that he had a group of friends at day care, and he enjoyed going there. The family had some support from Jo’s parents but did not have a wide support network to help with the children. They described themselves as “kiwi pakeha”.

Jo recalled that she had communication difficulties as a child but could not remember the details. Dallas had a history of ear infections and chest infections; he had his tonsils and adenoids out when he was 2 years old, and grommets inserted. He was able to understand

simple language, follow instructions and respond to some questions. He was a persistent communicator and communicated for a range of purposes. I observed him using a short vocalisation “uh” with different levels of emphasis and intonation, combined with gestures and facial expressions to either get attention, indicate that he needed something, explain a problem or to direct attention. He had a few single words such as “more” and “no”. It was apparent that he could only produce four different consonants and was combining these with a vowel sound to form words. He had a specific ‘effort’ noise to indicate he was struggling with something. He also used whining, pointing, showing, smiling and laughing. Using these communication behaviours, he was able to get his message across successfully in context most of the time.

Dallas appeared to have age-appropriate play skills. His parents described him as having good problem-solving skills. I observed that he was independent and able to do things for himself. He had recently learned to use the toilet. He could feed himself and needed a little help with washing and dressing. His parents described him as a very picky eater with a limited diet. I noticed that he occasionally drooled slightly. On this early visit, he was happy to interact with me, but mostly watched the television and interacted with his parents.

In the initial survey, completed by Jo during the baseline visit, Jo rated herself as “moderately concerned” about Dallas’s communication difficulties. Her attitude towards using a core board appeared positive as she ticked the following statements from a selection that described different perspectives about using a core board:

I’m excited to try something new

I’ll try anything to help my child

I think this might suit my child

I think this could relieve their frustration.

Jo also indicated that she was excited to be the key person assisting Dallas, as she knew him best. The parents did not have many questions about the study.

Baseline Data Collection

It was quite challenging to find a quiet space to record the baseline video; Luke did not want to be left out and had to be distracted by his father. He could be heard crying throughout the video. The open plan nature of the house meant that Dallas kept leaving the area to show different toys to his brother, which led to further outraged crying from Luke. Jo selected the toy box, and then sat and let Dallas help himself to any of the toys. She took a mostly passive role, even when he was operating the bubble machine and spilling bubble mixture on the floor. For his part, Dallas seemed to expect to have control of the toys; he was independent and did not readily seek help. Jo sometimes tried to draw his attention to particular items, but mostly allowed him to sort through and play with the toys without interfering. She sometimes commented on what he was touching or named items for him.

Dallas explored the toys, but particularly favoured the bubble machine, which he ran around the room with, and frequently left the room to fire bubbles at his brother. He often spilled the bubble mix and returned for a top up. He communicated frequently, for a range of purposes, using single, intonated vowel sounds and gestures. Jo was responsive to all his communication attempts but did not direct or join in with his play. Towards the end of the recording, when Dallas was looking at the toy microwave, Jo asked him to locate different items of food, which he was able to do immediately. The core board was available but not used by either of them.

Overview of the Intervention

Jo and Dallas remained in the study for the full year. As well as learning the supportive AAC strategies, Jo needed support to learn how to engage Dallas in play situations and keep him focused during interactions. She learned to use all the strategies successfully (Figures 5.46 and 5.47), often refining her understanding of how to apply them during the coaching sessions. Jo particularly benefitted from watching a model provided by me and then copying it. Dallas started to use the core board as soon as it was introduced and was highly motivated to communicate with it initially (Figure 5.48). He showed an immediate understanding of how to use it for a range of communicative purposes and accessed many different symbols from both core and fringe over the year. Jo encouraged him to put symbols together to make sentences, and he learned how to use different sentence structures to express himself.

As the study progressed, Dallas developed some spoken language, particularly high frequency words that he had practised on the core board. He continued to have significant speech sound difficulties and was very challenging to understand out of context or by less familiar people. Jo's use of the core board often dropped off over the maintenance phase, although Dallas did not have enough intelligible spoken language to express himself fully. Coaching sessions were useful to help Jo retain the strategies and keep the core board in use. By the end of the study, the core board was still used, but mainly when Dallas could not make himself understood. Jo continued to demonstrate the strategies during data collection visits, and Dallas always used the core board in this situation.

Figure 5.46

Frequency of Jo's Use of Taught Strategies

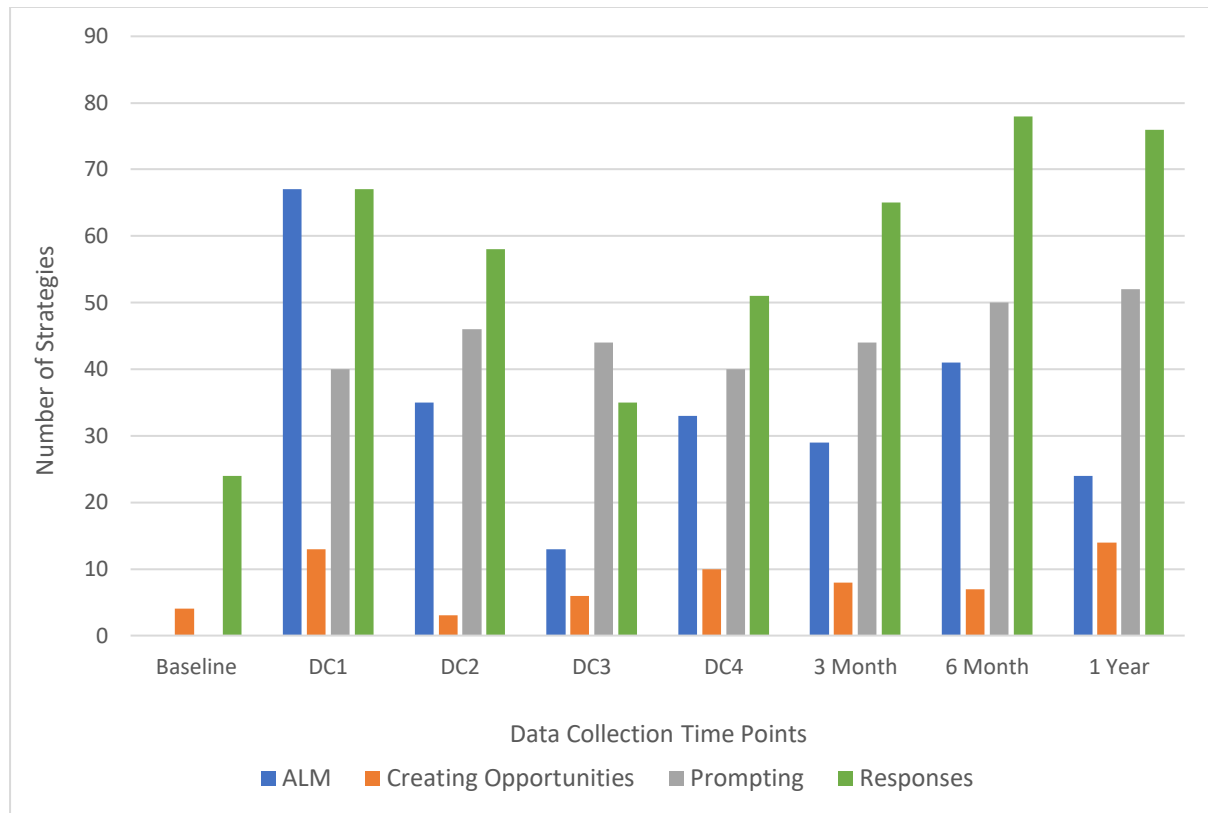


Figure 5.47

Percentage of Words Modelled on Core Board by Jo

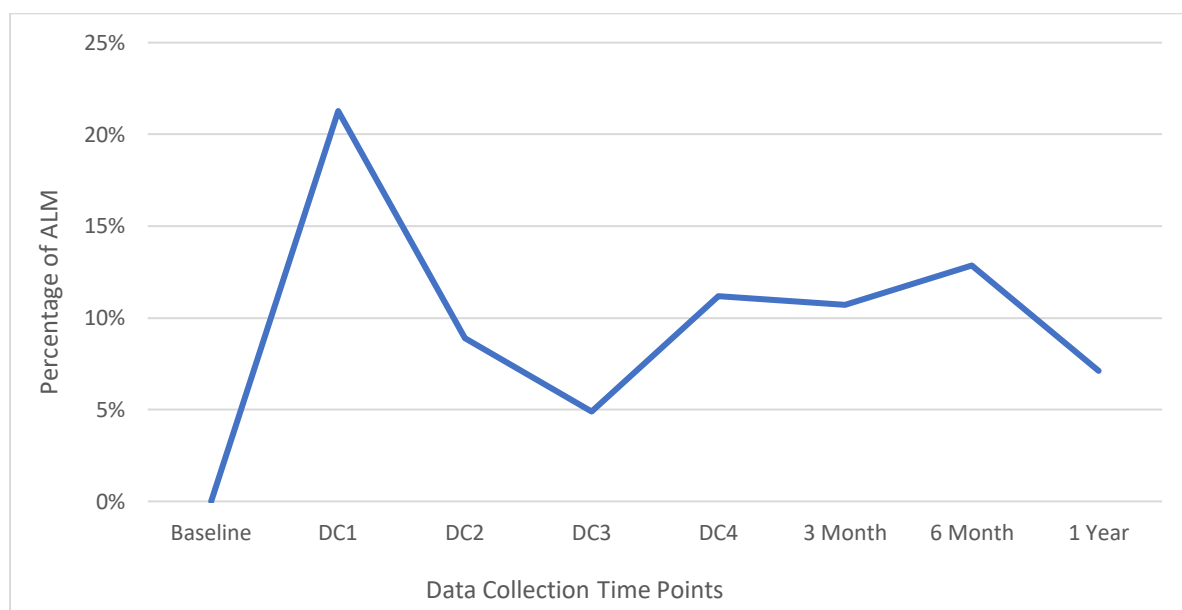
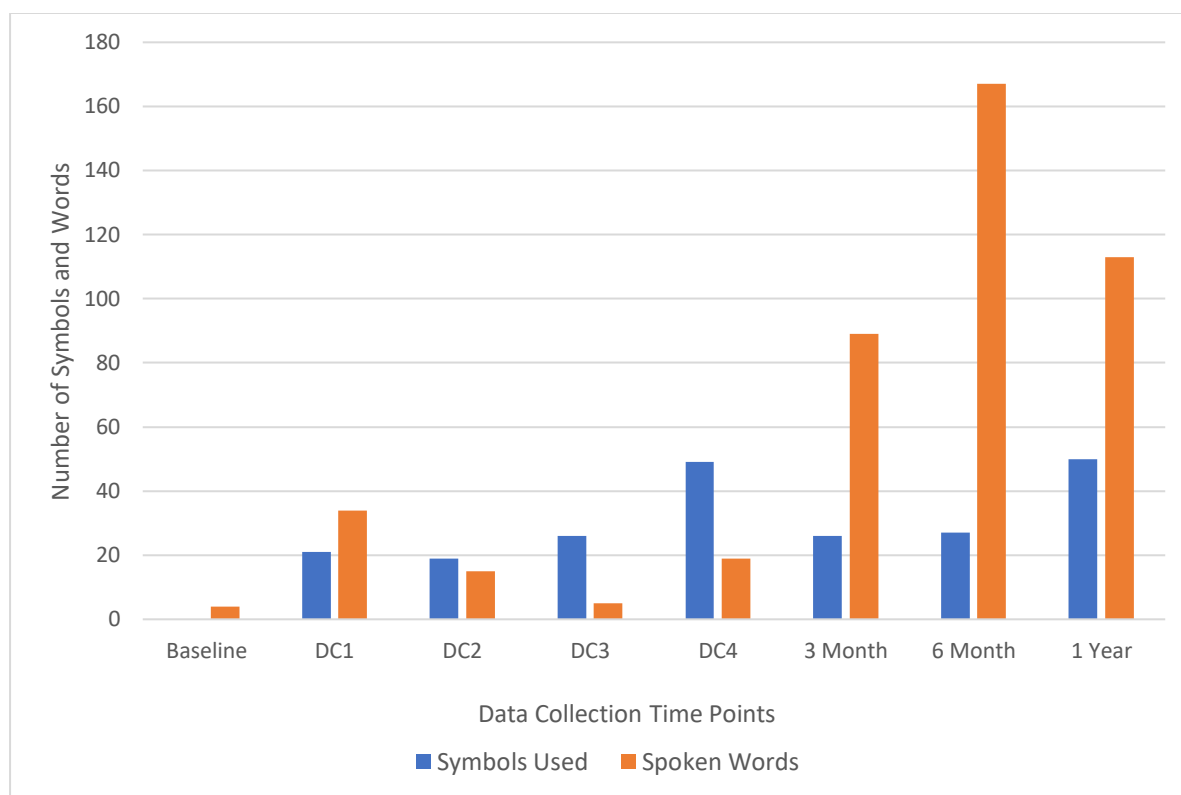


Figure 5.48*Dallas' Use of Spoken Words and Core Board Symbols****The First Eight Weeks – The Intervention***

Jo ensured that she had time off work and attended all four of the group workshops. She was always early for each workshop and completed the core tallies and home journals before each session. She sometimes needed some extra explanation to understand the concepts that were introduced, and in the first workshop, she needed support to complete the action plan. Throughout the study, Jo needed support to think of suitable activities to practise using the core board in, and specific help to plan what to model and what to expect from Dallas. It helped to review her action plan at the start of the coaching session and talk through or model how it might look in practice.

The first coaching session was on Jo's day off. She was at home with both of the children, who were watching television when I arrived. We started off by talking through the

action plan. I wanted to spend more time on this because I had noticed that Jo had struggled to complete it during the workshop. Jo was keen to get started on the planned snack time. However, Dallas had other ideas; he would not come to the table and started giggling and hiding. This went on for some time and he did not respond to Jo's attempts to direct him. Eventually I suggested we just talk it through and look at what she could have modelled. Once the attention was off Dallas, he calmed down a bit and came to the table. However, he became elevated if I tried to video, so I joined in the snack time and modelled using the core board. This was when I first noticed that this strategy was effective for Jo. She quickly picked up on my modelling and was able to copy it exactly. I then used positive feedback to provide reinforcement. Dallas responded quickly to the core board modelling and started to point to symbols, including 'drink' and 'help'.

Afterwards, when Jo and I were completing the action plan together, I asked Jo to think of a different activity for practice. I wanted Dallas to be able to use the symbol for 'help' in a different context so he would generalise it. Jo was adamant that she did not want to use the core board in a different situation at this time; she wanted to stick with snack time only. She felt that too many activities would confuse Dallas. My observations of Dallas suggested that he had a good grasp of how the core board worked, but I did not want to push Jo out of her comfort zone, so we left it as just for snack time for now.

It was evident that Jo had benefited from the coaching session at the first data collection. She opted to use the snack box, and managed Dallas's behaviour with more confidence, managing to keep him seated and focused for the full 10 minutes of recording. She also modelled on the core board with skill, modelling 21% of her spoken words (Figure 5.47). She demonstrated a particular knowledge of how to locate different symbols on the many fringe strips. What was particularly noticeable was how competently Dallas was using the core board already. He pointed to 21 symbols in the 10 minutes (Figure 5.46) and was

already using the core board frequently without being prompted (Figure 5.49 below). He was also using a mixture of core and fringe words (Figure 5.50 below). Additionally, he was communicating for social purposes as well as requesting (Figure 5.51 below). This was really encouraging progress in such a short space of time. Dallas also used 34 spoken words during this data collection; these were mostly simple consonant-vowel words, such as “di” for ‘this’, although he did say “bubble” three times.

Figure 5.49

Dallas’ Prompted Versus Spontaneous Core Board Use

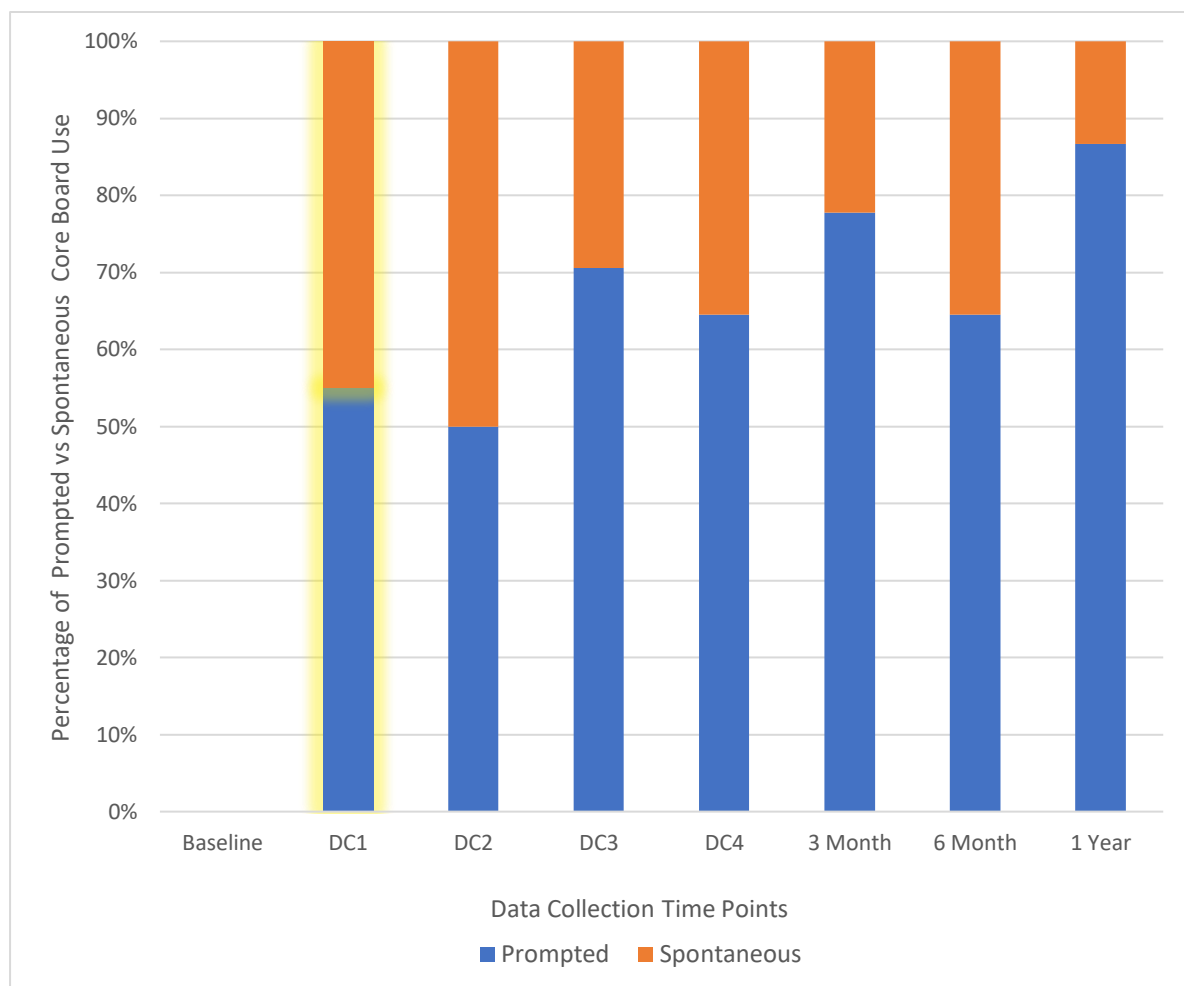


Figure 5.50

Proportion of Core and Fringe Words Used by Dallas

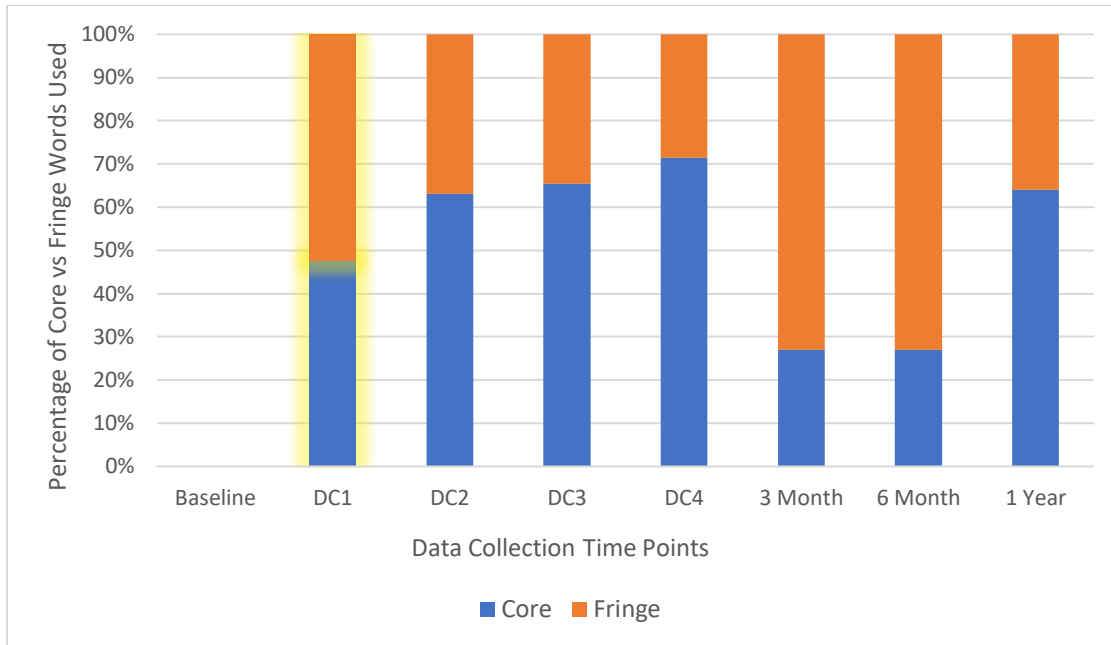
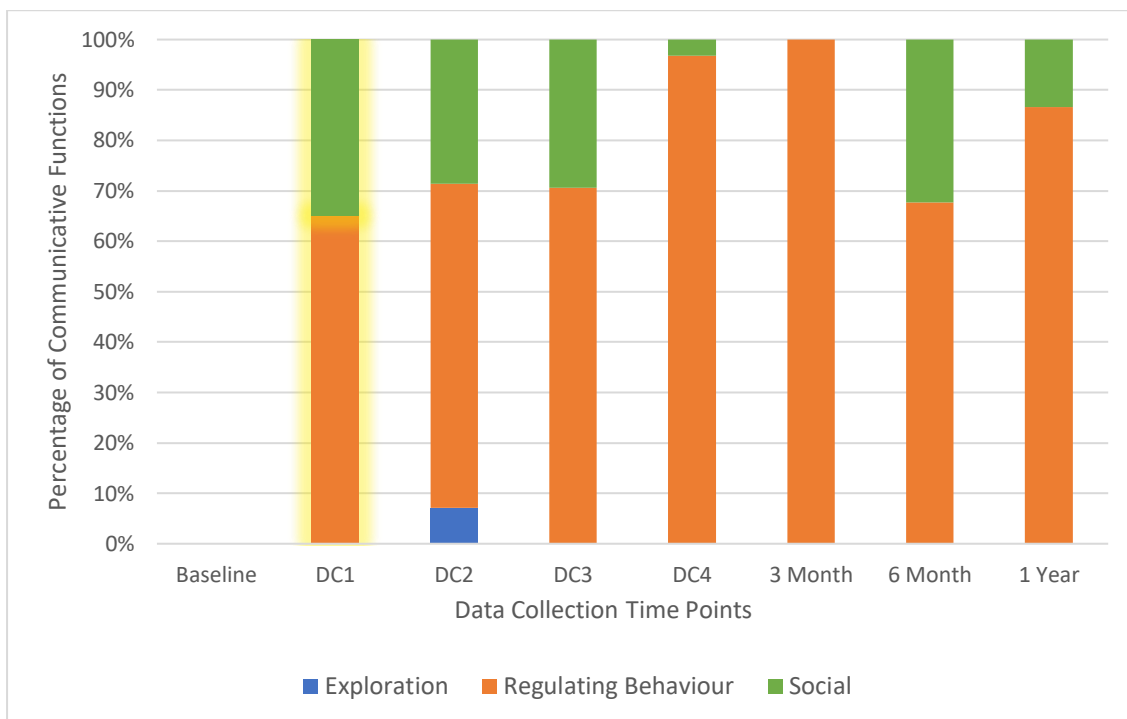


Figure 5.51

Different Communicative Functions Used by Dallas



As well as using the strategy that had been covered in the first workshop, modelling, Jo also used strategies that were yet to be taught. The snacks were in difficult containers, so she waited for Dallas to ask for help. Jo prompted him to use the core board several times and remained responsive to his communication attempts. Dallas used the symbols creatively to make comments, for example, after his mother opened the drink bottle, he pointed to 'HELP OPEN' and then at the drink bottle to comment that his mother helped him to open it. Later, he pointed to the symbol for muesli bar, and then held up the muesli bar he was eating, to indicate that they were the same thing. I was impressed by his immediate grasp of how to use the core board to communicate.

The second workshop covered 'creating opportunities for communication' which I thought would be helpful for Jo when playing with Dallas. She arrived with her personal journal and core tally. Her personal journal recorded that Dallas had been using the core board spontaneously to request different snacks. She also noted that she was having challenges with remembering to use it and take it places. She was also having problems keeping Dallas focused. The core tally showed that Dallas was using the core board for a range of core and fringe words associated with snack time, as shown in Figure 5.52 below.

Jo had planned two people games for her next coaching session, and I was keen to help her move on from snack time, as Dallas was showing so much potential with using the core board. However, we had the same difficulty as the last coaching session; he would not join Jo when she requested him to and showed little interest in the ball game she had planned. Jo and I worked together to try out different people games that would capture his interest. I started the game and modelled how to use the core board, and then Jo would copy what I had done, allowing me to step back and provide feedback. Jo was able to demonstrate the strategies, but the main support required was around keeping Dallas engaged in the game. My coach log noted "Jo tends to answer questions with very short answers, and I have not yet

managed to guide her through reflective questions.” Jo provided me with photos for personalised fringe strips after the coaching session, along with lists for other fringes, including favourite television shows.

Figure 5.52

Jo’s First Core Tally and Fringe List

I / me / my	it	who	what	am / is are / be	when	be careful	all	some	that	this
he / she	we / they / us	not / don't	come	do / does / did	again	now / it's time	how	why	finished all done	problem
you / your	drink 	eat / taste 	feel	get / got	late / later	ready	all gone	bad	big	clean
give / gave	go 	hear / listen	help 	like	where	away	cold	different	dirty	fast
look / see	make / made	open / close 	play	put	here	there	good	happy	hot 	little
read	say / tell	sit	stand	stop	in	out	more	sad	same	sick / sore
take	turn	wait	want	work	up	down	on	off	silly	slow

yes	1	2	3	4	5	no	toilet
-----	---	---	---	---	---	----	--------

Fringe

lunch box - lots
yummy - |||||
Please - ||||
Thankyou - ||||
Yucky - |||||
hurt - |||
Muesli bar - lots
biscuits - |||
muffin - ||
Crackers - ||||
Water - |||||

At this time, Dallas had a strong preference for a particular flavour and brand of muesli bars, and these had been a strong motivator in the first data collection. Jo was very concerned about his limited food range and requested that I did not make them available for the second data collection. She wanted me to use foods that he was less motivated by or new foods. I was concerned about this, because Dallas did not tend to stay around if he was not motivated by an activity, so I asked if we could also include some play dough toys. Right from the start of the second data collection recording, Dallas started to search the box for the muesli bars and used the core board to ask for them several times. He rejected all the snack options available and eventually played with the play dough.

Jo used less modelling on the core board this time, with 9% of her spoken words modelled on the board (Figure 5.47). She was using the strategy of prompting before it had been taught in a workshop (Figure 5.46) and was quite insistent that Dallas had to use the core board even when his non-verbal communication was clear. Dallas did not seem frustrated by this, and usually complied, apart from when he realised there were no muesli bars available. Dallas continued to use the core board to introduce conversation starters. These were not always recognised by Jo. Bob had taken Luke to go and collect a McDonald's takeaway. Dallas pointed to the symbol for hot chips on the food fringe strip, and then pointed to the front door, saying "deya". I interpreted this as him commenting that his father had gone to fetch him chips, but Jo was puzzled and said, "where's the chips?" When Dallas played with the play dough, Jo watched but did not join in. Dallas pointed to "HELP TURN" to tell her to take a turn pushing play dough through the syringe. He created play dough food and pretended to eat it.

Although Jo was using the prompt strategy quite insistently, Dallas did not appear to be put off using the core board. The next workshop covered the prompting strategies, and I was hopeful that this would encourage Jo to use more waiting and less verbal prompts. Jo's

home journal recorded that Dallas was taking his core board to day care and loved using it there. She had seen him using it at snack time to tell the staff what he wanted to eat. He had also started to point to pictures of the staff on his new fringe strips. Jo recorded that she was still struggling to remember the core board and use it consistently and was also finding it challenging to get Dallas “to say new things on the core board”. Jo’s completed core and fringe tally showed that Dallas was using a wider range of core and fringe words as shown in Figure 5.53, below.

Figure 5.53

Jo’s Second Core Tally and Fringe List

I / me / my 	it	who	what	am / is are / be	when	be careful	all	some	that	this
he / she 	we / they / us	not / don't	come	do / does / did	again 	now / it's time 	how	why	finished all done	problem
you / your	drink 	eat / taste 	feel	get / got	late / later	ready 	all gone	bad	big	clean
give / gave 	go 	hear / listen	help 	like 	where	away	cold	different	dirty	fast
look / see 	make / made	open / close 	play	put	here	there	good	happy	hot 	little
read	say / tell	sit 	stand	stop 	in	out	more 	sad	some	sick / sore
take	turn 	wait	want 	work	up	down	on	off	silly 	slow
(2)	yes 	1	2	3	4	5	no 	toilet 		

Fringe
 Fire engine - ||||
 Police car - |||
 Ambulance - |||
 Birthday - |
 emu - |
 Rhino - ||
~~Grake~~ Grake - |||
 Zebra - || |
 tiger - |||
 Muesli Bar - ||
 Please - ||
 Thankyou - |

The next coaching session was at the weekend, and Bob was home to provide some support. I was keen to obtain some video recording this time, so that Jo would be able to watch herself, identify the strategies she was using and possibly engage in some reflective conversation. Jo had planned a bubbles game, and this was motivating for Dallas, however he was not happy to let Jo have control of the bubbles and wanted to do them himself. Dallas usually preferred to be in control of any play situation, and this meant that he was often reluctant to join in people games set up by an adult. He was used to doing things his way. Jo appeared to be growing in confidence and was able to persuade him to let her have turns with the bubbles, so there were opportunities for him to request his turn on the core board. I was finally able to get some video footage of them both for Jo to watch.

Bob was also using the core board at home by this point, so he joined in with the coaching conversation at times. Jo had used prompting quite effectively during the bubble game, but she needed support to be able to name them or recognise what she was doing. She tended to favour verbal cues such as “show me on the board”, but also used other strategies such as a model prompt, if he did not respond. I showed her examples of this on the video and named the type of prompt when she was unable to. I helped Jo plan for a new play activity; she continued to need lots of guidance when generalising the skills she had learned to new activities. We also talked about the upcoming data collection, and I suggested not using this time to introduce new food to Dallas, as this is not the purpose of the data collection, and it might upset him.

Muesli bars were back on the menu for the third data collection, which pleased Dallas. Jo had taught him to use ‘please’ on the fringe strip, so he was now encouraged to put four symbols together “give me muesli bar please”. I was concerned that Dallas would get annoyed about having to work so hard to make requests, but he always complied fairly cheerfully. He usually pointed to a single symbol to make a request initially, then Jo

prompted him to make a sentence, which he complied with, including 'please'. When the muesli bar was finished, Dallas pointed to the empty container and Jo told him they were finished. Then this remarkable interaction occurred:

Dallas: (Points at muesli bar tub and vocalises) WHY

Jo: Why?

Dallas: (Points at container again) WHY (Points at container again)

Jo: Why? There was only one in there.

I was really surprised. I had been working with children who used core boards to communicate for several years, and in my experience, it is highly unusual for children to use the core board to ask questions, let alone a more complex question such as 'why?' Dallas appeared to know what the word meant and was using it appropriately. He was becoming very skilled at using AAC. Later, Dallas pointed to 'LISTEN' and then pointed to the bedroom, where his brother was crying. Dallas pointed to 26 symbols and said five words during this data collection (Figure 5.48).

At the start of this data collection, Dallas was sitting next to his mother at the dining table, as planned, with the core board between them. However, almost immediately, he got up and moved to the opposite side of the table, so he had a better view of what was in the assessment box. Jo adjusted the position of the core board, so that it was closer to him and facing him. This made it more difficult for her to model on the core board, and consequently, this data collection recorded her lowest use of this strategy, at just 5% (Figure 5.47). She used and maintained the other strategies (Figure 5.46).

Workshop four focused on response strategies. Jo already used the strategy of language building (asking Dallas to use a longer sentence), and I was keen for her to learn to

keep the conversation going, as Dallas was skilled at using conversation starters. Jo’s home journal recorded “He loves using the core board – taking it to childcare, it helps a lot.” She also noted that she was still having issues with remembering to take it out and getting Dallas to use new words. The core board tally shows that Dallas was using a range of core and fringe words (Figure 5.54), although it was likely that this had not been completed in full, as I had seen him use several fringe words during the coaching session that were not recorded.

Figure 5.54

Jo’s Third Core Tally and Fringe List

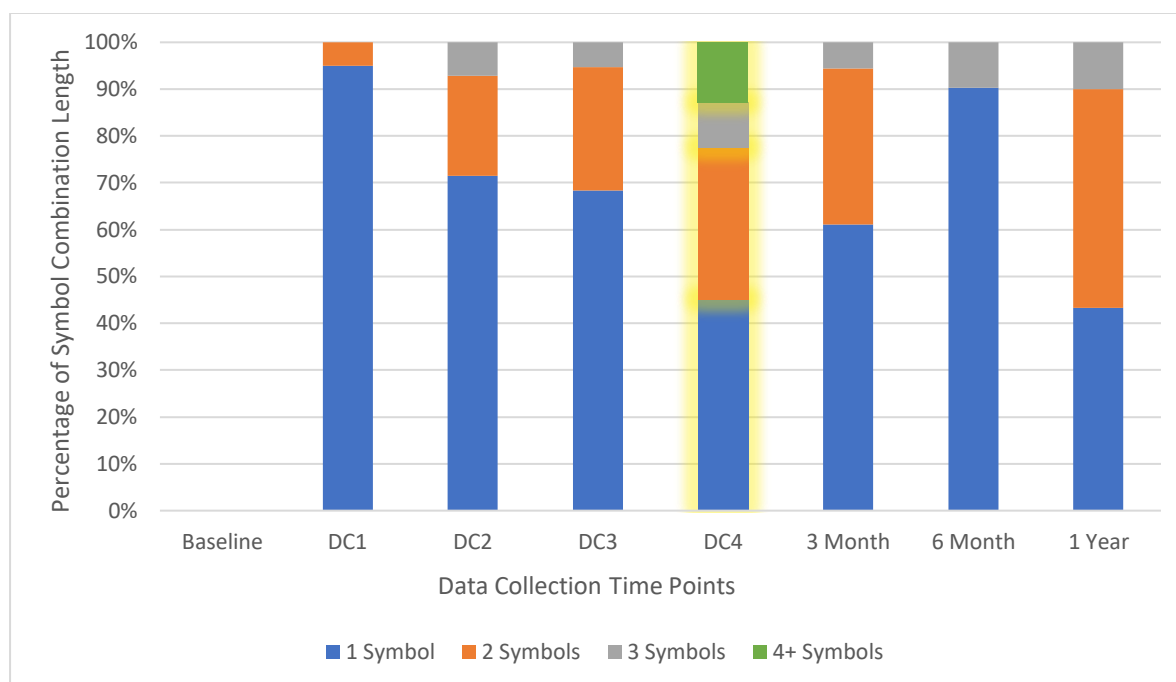
I / me / my ## III	it 	who	what	am / is are / be	when	be careful 	all	some	that	this
he / she	we / they / us	not / don't	come	do / does / did	again 	now / it's time	how	why	finished all done 	problem
you / your	drink 	eat / taste 	feel	get / got	late / later	ready ##	all gone	bad	big	clean
give / gave	go 	hear / listen	help ### ##	like	where	away	cold	different	dirty	fast
look / see	make/made	open/close 	play 	put	here	there	good	happy	hot	little
read	say / tell	sit 	stand 	stop 	in	out	more	sad	same	sick / sore
take	turn ### ## 	wait	want 	work	up 	down 	on	off	silly	slow

yes | 1 | 2 | 3 | 4 | 5 | no | toilet

Please ## III
 Thankyou ||
 Hello ||
 Biscuits - ## III
 Crackers & cheese - ||
 muesli bar III
 muffin - ## ||

Jo chose bubbles again for the next coaching activity. Both children were present, and Bob was at work. Dallas was not happy to be sharing the bubbles with his brother, but Jo had grown in her confidence to manage this kind of situation, and she managed to keep him engaged and using the core board for a while. Although Jo was able to demonstrate the strategies in her activities, she still found it difficult to name them or identify when she was using them when she watched the video back, so we watched the video through twice, and I helped her to identify the strategies using the information sheets from the workshops. I knew that Jo needed support to transfer the strategies to different play activities, so I then modelled a game with some wind-up toys and used the strategies while explicitly telling Jo what I was doing. She then joined in and copied me, so I was able to give her feedback.

Dallas enjoyed the wind-up toys so much, that he requested them at the next data collection instead of his usual muesli bar. He immediately navigated to the insect fringe strip and pointed to the caterpillar. Jo let him play with the wind-up toys but did not join in with the play and seemed keen to redirect him back to the familiar activity of snack time at times. Jo had always favoured using language building as a response strategy, and this was very evident during this data collection, where she consistently responded to his single symbol requests by prompting Dallas to repeat the request as a sentence. Many children would become frustrated by this, but Dallas always complied, and used several short sentences such as “GIVE ME BEE PLEASE”, as shown in Figure 5.55 below. Dallas rarely used symbols in sequence spontaneously, but usually in response to his mother’s prompting. Dallas pointed to 49 symbols during this data collection and said 19 spoken words (Figure 5.48). Jo maintained her use of all the strategies (Figure 5.46) and improved her use of aided language modelling from the previous data collection (Figure 5.47).

Figure 5.55*Number of Symbols Dallas Used in Sequence****End of the Intervention Phase***

With Jo's permission, I was able to contact the early intervention teacher from MOE at the end of the main intervention and report how well both Jo and Dallas were doing. My coaching sessions with Jo looked different compared to other adult participants in the study, but we had found a way that worked, and Jo seemed happy. Her end of intervention survey indicated that she felt her skills and confidence had improved (agree), and her child's communication had improved because of the core board (strongly agree). She indicated that she had found all the strategies very useful. Jo did not complete all of the written answer sections on the survey; when I asked her about this, she said she had nothing to say in some sections. She noted that she liked "talking to other parents" the most about the workshops. With regards to the coaching sessions, she said: "When I made mistakes I learnt what I did

wrong". She reported that she now had more patience and was less frustrated with Dallas when she couldn't understand him.

Early Maintenance Phase (three to six months)

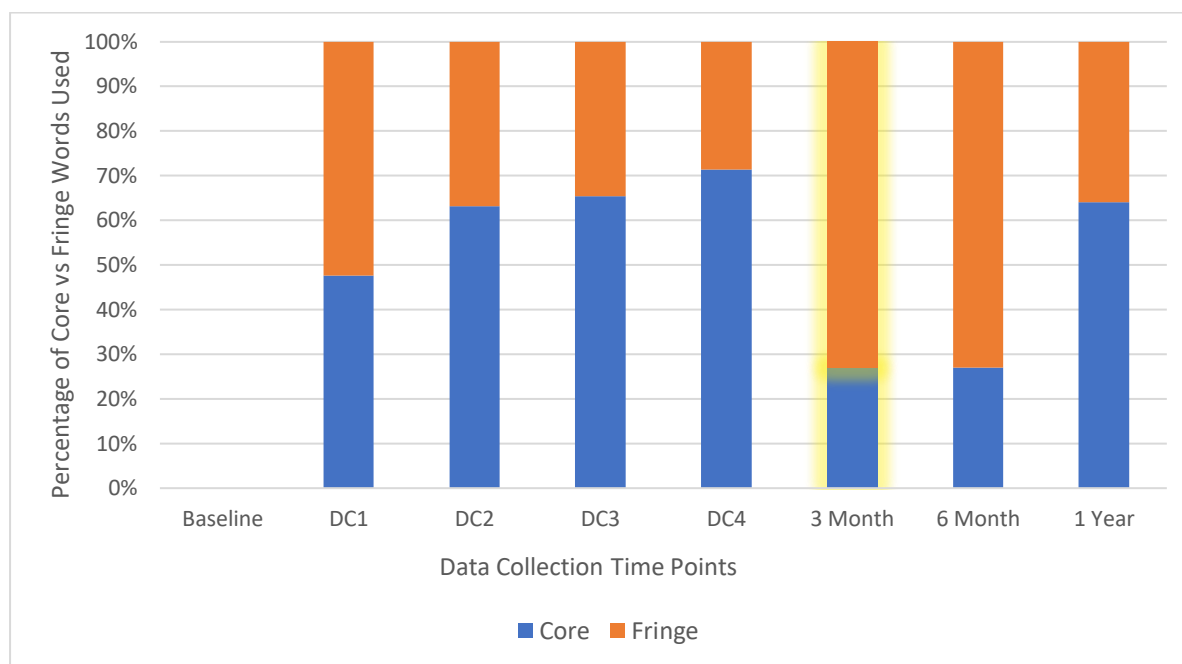
When I caught up with Jo at the first maintenance coaching session, she told me that the core board was still used regularly at day care, but then the family sometimes forgot to bring it into the house afterwards. She was at home with both children on her day off from work, so she attempted to do a building block activity with both children, which proved difficult. I joined in and helped her set it up, and then took some video. Jo often struggled to apply the strategies when trying out new play activities; this time she was quite directive and asked Dallas lots of testing questions about colours. This meant that he was not very motivated to keep playing the game. Although Jo continued to use the taught strategies, she was still unable to name them when watching the video back. I focused on helping her to think of ways to make the game a little less pressured and more fun for Dallas. Jo needed help to come up with new ideas for activities to practise the core board with. She opened up to me about her concerns for how Dallas would manage in school next year.

By the 3-month data collection, it was evident that Dallas was starting to develop more spoken language, albeit with a very reduced range of speech sounds. He was now using some of the core words he had practised on the core board, such as 'help'. He had also learned to say a version of 'please'. He was starting to use some spoken phrases, such as "oh no dear" for 'oh no, there'. He used 89 recognisable spoken words in this data collection and pointed to 26 symbols on the core board (Figure 5.48). Now that he was able to say some core words, he used a higher proportion of fringe vocabulary than core vocabulary on the core board, as shown in Figure 5.56 below. Jo continued to be quite directive in her approach,

using lots of language building prompts, but she also joined in with his play at times, and maintained her use of modelling and other strategies.

Figure 5.56

Proportion of Core and Fringe Words Used by Dallas



The next coaching session was 2 months later, and Jo immediately informed me that they were not using the core board anymore because Dallas was talking now. This was a surprise for me, and I spent a little time playing and interacting with Dallas so I could hear him talking. He seemed to have a similar amount of spoken language as at the last data collection, and it was very difficult for me to understand him. For example, although he could recognise different colours, he referred to them all as ‘bu’. He was unable to talk about anything out of context and he was mainly using single words and gestures. Based on this observation, I was concerned that it was too early to stop using AAC, as Dallas was a bright boy who had a lot that he wanted to communicate about. While his family were able to understand when he communicated his basic needs and ideas at home, it was unlikely that people who were less familiar with him understood him at all.

Jo did not have an activity planned for coaching, so I suggested a play dough activity, which I provided. I took some video of Jo and Dallas playing and observed that Jo was no longer modelling on the core board or encouraging Dallas to use it. When Jo watched the video back, she commented that she needed to point at the board more. We then talked through how much Dallas is talking and how this compares to other children his age. I pointed out that Dallas is bright and probably has much more that he wants to say. I suggested that continuing to use the core board would help him to learn more words and give him a way to communicate more than he can with speech alone. I then shared the graphs from the first five data collections, highlighting how she used the strategies successfully, and how quickly Dallas had made progress with both talking and using the core board. I particularly highlighted how he built up to four-word sentences over time. Jo appeared interested in this data and said she would like to start using the core board with him again. I helped her to set some realistic goals and choose activities for practice that would fit with her busy life. Two weeks later, I was delighted to receive the text shown in Figure 5.57 below.

Figure 5.57

Text Message from Jo



This was the first time Jo had sent me a message without me contacting her first.

Later Maintenance Phase (6 months to one year)

Jo had maintained using the core board with Dallas by the 6-month data collection, which was postponed slightly due to COVID-19 restrictions. Jo had improved the amount she was modelling on the core board (Figure 5.47) and continued to use all the strategies she had learned (Figure 5.46). There was no doubt that Dallas was talking more, he used 167 recognisable words in 10 minutes and 27 symbols on the core board. He continued to have significant speech sound delays and tended to use single consonant-vowel words or short phrases when talking. He continued to use more fringe vocabulary than core words on the core board (Figure 5.56). He enjoyed looking at his personalised people fringe strip and pointing to people so that his mother would name them and say where they were.

There were further COVID-19 restrictions shortly after the 6-month data collection, and I was conscious that Jo needed the ongoing support of the maintenance coaching sessions, so I offered to deliver the next one by Zoom. Jo was not comfortable using Zoom, but eventually we settled on using video chat via Facebook. Jo sent me some short video clips ahead of time via Facebook messenger, I edited these, and we were able to watch some together by me reversing my phone camera to show my laptop. Jo was maintaining the strategies and keeping Dallas engaged in the play, so I was able to provide positive feedback and a few suggestions. Jo said she was keen to focus on numbers and colours next, because Dallas was starting school soon and she didn't want him to fall behind. I would have preferred to focus on new vocabulary and fun play situations, but I felt it was important to work with Jo's ideas, so I made some suggestions for ways to incorporate this learning into some play activities.

There were two more coaching sessions before the end of the study, both in person. Jo continued to maintain the strategies in the first one but had dropped off her core board use by

the final session again. She had left the core board at day care, and it was evident that she was struggling to locate symbols when she was modelling. Throughout the study, Jo could demonstrate the strategies, but was unable to name them and could not always identify when she was using them. Without the ongoing maintenance coaching, I am sure this family would have stopped using the core board shortly after the intervention finished. I felt that Jo would have benefitted from more regular, monthly coaching during the maintenance phase, as she continued to need support with setting up new activities and generalising her skills to these.

However, Jo continued to demonstrate strategies from all four groups during the final data collection at one year (Figure 5.46). Her aided language modelling had dropped off, and she often took time to locate symbols, but she still used it to some extent (Figure 5.47). Dallas continued to develop his spoken language and use the core board when needed (Figure 5.48). He needed more prompting to use the core board than previously (Figure 5.49) and tended to make requests by saying his versions of ‘please’ and ‘thank you’. Both Jo and Dallas struggled to locate core symbols that they had previously used frequently.

Barriers and Supports

Jo worked full-time and had two children under 5 years-old, so her life was very busy. She needed some extra support to learn and use the strategies, but made great progress during the main intervention, and the core board became integrated into their family life at this time. However, core board use often dropped off over the maintenance phase and it is likely that this family would have stopped using it altogether had it not been for the ongoing maintenance coaching. Table 5.6 looks at the supports and barriers to using AAC experienced by this family over the year of the study.

One of the barriers I have picked out from my own observations, is that it was often difficult for Jo to remember and name the strategies she was using. She tended to learn and

use the strategies through role modelling, and then copying. This led to difficulties with transferring the strategies to new activities, and being able to consciously identify what she was doing. However, as a support, Jo was very hard working and persisted with learning and using the strategies in some activities; this was enough for Dallas to learn to use the core board successfully. When Dallas began to use more spoken language, Jo thought he no longer needed the core board; she may not have had a full understanding of typical language development, and needed support to see how the core board could still be of benefit. She referred to this in her interview: “But because Dallas started talking more often, I would sometimes forget to use a core board”. She acknowledged that the coaching sessions helped to “put me back on the track of using the core board.” Eventually, she developed more confidence in supporting Dallas’s communication and his development in general. In her interview, she ascribed this improved confidence to “Just keep on doing it and trying.”

Table 5.6

Supports and Barriers for Using AAC Experienced by Jo

	Supports	Barriers
Interview or survey data	<ul style="list-style-type: none"> • Learning the supportive AAC strategies during the workshops • Coaching • Support with ideas for action plans • Consistent practice 	<ul style="list-style-type: none"> • Dallas developing some spoken language • Thinking of ideas for activities • Dallas’s focus and behaviour • Day care staff sometimes forgot to get the board out

	<ul style="list-style-type: none"> • Supportive early intervention teacher from MOE • ESW in day care • Support from partner • Seeing child's progress • Dallas's positive reaction to the core board • Meeting other parents at the workshops 	<ul style="list-style-type: none"> • Managing both children together when using the board • Busy life: often forgot to take or use board • Forgetting where the symbols were located
Informal conversation or observations	<ul style="list-style-type: none"> • Supportive day care centre manager • Guided practice with feedback in coaching • Role modelling in coaching • Developing a strong coaching relationship • The use of visual data to support AAC use • Jo's strong work ethic and dedication to the process 	<ul style="list-style-type: none"> • Limited support networks • Jo's specific difficulties with memorising the strategy names and recognising them when she used them • Parents' knowledge of typical communication development

The End of the Study

In the interview at the end of the study, Jo reported that Dallas mainly used the core board if people couldn't understand his spoken language. She was keen for him to continue

using it when he started school, as she was worried that people wouldn't understand him. I had some concerns that Jo would not manage to continue supporting his core board use without ongoing coaching, and with her permission I spoke to the early intervention teacher. The teacher shared my concerns but said that Jo had refused her offer of ongoing home visits. I wrote a comprehensive report detailing Jo and Dallas' progress over the year and shared it with Jo's MOE workers. I made recommendations that Dallas is supported to use the core board in day care, and Jo is offered further support at home. I have been in touch with Jo recently, to share this case study with her and check that she is happy with it. Dallas is doing well at school, and mainly uses spoken language. His speech and language are both still very delayed.

6. Cross-Case Analysis

As a researcher, I found many striking similarities across the six cases, as well as some areas of difference. In this chapter, the findings will be arranged according to the second, third and fourth research questions (the first research question having been fully addressed in the individual case studies) and will integrate both quantitative and qualitative data sources. In the first section, the parents' responses to the training and coaching intervention will be considered, particularly with reference to the effects this had on their skills, knowledge, and confidence to use the core board with their children. In the second section, the effects of the intervention on the children's communication will be described. In the final section, common themes from the surveys and interviews will be outlined, with reference to how they contributed to the understanding of what factors supported each family to keep using the core board across the year of the study.

How Does a Comprehensive Training and Coaching Intervention Impact on Parents' Use of Communication Strategies to Support their Child to Use a Core Board?

This section will mainly draw on the quantitative data gathered during the eight video-recorded observations taken over the year for each case, as well as the scaled questions from the second survey. It will be supplemented by data from the field notes (e.g., coach logs) that were maintained throughout the year, as well as the open questions in the second survey and some interview data. During the year of the study, all six parents learned to use the supportive AAC strategies with skill and confidence, and maintained use of these strategies for the duration of their involvement in the study, or until their child no longer needed to use a core board to communicate. There were variations in the speed of acquisition of the strategies and individual application of them from parent to parent. This section will examine the parents' strategy use in detail.

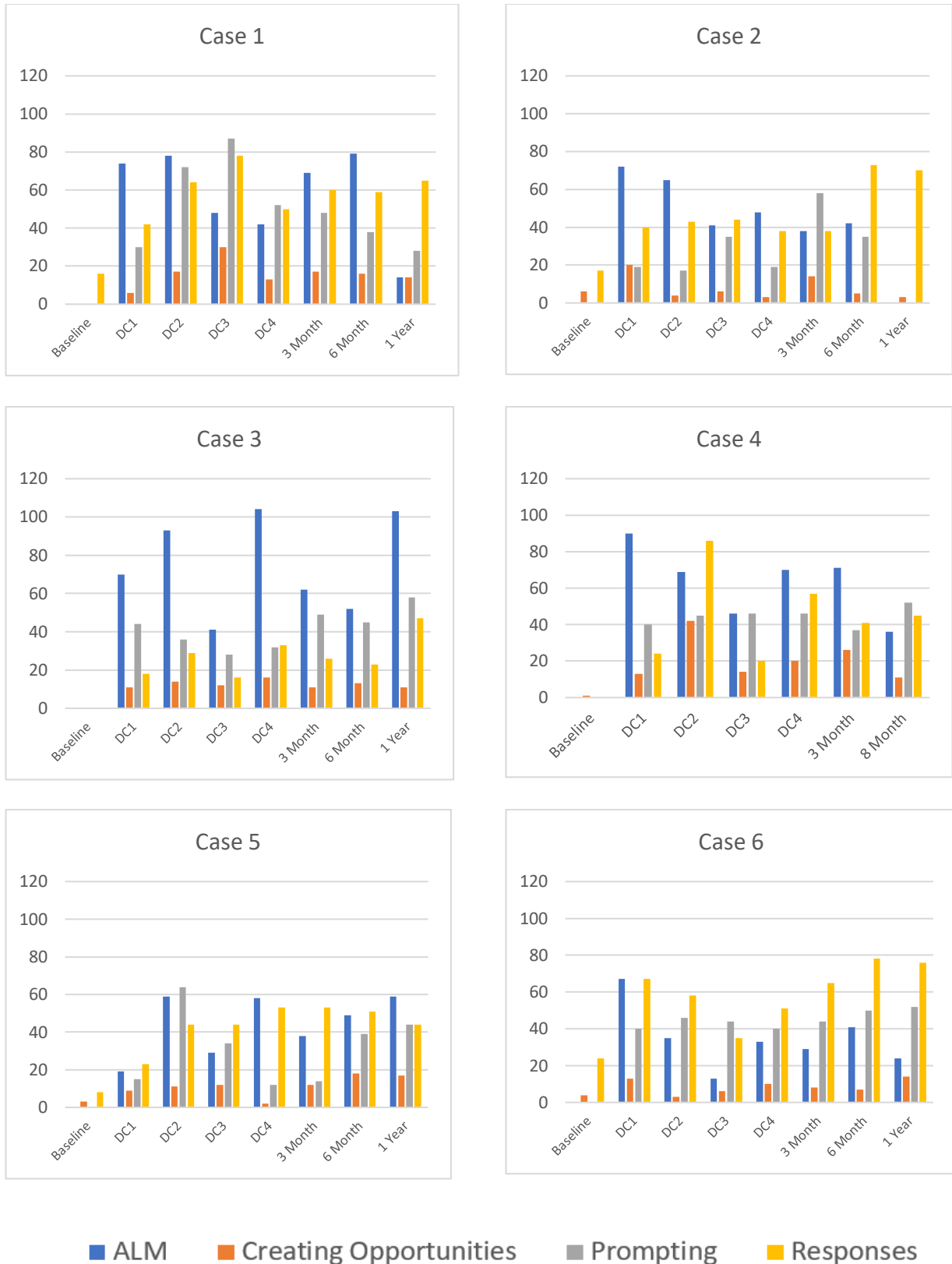
Parents' Use of the Taught Strategies over the Study Year

None of the parents had used a core board or received any training on how to support it before their involvement in the study, so it was not surprising that they did not demonstrate any AAC-specific skills from strategy groups one and three (aided language modelling and prompting) during the baseline data collection (Figures 6.1, 6.2 and 6.4). Some of the parents demonstrated a few examples from strategy group two: 'creating opportunities for communication', particularly Kate (case 2), who was an experienced kaiako (early childhood teacher). Some parents demonstrated response strategies, but this was entirely dependent on whether their children attempted to communicate during the 10-minute recording. All six parents then recorded an immediate increase across all four strategy groups after the first workshop and coaching session, in data collection one. For all but the parent in case 5, this increase was remarkable, particularly for the strategy of aided language modelling, which had just been shared in the first workshop and practised in the first coaching session (Figures 6.1 and 6.2).

Data collection recordings showed that all the parents then maintained use of the strategies throughout their involvement in the study or until their child no longer needed to use the core board. However, these planned recordings are not fully representative of the parents' consistency in using and supporting the core board throughout the year. For example, data from the field notes record that the parents from cases 3 and 6 (Sarah and Jo) both had periods during the maintenance phase where they stopped using the core board at home. This was addressed in coaching sessions, and their strategy use had increased by the time of the next recorded data collection. Field notes and interview data record that the parent from case 5, Puja, fluctuated in her attitude to using the core board throughout the first half of the year, and although she was able to demonstrate the strategies during the data collection sessions at this time, the core board was not frequently used outside of my visits.

Figure 6.1

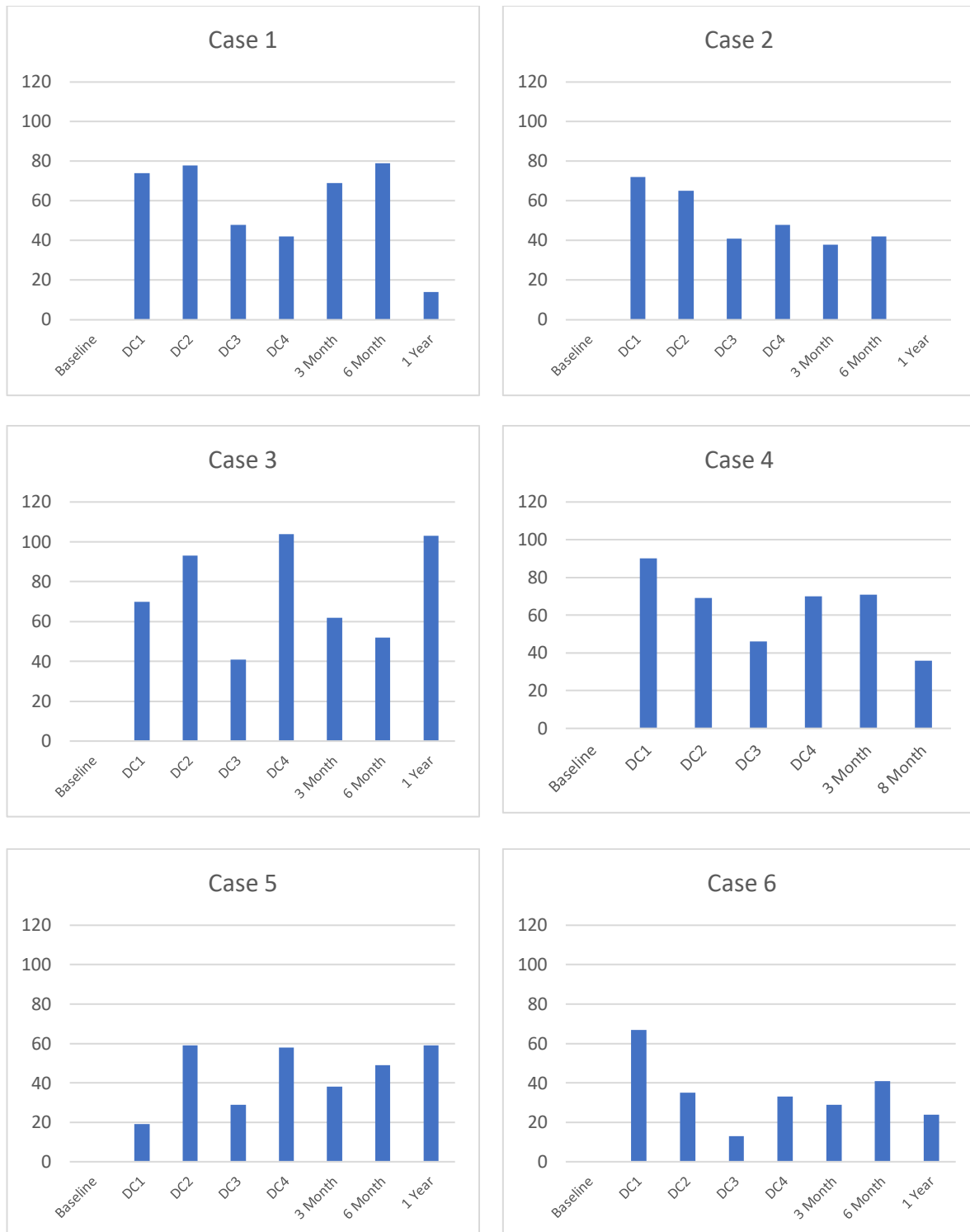
Frequency Count of Parents' Use of All Strategies During the 10 Minute Observations



■ ALM ■ Creating Opportunities ■ Prompting ■ Responses

Figure 6.2

Frequency Count of Parents' Use of the Aided Language Modelling Strategy



All the parents demonstrated some strategies from the second strategy group, ‘creating opportunities for communication’ during the data collections after baseline (Figure 6.3). The assessment boxes contained items that naturally encouraged use of this strategy group, such as containers that were difficult to open, preferred toys, and toys that were hard for young children to operate without help. Parents also reported and demonstrated during coaching visits that they were using these strategies as a matter of routine at home. For example, Emma (case 1) had invested in some toys that needed help and had kept these out of reach. Ashley (case 4) rearranged her snack cupboard and made it part of the routine that the children had to request snack foods, as did Jo (case six). The high number of occurrences for this strategy group demonstrated in some data collection recordings (e.g., parent from case 4, DC2 in Figure 6.3) is explained by the use of people games. When parents successfully introduced and used repetitive people games during the data collection recordings, they tended to score high amounts in this strategy group.

The parents all started to use prompting strategies from the first data collection (Figure 6.4), even though this strategy had not yet been covered in the workshops. Over the course of the intervention phase, they learned to refine this prompting and become more aware of how they were using it, and how it affected their child. The parents from cases 1, 3, 4 and 6 maintained similar levels of prompting throughout the study. My coach logs recorded that Grace, the child from case 2, was very sensitive to being prompted, so this was a strategy group that her mother used sparingly. Tina, the child from case 5, became very resistant to prompting during the latter half of the intervention phase, so Puja stopped using this strategy at this time. Detailed field notes also showed that all the parents experienced occasions where they overused this strategy, either during data collections or during coaching observations, causing visible frustration for their children. It was a strategy that the parents naturally started to use without being taught but required practice and feedback to shape it.

Figure 6.3

Frequency Count of Parents' Use of Creating Opportunities for Communication Strategies

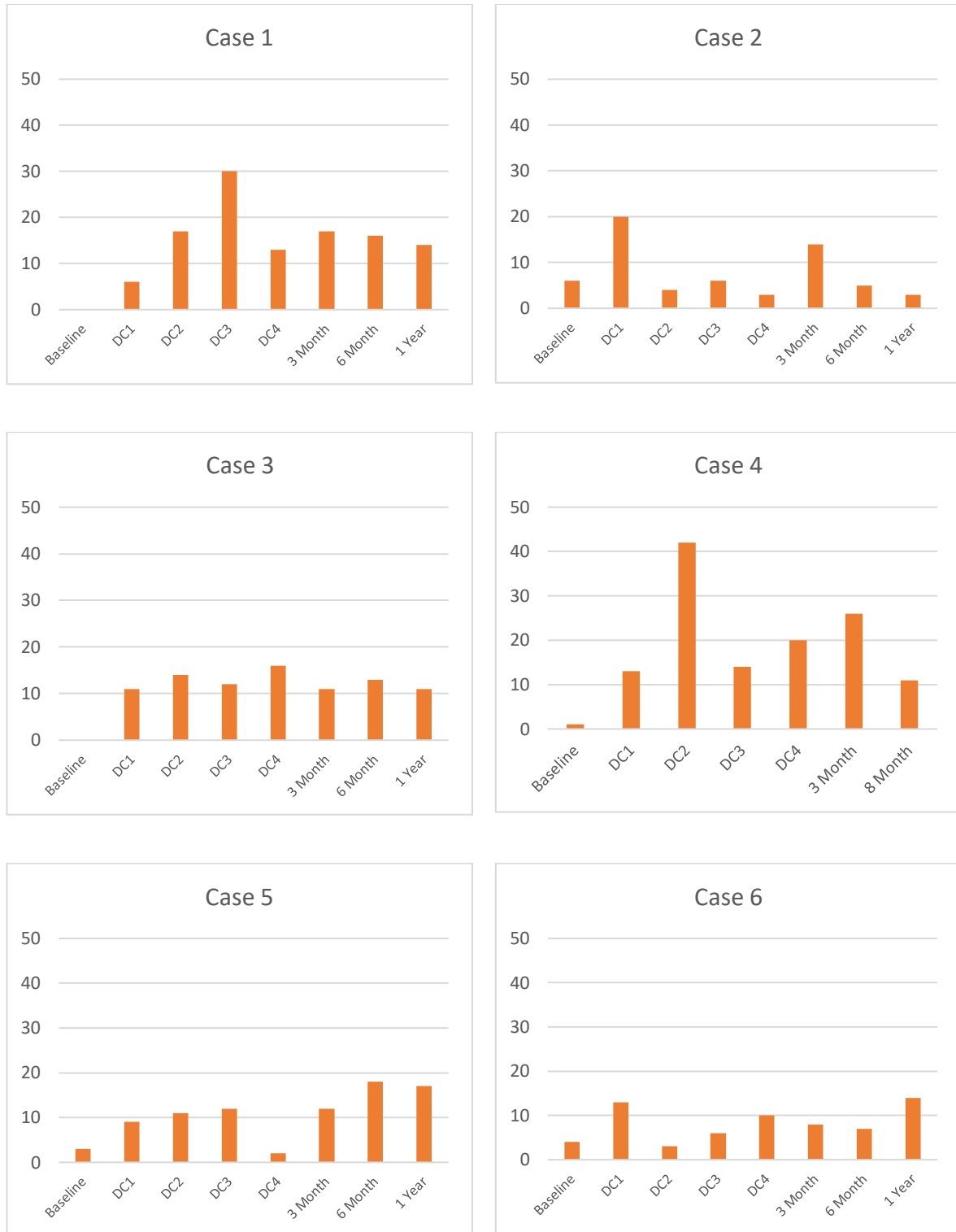
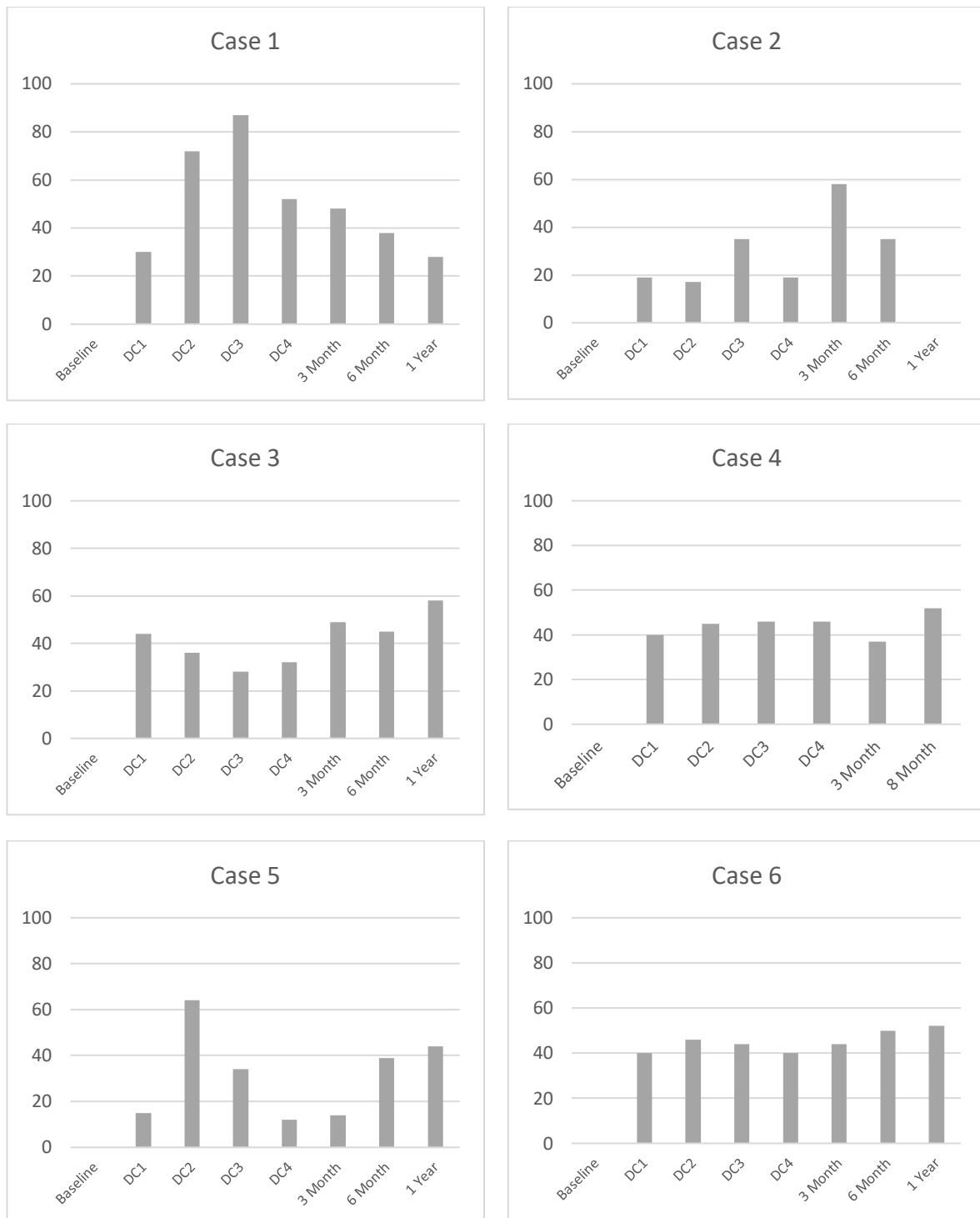


Figure 6.4

Frequency Count of Parents' Use of Prompting Strategies

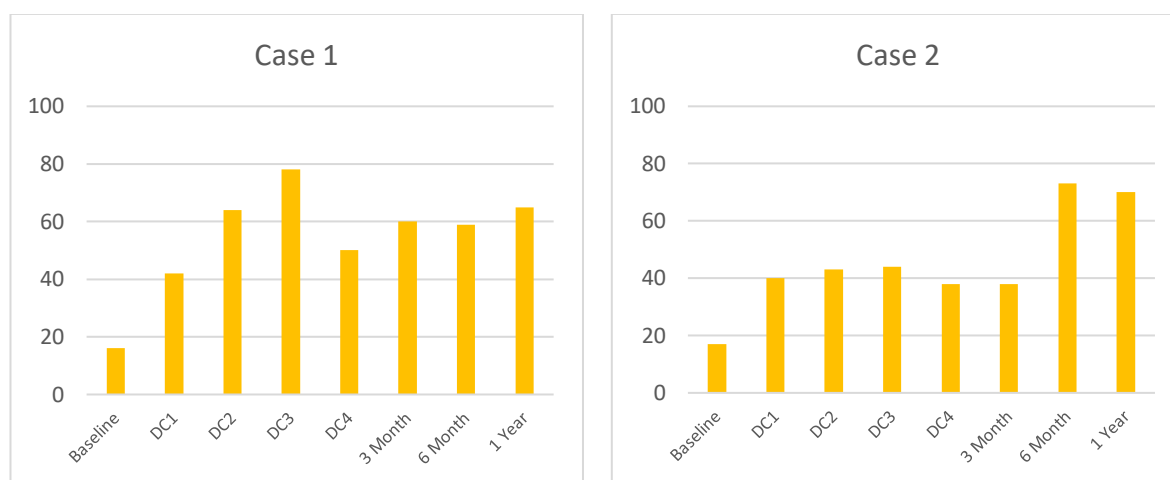


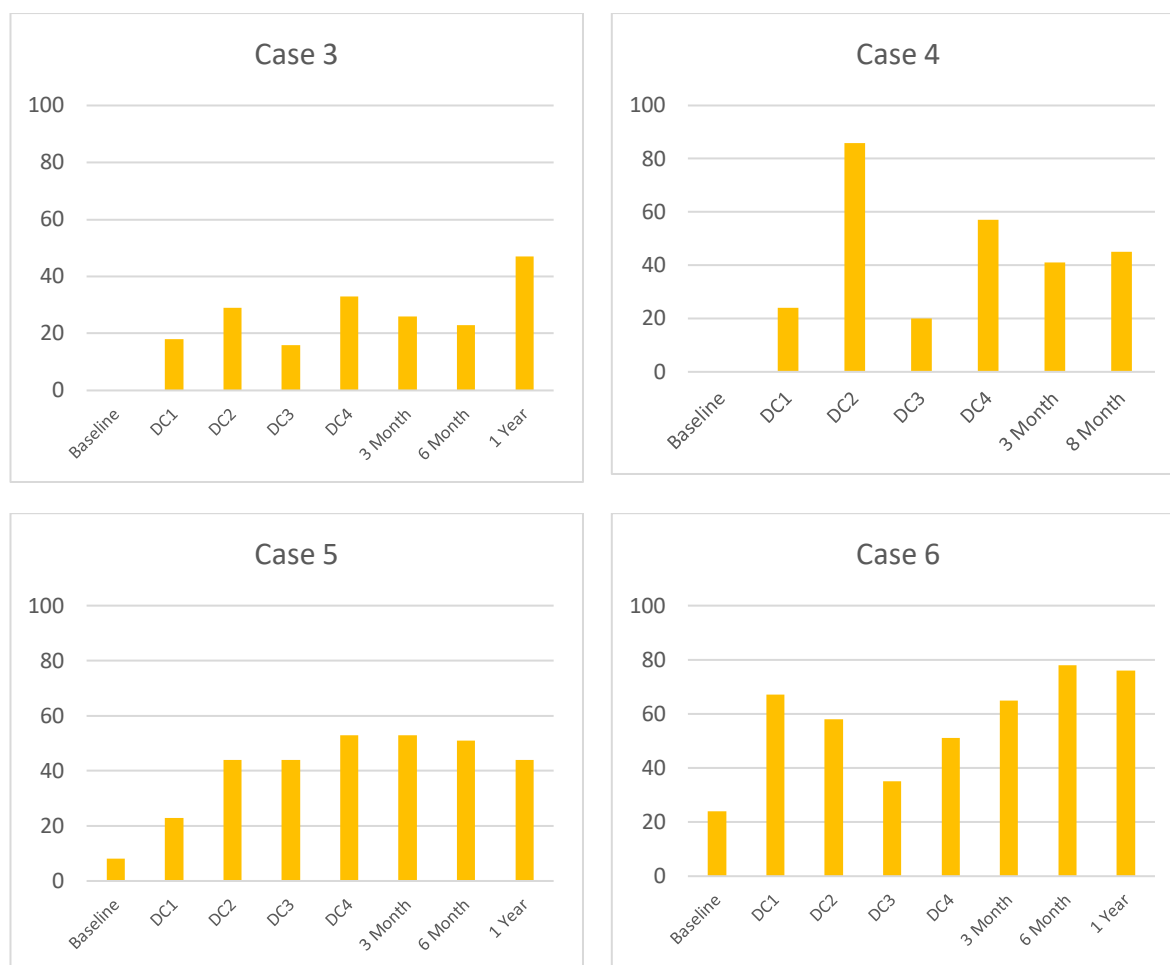
Throughout the study, even at baseline, all the parents responded consistently to any attempts that their child made to communicate. I observed this outside of the data collection

recordings as well as during. There are many examples in the coach logs where this responsiveness to their children made coaching conversations difficult. This use of the response strategies can be seen in Figure 6.5, which shows that all the parents used and maintained this strategy group. The parents that did not demonstrate this strategy during the baseline recording simply did not have an opportunity to respond to their children, because their children did not make any communication attempts. The nature of the parents' responses changed over time, as they learned how to match different types of responses to their children's individual communication attempts, level of effort, and mood. Puja (case 5), for example, used a high level of reward responses, because her daughter, Tina, was just learning to use the core board to make single symbol requests. In contrast, the other parents tended to use more language building responses to encourage their children to put symbols together or gave responses that helped to maintain the interaction.

Figure 6.5

Frequency Count of Parents' Use of Response Strategies





Parents' Views on their Progress and the Intervention

The effect of the initial intervention phase on increasing the parents' use of supportive strategies, is not just borne out in the data above, but also in the parents' responses to the survey at the end of this phase. All six parents agreed that they felt confident to support their child to use a core board, and five out of six agreed that their skills had improved (Figure 6.6). The parent who was undecided about her skills at this point, Puja (case 5), stated in her interview at the end of the study that she felt she had mastered these skills. The parents also rated all the strategies that they had been taught as useful in varying degrees (Figure 6.7). At this early point in the year of the study, the parents were already rating coaching as more useful than the workshops (Figure 6.8), although they did rate the workshops as useful, and

unanimously stated that they had enjoyed meeting parents with similar children in response to the open question about the workshops in the second survey.

Figure 6.6

Parents' Survey Answers Relating to Skills and Confidence

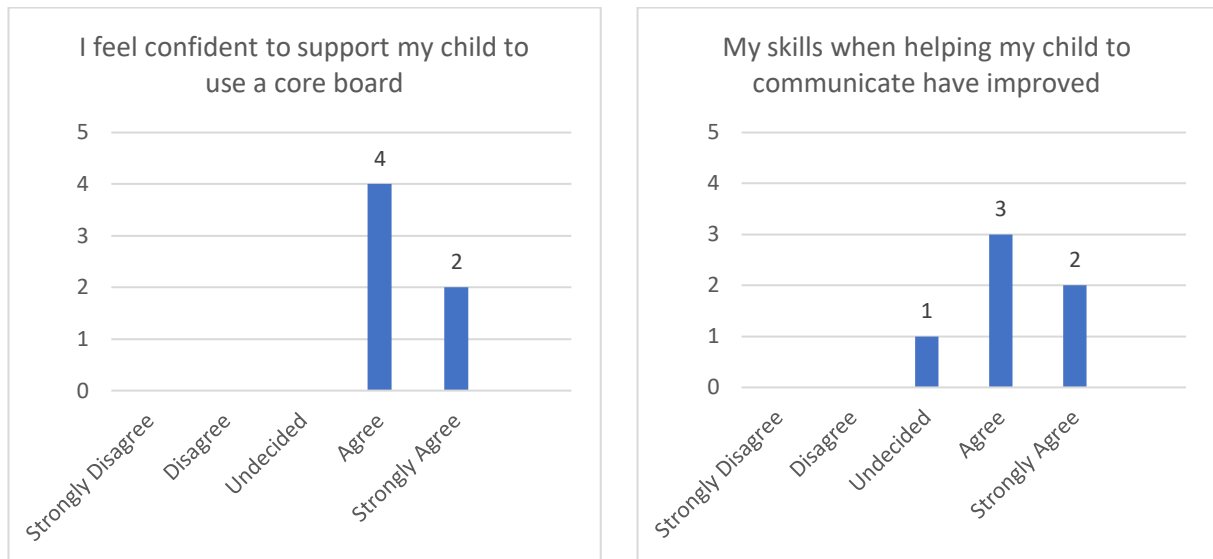


Figure 6.7

Parents' Survey Answers Relating to Usefulness of Taught Strategies

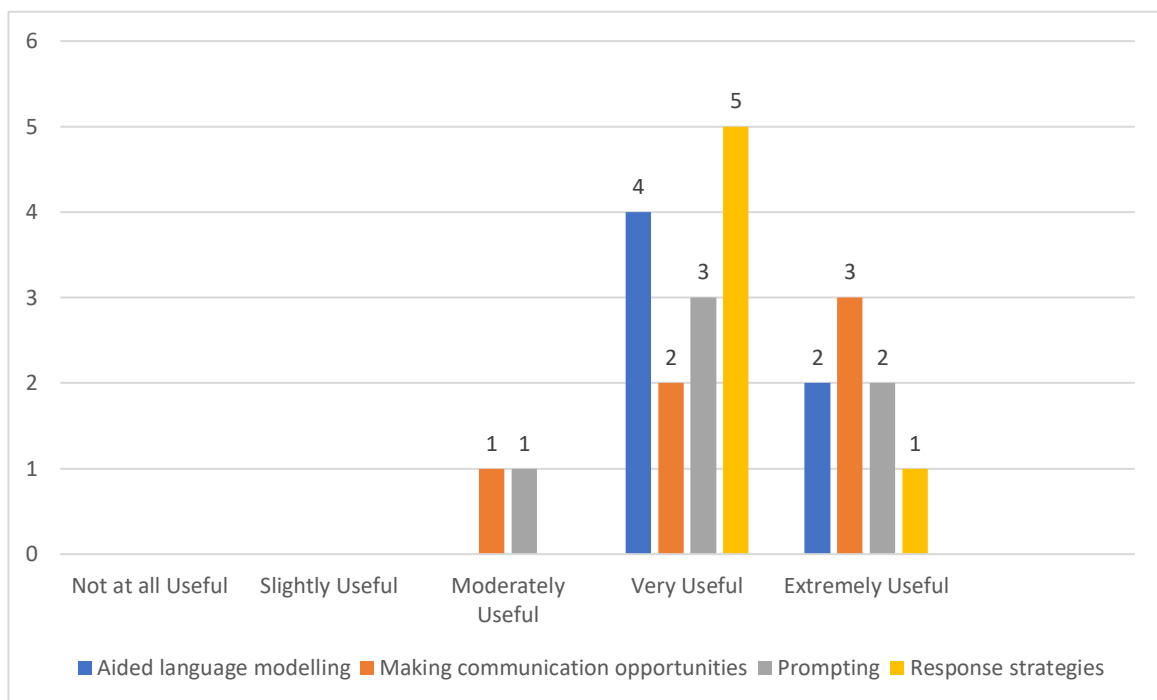
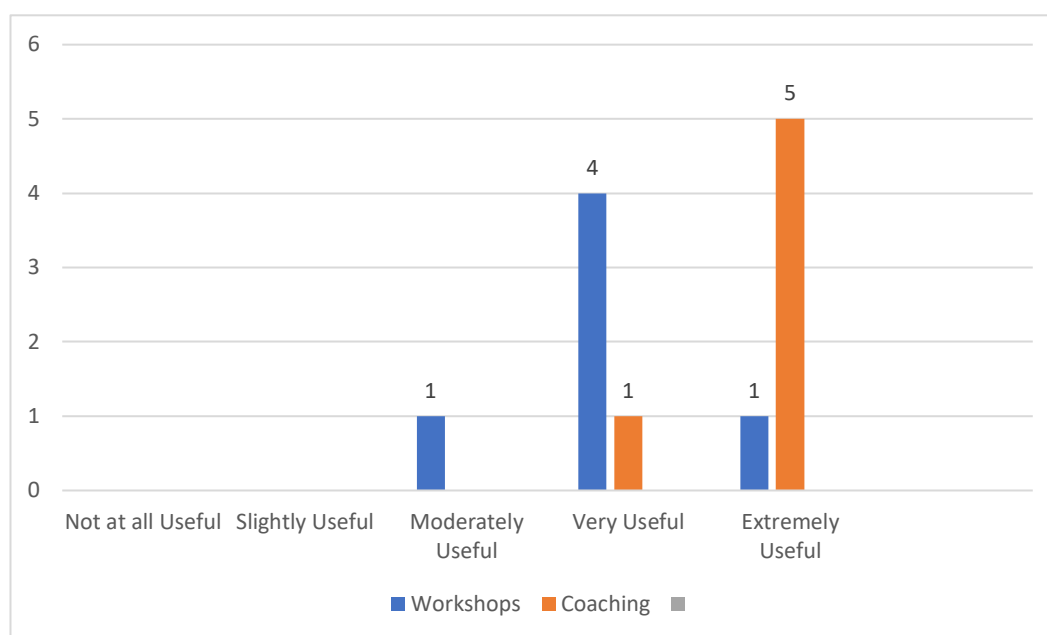


Figure 6.8*Parents' Survey Answers Relating to Usefulness of Training and Coaching****Other Factors that Affected Parents' Use of Strategies Over Time***

After the intervention phase of the study, the parents were supported with bimonthly coaching sessions until the end of the year. Five parents remained involved for the full year, and they all reported in the interview that the ongoing coaching was useful for helping them to improve and maintain the skills they had learned. Although all the parents initially had reservations about video feedback as a tool, they all stated that they found this process useful in the interview. For example, Emma (case 1) observed specific communication behaviours that she did that were unhelpful for her child and Sarah and Jo, (cases 3 and 6), observed aspects of their children's behaviour and intent that they had missed in the moment. The coach logs record that all the participants grew in their confidence at identifying the strategies they were using as well as areas for improvement.

It was not always appropriate to share the visual data with the parents, but when this information was shared during coaching conversations, data collection recordings and field notes

suggest that it had a beneficial effect on motivation and use of supportive strategies. For example, Emma (parent, case 1), increased her used of modelling when she saw that it had dropped in her data (Figure 6.2, difference between DC4 and 3-month collection points). Case 3 parent, Sarah, decided to restart using the core board after she viewed her data. Case 4 parent, Ashley, decided to continue with the study after viewing her data, and case 6 parent, Jo, chose to restart using the core board with Dallas after seeing her data. The coach logs and observational data suggest that viewing the visual data that showed the parents' use of strategies and the children's communication behaviours appeared to be a strong motivator for maintaining and improving on the progress the parents were making.

General play skills were not included in the initial workshop teachings, but coach logs and reflective journal notes record that all six parents needed some support in this area. The ability to use the supportive AAC strategies successfully depended to some extent on the child being engaged with the parent during a motivating activity. Five of the six parents needed some level of help initially to gain the skills to set up inviting play activities and to keep the children engaged. These parents continued to need support throughout the year at different times to manage their child's engagement during play. Kate, the parent in case 2, was an experienced kaiako, and initially had no difficulties with setting up and maintaining engaging play situations for her child. However, once Grace started talking, the coach logs show that Kate needed some support to develop her confidence to extend play and make it more imaginative.

Parents' Sharing of Strategies with Other Communication Partners

Despite all the parents learning the skills and strategies to a highly competent level, the interview data revealed that none of them shared the skills in any depth outside of their immediate family. Parents from cases 1, 5 and 6 reported that they attempted to train their partners to some extent. The parent from case 2 passed on some information to her child's ESW, mainly in the form of handouts from the course. The parent from case 3 did not attempt to train

anyone in her family or at her child's day care. All six parents mainly supported the children with little assistance from others. If the core board was used at day care, interview data and field notes suggest that it was mainly due to the influence of the family's MOE support workers, such as the early intervention teacher, rather than the parents themselves.

How Does the Introduction of a Core Board, Combined with a Parent Training

Intervention, Impact on the Symbolic Communication Attempts of Children with CCN?

This section will compare the changes in the children's communication behaviours during the study, particularly in relation to core board use. The data for this comes primarily from the recorded data collection observations that occurred eight times for each family. This will be integrated with information from the second survey, as well as the field notes and interview data. All six children learned how to use the core board to communicate during the year of the study. Five out of the six children started to use the core board within the first two weeks of it being introduced and were using the core board to communicate competently and on a regular basis by the end of the intervention phase. Additionally, four of the children in the study increased the amount of spoken language that they used, and this was the main form of communication for three of the children by the end of the year.

Children's Use of the Core Board and Spoken Language over the Study Year

Although the core board was available at the baseline recording, none of the children paid any attention to it. All the children interacted with the core board in the first two weeks of the intervention, but case 5 child, Tina, did not use it during the first data collection (Figure 6.9). She continued to only use it occasionally during the intervention phase and was reluctant to interact with the core board at all in the first 3 months of the maintenance phase. The other children all used the core board frequently during the intervention period. As well as the data shown in Figure 6.9, parents reported during the workshop discussions and coaching sessions that their children were using the core board daily, and the core board

tallies that they kept during this time backed this up. Further evidence that the children were using the core boards regularly for communication were my recorded observations in the coach logs and other field notes after home visits that all the children (apart from Tina) were using the core board quite fluently and had no difficulties locating high frequency symbols.

All the children used the core board to communicate during the maintenance phase for some or all the time; this is also when Tina (child from case 5) started to use the core board more frequently. There were individual fluctuations during this time, and cases 1 and 2 (Blaine and Grace) both eventually started using enough spoken language that they no longer needed to use the core board. The two children who did not develop any spoken language (cases 3 and 5), increased their use of the core board by the end of the year.

Only two children used any spoken language during the baseline data recording (cases 1 and 6), and this was minimal. Three children had a sudden increase in spoken words within the first 2 weeks of the intervention (Figure 6.10). These children were Blaine, Regan, and Dallas (children from cases 1, 4 and 6). As well as this increase in spoken language being captured in the data collection recording, the field notes recorded that the parents also commented on it during home visits. For all three children, the transcripts from the recorded data collection recordings showed that the new spoken language almost entirely consisted of words that they had been exposed to from the core section of the core board, for example 'more', 'go' and 'open'. Recorded data transcriptions show that this pattern continued with these three children, and that they acquired more of the core words that were targeted on the core board by their parents over the following weeks and months. Case 2, Grace, did not follow this pattern. Her data recording transcriptions and field notes recorded that she started talking suddenly around 5 months into the intervention and used a range of core and fringe words almost immediately.

Figure 6.9

Frequency Count of Children’s Use of Core Board Symbols During Observations

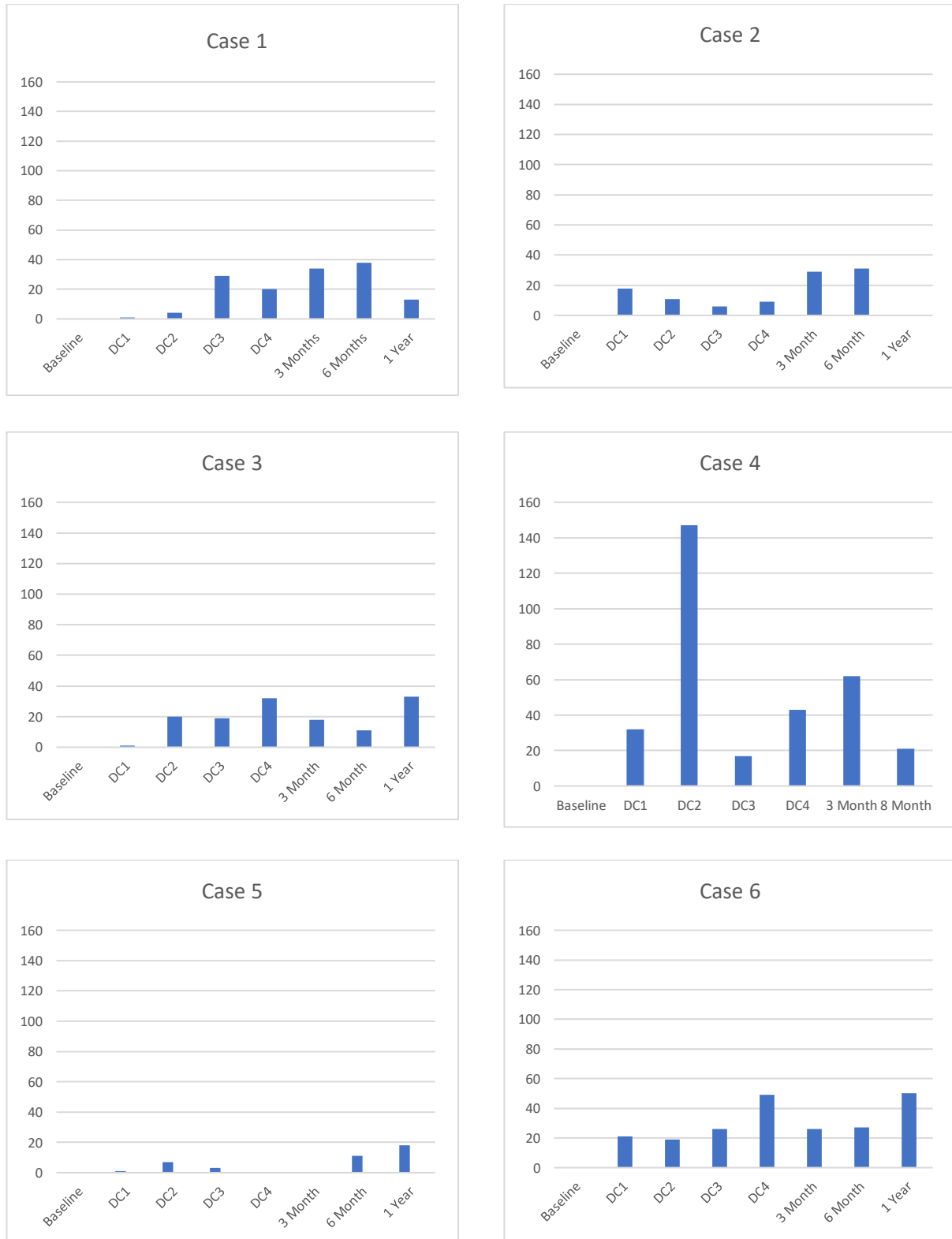
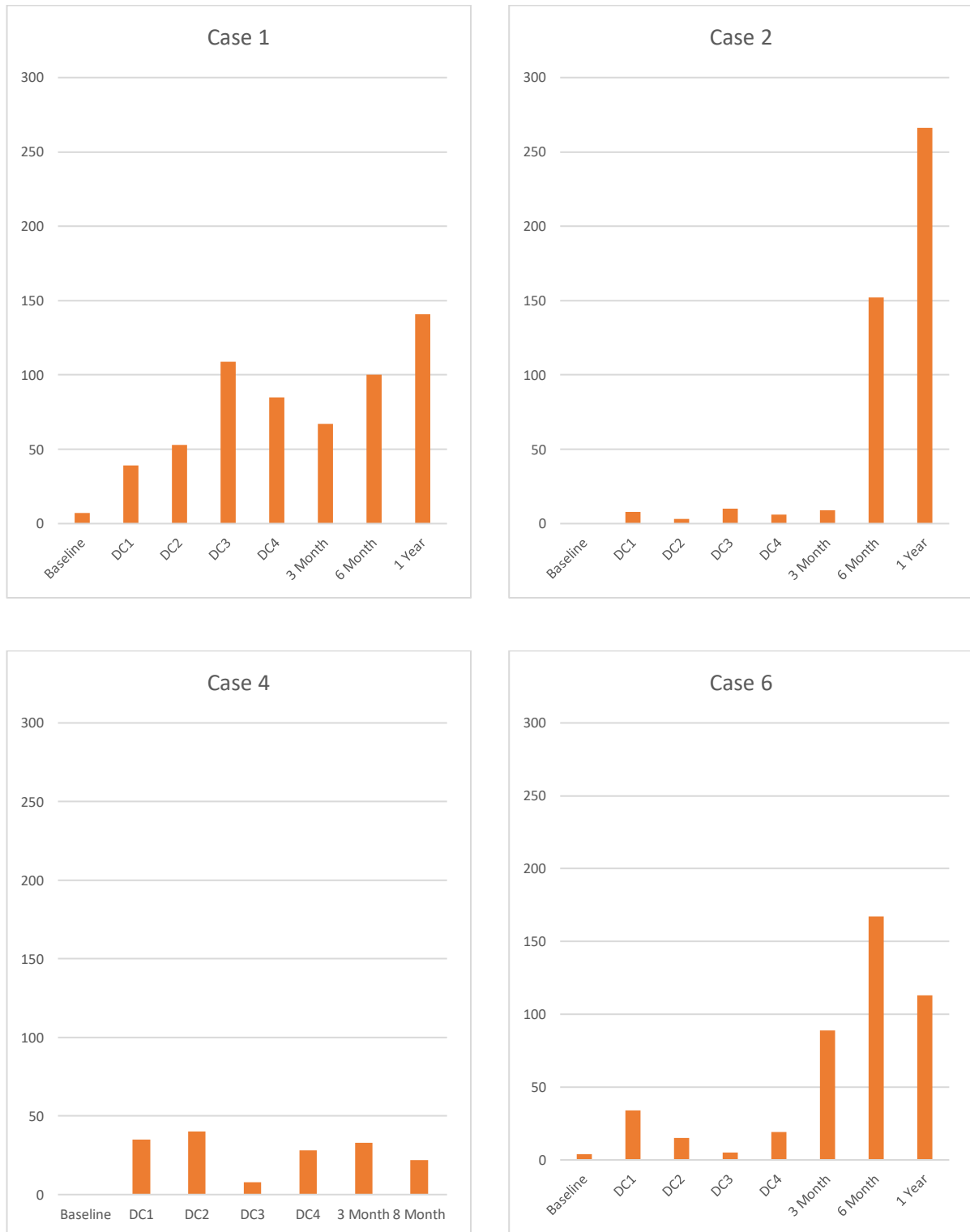


Figure 6.10

Frequency Count of Spoken Words Used by Children During Observations (omitting cases where children remained non-speaking)



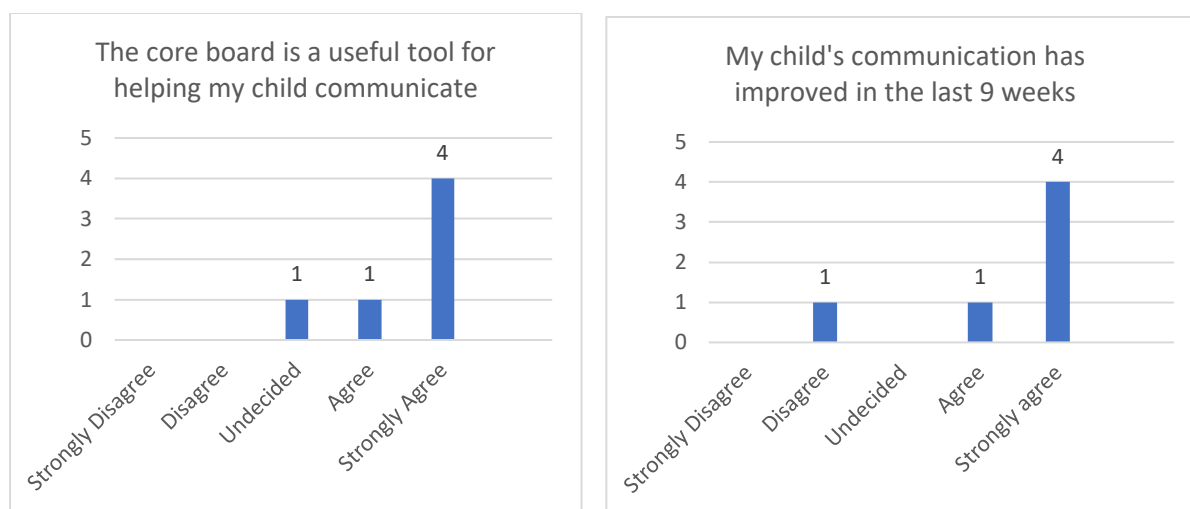
For the children who started using more spoken language, the general trend was for them to acquire more words and use more spoken language over time (Figure 6.10). Cases 1 and 6, Blaine and Dallas, both had very significant speech sound difficulties that continued to make spoken communication difficult for them throughout the year of the study. Over time, both these boys started to produce some of the very high frequency core words correctly, but they both continued to have difficulties producing less high frequency words. Case 4, Regan, began using more spoken language immediately, but he did not follow the pattern of increasing his spoken language over the year, and remained minimally verbal by the end of his involvement in the study. Case 2, Grace, started talking later in the intervention, and then developed spoken language at an exponential rate. She had few speech sound errors and talked in full sentences by the end of the study.

Parents' Views on Children's Communication Progress

The children's improvement in communication was borne out by parental report in both the survey at the end of the intervention (Figure 6.11) and the interview data, as well as during conversations during coaching visits that were recorded in the coach logs. Five of the six parents agreed that the core board was a useful tool in the survey at the end of the intervention phase, and five also felt that their children's communication had improved. By the end of the study year, all the remaining parents indicated that their children had made progress with communication during their interviews. Additionally, three of the parents felt that their child had outgrown the core board by the end of the study and indicated that their child no longer needed AAC (case 2) or would benefit from a change to high tech AAC system (cases 1 and 3).

Figure 6.11

Second Survey Data relating to Children's Communication



Detailed Information on Children's Use of AAC over the Study Year

Over the course of the study, all the children developed their competence with using a core board to communicate. Five of the six children developed the ability to communicate for a diverse range of purposes and topics and were able to point to symbols in sequence to expand on their ideas (Figure 6.14). Over the year, all six children used the core board for more than simply making requests during data collection visits, as shown in Figure 6.12. This included examples of using the core board for social communication across all six children at some point during the study. Over the course of the year, the detailed observational data shows that the children between them used the core board to explore vocabulary, make requests, protest, make comments, gain and maintain attention, ask questions, answer questions and perform social greetings. In addition to data from the recordings, parents supplied examples of this on numerous occasions, which was recorded in coach logs and the reflective journals.

Figure 6.12

Percentage of Communicative Functions Used by Children During Observations

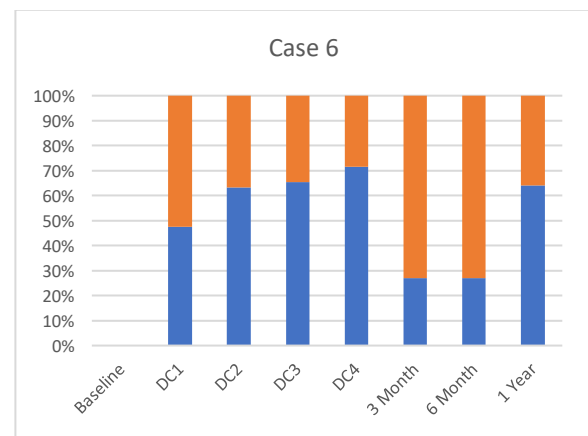
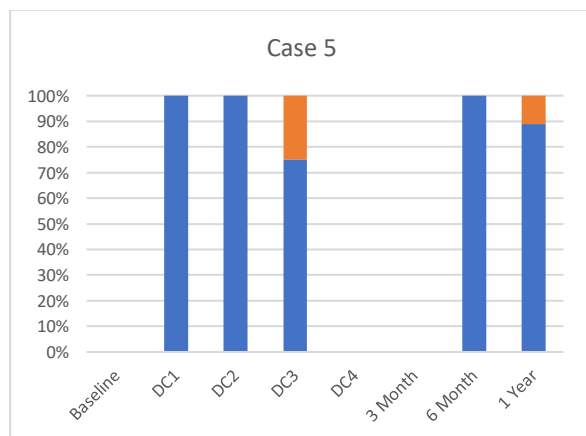
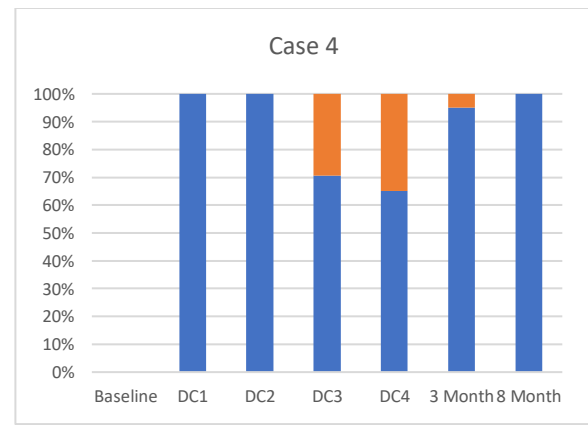
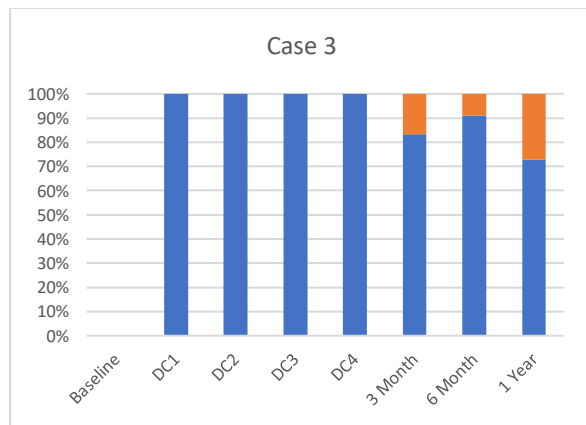
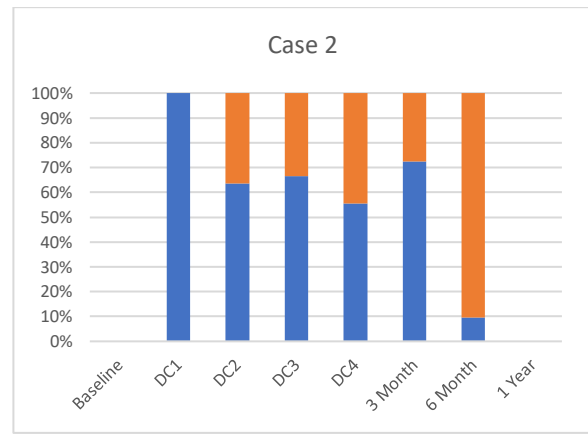
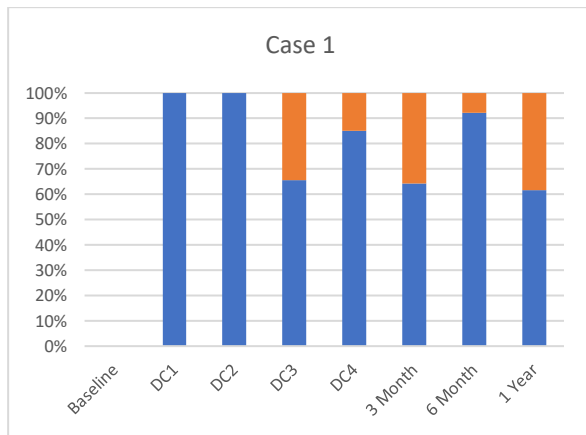


At the start of the study, all but one child (case 1) used more core than fringe symbols during the observations (Figure 6.13). Coach logs and interview data recorded that this was a consistent finding outside of the observations as well. Towards the end of the intervention phase, some of the parents supplied lists for personalised fringe strips, and these were supplied for four of the children by the end of the intervention phase. Case 5 did not receive their personalised fringe strips until nearly 6 months into the study, and case 3 opted not to personalise any of the fringe strips. As the study year progressed, the children generally began to use more fringe vocabulary during the observations. Observation transcripts showed that this was often vocabulary from their personalised strips, as well as frequent use of food, drink and toy vocabulary that matched items in the observation boxes. The children who were beginning to use more spoken language, particularly cases 1, 2 and 6, began to use proportionately more fringe vocabulary as they were able to say more of the core words. This finding was corroborated by their parents during coaching sessions and in interview data.

Figure 6.14 gives an overview of the different length of symbol combinations that children used in the various data collections. The coach logs showed that five of the children had goals set by their parents to increase their symbol combinations, and these children all achieved symbol combinations of four or more at some points during the study. It is worth noting, however, that the recorded observations showed that all the children in the study tended to use just one or two symbols in their spontaneous communication, and usually required some level of prompting to put more symbols together than this. Analysis of the coded observation data showed that these symbol sequences nearly always contained at least one core word, and were sometimes only composed of core words, such as “want more big”. Occasionally, multi-symbol phrases were composed of only fringe words, but this tended to be counting sequences, or requests for lists of items such as two different foods.

Figure 6.13

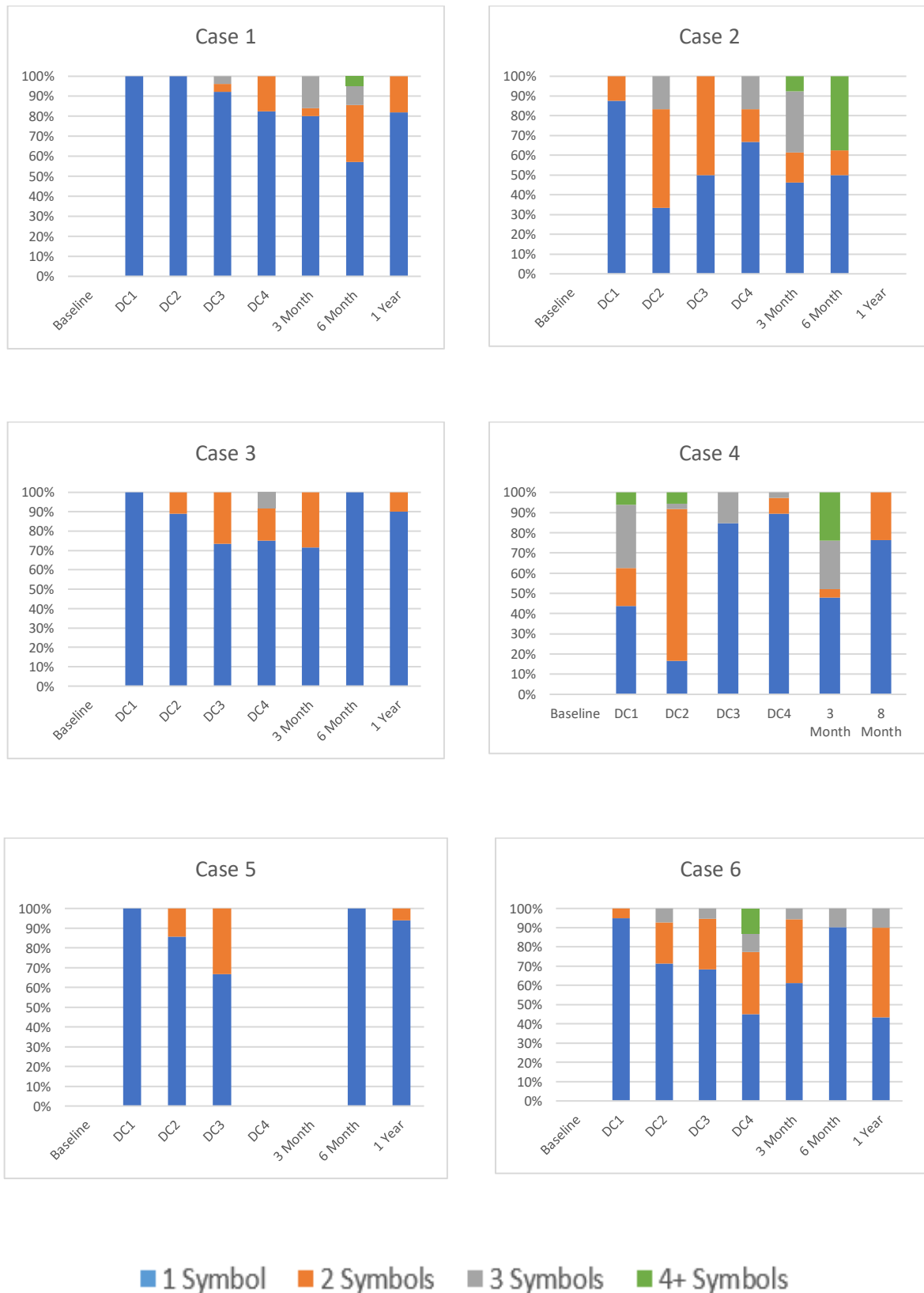
Percentage of Core and Fringe Words Used by Children During Observations



■ Core ■ Fringe

Figure 6.14

Percentage of Multi-Symbol Combinations Used by Children During Observations



Children's Attitudes to Introduction and Use of AAC

Not all the children appeared pleased to have the core board arrive in their lives. Data from the parents' home journals and interviews, as well as the coach logs and other field notes, showed that four of the six children (Grace, Eli, Regan, and Tina from cases 2,3,4, and 5) all resisted using the core board to communicate at some points during the study. Cases 1 and 6, Blaine and Dallas, the two boys with severe speech sound difficulties, were the only children to always appear willing to use the core board according to the field notes and reinforced by their parents' survey and interview answers. These data sources recorded that they both accepted it immediately and took ownership of it, carrying the core board around with them and running to get it when they had something to communicate. Information from the interviews, as well as field notes, recorded that they were both also happy to use it at day care and with other familiar adults. After they developed spoken language, coach logs and interview data recorded that they both continued to use it when they needed to make themselves understood. Coach logs and the parent home journal showed that Regan, case 4, who is autistic, appeared happy with the introduction of the core board and was usually content to use it on his terms. He frequently resisted being prompted to use it to make requests and sometimes had periods where he refused to use it at all. Interview data and field notes also showed that children from cases 2, 3, and 5, Grace, Eli, and Tina, were all reluctant users at times, using their preferred non-verbal methods of communication by default.

What factors influence the success or failure of implementing a core board as an AAC system for young children with CCN?

The data that informs this section was gained from the initial case history taking, from coach logs, reflective journals, the open answer section of the survey and the semi-structured interview. At the start of the study, during the recruitment phase, I had an expectation that retention in the study would be a significant issue. The study required participants to be

involved over a full year, there would be considerable demands on the time of all the participants and they would be expected to take part in regular data collection observations as well as ongoing coaching sessions. The children were at an age where there are typically high demands on family time. Additionally, I recognised that some parents may still be coming to terms with their child's additional needs or a recent diagnosis, which may extend beyond just communication. Implementing any AAC system can be challenging and time consuming. I eventually recruited six families with the expectation that at least half would not complete the year. In the event, all six families remained in the study until 8 months, and five families completed the full year. In all six cases, the core board was used successfully for communication for some time during the study. I had not anticipated this level of retention and success at the start of the study.

Identified Barriers to Using AAC

Although I had already observed and discussed many of the barriers and supports that each parent experienced during their AAC journey through conversations during workshops, coaching sessions and informally at other times, the semi-structured interview was designed to capture the parents' voice about what had helped or hindered them along the way. All the families involved in the study experienced significant obstacles to the successful implementation of the core board with their children. Not least, this study took place over the COVID-19 pandemic, and the latter half of the study year coincided with the virus' second arrival in Aotearoa, which was accompanied by a series of restrictions and localised lockdowns. One parent, Ashley (case 4), experienced a series of difficult life events, and eventually left the study at 8 months after the family caught COVID-19 and became very unwell. This family had struggled with juggling working from home, childcare, managing routines and behaviour over the lockdowns, and this was the final straw for them. Four of the six families reported that COVID-19 and the accompanying restrictions had a negative effect

on their abilities to maintain core board use at home. In contrast, Grace, the child in case 2, learned to talk over one of the COVID-19 lockdowns. Sarah, the parent from case 3, stated the second lockdown provided her with more time to spend practising the strategies with her child.

One factor that was a common theme for all six parents was a lack of time. All the mothers involved in the study were either in full time work or study, and my field notes record that they also often felt that they shouldered more than half of the childcare and household tasks. Four of the children had younger siblings, one had a teenage brother. Two of the parents had babies during the study year. These were very busy people with a lot of demands on their time before the study began. The intervention phase required them to attend 10 hours of workshops and at least 4 hours of coaching in an 8-week period, as well as an expectation that they would practise using the strategies regularly, complete home journals and core tallies, and make the core board part of their daily routines. This is a challenge mentioned by all the parents in the interview, for example Sarah (case 3) explained:

I would say the most challenging part was remembering to, at first was remembering to keep up with our plan. Yeah, just because, you know, you have work and other kids, and I get busy. So, it's kind of like that extra that you have to do. Yeah, so that was hard for me.

As time went on, most parents managed the time issue by making core board use part of their routine, and fitting it in with everyday activities, as stated by Emma (case 1): “the core board just kind of became part of like a routine.”

On top of the usual busyness of life with young children, some of the parents experienced significant life events, either planned or unexpected, that made it harder for them to stick to the routine of using the core board. Two parents had babies, two of the families

experienced relationship breakdown, one family moved home, one set of parents got married and experienced a family bereavement, nearly all the families got COVID-19 at some point during the year, and there were other events such as job changes and health problems. These factors led to one family leaving the study at 8 months. For other families it meant that the core board time was sometimes put on hold or reduced for a while. Sometimes a planned maintenance coaching session was a reminder to start practising again, as identified by Jo (case 6) in her interview: “I think they (the coaching sessions) were very helpful, and it put me back on the track of using the core board.”

One barrier to maintaining AAC use, experienced by most parents, was the behaviour and attitude of their children towards either using the core board or participating in joint play activities with their parents. Whilst both the children from cases 1 and 6, Blaine and Dallas, were always happy to use the core board to communicate, Dallas’ mother, Jo, frequently reported that she found it difficult to manage his behaviour and keep him engaged in activities where he could practise using the core board. For cases 2, 3, 4 and 5, the parents had to manage some strong resistance from the children towards using the core board to communicate at times. This varied between silent refusal, walking away, throwing, or pushing the core board away, or a full meltdown. For case 5, this lasted for over three months, and ended shortly after her mother changed her feelings about using AAC and started to model on the core board more in daily activities. For cases 2, 3 and 4, it meant that the parents constantly had to think about how to make activities more motivating, be cautious with their use of sabotage, and use prompting in a skilled and sensitive manner. Without the personalised coaching, this may have proven too difficult to maintain. All the parents referenced this support either in their survey answers or the interview, for example, Ashley (case 4) in one of her survey answers:

I find them (the coaching sessions) helpful when something isn't working well and brainstorming ideas etc. because Sam has the education experience and I'm an expert in my child so it's always really useful and practical. Like ASD, not everything will always work for your child and their needs, so it's personalised.

Although five of the parents were positive about the core board in the survey, and all the parents were broadly positive about the core board by the end of the study year, there were aspects of its design that were found to be challenging. Puja (case 5) found the appearance of the core board to be very off-putting and felt that it would draw eyes and single her child out in public. For the parents who used the core board out in the community, Kate (case 2) and Sarah (case 3), shared that they noticed people staring at them when they used it with their children. Emma (case 1) and Jo (case 6) both had difficulties finding symbols on it at times, particularly if they were out of practice. Emma found it difficult to memorise all the symbols on the fringe strips. Once Emma's son, Blaine, had started to communicate for a wider range of purposes, the range of vocabulary he needed was not available on the core board. Although he was able to sometimes find alternatives, the system was too slow for him, and he often gave up. Grace, the child from case 2, had some physical limitations, and the core board was sometimes hard to position in a way that allowed easy access for her. By the end of the study, three of the parents were keen to explore high tech options for AAC, so some of these limitations could be addressed.

The nature of the study meant that only one parent from each family was trained and supported to use the core board, rather than the whole family and other significant people such as the day care staff. This meant that the participating parents from each family became the main support people for using the core board with their child, and often had little support from others. Only one parent, Puja (case 5), explicitly said that this made things difficult during her interview, but it is likely that all the parents would have found it easier to keep

going if they had been part of a team of people supporting the child. Three parents mentioned that it was difficult to ensure that the core board was used in day care. My coach logs record a common theme that the parents worried that day care staff wouldn't support it correctly.

There was a commonly held belief that day care staff were too busy to support daily use of the core board with their child, for example Sarah, (case 3), in her interview states: "But I know a lot of kindies, because they're so busy with multiple children, they might not always do that."

The most common reason for parents to reduce or stop using the core board during the study was if their child started to use more spoken language or another symbolic form of communication. In one situation, case 2, this was entirely appropriate, as Grace developed spoken language very rapidly, and soon had enough language to express most of her ideas. It was less clear cut for cases 1 and 6, Blaine and Dallas, who started to develop spoken language early in the study but remained very difficult to understand. The core board was still useful as a tool both to help people understand them and to build their vocabulary and syntax. The observational data, however, shows that both parents started to reduce their aided language modelling, and the children became less fluent at using the core board when they were not using it as often. Eli and Tina (cases 3 and 5) both used a small amount of sign language, and this was sometimes quicker and easier than finding and using the core board, although neither of them had the same range of vocabulary and syntax when they used sign. Using an aided AAC system, such as a core board, is slow and laborious, and both the children and the adults tended to use the system less if there were any other communication options.

Identified Supports for Using AAC

Despite these considerable and sometimes universally experienced barriers to using and supporting the core board, all the parents maintained use of it for the duration of their

involvement in the study, or until it was no longer needed. There were a range of supportive factors for the parents, who were already motivated to help their children and had opted to be part of the study. Five out of six of the parents had a positive outlook towards using AAC from the start of the study according to the initial surveys, and all the parents were concerned about their children's communication. A strong motivating factor for five of the families was the immediate and observable progress that their children started to make with communication. They could see results, and this helped to make the hard work seem worthwhile. Most parents commented on this in the survey at the end of the intervention, for example, Sarah (case 3) wrote "My son has made such amazing progress within this 9 weeks and has started talking a lot more than he was before the course." By the end of the study year, all the children had made observable progress with their communication skills.

Although none of the parents had prior experience of using AAC, they showed a dedication to learning, and they mostly learned quickly. The coach logs recorded that some of the parents developed a high degree of skill and showed strong reflective abilities during coaching conversations. They were able to process the information and use it in a way that worked for their family and child. Some of them, such as Emma, (the parent from case 1), became adept at goal setting and problem solving. The entire parent cohort were strongly motivated to help their child and prepared to work hard to achieve it, as shown in the initial survey data and their consistent strategy use throughout the year.

Different families talked about a variety of factors that helped them during the interviews, but there were only four supportive factors that were experienced across all cases. One of these was observing their child's progress. The other three were the initial training, the knowledge of the supportive AAC strategies, and the personalised coaching. Of these, the parents referred to the coaching as the most helpful factor in supporting them to continue using the core board with their child. The combination of these three components of the

intervention were seen as essential by all six parents. For example, Emma (the parent in case 1), states in her interview: “I think, yeah, it'd be so weird if you just like got it and didn't have any training. Like, I don't think I would ... I would literally never use it like.” Also, Sarah (case 3), in her interview: “Yeah, definitely her teaching us strategies. Yeah, that was really useful. Because, you know, it's not something that you would kind of be able to learn by yourself.” The parents all recognised that learning the supportive strategies was essential to get started, and then the coaching was needed to help them apply it in practice and to keep going over time, as described by Puja, (case 5): “And in workshops, you only can see the theory part, you can use that, you can use the strategies, you can cheat. But when she comes home she show us exactly how to use it.”

For many of the participating families, it was an eventful and sometimes difficult year. The six mothers who participated in the study had numerous pressures on them outside of the study. They all experienced a range of supports and obstacles that helped or hindered their personal journeys with AAC. However, the detailed teaching of evidence-based supportive strategies, and the ongoing support of personal, in-home coaching, appear to be the determining factors in keeping these families on track with supporting and using a core board with their child.

Summary

This chapter has considered the results across all six cases and looked at the patterns that emerged through the quantitative and qualitative data. The six individual case studies, combined with the cross-case analysis, have provided many useful insights, and raised some interesting points for discussion. The parents all learned and used the supportive strategies and maintained using these for as long as their child needed to use AAC to communicate. The children all made gains in their communication, although these gains presented differently for each child. All the children used the core board to communicate successfully at some point

during the year. The parents identified a range of barriers and supports to using AAC with their children, but all identified the use of training and coaching as supportive. The insights raised through the case studies and in the cross-case analysis will be considered in detail in the next chapter, the discussion.

7. Discussion

The present study was a complex piece of research, which took place over an extended period and involved multiple data sources. Individual results for each parent and child have been explored in the case studies, and outcomes that were observed and recorded across cases have been described in the cross-case analysis. The results raised many points of interest that merit further discussion here. This chapter will discuss key outcomes for families and children alongside critical insights related to the EP-AAC intervention used in this study.

The discussion will start with an overview of the outcomes of the intervention on the parents' use of supportive AAC strategies and seek to compare this to similar studies, as well as explore how this study has contributed to research areas that were lacking in evidence. It will then focus on the outcomes for the children from a range of perspectives and consider the different factors that may have influenced these. Two of the child participants had severe speech sound difficulties that closely aligned with the definition of childhood apraxia of speech (CAS). Their attitude to AAC and their progress with spoken language during the intervention had many similarities. This will be examined considering current literature and intervention guidelines relating to CAS.

This study had a particularly long maintenance phase, with data collected over a year. The maintenance and generalisation of the observed behaviours will be discussed in relation to other similar studies. This research also set out to be family centred, holistic and naturalistic to achieve the best results for the child and their family; the discussion will explore whether this goal was achieved. This will lead on to a consideration of parent coaching and how it played a key role in this study. Next, the structure of the training and coaching intervention will be examined, with suggestions made for improvements for future replications of this intervention. One of the interesting themes that emerged over the course

of the intervention was the use of prompting and sabotage techniques by the parents, and the effects these had on their children. This will be examined in more detail and in relation to current literature.

This study included eight systematic observations for each family throughout the year, and it was observed that these played a role in shaping the outcomes of the intervention. This will be examined in more detail. One aspect of AAC implementation that was given priority in this research was understanding the supports, and conversely, the barriers to using AAC with young children. This study gathered detailed data in this area, and, in the final part of this discussion, this will be examined and compared to data gathered by other researchers.

Parents' Use of Strategies

This study provides evidence that a comprehensive training and coaching intervention can successfully support parents to learn, use, and maintain supportive AAC strategies during home-based routines. By the end of the 9-week intervention phase, which included 10 hours of group-based instruction and approximately 4-5 hours of personalised coaching, all six parents were using all four strategy groups with skill. Five out of the six parents could articulate what they were doing and why, and all six reported feeling more confident to support their child to use a core board. This finding aligns well with current research about parent training for communication strategies in general (Roberts et al., 2019) as well as several studies where parents were taught and coached on specific AAC strategies (Biggs et al., 2019). The parents in this study were motivated to help their children and were able to practise the strategies across a range of daily routines; benefits that have been cited by Binger et al. (2008) and Nunes and Hanline (2007), among others.

The parents in this study were based in one geographical area. Four out of the six parents had higher education qualifications, and one was studying at undergraduate level.

They came from different cultural and socio-economic backgrounds. Most parents were open to using AAC at the start of the intervention, but one parent was not initially open to this approach. All six parents made significant progress with using the strategies however, which mirrors the findings of Brian, Drmic, et al. (2022). Other aspects relating to the parents' involvement in this study, such as their engagement in coaching, their maintenance and generalisation of the strategies, and the supports and barriers to AAC implementation that they identified will be discussed later in this chapter in the relevant sections.

Children's Communication Behaviours

This study provides preliminary evidence for the use of a core board with fringe vocabulary when it is supported by a parent who has the appropriate knowledge and skills, to improve communication outcomes for pre-school children with complex communication needs. Six children with different communication profiles, but all with less than 10 spoken words, made significant progress with their communication skills over the year. By the end of the year, four of the children used mainly spoken language to communicate, and the other two children used the core board to express themselves. Five of the children used the core board competently within the first 9 weeks of the study, with one developing core board use later in the year. By the end of the first 9 weeks of intervention, five of the six parents reported significant improvements in their children's communication skills. All six children used the core board to express different communicative functions over the year and five of the six children regularly created multi-symbol outputs.

There appear to be no examples in recent literature of studies conducted using a low-tech core board with fringe as an AAC system for children. Jonsson et al. (2011) used a low-tech communication board with the children in their study, but it contained only 50 symbols, and these were a combination of core and fringe symbols. Additionally, their study focussed on the strategy of aided language modelling and did not collect data on child outcomes. Other

studies that have collected data on child outcomes do not appear to have used AAC systems with a comprehensive core vocabulary, and have instead favoured single, specifically-programmed pages on speech generating devices using specific target words for the activity the child is engaged in (e.g., Kent-Walsh, Binger, & Hasham, 2010; Ronski et al., 2010). The lack of evidence for comprehensive, core based AAC systems has been raised as a concern in recent literature (Light et al., 2019). One study, Bedwani et al. (2015) used a core based AAC app, LAMP Words for Life, with eight autistic children over an 8-week period. This study involved intervention via trained speech language pathologists and measured improved expressive communication outcomes across all participants. There is scope for more research on AAC systems that feature robust core vocabularies, but this current study offers preliminary evidence that low tech core boards can be a very useful communication tool for young children and beginning communicators with complex communication needs.

Some authors have questioned the use of core vocabulary in AAC systems for early communicators such as the children in this study (e.g., Franco et al., 2017; Laubscher & Light, 2020) or the use of grid based core vocabularies with young children (e.g., Drager et al., 2003; Light et al., 2019). The core board used in this system had 77 core words, organised in a colour-coded, semantically organised grid format with fringe vocabulary attached on strips at the top. Five of the children had no apparent difficulties accessing the vocabulary they required in this format, particularly when their parents were modelling consistently. These five children all started to access core words on the core board within the first 2 weeks of the intervention and did not appear to have any difficulties with learning and remembering the motor plans required for high frequency words. One child did have more difficulties with scanning and accurately locating symbols, but this was complicated by their parent's ambivalence towards using AAC and therefore inconsistent access to the core board, as well as modelling. By the end of the year, this child was also able to locate and point to high

frequency symbols, although she still lacked the fluency that the other children acquired and used only a small number of core words.

Additionally, all six children used a much higher proportion of core words than fringe words during the data collection sessions, suggesting that they found these words useful. This may have been because these were the words more commonly modelled by their parents, and because these words are easier to access than fringe words on this AAC system. It equally could be because these words are flexible and useful for expressing a range of ideas, as proposed by van Tilborg and Deckers (2016). The 77 core words displayed on this core board have been carefully chosen to suit the needs of early communicators (Bell & Thomas, 2017). The children who had speech difficulties but started to use more spoken words eventually changed to using more fringe words because they were able to say the core words.

The five children who regularly sequenced symbols together to create a phrase or sentence almost always used mostly core words, with occasional fringe words to add content or meaning. Of the many multi (two or more) symbol sequences recorded during this study, nearly all of them contained core words. The exception to this was number sequences used to count down during a game. There are several AAC professionals who promote the inclusion of core words in beginning vocabularies to allow the development of syntax (e.g., Boenisch & Soto, 2015; Quick et al., 2019). The ability to move beyond single words and on to using phrases and sentences is viewed as an essential part of developing communication autonomy that should be available for children who use AAC, as it is for children who naturally develop spoken language. Three of the children in this study began to combine symbols together from the first data collection at 2 weeks into the intervention, suggesting that the inclusion of functional core words was an important feature for these children who were able to use them syntactically from very early on.

The core board used in this study had many additional fringe strips attached giving access to over 400 fringe words. All the parents were encouraged to provide lists for personalised fringe vocabulary, and most did. These personalised lists were unanimously well received by the children, and contained items such as family members, favourite foods, books, toys, places, and television programmes. The five parents that requested additional personalised fringe strips reported that these were used frequently by the children. This fits with the findings and recommendations of many researchers and professionals (e.g., Deckers et al., 2017; Trembath et al., 2007). Even after the fringe strips were personalised, most of the children continued to use mostly core words during the observation data collection recordings, but this was probably influenced by the contents of the assessment boxes and their parents' specific modelling and prompting. The parents had received specific instruction to prioritise core words, and this was reflected by their use of strategies during the observations. Some parents reported that their children used more fringe words outside of the systematic observations.

The use of different communicative functions has often been neglected in studies collecting data on child use of AAC (Holyfield et al., 2017; Light & McNaughton, 2015; Logan et al., 2017). This study set out to create conditions that would enable the development and use of communicating with AAC for a range of purposes. This included: the use of a robust core and fringe vocabulary (Banajee et al., 2003), instructing and coaching the parents to model a range of communicative functions on the core board (Dodd & Gorey, 2014), and basing the data collection recordings in the home during naturalistic routines with a parent. These approaches appeared to be successful, and all six children used communicative functions other than just requesting over the year, including: commenting, asking for information, drawing attention to something, giving instructions, and asking questions.

Parents reported that the children used a wider range of communicative functions outside of the systematic observation recordings.

In fact, all six children did favour requesting (either objects, actions, or social routines) during the observations. Two of the children are autistic, and it has been suggested by several experts that autistic children are more likely to communicate to regulate behaviour (e.g., Iacono et al., 2016; Logan et al., 2017). However, all the children favoured requesting during the observations during the time of the study once they were able to use the core board to communicate. The objects and activities provided in the observation boxes were mainly chosen to increase engagement and communication in the children. Many of the items were designed to encourage requesting, such as containers that were difficult to open, or toys that needed help to operate. This is likely to have influenced the balance of communicative functions. There were toys included that promoted cooperative and imaginative play, as well as storybooks, but for the most part, the children did not seek out these items, preferring the fun, cause-and-effect type toys, or their favourite snacks and drinks.

There is increasing evidence in the literature that the introduction of AAC can have a beneficial effect on spoken language (e.g., Ronski et al., 2010; Walters et al., 2021), and the results of this study provide further evidence for this finding. At the start of this study, all six children were either not speaking, or had less than 10 words, and all the children were over the age of 3 years and 6 months. By the end of the study, four of the children were using spoken language; one child appeared to be nearing typical expressive language norms for her age based on data collected during the systematic observations and other informal interactions. For three of these children, a significant increase in spoken words was observed at the first observation after only 2 weeks of core board use. The words they attempted to say tended to correspond to the words their parents were targeting on the core board when modelling. This is likely to be because they were hearing these words more frequently,

spoken in isolation, in a clear, slow manner, linked to a motivating activity, and represented by a visual cue (DeThorne et al., 2009).

Two of the children in the study had severe speech difficulties that align with the definition of childhood apraxia of speech (CAS). These two boys shared many similarities in their communication profiles and their eventual outcomes. Both children presented with well-developed receptive language skills at the start of the study based on parental report and my own observations. They were both sociable, with friends at day care, and reported to be highly motivated to communicate. They both already used a range of non-verbal strategies to get their messages across. These boys appeared to see the core board as an immediate positive and were reported to “love” the core board by the end of the first 9 weeks. Their parents reported that they took responsibility for keeping it in proximity, and that both were happy to take it to day care and use it with other people. These children both developed some spoken language early in the intervention, starting with high frequency core words. These words were often produced inaccurately, and their productions were inconsistent.

As time went on, both boys developed more spoken language, and began to use the core board to repair their communication rather than initiate it. This led to them favouring fringe over core words by the end of the study, as they could say most high frequency core words quite accurately by this time. These children differed from the other children in the study because they rarely appeared to be irritated by the presence of the core board, or the encouragement to use it, and instead appeared to always see it as a positive tool. They also used it for a wide range of communicative functions, as well as creating novel multi-symbol phrases. These observations align with the findings in previous case studies of children with CAS (e.g., Bornman et al., 2001; Lüke, 2016). The findings also strengthen the evidence for the benefits of introducing AAC with pre-school children presenting with CAS (Hayes et al., 2022; Murray et al., 2014; Oommen & McCarthy, 2015).

Maintenance and Generalisation

This study collected data through systematic observations for an extended period of a year, which is longer than most other recent studies that examined AAC implementation in the scientific literature (e.g., Kent-Walsh et al., 2015; Shire & Jones, 2015). During this time, the parents received maintenance coaching sessions once every two months. All the parents maintained the ability to use the supportive AAC strategies for as long as they were needed, which was either the full year, or until their child no longer needed to use a core board to communicate with them. The use of maintenance coaching clearly played a role in these positive outcomes. Other researchers have found that parents and other communication partners can struggle to maintain the use of strategies over time without some form of ongoing support (e.g., Ganz et al., 2013; Moore et al., 2014). Although the quantitative data mainly shows the parents maintaining the strategies during the maintenance phase, their strategy use had often dropped off before maintenance coaching visits. These visits then served the purpose of rekindling their motivation to continue with supporting the use of the core board and using the strategies. Four of the parents confirmed this observation in their interviews.

The use of bi-monthly coaching appeared to be sufficient for most of the parents in this study. One parent struggled more than the others to maintain the strategies and generalise them to other activities. This family may have benefited from more frequent maintenance coaching sessions. Bi-monthly coaching sessions require minimal professional input in terms of time and represent a realistic approach for stretched early intervention services. It is worth noting that after the study finished, one family stopped using the core board once support was withdrawn, even though there were clear benefits for their son. The other family who was still using the core board continued to do so but were able to pay for ongoing support from a private speech language therapist.

Although the children's data from the observations are more variable over time, often dependent on the child's disposition on the day among other factors, the trend was for increasing communication success throughout the year. For some, this meant increasing use of spoken language alongside decreased use of the core board. For others, it meant increasing use of the core board for communication, as well as developing skills such as new vocabulary, more multi-symbol sequences or a wider range of communicative functions. One child (case 3) who still required AAC to communicate by the end of the year, appeared to have plateaued in his core board use. He was still using it to communicate but had reverted to more single symbols. His mother felt that he was ready for a more complex AAC system with voice output. He also preferred to use some signs when making quick requests throughout the day as these were more convenient than fetching a core board. In the interviews, most parents expressed the idea that the core board had been a useful starter AAC tool, but that their children had grown out of it in some way over the year, either by learning to talk or because they needed something with more vocabulary and voice output.

In terms of generalisation, this study was set up to encourage AAC use across a range of natural routines from the start, rather than just focus on one specific activity. Many AAC studies have focused on instructing communication partners to use the AAC system in just one or two specific routines in one environment (Biggs et al., 2019). The parents in this study were encouraged to use AAC in a range of different home routines, and coaching sessions were flexible to support this, including trips to the supermarket and walks outside. The group workshops included discussion times where parents shared different routines and what had worked for them.

Although there was some generalisation across environments and people, this was an area that could have benefitted from further support. One family never used the core board outside the home. The five other families all took the core board to the day care setting,

where parents reported it was used and supported to varying degrees. Two families felt confident enough to take the core board out on shopping trips or other family outings, but, overall, the core boards were mainly used in the home. Part of the reason for this, according to interview data, were the restrictions entailed by the COVID-19 pandemic. Some parents found their children's behaviour difficult to manage in public, and simply did not take them out very much apart from to day care facilities. One parent reported that her child was too distracted when out to use a core board. Three parents expressed concern about societal attitudes to using AAC with their child.

Interestingly, the parents did not tend to pass on the skills and strategies that they had learned to other people. Three of the fathers eventually learned to support the core board to some degree, and three did not at all. Other than that, the participating parents did not share their learning with other family members, apart from one parent sharing with her sister. The support from day care staff was variable, and generally relied on guidance from Ministry of Education staff rather than the parents. In short, the parents in this study learned to use and articulate the strategies to a high skill level, but they did not pass on this knowledge to other key people in the child's life. The study was set up to involve only one parent from each family to reduce confounding variables and increase the ease of data collection. This is one area where best practice was not observed, because involving a whole team around a child, or at least all the significant family members, is likely to lead to better outcomes for the child (Snodgrass & Meadan, 2018).

Naturalistic, Family-Centred Intervention

This research achieved the aim of empowering parents to support their children to use a core board to communicate in naturalistic home routines. The use of collaborative coaching in the home gave the parents opportunities to share their skills and knowledge and take a collaborative role in planning the next steps for their child. All the parents reported high

levels of satisfaction with this process, and the exceptional retention of families over the year in the study is a strong indicator that the parents felt that the process was respectful and useful. Many researchers have proposed that communication interventions need to take place during naturalistic routines that are familiar to the child, because this is where most language learning occurs, particularly in the pre-school years (Gevarter & Zamora, 2018; Smith et al., 2016; Woods, 2008). Additionally, interventions that are family-centred, i.e., respectful, supportive, flexible, collaborative, strengths-based and informative (Starble et al., 2005) are likely to have more successful outcomes that last over time.

The EP-AAC intervention used in this study placed a high importance on joint action planning, and providing the parents with autonomy over which strategies to practise, and which routines to practise them in. The coaching provided was entirely flexible and aimed to meet the individual needs of the families. This sometimes involved meeting outside the home (e.g., in the local supermarket), and frequently involved visits out of normal working hours, such as evenings and weekends. It also involved flexibility in adapting to the needs of the child, and other siblings if they were present. All the parents reported that they appreciated this level of flexibility and personalisation. Parents' choices over practice activities were always respected, even if they presented challenges for communication opportunities, because every family functions differently, and it was seen as important to embed the learning into the routines that mattered for that family. This proved to be very successful and appreciated by the families. It is likely that this respect of parental choice increased the positive maintenance outcomes observed in this study.

Parent Coaching

This study had a strong coaching component, which underpinned the success of the implementation of AAC shown in the data. The evidence supporting the use of coaching for parents who have children with complex communication needs is increasingly strong in the

literature, showing positive outcomes for both parents' use of supportive strategies and the impact on children's communication skills (Biggs et al., 2019; Kent-Walsh et al., 2015; Roberts & Kaiser, 2011). However, in practice, clinicians often feel poorly equipped to deliver coaching in the home, and programmes that are specifically described as containing coaching have been found to be variable in content and often lacking in key elements of coaching, such as practice with feedback (Pellecchia et al., 2022; Sone et al., 2023). The EP-AAC coaching protocol was unique in design and allowed for a highly flexible approach to coaching. The results showed sustained use of the strategies by the parents, and successful communication outcomes for the children. All six parents rated the coaching as the most useful aspect of the intervention in their survey and interview data.

Relationship building is an important aspect of collaborative coaching (Woods, 2008), and the five parents in this study who participated in interviews at the end of the year, all valued the relationship that was built with them and their children. The length of the study allowed for meaningful and trusting relationships to develop and grow. These positive relationships could also have been attributed to my extensive experience of working with families, as well as my obvious passion and dedication for the project. It is likely that the strong relationships that were built contributed to the surprisingly good retention of participants in the study. The parents also spoke about the importance of having flexibility offered in terms of time, place, and activities, and the collaborative approach to problem solving and action planning during their interviews. They appreciated the personalisation of the strategies to their individual situations and children.

Coaching does present challenges in early intervention (Pellecchia et al., 2020). In this study, coaching visits often had to take place during evenings and weekends, to accommodate the parents' work commitments. Parents were initially sometimes reluctant to be recorded and could be avoidant about practising an activity with their child while being

observed. This improved after reviewing the purpose of coaching in a group workshop, and then with time and relationship building. The use of guided practice with feedback was helpful in some instances where parents may have lacked confidence. The presence of the children after the coaching activity and during the coaching conversation often caused disruption and made the conversation challenging to focus on. Talking to the parents as a group during the third workshop about ways to manage this issue improved matters to a certain extent, and parents put more consideration into having another adult available for support, or ensuring their child was occupied after the practice activity finished. Some parents pre-recorded the activity before the coaching session, which was very helpful.

Activities in coaching sessions did not always go to plan. Sometimes the child was not interested and refused to engage. All the parents needed additional help to set up motivating play activities at times. Reflective conversations were not easy for some parents, and they were unable to answer the questions; this often improved over time. Reflective conversation remained a challenge for one parent who may have had some underlying receptive language difficulties. The EP-AAC coaching protocol has a flexible structure that allows for modifications of the coaching conversation based on the parents' confidence, awareness, and capacity, and this was useful for adapting to different reactions from parents during coaching sessions.

Parent Instruction and the Overall Design of the Intervention

Like many other interventions involving AAC implementation, this study used a mixed training and coaching intervention, involving group workshops followed by personalised training in the home (Kent-Walsh et al., 2015). Although the overall aims of the intervention were achieved, and the parents all learned to use the supportive AAC strategies, there were some interesting challenges during the time of the intervention and maintenance

phase that will be addressed in this section. Ways to improve or change the method of delivery of the intervention will be considered here.

The Four Group Workshops

The parents managed to take time out of work to attend the four workshops that were held during weekdays. For most, this involved arranging time off work or reorganising shifts. This could be challenging according to the survey responses. Having the workshops away from the home meant that there were no distractions, and the parents were able to focus on the learning, something which was much harder to achieve during coaching sessions in the home. Although the workshops were designed to be interactive and utilise a variety of activities, it was observed that some parents struggled to stay focused during information sharing sections. The parents unanimously appreciated the opportunity to meet other parents of children with complex communication needs. None of the parents stayed in touch after the workshops finished, however.

Committing to four group sessions in the daytime is difficult for most working parents and might not be realistic outside of a research study. Alternatives could be evening sessions, or one full day instead of four separate sessions. Evening sessions can present difficulties with childcare and tend to be a time when people are tired. One full day would use time efficiently but may run the risk of overloading the parents with information. Another option could be to provide the information about the strategies online before the coaching starts or provide it in the home in smaller chunks as part of the individual coaching sessions. Incorporating the instruction and information sharing into the coaching sessions has been achieved with success by many researchers (e.g., Starble et al., 2005; Stiebel, 1999; Stoner et al., 2013). These options would remove the opportunity to meet other parents in a similar situation and share ideas in real life, and for some parents, it would have been difficult to get their undivided attention in the home environment.

Involvement of Other Family Members

The parents in this study achieved a high skill level with the supportive strategies but did not feel confident to share this new knowledge with others and remained the key person to support the core board with their children throughout. Focusing on one family member meant that there was often another person available to provide childcare during coaching sessions, but it did place a lot of pressure on the parent who participated in the study. Without the constraints entailed by data collection and the quest for validity, a more desirable option might be to open the workshops to any family members who wish to attend. The coaching could also be more inclusive of other key family members who attend the workshops.

Involvement of Day Care Staff

Due to the constraints of the study, no contact was made with the children's day care facilities, and the role of passing on information about the intervention was left to the parents and the Ministry of Education. Interview data revealed that most parents did not feel comfortable with making any demands on the day care staff with reference to using the core board, and information about the supportive strategies was not shared. This intervention could have achieved a higher level of success if some of the information was shared with day care facilities, perhaps in the form of a workshop, followed by some modelling or guided practice. Snodgrass and Meadan (2018) employed a full team approach when implementing an AAC system with a student, and provided training and coaching to his parent, teacher, and teaching assistant, with successful outcomes for all involved.

AAC Strategies

The EP-AAC intervention involved the sharing of four, evidence-based, supportive AAC strategies. Woods' (2008) article on coaching parents suggests introducing only one new concept at a time, teaching it in a systematic way, and then providing time for practice and feedback before introducing the next concept. Supportive AAC strategies are nuanced

and complex, and the EP-AAC intervention was set up to introduce them in the manner recommended by Woods. The strategies were introduced in what was considered to be a logical order, starting with aided language modelling (ALM), which can be practised on its own, without any expectation for the child to start using the AAC system themselves. This was followed by ‘creating opportunities for communication’, which is not specific to AAC implementation, but forms the foundation of most language interventions. The more complex strategies of prompting and responding were left until later in the intervention.

During the study, however, all the parents started using strategies from all four strategy groups to some degree straight after the first workshop. At the first systematic observation after the intervention had started, all the parents used withholding strategies, as well as prompting. For most of the parents, these strategies were often executed in a way that placed too much pressure on their child to communicate using the core board. This sometimes caused the child to withdraw or become frustrated. For example, some parents used multiple prompts while ignoring their child’s very clear non-verbal cues and gestures. The parents also frequently overused strategies that collectively can be termed as ‘sabotage’ such as repeatedly letting their children struggle to open multiple containers or withholding food and drink. For some children, this behaviour change in their parent appeared to be bewildering, and it did not endear the core board to them.

The reasons why the parents used the strategies before they were taught are not fully clear, but could be explained by the following:

- They had viewed videos in the first group workshop that showed other communication partners using these strategies.
- I had demonstrated these strategies unintentionally when interacting with their children.

- The observation boxes contained items that naturally encouraged sabotage-type strategies, such as containers that were difficult to open, and toys that were difficult to operate.
- The parents were highly motivated for their children to start using the core board so used prompts before being instructed about them.
- The parents were invested in helping me to get good outcomes during the systematic observations, so used higher levels of prompting and sabotage at these times in misguided attempts to get their children to use the core board.
- The parents were all responsive to their children's communication attempts before the intervention, so naturally they responded contingently to any communication using the core board.

As well as having some negative effects on their children's enjoyment of communication, the parents' use of strategies ahead of time presented problems in the coaching sessions. The parents had not learned about these strategies in a systematic way and did not yet have the language to talk about them yet. Their action plans were focused on practising the strategy group that they had just received instruction on, and the coaching protocol was clear that I should focus on the strategy that the parents had planned for. This was challenging when the parents were overusing prompting and sabotage in a way that was causing their children frustration. In the event, I sometimes had to point out prompting or sabotage that was overused, and this became part of the coaching conversation alongside the strategy they were focused on.

Additionally, coaching was challenging until the point where the parents had received instruction on all four strategy groups. It is difficult to use these strategies discretely when supporting a child to use AAC. They naturally work in harmony, and a skilled communication partner weaves the strategies together in each interaction turn. When the

parents were unaware of a particular strategy group, it often had a knock-on effect to other strategies that they were aware of, but they did not yet have the language or understanding to recognise this or describe it. This made the reflective conversations difficult, because the parents did not have the knowledge to fully understand why something was not working as it should. From the coach perspective, coaching became much easier after the fourth workshop, when the parents had full knowledge and understanding of all four strategy groups. I was then able to ask more directed questions that reminded them to refer to their knowledge of different strategies. At this point, coaching became more collaborative and less directive, as I was able to let them lead more during the coaching conversation.

Once the parents had learned about these strategies in more detail, their use of them did not necessarily increase, but coach logs showed that their skill in applying them gradually improved. This is a phenomenon that is not obvious in the quantitative data relating to the parents, which only represents the frequency of use of these strategies. However, it did usually influence their children's willingness to use the core board to communicate, and all the children increased the amount that they communicated over the year. It also helped to reduce their children's frustration once the parents began to use these strategies with more skill and nuance.

There is no perfect solution to this conundrum. If all the AAC strategies were introduced at one time, perhaps in a full day of training, it could overload the parents. It would also not offer the potential for practice of each strategy in isolation, which does have benefits. Another possible option would be to present the information about strategies via an online learning platform that the parents could access at their convenience before coaching begins. This would provide the opportunity to return to the specific strategy instruction repeatedly once coaching has commenced. It would not have the benefits of meeting other

parents in person or the group discussions, which all the parents stated they valued during this study.

The skills needed to engage a child in play were not included in the four strategy groups shared during the EP-AAC intervention. Some aspects of play were considered as part of the ‘creating opportunities for communication’ strategy group, particularly repetitive, fun, people games. All the parents needed some support at one time or another during the intervention and maintenance phase to set up and engage their child in fun play activities. For some parents, this support was needed throughout the intervention. The ability to follow their child’s lead, play with them and add in ideas in an imaginative and fun way are often seen as important components of other language interventions, such as Hanen parent programmes (Konza et al., 2010). Play is an important activity for communication development (Westby, 2017) and is a low pressure activity that is often used when implementing AAC with young children (Biggs et al., 2018). The parents in this study needed help selecting appropriate toys to engage their children, knowing how to operate the toys in a way that maintained engagement, knowing how to balance following the child’s lead with making themselves part of the game, knowing how to introduce new ideas in a playful manner, knowing what language to use and model, and many other similar skills. It is fair to say that I had not fully considered the importance of sharing these skills whilst designing the intervention, and it is an area that I would consider including in a more systematic way in the future. As it was, play skills were often shared and discussed during the coaching sessions.

The Use of Withholding and Prompting Strategies.

The two strategies that required the most shaping and practice in this study were withholding and prompting. Most parents required extended support to use these strategies effectively, and they were the strategies that were most likely to cause frustration for the children. The withholding strategies were taught as part of the second strategy group –

‘creating opportunities for communication’ and included having preferred items in sight but unobtainable without assistance, motivating toys that need an adult to help operate, and giving preferred items bit by bit. When these strategies were shared in the group workshop, the parents were warned to use them carefully and respectfully. In both coaching observations and in the systematic observations, the parents were often observed to overuse these strategies. For example, some parents put unopened snack packets in containers, and then required the children to ask for help twice, once for the container, then the packet. They sometimes followed this up with only giving the child a small amount from the packet, so they had to ask for more. Some children coped with this level of sabotage, but others became frustrated or upset. Coaching was effective for tackling the overuse of these strategies, but some children in the study were extremely sensitive to any use of these strategies and would stop engaging at all. For the future, I would extend the warnings given when these strategies are first introduced and explain that for some children, they are not recommended at all. Care is needed when placing any pressure on children to communicate; it must be respectful and show awareness of their unique neurological diversity (Roberts, 2020).

Parents in this study also tended to overuse prompting at times. This manifested in different ways. Sometimes children were prompted to use the core board when they had already used very clear non-verbal communication or even spoken words. Sometimes prompts were repeated too many times and the child lost interest in the activity or object. Parents sometimes used higher level prompts, such as a physical or model prompt, when just waiting may have been more effective. Again, this took lots of problem solving and feedback during coaching sessions to refine. Some children responded negatively to obvious prompting and became less likely to use the core board. Their parents had to learn to use prompting with nuance and skill, and only when their child was fully engaged in the activity. Prompting has been shown to be an effective AAC strategy (Biggs et al., 2018; Ronski et al., 2010), but it

does require the communication partner to be in tune with the child and needs to be balanced carefully with rewarding play opportunities and other natural interactions. Recently, AAC experts have cautioned against the use of prompting if it is used to increase compliance (Richards, 2022), highlighting that is important that prompting is used in a way that recognises a child's autonomy.

The Systematic Observations

After 3 months of the intervention, I wrote a reflective journal entry about the systematic observations, because I was surprised at how smoothly they were going. I had expected there to be many difficulties in obtaining the eight 10-minute video recordings for each case over the year, but as the study progressed, it was evident that both parents and children appeared to enjoy these observations, and there was never a time where I had to abandon the observation due to distress or other factors. Furthermore, these observations usually seemed to progress more smoothly than the observations during coaching sessions. The children were often more engaged, and the parents seemed more confident. Over time, I felt that these observations may be influencing the outcomes of the intervention and contributing to its success. In my journal I wrote:

The data collection has gone much better than I thought it would. The parents are always prepared and ready for it, and do not seem to dislike or resent it. If anything, most of them seem to enjoy it, and go to some lengths to ensure that it is successful, for example, picking the right time of day, withholding food beforehand, ensuring that siblings are with another person, turning off the TV or other distractions, planning what they want to be available. The children unanimously LOVE the observation boxes and associate them with fun, rewards, and things that they like. The children are usually calm and co-operative during the observation, even the ones who are tricky to manage in coaching sessions. This is probably because it is quiet and calm with no

distractions, and there are novel, motivating items, and they have the full attention of their mum, who is using a range of communication strategies. Now, by the observation at 3 months, parents are starting to comment ‘oh that went quick’ when I say 10 minutes is over.

In effect, the systematic observations, which were always conducted at a separate visit to the coaching sessions, were acting as another support for the parents. They often concluded with some discussion about how things had gone, and this had similarities to an informal coaching conversation. As time progressed, I started to share some of the visual data with parents in coaching sessions, and this proved to be a powerful motivator to work more on specific strategies. Overall, the systematic observations may have had a positive effect on the outcomes of the intervention for the following reasons:

- The toys / snacks and the way the boxes were organised gave the parents ideas on items that promote communication.
- They sometimes included unplanned coaching conversations as the parents often asked questions or reflected as I was packing up.
- It made the parents more accountable and more likely to practice, plan and think about the strategies.
- Because of the planning involved, it provided a successful interaction which was then reinforcing for the parents and gave them more ideas.
- The information from the data analysis informed my coaching sessions and helped me plan what to focus on.
- The graphs / visual representations from the data analysis played an important part in some coaching sessions.

Facilitators and Barriers to Implementing a Core Board

This study involved the implementation of a low tech AAC system (a core board) with pre-school children who had no prior AAC intervention. The core board is a relatively complex AAC system in terms of vocabulary, but without the familiar appeal of an iPad or tablet. The families recruited to this study were in the early stages of recognising their children's communication difficulties; the children were still young and some of them did not have any diagnoses to explain their language delays. There were many factors that made it likely that the implementation process would be challenging or might fail completely. However, all the parents continued to support the AAC system for as long as their children needed it, and every child used the core board to communicate successfully at some point. This was explored through the surveys and interviews, and the data provided gives insight into why this intervention and AAC system were successful.

In their systematic review looking at the facilitators and barriers to low-tech and unaided AAC implementation, Moorcroft et al. (2019b) identified a variety of environmental and personal factors. These included the support and attitudes of professionals, support or lack of support from family members, societal attitudes, the attitudes of the parents, and the children's cognition and physical abilities. In addition to this study, Moorcroft et al. (2019a) interviewed 16 speech language therapists to gain their perspectives on the same issues. They identified six themes that speech language therapists considered important to the success or failure of AAC implementation. These were: parental attitudes to the child, parental attitudes to AAC, support networks around the parents, the capacity of and the demands on the parents, services provided by professionals, and specific features of AAC systems.

This study involved six parents who, from the outset, were concerned about their children's communication and motivated to help them. They had committed to a year-long study and were aware of the level of input required and were prepared to provide this. Five of

the six parents had a positive attitude to trying AAC as a communication strategy for their child and did not have concerns about the appearance or function of the core board. The parents had variable amounts of support from family and education services, but all of them were the key person in the implementation of the core board. The parents in this study were mostly educated to degree level, and all had many demands on their time. The families in this study did not have substantial input from speech language therapists in government-funded services, but their involvement in this study gave them access to a skilled and experienced speech language therapist who was motivated to support the success of the AAC system. They had access to comprehensive training and ongoing coaching. The AAC system was found to be adequate as a starter system by five of the six parents. One unique feature about this study was the comprehensive initial training and the ongoing, personalised coaching. This represented a higher level of support than is often available for parents when implementing AAC (Baxter et al., 2012) and represents the essential factor that led to the successful outcomes that were measured.

Summary

This discussion has considered the outcomes of the study in relation to the research questions. In addition to this, it has examined a range of interesting issues that became apparent during the intervention, data collection, and subsequent data analysis. This has included features of the EP-AAC intervention, the AAC supportive strategies and the reasons behind the positive outcomes in terms of parent retention and child communication.

8. Conclusion

The present study has painted a detailed picture of the journey that six families travelled when they implemented a commonly used, low-tech, AAC system - a core board with fringe vocabulary - with their young children. The study has provided evidence of the positive effects of training and coaching for parents and the use of a core board to help children communicate. The detailed quantitative and qualitative data collected during this study provided an in-depth insight into the factors that can facilitate success when implementing AAC with a young child and their family. The results of this study reinforce the importance of parents and caregivers in the implementation of AAC for young children.

The intervention that was designed as part of this study, the EP-AAC, provides a protocol that can be replicated with other parents and caregivers. The EP-AAC is a supportive, collaborative, and comprehensive training and coaching intervention that empowers parents to develop the skills they need to support their child, and, importantly, continues to provide them with on-going but infrequent coaching support after they have learned and mastered the skills. The development of the EP-AAC intervention was a response to the knowledge that AAC implementation is a complex process; parents are a key component of that process; and the essential ingredient for success is an ongoing, collaborative coaching relationship. In this conclusion, the findings of the present study will be considered in relation to implications for practitioners working in the field of AAC, as well as for service managers and policy makers. The rigour of the present study will be described, followed by the limitations. Future directions leading from this research will be outlined. The chapter will be concluded with a final summary.

Implications for Practitioners, Service Managers and Policy-Makers

The results from this study should be of interest to professionals who are working with children with complex communication needs and implementing AAC systems with early communicators. As well as underlining the need to involve and support parents and caregivers, this study has provided evidence for an AAC system that is now widely used both in Aotearoa New Zealand and overseas but has limited research evidence to support its use. Six children learned to use a core board to communicate during the year of the study. Their progress varied, but they all made significant gains with their communication. The outcomes of the present study reinforced current evidence that implementing AAC with pre-school children with complex communication needs can have a beneficial effect on the development of spoken language for some children. The use of a mixed methods case study design also allowed for data to be collected on the many factors involved in successful AAC implementation. The children in this study were able to use the core board to express a range of communicative functions. They generalised their use of the core board across a range of activities and some environments. For those children who continued to need AAC, they maintained their use of the core board for the full year of the study.

One current debate in the AAC literature is the use of core vocabulary in AAC systems for early communicators. The children in this study learned and used several core words as well as fringe words. Core words were represented at a higher level than fringe words in the data collected from the children. Personalisation of the fringe vocabulary was also important for increasing the children's enthusiasm for the AAC system. Five of the six children learned to sequence core and fringe words to express phrases and sentences. Five of the six children learned to locate the symbols in the grid system without apparent difficulty. As a result of the present study, practitioners can feel more confident in their use of core boards with fringe as beginning AAC systems with young children with complex

communication needs, provided they are introduced with comprehensive and ongoing support for key communication partners. This support is essential for success.

Children who have not developed spoken language by 3 years of age are generally viewed as requiring additional help from early intervention services, including speech language therapists. It is increasingly common to consider implementing some form of AAC with this population, and core boards are one of the options available in Aotearoa New Zealand. The present study reinforces the potential benefits of this option, but also highlights the need for comprehensive training and support of communication partners, with coaching over time shown to be an essential component for success. With consideration of these findings, the following recommendations are suggested for policy makers, service managers and practitioners:

- Support practitioners to use family-centred practice and develop strong relationships with parents and caregivers when implementing AAC with pre-school children.
- Enable practitioners to provide comprehensive training and coaching for parents to learn evidence based AAC strategies when an AAC system is introduced.
- Ensure that practitioners have training and support to deliver coaching with knowledge and confidence in their abilities.
- Consider ways of providing a service for parents that is flexible and personalised to their individual needs as a family.
- Adapt services to provide infrequent ongoing coaching over time to maintain positive benefits of AAC.

- Recognise that core boards with fringe vocabulary can be a useful and cost-effective beginning AAC system for children with complex communication needs if quality support is provided to key communication partners.

Study Rigour

The design used for the present study allowed for a naturalistic intervention with high social and ecological validity. In conducting this study, I aimed to follow the framework provided by Guba and Lincoln (1985) to ensure rigor and trustworthiness. The chosen mixed methods multiple case study design was not simply selected due to the limitations of a single doctoral researcher, but deliberately chosen as the most suitable approach for capturing the complex nature of the research context. I strived to meet the highest levels of rigor throughout the study, ensuring that my research questions formed the foundation of data collection and analysis.

To establish credibility, I employed various strategies. Prolonged engagement with the participants for over a year allowed me to develop strong and positive relationships, fostering openness and trust during interactions. As a researcher who is also a practitioner, with a background of working with children and AAC, including core boards, I was aware that I would have underlying assumptions and beliefs about the AAC system and the intervention, so I sought to challenge myself on these throughout the research. To mitigate potential biases, I engaged in reflective journaling and sought frequent supervision to maintain a high level of reflexivity. These practices, coupled with my commitment to integrity and producing honest research, strengthened the credibility of the study.

The mixed methods design, rooted in pragmatism, aimed to be sensitive to the context of AAC use in Aotearoa New Zealand and the participants' needs. Through detailed descriptions of the research setting, participants, and data collection procedures, I have

provided readers with the necessary information to assess the potential transferability of the findings to their own contexts. The inclusion of diverse case studies with participants from different backgrounds and diagnoses increases the potential for transferability to children with similar communication needs.

To ensure dependability, I meticulously documented the intervention and data collection processes, allowing for potential replication of the study. Transparent and detailed explanations of the data analysis methods, and the inclusion of interobserver agreement testing, enhanced the dependability of the results. The participants' approval of their individual case studies further reinforced the dependability of the research findings.

Confirmability was prioritised by grounding all results in the data. Multiple data sources, including both quantitative and qualitative data, were triangulated to strengthen the findings. By using participants' quotes throughout the case studies, I ensured an authentic voice and perspective. Engaging participants in the review and approval of their case studies further enhanced the confirmability of the research findings.

I strived to maintain rigor throughout this study. The strategies employed for credibility, transferability, dependability, and confirmability, such as prolonged engagement, reflexivity, transparent documentation, and participant involvement, contributed to the overall strength and trustworthiness of the research outcomes.

Limitations

There are several limitations to consider in this study. First, the case study design, while appropriate for the research, resulted in a relatively small number of participants, limited to only six families. This sample size may restrict the generalisability of the findings to a broader population.

Furthermore, certain aspects of the intervention were structured in a way that prioritised ease of data collection and analysis rather than representing best practices in AAC. For instance, only one parent from each family participated in the training and coaching, which is not ideal as knowledge transfer to other important communication partners in the children's lives was compromised. Additionally, the study primarily focused on supporting the immediate family and did not fully consider other environments and contexts in which the child interacts, such as daycare facilities. Staff at these facilities, who serve as key communication partners, were not directly involved in the intervention, which may have impacted the implementation and overall success of the intervention.

It is important to acknowledge that the AAC system used in this study was a standard 77-cell core board with attached fringe vocabulary. While parents had the opportunity to personalise the fringe vocabulary, the same AAC system was employed across the diverse backgrounds and needs of the six participating families. This approach did not account for the individual needs, cultural identities, and diverse languages represented within the participant group.

Another limitation arises from my dual role as both the researcher and the interventionist. Over the course of the year-long study, I developed strong relationships with the parents, having extensive experience as a practitioner in supporting families with disabilities. My personal investment and level of flexibility in delivering the intervention may have positively influenced the outcomes. Additionally, my expertise and commitment, combined with the unique circumstances of being solely focused on the study without other responsibilities at some points, may have contributed to the overall success of the intervention. Although a research assistant was used for the interview at the end of the study, this may not have fully mitigated the effects of the strong relationship I had built with the parents, which may have led them to report more positively on the intervention.

Furthermore, the methods of data collection, particularly the systematic observations, may have introduced additional benefits for the families beyond the training and coaching provided by the EP-AAC intervention. This could have influenced the parents' performance during the observations, potentially deviating from their typical day-to-day interactions.

It is important to interpret the study findings considering these limitations, and future research should address them to provide a more comprehensive understanding of AAC interventions for children with complex communication needs.

Future Directions

To further validate the effectiveness of the EP-AAC intervention, future research could involve multiple practitioners or researchers conducting the intervention with different groups of children with complex communication needs. This will help determine if the positive outcomes observed in this study are replicable across various contexts and individuals.

While the EP-AAC intervention showed promise, it would be valuable to investigate incorporating some changes into the way it is conducted. This could include developing an online version of the group workshops, so that parents and other communication partners have access to the information at a pace that suits their individual learning needs. Consideration could also be given to including play skills as a fifth strategy group. Another option for trial could be the provision of the training component as a one-off full day course before coaching commences. The EP-AAC intervention could also be trialled with families who are implementing different AAC systems. Using other systems that incorporate both core and fringe vocabulary, including high-tech AAC devices, could provide insights into the intervention's versatility and adaptability across a broader range of communication technologies.

To gain a more comprehensive understanding of the EP-AAC intervention's impact, future studies should consider involving a larger team around the child. This could include additional family members, education professionals, and other relevant communication partners. Expanding the participant pool will enable researchers to assess the intervention's effects within a more holistic context and consider the perspectives and contributions of various individuals involved in the child's communication journey.

Final Summary

Six parents received training and support to learn a set of complex skills and strategies to support their child. Six pre-school children with complex communication needs learned to use a core board to communicate a range of ideas. The outcomes of this study far exceeded initial expectations. The retention of families was high, with all six families remaining in the study for 8 months, and five continuing for the full year, indicating that the parents were extremely satisfied with the support they were receiving and the progress they could see in their children. The parents grew in confidence, taking a leading role in coaching sessions as time went on, and maintaining their strategy use and skills throughout the year. The children all made significant progress with communication. By the end of the year, four children were using more spoken language, and two children were competently using the core board to express a range of ideas. When I reflect on this, I am proud of what this study has achieved. The research aims were upheld, and I feel it has many significant outcomes that will benefit other professionals working with AAC in the field of early intervention and beyond.

Bibliography

- Adamson, L., Ronski, M., Deffebach, K., & Sevcik, R. (1992). Symbol vocabulary and the focus of conversations: Augmenting language development for youth with mental retardation. *Journal of Speech, Language & Hearing Research, 35*(6), 1333-1343.
<https://doi.org/10.1044/jshr.3506.1333>
- Allen, A., Schlosser, R., Brock, K., & Shane, H. (2017). The effectiveness of aided augmented input techniques for persons with developmental disabilities: A systematic review. *AAC: Augmentative & Alternative Communication, 33*, 149-159.
<https://doi.org/10.1080/07434618.2017.1338752>
- American Speech-Language-Hearing Association. (2005). *Evidence-based practice in communication disorders [position statement]*. www.asha.org/policy
- Amery, R., Wunungmurra, J., Raghavendra, P., Bukulatjpi, G., Baker, R., Gumbula, F., Barker, R., Theodoros, D., Amery, H., Massey, L., & Lowell, A. (2022). Augmentative and alternative communication for Aboriginal Australians: Developing core vocabulary for Yolŋu speakers. *AAC: Augmentative and Alternative Communication, 38*(4), 209-220.
<https://doi.org/https://doi.org/10.1080/07434618.2022.2128410>
- Andrews, T. (2016). Questioning the use of core boards. *Altogether Autism*(1), 13.
https://issuu.com/parenttoparentnz/docs/aa_journal_summer_2016_3
- AssistiveWear. (n.d.). *Choosing a grid size*. <https://www.assistiveware.com/learn-aac/choosing-a-grid-size>
- Balandin, S., & Iacono, T. (1998). A few well-chosen words [Article]. *AAC: Augmentative and Alternative Communication, 14*(3), 147-161.
<https://doi.org/10.1080/07434619812331278326>

Banajee, M., Dicarlo, C., & Stricklin, S. (2003). Core vocabulary determination for toddlers.

AAC: Augmentative & Alternative Communication, 19(2), 67-73.

<https://doi.org/10.1080/0743461031000112034>

Barker, R., Akaba, S., Brady, N., & Thiemann-Bourque, K. (2013). Support for AAC use in preschool, and growth in language skills, for young children with developmental disabilities. *Augmentative And Alternative Communication* 29(4), 334-346.

<https://doi.org/10.3109/07434618.2013.848933>

Barrett, L. (2021). Effectiveness of community-based social media groups for caregivers of school-aged augmentative and alternative communication users. *Pediatric Nursing*, 47(4), 181-187.

<https://ezproxy.massey.ac.nz/login?url=https://search.ebscohost.com/login.aspx?direct=true&AuthType=sso&db=ccm&AN=151839334&site=eds-live&scope=site&authtype=sso&custid=s3027306>

Barton, E., & Lissman, D. (2015). Group parent training combined with follow-up coaching for parents of children with developmental delays. *Infants & Young Children*, 28(3), 220-236. <https://doi.org/10.1097/IYC.0000000000000036>

Baxter, S., Enderby, P., Evans, P., & Judge, S. (2012). Barriers and facilitators to the use of high-technology augmentative and alternative communication devices: A systematic review and qualitative synthesis. *International Journal of Language & Communication Disorders*, 47(2), 115-129. <https://doi.org/10.1111/j.1460-6984.2011.00090.x>

Bazeley, P. (2013). *Qualitative data analysis: Practical strategies*. Sage Publications.

Bean, A., Cargill, L., & Lyle, S. (2019). Framework for selecting vocabulary for preliterate children who use augmentative and alternative communication. *American Journal of*

Speech-Language Pathology, 28(3), 1000-1009.

https://doi.org/10.1044/2019_AJSLP-18-0041

Bean, A., Williams, W., Paden Cargill, L., Lyle, S., Sonntag, A. (2022). Systematic physical assistance during intervention for people who use high-tech augmentative and alternative communication systems: The importance of using a common vocabulary. *Journal of Speech, Language & Hearing Research*, 65(4), 1592-1596.

https://doi.org/10.1044/2021_JSLHR-21-00421

Beck, A., Stoner, J., & Dennis, M. (2009). An investigation of aided language stimulation: does it increase AAC use with adults with developmental disabilities and complex communication needs? . *AAC: Augmentative & Alternative Communication*, 25(1), 42-54. <https://doi.org/10.1080/07434610802131059>

Bedwani, M., Bruck, S., & Costley, D. (2015). Augmentative and alternative communication for children with autism spectrum disorder: An evidence-based evaluation of the language acquisition through motor planning (LAMP) programme. *Cogent Education*, 2(1), 1-25. <https://doi.org/10.1080/2331186X.2015.1045807>

Bell, J., & Thomas, P. (2017). *How to make a wearable core board*.

<https://talklink.org.nz/resources/how-to-make-a-wearable-core-board>

Beukelman, D., Jones, R., & Rowan, M. (1989). Frequency of word usage by nondisabled peers in integrated preschool classrooms. *AAC: Augmentative and Alternative Communication*, 5(4), 243-248. <https://doi.org/10.1080/07434618912331275296>

Biggs, E., Carter, E., & Gilson, C. (2018). Systematic review of interventions involving aided AAC modeling for children with complex communication needs. *American Journal on Intellectual and Developmental Disabilities*, 123(5), 443-473.

<https://doi.org/10.1352/1944-7558-123.5.443>

- Biggs, E., Carter, E., & Gilson, C. (2019). A scoping review of the involvement of children's communication partners in aided augmentative and alternative communication modeling interventions. *American Journal of Speech-Language Pathology*, 28(2), 743-758. https://doi.org/10.1044/2018_AJSLP-18-0024
- Binger, C., Kent-Walsh, J., Berens, J., Del Campo, S., & Rivera, D. (2008). Teaching Latino parents to support the multi-symbol message productions of their children who require AAC. *AAC: Augmentative & Alternative Communication*, 24(4), 323-338. <https://doi.org/10.1080/07434610802130978>
- Binger, C., Kent-Walsh, J., Ewing, C., & Taylor, S. (2010). Teaching educational assistants to facilitate the multisymbol message productions of young students who require augmentative and alternative communication. *American Journal of Speech-Language Pathology*, 19(2), 108-120. [https://doi.org/10.1044/1058-0360\(2009/09-0015\)](https://doi.org/10.1044/1058-0360(2009/09-0015))
- Binger, C., & Light, J. (2007). The effect of aided AAC modeling on the expression of multi-symbol messages by preschoolers who use AAC. *Augmentative and Alternative Communication*, 23(1), 30-43. <https://doi.org/10.1080/07434610600807470>
- Bingham, M., Spooner, F., & Browder, D. (2007). Training paraeducators to promote the use of augmentative and alternative communication by students with significant disabilities [research-article]. *Education and Training in Developmental Disabilities*, 42(3), 339-352. <http://ezproxy.massey.ac.nz/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edsjsr&AN=edsjsr.23879627&site=eds-live&scope=site>
- Boenisch, J., & Soto, G. (2015). The oral core vocabulary of typically developing English-speaking school-aged children: Implications for AAC practice. *Augmentative and Alternative Communication*, 31(1), 77-84. <https://doi.org/10.3109/07434618.2014.1001521>

- Bondy, A., & Frost, L. (1994). The Picture Exchange Communication System. *Focus on Autistic Behavior*, 9(3), 1-19. <https://doi.org/10.1177/108835769400900301>
- Bornman, J., Alant, E., & Meiring, E. (2001). The use of a digital voice output device to facilitate language development in a child with developmental apraxia of speech: A case study. *Disability and Rehabilitation*, 23(14), 623-634. <https://doi.org/10.1080/09638280110036517>
- Bourque, K., & Goldstein, H. (2020). Expanding communication modalities and functions for preschoolers with autism spectrum disorder: Secondary analysis of a peer partner speech-generating device intervention. *Journal of Speech, Language & Hearing Research*, 63(1), 190-205. https://doi.org/10.1044/2019_JSLHR-19-00202
- Branson, D., & Demchak, M. (2009). The use of augmentative and alternative communication methods with infants and toddlers with disabilities: a research review. *AAC: Augmentative & Alternative Communication*, 25(4), 274-286. <https://doi.org/10.3109/07434610903384529>
- Brian, J., Drmic, I., Roncadin, C., Dowds, E., Shaver, C., Smith, I., Zwaigenbaum, L., Sacrey, L., & Bryson, S. (2022). Effectiveness of a parent-mediated intervention for toddlers with autism spectrum disorder: Evidence from a large community implementation. *Autism: The International Journal of Research and Practice*, 26(7), 1882-1897. <https://doi.org/10.1177/13623613211068934>
- Brian, J., Solish, A., Dowds, E., Roth, I., Bernardi, K., Perry, K., Daoud, S., Jilderda, S., MacWilliam, S., Smith, I., Zwaigenbaum, L., & Bryson, S. (2022). 'Going Mobile'-increasing the reach of parent-mediated intervention for toddlers with ASD via group-based and virtual delivery. *Journal of autism and developmental disorders*, 52(12), 5207-5220. <https://doi.org/10.1007/s10803-022-05554-7>

- Brown, J., & Woods, J. (2015). Effects of a triadic parent implemented home-based communication intervention for toddlers. *Journal of Early Intervention, 37*(1), 44-68. <https://doi.org/10.1177/1053815115589350>
- Brown, J., & Woods, J. (2016). Parent-implemented communication intervention: Sequential analysis of triadic relationships. *Topics in Early Childhood Special Education, 36*(2), 115-124. <https://doi.org/10.1177/0271121416628200>
- Bruno, J., & Dribbon, M. (1998). Outcomes in AAC: Evaluating the effectiveness of a parent training program. *AAC: Augmentative and Alternative Communication, 14*(2), 59-70. <https://doi.org/10.1080/07434619812331278216>
- Bruno, J., & Trembath, D. (2006). Use of aided language stimulation to improve syntactic performance during a weeklong intervention program. *AAC: Augmentative & Alternative Communication, 22*(4), 300-313. <https://doi.org/10.1080/07434610600768318>
- Brydon, S., Gibbs-Harker, G., Clendon, S., & Doell, E. (2021). *EP-AAC Systematic Observation Coding Manual*. Massey University.
- Brydon, S., McLaughlin, T., & Clendon, S. (2021). *EP-AAC Coaching Protocol*. Massey University.
- Cafiero, J. (2001). The effect of an augmentative communication intervention on the communication, behavior, and academic program of an adolescent with autism. *Focus on Autism and Other Developmental Disabilities, 16*(3), 179-189. <https://doi.org/10.1177/108835760101600306>
- Carlson, F. (1981). A format for selecting vocabulary for the nonspeaking child. *Language, Speech, and Hearing Services in Schools, 12*(4), 240-245. <https://doi.org/10.1044/0161-1461.1204.240>

- Castleberry, A., & Nolen, A. (2018). Thematic analysis of qualitative research data: Is it as easy as it sounds? *Currents in Pharmacy Teaching and Learning*, *10*, 807-815.
<https://doi.org/10.1016/j.cptl.2018.03.019>
- Chavers, T., Morris, M., Schlosser, R., & Koula, R. (2021). Effects of a systematic augmentative and alternative communication intervention using a speech-generating device on multistep requesting and generic small talk for children with severe autism spectrum disorder. *American Journal of Speech-Language Pathology*, *30*, 2476-2491.
https://doi.org/10.1044/2021_AJSLP-20-00353
- Clarke, L. (2021). Characteristics of professional development research in Aotearoa New Zealand's early childhood education sector : a systematic literature review. *New Zealand annual review of education*, *27*, 79-115.
<https://ezproxy.massey.ac.nz/login?url=https://search.ebscohost.com/login.aspx?direct=true&AuthType=sso&db=edsinz&AN=edsinz.999170536802837&site=eds-live&scope=site&authtype=sso&custid=s3027306>
- Clarke, M., Soto, G., & Nelson, K. (2017). Language learning, recasts, and interaction involving AAC: Background and potential for intervention. *Augmentative and Alternative Communication*, *33*(1), 42-50.
<https://doi.org/10.1080/07434618.2016.1278130>
- Collin Stone, B. (2019). *Ko tōku reo tōku ohooho: towards culturally located te reo Māori augmentative and alternative communication* [Masters, Canterbury]. New Zealand.
- Conklin, C., Weitzman, E., Pepper, J., McDade, A., & Stein, T. (2018). *Making Hanen Happen: It Takes Two to Talk® —The Hanen Program® for parents. Leader's guide for certified speech-language pathologists. 8th Edition*. Hanen Early Language Program.

- Creswell, J. (2014). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (5th ed.). NY: Pearson.
- Creswell, J., & Plano Clark, V. (2017). *Designing and conducting mixed methods research* (3rd ed.). Sage Publications. <https://us.sagepub.com/en-us/nam/designing-and-conducting-mixed-methods-research/book241842#preview>
- Dada, S., & Alant, E. (2009). The effect of aided language stimulation on vocabulary acquisition in children with little or no functional speech. *American Journal of Speech-Language Pathology*, 18(1), 50-64. [https://doi.org/10.1044/1058-0360\(2008/07-0018\)](https://doi.org/10.1044/1058-0360(2008/07-0018))
- Dada, S., Flores, C., Bastable, K., & Schlosser, R. (2021). The effects of augmentative and alternative communication interventions on the receptive language skills of children with developmental disabilities: A scoping review. *International Journal of Speech-Language Pathology*, 23(3), 247-257. <https://doi.org/10.1080/17549507.2020.1797165>
- Deckers, S., Van Zaalen, Y., Van Balkom, H., & Verhoeven, L. (2017). Core vocabulary of young children with Down syndrome. *Augmentative and Alternative Communication*, 33(2), 77-86. <https://doi.org/10.1080/07434618.2017.1293730>
- DeThorne, L., Johnson, C., Walder, L., & Mahurin-Smith, J. (2009). When "Simon Says" doesn't work: Alternatives to imitation for facilitating early speech development [Article]. *American Journal of Speech-Language Pathology*, 18(2), 133-145. [https://doi.org/10.1044/1058-0360\(2008/07-0090\)](https://doi.org/10.1044/1058-0360(2008/07-0090))
- Dodd, J., & Gorey, M. (2014). AAC intervention as an immersion model. *Communication Disorders Quarterly*, 35(2), 103-107. <https://doi.org/10.1177/1525740113504242>
- Drager, K., Light, J., Speltz, J., Fallon, K., & Jeffries, L. (2003). The Performance of Typically Developing 2 1/2-Year-Olds on Dynamic Display AAC Technologies With

- Different System Layouts and Language Organizations [Article]. *Journal of Speech, Language & Hearing Research*, 46(2), 298. [https://doi.org/10.1044/1092-4388\(2003/024\)](https://doi.org/10.1044/1092-4388(2003/024))
- Drager, K., Postal, V., Carrolus, L., Castellano, M., Gagliano, C., & Glynn, J. (2006). The effect of aided language modeling on symbol comprehension and production in 2 preschoolers with autism. *American Journal of Speech-Language Pathology*, 15(2), 112-125. [https://doi.org/10.1044/1058-0360\(2006/012\)](https://doi.org/10.1044/1058-0360(2006/012))
- Dukhovny, E., & Gahl, S. (2014). Manual motor-plan similarity affects lexical recall on a speech-generating device: Implications for AAC users [Article]. *Journal of Communication Disorders*, 48, 52-60. <https://doi.org/10.1016/j.jcomdis.2014.02.004>
- Dukhovny, E., & Thistle, J. (2017). An exploration of motor learning concepts relevant to use of speech-generating devices [Article]. *Assistive Technology*, 1-7. <https://doi.org/10.1080/10400435.2017.1393845>
- Eustace, M., McGarr, K., & Theys, C. (2023). Māori aspirations following stroke: A pathway forward for the speech-language therapy field [Article]. *Aphasiology*. <https://doi.org/10.1080/02687038.2023.2170695>
- Fallon, K., Achenbach, A., & Light, J. (2003). The semantic organization patterns of young children: Implications for augmentative and alternative communication [Article]. *AAC: Augmentative and Alternative Communication*, 19(2), 74-85. <https://doi.org/10.1080/0743461031000112061>
- Fallon, K., Light, J., & Paige, T. (2001). Enhancing vocabulary selection for preschoolers who require augmentative and alternative communication (AAC). *American Journal of Speech-Language Pathology*, 10(1), 81-94. [https://doi.org/10.1044/1058-0360\(2001/010\)](https://doi.org/10.1044/1058-0360(2001/010))

- Farrell, J. (2015). What is "beginning AAC"? <https://www.janefarrall.com/what-is-beginning-aac/>
- Franco, N., Lima, A., Lima, T., Silva, E., Lima, R., & Fidalgo, R. (2017). *A recall analysis of core word lists over children's utterances for augmentative and alternative communication* []. 2017 IEEE 30th International Symposium on Computer-Based Medical Systems (CBMS), Thessaloniki, Greece.
<http://ezproxy.massey.ac.nz/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edsee&AN=edsee.8104202&site=eds-live&scope=site>
- Frick Semmler, B., Bean, A., & Wagner, L. (2023). Examining core vocabulary with language development for early symbolic communicators. *International Journal of Speech-Language Pathology*, 1-10. <https://doi.org/10.1080/17549507.2022.2162126>
- Fried-Oken, M., & More, L. (1992). An initial vocabulary for nonspeaking preschool children based on developmental and environmental language sources [Article]. *Augmentative and Alternative Communication*, 8(1), 41-56.
<https://doi.org/10.1080/07434619212331276033>
- Friedman, M., & Woods, J. (2012). Caregiver coaching strategies for early intervention providers: moving toward operational definitions. *Infants & Young Children*, 25(1), 62-82. <https://doi.org/10.1097/IYC.0b013e31823d8f12>
- Ganz, J., Earles-Vollrath, T., Heath, A., Parker, R., Rispoli, M., & Duran, J. (2012). A meta-analysis of single case research studies on aided augmentative and alternative communication systems with individuals with autism spectrum disorders. [Article]. *Journal of autism and developmental disorders*(1), 60.
<https://doi.org/10.1007/s10803-011-1212-2>
- Ganz, J., Goodwyn, F., Boles, M., Hong, E., Rispoli, M., Lund, E., & Kite, E. (2013). Impacts of a PECS instructional coaching intervention on practitioners and children

with autism. *Augmentative and Alternative Communication*, 29(3), 210-221.

<https://doi.org/10.3109/07434618.2013.818058>

Gerring, J. (2017). *Case study research: Principles and practices* (2nd ed.) [Bibliographies Non-fiction]. Cambridge University Press.

Gevarter, C., & Zamora, C. (2018). Naturalistic speech-generating device interventions for children with complex communication needs: A systematic review of single-subject studies. *American Journal of Speech-Language Pathology*, 27, 1073-1090.

https://doi.org/10.1044/2018_AJSLP-17-0128

Gisborne District Council. (2022). *Alternative communication at our parks*.

<https://www.gdc.govt.nz/council/news/2022-news/alternative-communication-at-our-parks>

Goldbart, J., & Marshall, J. (2004). 'Pushes and pulls' on the parents of children who use AAC. *AAC: Augmentative & Alternative Communication*, 20(4), 194-208.

<https://doi.org/10.1080/07434610400010960>

Goossens, C. (1989). Aided Communication Intervention Before Assessment: A Case Study of a Child with Cerebral Palsy [Article]. *Augmentative and Alternative Communication*, 5(1), 14-26. <https://doi.org/10.1080/07434618912331274926>

Guba, E., & Lincoln, Y. (1985). *Naturalistic inquiry*. Sage.

Halloran, J., & Halloran, C. (2006). *LAMP: Language Acquisition through Motor Planning*. The Centre for AAC and Autism.

Harris, M., & Reichle, J. (2004). The impact of aided language stimulation on symbol comprehension and production in children with moderate cognitive disabilities. *American Journal of Speech-Language Pathology*, 13(2), 155-167.

[https://doi.org/10.1044/1058-0360\(2004/016\)](https://doi.org/10.1044/1058-0360(2004/016))

- Hayes, S., Riccardi, J., & Lewis, B. (2022). Clinical practice patterns in childhood apraxia of speech and augmentative and alternative communication: Implications for speech-language pathology education. *Perspectives of the ASHA Special Interest Groups*, 7(5), 1490-1498. https://doi.org/10.1044/2022_PERSP-22-00069
- Holland, A. (1975). Language therapy on children: Some thoughts on context and content. *Journal of Speech and Hearing Disorders*, 40, 514-523. <https://doi.org/10.1044/jshd.4004.514>
- Holyfield, C., Drager, K., Light, J., & Kremkow, J. (2017). Systematic review of AAC intervention research for adolescents and adults with autism spectrum disorder. [Article]. *AAC: Augmentative and Alternative Communication*, 33(4), 201-212. <https://doi.org/10.1080/07434618.2017.1370495>
- Hourcade, J., Pilotte, T., West, E., & Parette, P. (2004). A history of augmentative and alternative communication for individuals with severe and profound disabilities. *Focus on Autism and Other Developmental Disabilities*, 19(4), 235-244. <https://doi.org/10.1177/10883576040190040501>
- Hudson, M., Milne, M., Reynolds, P., Russell, K., & Smith, B. (2010). *Te Ara Tika: Guidelines for Māori research ethics: A framework for researchers and ethics committee members* (Health Research Council of New Zealand., Issue. <https://www.hrc.govt.nz/resources/te-ara-tika-guidelines-maori-research-ethics-0>
- Iacono, T., Trembath, D., & Erickson, S. (2016). The role of augmentative and alternative communication for children with autism: current status and future trends [article]. *Neuropsychiatric Disease and Treatment*, 12, 2349-2361. <https://doi.org/10.2147/NDT.S95967>
- Johnson, J., Inglebret, E., Jones, C., & Ray, J. (2006). Perspectives of speech language pathologists regarding success versus abandonment of AAC. *AAC: Augmentative &*

Alternative Communication, 22(2), 85-99.

<https://doi.org/10.1080/07434610500483588>

Johnson, R., & Onwuegbuzie, A. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher*, 33(7), 14-26.

<https://doi.org/10.3102/0013189X033007014>

Johnston, S., Reichle, J., & Evans, J. (2004). Supporting augmentative and alternative communication use by beginning communicators with severe disabilities [Article]. *American Journal of Speech-Language Pathology*, 13(1), 20-30.

[https://doi.org/10.1044/1058-0360\(2004/004\)](https://doi.org/10.1044/1058-0360(2004/004))

Jonsson, A., Kristoffersson, L., Ferm, U., & Thunberg, G. (2011). The ComAlong communication boards: Parents' use and experiences of aided language stimulation. *AAC: Augmentative & Alternative Communication*, 27(2), 103-116.

<https://doi.org/10.3109/07434618.2011.580780>

Kaiser, & Roberts, M. (2013). Parents as communication partners: An evidence-based strategy for improving parent support for language and communication in everyday settings. *Perspectives on Language Learning & Education*, 20(3), 96-111.

<https://ezproxy.massey.ac.nz/login?url=https://search.ebscohost.com/login.aspx?direct=true&AuthType=sso&db=ccm&AN=104044638&site=eds-live&scope=site&authtype=sso&custid=s3027306>

Kaiser, A., Hancock, T., & Trent, J. (2007). Teaching parents communication strategies. *Early Childhood Services: An Interdisciplinary Journal of Effectiveness*, 1(2), 107-136.

<http://ezproxy.massey.ac.nz/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=psych&AN=2008-02658-003&site=eds-live&scope=site>

- Kaiser, A., Hemmeter, M., Ostrosky, M., Alpert, C., & Hancock, T. (1995). The effects of group training and individual feedback on parent use of milieu teaching. *Journal of Childhood Communication Disorders, 16*(2), 39-48.
<https://doi.org/10.1177/152574019501600206>
- Kazdin, A. (2011). *Single-case research designs: methods for clinical and applied settings* (2 ed.). Oxford University Press. <https://doi.org/10.1080/07317107.2012.654458>
- Kemp, P., & Turnbull, A. (2014). Coaching with parents in early intervention: An interdisciplinary research synthesis. *Infants & Young Children, 27*(4), 305-324.
<https://doi.org/10.1097/IYC.0000000000000018>
- Kent-Walsh, J., Binger, C., & Hasham, Z. (2010). Effects of parent instruction on the symbolic communication of children using augmentative and alternative communication during storybook reading. *American Journal of Speech-Language Pathology, 19*(2), 97-107. [https://doi.org/10.1044/1058-0360\(2010/09-0014\)](https://doi.org/10.1044/1058-0360(2010/09-0014))
- Kent-Walsh, J., Binger, C., & Malani, M. (2010). Teaching partners to support the communication skills of young children who use AAC: Lessons from the ImPAACT program. *Early Childhood Services, 4*(3), 155-170.
<https://www.researchgate.net/publication/260124248>
- Kent-Walsh, J., & McNaughton, D. (2005). Communication partner instruction in AAC: Present practices and future directions. *AAC: Augmentative & Alternative Communication, 21*(3), 195-204. <https://doi.org/10.1080/07434610400006646>
- Kent-Walsh, J., Murza, K. A., Malani, M. D., & Binger, C. (2015). Effects of communication partner instruction on the communication of individuals using AAC: A meta-analysis. *AAC: Augmentative & Alternative Communication, 31*(4), 271-284.
<https://doi.org/10.3109/07434618.2015.1052153>

- Knoche, L., Kuhn, M., & Eum, J. (2013). “More time. More showing. More helping. That’s how it sticks”: the perspectives of early childhood coachees. *Infants & Young Children*, 26(4), 349-365. <https://doi.org/10.1097/IYC.0b013e3182a21935>
- Konza, D., Maloney, C., & Grafton, P. (2010). It Takes Two to Talk: A focused intervention program for parents and children with language delays [Article]. *International Journal of Interdisciplinary Social Sciences*, 5(6), 225-236. <https://ezproxy.massey.ac.nz/login?url=https://search.ebscohost.com/login.aspx?direct=true&AuthType=sso&db=aph&AN=66384508&site=eds-live&scope=site&authtype=sso&custid=s3027306>
- Kraft, M., Blazar, D., & Hogan, D. (2018). The effect of teacher coaching on instruction and achievement: A meta-analysis of the causal evidence. *Review of Educational Research*, 88, 547-588. <https://doi.org/https://doi.org/10.3102/0034654318759268>
- Laher, Z., & Dada, S. (2023). The effect of aided language stimulation on the acquisition of receptive vocabulary in children with complex communication needs and severe intellectual disability: a comparison of two dosages [Article]. *AAC: Augmentative and Alternative Communication*. <https://doi.org/10.1080/07434618.2022.2155566>
- Langarika-Rocafort, A., Mondragon, N., & Etxebarrieta, G. (2021). A systematic review of research on augmentative and alternative communication interventions for children aged 6-10 in the last decade. *Language, Speech & Hearing Services in Schools*, 52(3), 899-916. https://doi.org/10.1044/2021_LSHSS-20-00005
- Laubscher, E., & Light, J. (2020). Core vocabulary lists for young children and considerations for early language development: A narrative review. *AAC: Augmentative & Alternative Communication*, 36(1), 43-53. <https://doi.org/10.1080/07434618.2020.1737964>

Light, J. (1999). Do augmentative and alternative communication interventions really make a difference?: The challenges of efficacy research [Article]. *AAC: Augmentative and Alternative Communication*, 15(1), 13-24.

<https://doi.org/10.1080/07434619912331278535>

Light, J., Collier, B., & Parnes, P. (1985). Communicative interaction between young nonspeaking physically disabled children and their primary caregivers: Part I-discourse patterns [Article]. *Augmentative and Alternative Communication*, 1(2), 74-83. <https://doi.org/10.1080/07434618512331273561>

Light, J., Dattilo, J., English, J., Gutierrez, L., & Hartz, J. (1992). Instructing facilitators to support the communication of people who use augmentative communication systems. *Journal of speech and Hearing Research*, 35, 865-875.

<https://doi.org/10.1044/jshr.3504.865>

Light, J., & Drager, K. (2007). AAC technologies for young children with complex communication needs: State of the science and future research directions. *Augmentative and Alternative Communication*, 23, 204-216.

<https://doi.org/10.1080/07434610701553635>

Light, J., Drager, K., McCarthy, J., Mellott, S., Millar, D., Parrish, C., Parsons, A., Rhoads, S., Ward, M., & Welliver, M. (2004). Performance of typically developing four- and five-year-old children with AAC systems using different language organization techniques. *AAC: Augmentative & Alternative Communication*, 20(2), 63-88.

<https://doi.org/10.1080/07434610410001655553>

Light, J., & McNaughton, D. (2012). The changing face of augmentative and alternative communication: Past, present, and future challenges. [Article]. *AAC: Augmentative & Alternative Communication*, 28(4), 197-204.

<https://doi.org/10.3109/07434618.2012.737024>

- Light, J., & McNaughton, D. (2014). Communicative competence for individuals who require augmentative and alternative communication: A new definition for a new era of communication? [Article]. *AAC: Augmentative & Alternative Communication*, 30(1), 1-18. <https://doi.org/10.3109/07434618.2014.885080>
- Light, J., & McNaughton, D. (2015). Designing AAC research and intervention to improve outcomes for individuals with complex communication needs. *AAC: Augmentative & Alternative Communication*, 31(2), 85-96. <https://doi.org/10.3109/07434618.2015.1036458>
- Light, J., McNaughton, D., & Caron, J. (2019). New and emerging AAC technology supports for children with complex communication needs and their communication partners: State of the science and future research directions. *AAC: Augmentative & Alternative Communication*, 35(1), 26-41. <https://doi.org/10.1080/07434618.2018.1557251>
- Light, J., Parsons, A., & Drager, K. (2002). "There's more to life than cookies": Developing interactions for social closeness with beginning communicators who use AAC. In J. Reichle, D. R. Beukelman, & J. Light (Eds.), *Exemplary practices for beginning communicators: Implications for AAC* (pp. 187-218). Paul H. Brookes Publishing Co.
- Logan, K., Iacono, T., & Trembath, D. (2017). A systematic review of research into aided AAC to increase social-communication functions in children with autism spectrum disorder. *Augmentative and Alternative Communication*, 33(1), 51-64. <https://doi.org/10.1080/07434618.2016.1267795>
- Lüke, C. (2016). Impact of speech-generating devices on the language development of a child with childhood apraxia of speech: a case study. *Disability and Rehabilitation: Assistive Technology*, 11(1), 80-88. <https://doi.org/10.3109/17483107.2014.913715>
- Marra, L., & Micco, K. (2019). Communication partner training to increase interactive communication using augmentative and alternative communication: A case study.

Perspectives of the ASHA Special Interest Groups, 4(4), 584-592.

https://doi.org/10.1044/2019_PERS-SIG2-2018-0012

Mataiti, H., van Bysterveldt, A., & Miller, J. (2016). Changing roles and responsibilities: The development of coaching in early intervention education settings, in Aotearoa New Zealand. *NZ Research in ECE Journal, Special Issue: Equality and Diversity*, 19, 15-31.

<https://search.informit.org/doi/abs/10.3316/informit.687350120969337?download=true>

McCarthy, J., Schwarz, I., & Ashworth, M. (2017). The availability and accessibility of basic concept vocabulary in AAC software: A preliminary study. *Augmentative and Alternative Communication*, 33, 131-138.

<https://doi.org/10.1080/07434618.2017.1332685>

McWilliam, R. A., Boavida, T., Bull, K., Cañadas, M., Hwang, A. W., Józefacka, N., Lim, H. H., Pedernera, M., Sergnese, T., & Woodward, J. (2020). The routines-based model internationally implemented [Article]. *International Journal of Environmental Research and Public Health*, 17(22), 1-19-19. <https://doi.org/10.3390/ijerph17228308>

Mein, R., & O'Connor, N. (1960). A study of the oral vocabularies of severely subnormal patients. *Journal of Mental Deficiency Research*, 4, 130-143.

<https://doi.org/10.1111/j.1365-2788.1960.tb00761.x>

[Record #390 is using a reference type undefined in this output style.]

Mirenda, P. (2008). A back door approach to autism and AAC. *AAC: Augmentative & Alternative Communication*, 24(3), 220-234.

<https://doi.org/10.1080/08990220802388263>

Mirenda, P. (2014). Revisiting the mosaic of supports required for including people with severe intellectual or developmental disabilities in their communities. *Augmentative*

and Alternative Communication, 30(1), 19-27.

<https://doi.org/10.3109/07434618.2013.875590>

Mirenda, P. (2017). Values, practice, science, and AAC. *Research and Practice for Persons with Severe Disabilities*, 42(1), 33-41. <https://doi.org/10.1177/1540796916661163>

Moorcroft, A., Scarinci, N., & Meyer, C. (2019a). Speech pathologist perspectives on the acceptance versus rejection or abandonment of AAC systems for children with complex communication needs. *AAC: Augmentative & Alternative Communication*, 35(3), 193-204. <https://doi.org/10.1080/07434618.2019.1609577>

Moorcroft, A., Scarinci, N., & Meyer, C. (2019b). A systematic review of the barriers and facilitators to the provision and use of low-tech and unaided AAC systems for people with complex communication needs and their families. *Disability & Rehabilitation: Assistive Technology*, 14(7), 710-731.

<https://doi.org/10.1080/17483107.2018.1499135>

Moore, H., Barton, E., & Chironis, M. (2014). A program for improving toddler communication through parent coaching. *Topics in Early Childhood Special Education*, 33(4), 212-224. <https://doi.org/10.1177/0271121413497520>

Murray, E., McCabe, P., & Ballard, K. (2014). A systematic review of treatment outcomes for children with childhood apraxia of speech [Article]. *American Journal of Speech-Language Pathology*, 23(3), 486-504. https://doi.org/10.1044/2014_AJSLP-13-0035

Nigam, R., Schlosser, R., & Lloyd, L. (2006). Concomitant use of the matrix strategy and the mand-model procedure in teaching graphic symbol combinations. *AAC: Augmentative & Alternative Communication*, 22(3), 160-177.

<https://doi.org/10.1080/07434610600650052>

Nunes, D., & Hanline, M. (2007). Enhancing the alternative and augmentative communication use of a child with autism through a parent-implemented naturalistic

- intervention. *International Journal of Disability, Development and Education*, 54(2), 177-197. <https://doi.org/10.1080/10349120701330495>
- Oommen, E., & McCarthy, J. (2015). Simultaneous natural speech and AAC interventions for children with childhood apraxia of speech: Lessons from a speech-language pathologist focus group. *Augmentative and Alternative Communication*, 31(1), 63-76. <https://doi.org/10.3109/07434618.2014.1001520>
- Parette, H., Brotherson, M., & Huer, M. (2000). Giving families a voice in augmentative and alternative communication decision-making [research-article]. *Education and Training in Mental Retardation and Developmental Disabilities*, 35(2), 177. <http://ezproxy.massey.ac.nz/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edsjsr&AN=edsjsr.23879942&site=eds-live&scope=site>
- Pellecchia, M., Beidas, R., Mandell, D., Cannuscio, C., Dunst, C., & Stahmer, A. (2020). Parent empowerment and coaching in early intervention: study protocol for a feasibility study. *Pilot and Feasibility Studies*, 6(22), 1-12. <https://doi.org/10.1186/s40814-020-00568-3>
- Pellecchia, M., Mandell, D., Beidas, R., Tomczuk, L., Dunst, C., Newman, J., Zeigler, L., & Stahmer, A. (2022). Parent coaching in early intervention for autism spectrum disorder: A brief report [Article]. *Journal of Early Intervention*. <https://doi.org/10.1177/10538151221095860>
- Plano Clark, V., Foote, L., & Walton, J. (2018). Intersecting mixed methods and case study research: Design possibilities and challenges. *International Journal of Multiple Research Approaches*, 10(1), 14-29. <https://doi.org/10.29034/ijmra.v10n1a1>
- Porter, G., & Cafiero, J. (2009). Pragmatic Organization Dynamic Display (PODD) communication books: A promising practice for individuals with autism spectrum disorders. *Perspectives on Augmentative & Alternative Communication*, 18(4), 121-

129.

<http://ezproxy.massey.ac.nz/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=ccm&AN=105137232&site=eds-live&scope=site>

Prizant, B., & Wetherby, A. (1985). Intentional communicative behavior of children with autism: Theoretical and practical issues. *Australian Journal of Human*

Communication Disorders, 13(2), 21-59. <https://doi.org/10.3109/asl2.1985.13.issue-2.03>

Quick, N., Erickson, K., & McCright, J. (2019). The most frequently used words: Comparing child-directed speech and young children's speech to inform vocabulary selection for aided input. *AAC: Augmentative & Alternative Communication*, 35(2), 120-131.

<https://doi.org/10.1080/07434618.2019.1576225>

Richards, O. (2022, January 10 2022). Moving away from compliance-based strategies for supporting individuals who use augmentative and alternative communication. *Moving away from compliance-based strategies for supporting individuals who use augmentative and alternative communication*.

Roberts, D. (1978). An introduction to Peirce's proof of pragmatism. *Transactions of the Charles S. Peirce Society*, 14(2), 120-131. <https://www.jstor.org/stable/40319835>

Roberts, J. (2020). *The Problem with PECS®*. <https://therapistndc.org/the-problem-with-pecs/>

Roberts, M., Curtis, P., Sone, B., & Hampton, L. (2019). Association of parent training with child language development: A systematic review and meta-analysis. *JAMA*

pediatrics, 173(7), 671-680. <https://doi.org/10.1001/jamapediatrics.2019.1197>

Roberts, M., & Kaiser, A. (2011). The effectiveness of parent-implemented language interventions: A meta-analysis. *American Journal of Speech-Language Pathology*, 20(3), 180-199. [https://doi.org/http://dx.doi.org/10.1044/1058-0360\(2011/10-0055\)](https://doi.org/http://dx.doi.org/10.1044/1058-0360(2011/10-0055))

Romski, M., & Sevcik, R. (1996). *Breaking the speech barrier: Language development through augmented means*. Brookes.

Romski, M., & Sevcik, R. (2005). Augmentative communication and early intervention: Myths and realities. *Infants & Young Children, 18*(3), 174-185.
<https://doi.org/10.1097/00001163-200507000-00002>

Romski, M., Sevcik, R., Adamson, L., Cheslock, M., Smith, A., Barker, R., & Bakeman, R. (2010). Randomized comparison of augmented and nonaugmented language interventions for toddlers with developmental delays and their parents. *Journal of Speech, Language & Hearing Research, 53*(2), 350-364. [https://doi.org/1092-4388\(2009/08-0156\)](https://doi.org/1092-4388(2009/08-0156))

Romski, M., Sevcik, R., Barton-Hulsey, A., & Whitmore, A. (2015). Early intervention and AAC: What a difference 30 years makes. *AAC: Augmentative and Alternative Communication, 31*(3), 181-202. <https://doi.org/10.3109/07434618.2015.1064163>

Rosa-Lugo, L., & Kent-Walsh, J. (2008). Effects of parent instruction on communicative turns of Latino children using augmentative and alternative communication during storybook reading. *Communication Disorders Quarterly, 30*(1), 49-61.
<https://doi.org/10.1177/1525740108320353>

Rush, D., & Shelden, M. (2011). *The early childhood coaching handbook*. Paul H. Brookes Publishing Co.

Rush, D., & Shelden, M. (2020). *The early childhood coaching handbook* (2 ed.). Brookes Publishing.

Rush, D., Shelden, M., & Hanft, B. (2003). Coaching families and colleagues: A process for collaboration in natural settings. *Infants & Young Children, 16*(1), 33-47.
<https://doi.org/10.1097/00001163-200301000-00005>

- Sanders, E., & Blakeley, A. (2021). Vocabulary in dialogic reading: Implications for AAC. *AAC: Augmentative & Alternative Communication*, 37(4), 217-228.
<https://doi.org/10.1080/07434618.2021.2016961>
- Sanders, H. (2017). *Extension of school augmentative and alternative communication services to home: A national survey* University of Kansas].
- Sawyer, B. E., Hammer, C., Santoro, J., Smith, J., & Feil, E. (2022). Developing parents plus: A parent-implemented intervention for young children with developmental language disorders. *Infants and Young Children*, 35(3), 205-221.
<https://doi.org/10.1097/IYC.0000000000000219>
- Schlosser, R., & Lee, D. (2000). Promoting generalization and maintenance in augmentative and alternative communication: a meta-analysis of 20 years of effectiveness research [Article]. *AAC: Augmentative and Alternative Communication*, 16(4), 208-226-226.
<https://doi.org/10.1080/07434610012331279074>
- Sennott, S., Light, J., & McNaughton, D. (2016). AAC modeling intervention research review. *Research and Practice for Persons with Severe Disabilities*, 41(2), 101-115.
<https://doi.org/10.1177/1540796916638822>
- Sevcik, R., Ronski, M., Watkins, R., & Deffebach, K. (1995). Adult partner-augmented communication input to youth with mental retardation using the system for augmenting language (SAL). *Journal of speech and Hearing Research*, 38, 902-912.
<https://doi.org/10.1044/jshr.3804.902>
- Shire, S., & Jones, N. (2015). Communication partners supporting children with complex communication needs who use AAC: A systematic review. *Communication Disorders Quarterly*, 37(1), 3-15. <https://doi.org/10.1177/1525740114558254>
- Sigafoos, J. (1999). Creating opportunities for augmentative and alternative communication: Strategies for involving people with developmental disabilities. *Augmentative and*

Alternative Communication, 15(3), 183-190.

<https://doi.org/10.1080/07434619912331278715>

Simons, H. (2009). *Case study research in practice*. Sage.

<https://doi.org/10.4135/9781446268322>

Smith, A. L., Barton-Hulsey, A., & Nwosu, N. (2016). AAC and Families: Dispelling Myths and Empowering Parents. *Perspectives of the ASHA Special Interest Groups*, 1(12),

10-20. <https://doi.org/10.1044/persp1.SIG12.10>

Smith, M. (2015). Supporting vocabulary development in children who use augmentative and alternative communication. *Journal of the Speech Language Hearing Association Taiwan*, 33, 35-59.

<https://doi.org/10.6143/JSLHAT.2014.10.03>

Smith, M., & Grove, N. (2003). Asymmetry in input and output for individuals who use augmentative and alternative communication. In J. Light, D. R. Beukelman, & J.

Reichle (Eds.), *Communicative competence of individuals who use augmentative and alternative communication* (pp. 163-195). Brookes.

Snodgrass, M., & Meadan, H. (2018). A boy and his AAC team: Building instructional competence across team members. *AAC: Augmentative & Alternative*

Communication, 34(3), 167-179. <https://doi.org/10.1080/07434618.2018.1491059>

Snodgrass, M., Stoner, J., & Angell, M. (2013). Teaching conceptually referenced core vocabulary for initial augmentative and alternative communication. *AAC: Augmentative & Alternative Communication*, 29(4), 322-333.

<https://doi.org/10.3109/07434618.2013.848932>

Snyder, P., Hemmeter, M., & Fox, L. (2015). Supporting implementation of evidence-based practices through practice-based coaching. *Grantee Submission*, 35(3), 133-143.

<https://doi.org/10.1177/0271121415594925>

- Sone, B., Lee, J., Grauzer, J., Kaat, A., & Roberts, M. (2023). Identifying effective strategies to instruct parents during parent-implemented intervention: The role of parent practice with feedback. *Early Childhood Research Quarterly*, *62*, 394-404.
<https://doi.org/10.1016/j.ecresq.2022.09.010>
- Soto, G., Clarke, M., Nelson, K., Starowicz, R., & Savaldi-Harussi, G. (2020). Recast type, repair, and acquisition in AAC mediated interaction [journal article]. *Journal of Child Language*, *47*(1), 250-264. <https://doi.org/10.1017/S0305000919000436>
- Starble, A., Hutchins, T., Favro, M., Prelock, P., & Bitner, B. (2005). Family-centered intervention and satisfaction with AAC device training. *Communication Disorders Quarterly*, *27*(1), 47-63. <https://doi.org/10.1177/15257401050270010501>
- Stiebel, D. (1999). Promoting augmentative communication during daily routines: A parent problem-solving intervention. *Journal of Positive Behavior Interventions*, *1*(3), 159-169. <https://doi.org/10.1177/109830079900100304>
- Stoner, J., Meadan, H., & Angell, M. (2013). A model for coaching parents to implement teaching strategies with their young children with language delay or developmental disabilities. *Perspectives on Language Learning & Education*, *20*(3), 112.
<https://doi.org/10.1044/lle20.3.112>
- Sussman, F. (1999). *More than words: A guide to helping parents promote communication and social skills in children with Autism Spectrum Disorder*. Hanen Centre.
- Tager-Flusberg, H., & Kasari, C. (2013). Minimally verbal school-aged children with autism spectrum disorder: The neglected end of the spectrum. *Autism research*, *6*(6), 468-478. <https://doi.org/10.1002/aur.1329>.
- Thistle, J., & Wilkinson, K. (2009). The effects of color cues on typically developing preschoolers' speed of locating a target line drawing: implications for augmentative

- and alternative communication display design. *American Journal of Speech-Language Pathology*, 18(3), 231-240. [https://doi.org/10.1044/1058-0360\(2009/08-0029\)](https://doi.org/10.1044/1058-0360(2009/08-0029))
- Thistle, J., & Wilkinson, K. (2015). Building evidence-based practice in AAC display design for young children: Current practices and future directions. *AAC: Augmentative & Alternative Communication*, 31(2), 124-136.
<https://doi.org/10.3109/07434618.2015.1035798>
- Thomas, D. (2006). A general inductive approach for analyzing qualitative evaluation data. *American Journal of Evaluation*, 27(2), 237-246.
<https://doi.org/10.1177/1098214005283748>
- Tönsing, K. (2016). Supporting the production of graphic symbol combinations by children with limited speech: A comparison of two AAC systems. *Journal of Developmental and Physical Disabilities*, 28, 5-29. <https://doi.org/10.1007/s10882-015-9425-5>
- Tönsing, K., Dada, S., & Alant, E. (2014). Teaching graphic symbol combinations to children with limited speech during shared story reading. *Augmentative and Alternative Communication*, 30(4), 279-297. <https://doi.org/10.3109/07434618.2014.965846>
- Trembath, D., Balandin, S., & Togher, L. (2007). Vocabulary selection for Australian children who use augmentative and alternative communication. *Journal of Intellectual & Developmental Disability*, 32(4), 291-301.
<https://doi.org/10.1080/13668250701689298>
- Trivette, C., Dunst, C., Hamby, D., & O'herin, C. (2009). Characteristics and consequences of adult learning methods and strategies. *Research Brief*, 3(1), 1-33.
<https://files.eric.ed.gov/fulltext/ED565253.pdf>
- van der Meer, L., & Rispoli, M. (2010). Communication interventions involving speech-generating devices for children with autism: A review of the literature [Review].

Developmental Neurorehabilitation, 13(4), 294-306.

<https://doi.org/10.3109/17518421003671494>

Van Tatenhove, G. (2009). *The Pixon project kit: A language development curriculum*.
Prentke-Romich Company.

Van Tatenhove, G. (2009b). Building language competence with students using AAC devices: Six challenges. *SIG 12 Perspectives on Augmentative and Alternative Communication*, 18, 38-47. <https://doi.org/10.1044/aac18.2.38>

van Tilborg, A., & Deckers, S. (2016). Vocabulary selection in AAC: Application of core vocabulary in atypical populations. *Perspectives of the ASHA Special Interest Groups*, 1(12), 125-138. <https://doi.org/10.1044/persp1.SIG12.125>

Walters, C., Sevcik, R., & Ronski, M. (2021). Spoken vocabulary outcomes of toddlers with developmental delay after parent-implemented augmented language intervention. *American Journal of Speech-Language Pathology*, 30, 1023-1037.
https://doi.org/10.1044/2020_AJSLP-20-00093

Wandin, H., Lindberg, P., & Sonnander, K. (2022). A trained communication partner's use of responsive strategies in aided communication with three adults with Rett syndrome: A case report [article]. *Frontiers in Psychology*, 13.
<https://doi.org/10.3389/fpsyg.2022.989319>

Westby, C. (2017). *Play & language : The roots of literacy* [Videorecording
Electronic representation]. PESI Inc.

<https://ezproxy.massey.ac.nz/login?url=https://search.ebscohost.com/login.aspx?direct=true&AuthType=sso&db=cat09011a&AN=mul.oai.edge.massey.folio.ebsco.com.fs00001086.86a8b34f.e5b3.5130.9f61.83d57463ba2e&site=eds-live&scope=site&authtype=sso&custid=s3027306>

<http://ezproxy.massey.ac.nz/login?url=http://www.aspresolver.com/aspresolver.asp?MARC:3590865>

- Wetherby, A., Cain, D., Yonclas, D., & Walker, V. (1988). Analysis of intentional communication of normal children from the prelinguistic to the multiword stage. *Journal of speech and Hearing Research, 31*, 240-252. <https://doi.org/10.1044/jshr.3102.240>
- Wetherby, A., Guthrie, W., Woods, J., Schatschneider, C., Holland, R., Morgan, L., & Lord, C. (2014). Parent-implemented social intervention for toddlers with autism: An RCT. *Pediatrics, 134*(6), 1084-1093. <https://doi.org/10.1542/peds.2014-0757>
- Wilkinson, K., Gilmore, R., & Yiming, Q. (2022). Judicious arrangement of symbols on a simulated augmentative and alternative communication display optimizes visual attention by individuals with Down Syndrome. *Journal of Speech, Language & Hearing Research, 65*(2), 710-726. https://doi.org/10.1044/2021_JSLHR-21-00278
- Wilkinson, K., & Jagaroo, V. (2004). Contributions of visual cognitive neuroscience to AAC display design. *Augmentative and Alternative Communication, 20*, 123–136. <https://doi.org/10.1080/07434610410001699717>
- Wilkinson, K., Ronski, M., & Sevcik, R. (1994). Emergence of visual-graphic symbol combinations by youth with moderate or severe mental retardation. *Journal of Speech, Language, and Hearing Research, 37*(4), 883-895. <https://doi.org/jshr.3704.883>
- Woods, J. (2008). Providing early intervention services in natural environments. *The ASHA Leader, 13*(4), 14-23. <https://doi.org/10.1044/leader.FTR2.13042008.14>
- Wright, C., & Kaiser, A. (2017). Teaching parents enhanced milieu teaching with words and signs using the teach-model-coach-review model. *Topics in Early Childhood Special Education, 36*(4), 192-204. <https://doi.org/10.1177/0271121415621027>
- Yin, R. (2014). *Case study research: Design and methods* (5th ed.). Sage Publications.

Yoder, P., & Symons, F. (2010). *Observational measurement of behavior* [Book]. Springer Publishing Company.

Yorkston, K., Dowden, P., Honsinger, M., Marriner, N., & Smith, K. (1988). A comparison of standard and user vocabulary lists. [Article]. *Augmentative and Alternative Communication*, 4(4), 189-210. <https://doi.org/10.1080/07434618812331274807>

Zangari, C. (2013). Core samples. <https://praacticalaac.org/praactical/core-samples/>

Zangari, C. (2015). *From activity-based AAC to robust language: Part 2.*

<http://praacticalaac.org/praactical/from-activity-based-aac-to-robust-language-part-2/>

Zangari, C. (2017a). *5 misconceptions about core vocabulary in AAC.*

<https://praacticalaac.org/praactical/5-misconceptions-about-core-vocabulary-in-aac/>

Zangari, C. (2017b). *Reducing prompt dependence in AAC Learners: 5 things to try.*

PrAACtical AAC. <https://praacticalaac.org/praactical/reducing-prompt-dependence-in-aac-learners-5-things-to-try/>

Zangari, C., Lloyd, L., & Vicker, B. (1994). Augmentative and alternative communication: An historic perspective. *AAC: Augmentative and Alternative Communication*, 10(1), 27-59. <https://doi.org/10.1080/07434619412331276740>

Appendices**Appendix 1: Parent's Home Journal****EP-AAC Home Journal****Date:****Name:**

What has worked well over the past 2 weeks?

What challenges have there been?

Describe one memorable incident:

Which strategies I used the most:

Things I need to ask about:

Appendix 2: Examples of Action Plan Templates

EP-AAC

Workshop 1

Action Plan

Write down an activity or home routine I will practise this fortnight: *(include where it is likely to take place and list any items I will need)*

What words or symbols is my child likely to use spontaneously during this activity, or what might they try to say?

Some words or phrases I will model during the activity

(4 to 1 core to fringe)

General modelling (e.g. making comments, asking questions):

Targeted modelling (modelling what I think my child is trying to say):

Where will I place the core board so my child can see it easily and reach for it?

Back up activities:

EP-AAC

Maintenance Action Plan

Date:

Generalisation Goals:

Activity one:

I will focus on these strategies:

I will make these opportunities for communication:

I want my child to take these turns:

I will use these prompts if needed:

I will use these response strategies:

Activity two:

I will focus on these strategies:

I will make these opportunities for communication:

I want my child to take these turns:

I will use these prompts if needed:

I will use these response strategies:

Other things for me to consider:

7. What is your educational level? (Tick one)

- Left school before gaining qualifications
- High school qualification
- Trade qualification
- Undergraduate degree
- Postgraduate degree
- Prefer not to say

8. As part of this study, you will participate in training to support you to be the main person to help your child learn to use a core board to communicate. Describe your current feelings about this (tick as many statements as apply):

- I'm excited; I know my child best
 - I'm worried that I don't have the time to do this
 - I'm worried that I don't have the skills
 - I would prefer an expert to do the main work
 - It makes sense; I'm with them most of the time
 - Other feelings (please write them here)
-
-

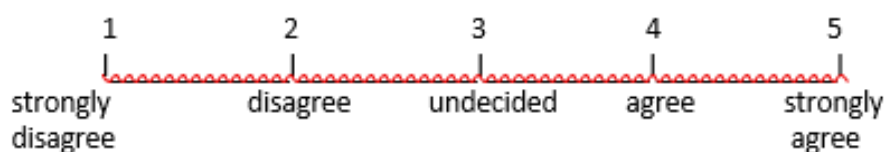
9. As part of this study, your child will be provided with a core board like the one you have seen today. They will be encouraged to point to symbols on the board to communicate. Describe your current feelings about using a core board (tick as many statements as apply):

- It might stop my child from learning to talk
 - I am excited to try something new
 - I'll try anything to help my child
 - It might make my child look different
 - It looks complicated and difficult to learn
 - I think this might suit my child
 - I just want my child to talk
 - I think this could relieve their frustration
 - I don't think my child really needs this
 - My child is too young for this; I'd rather try other things first
 - I like the way it looks
 - I don't think my child can manage this
 - Other feelings (please write them here)
-
-

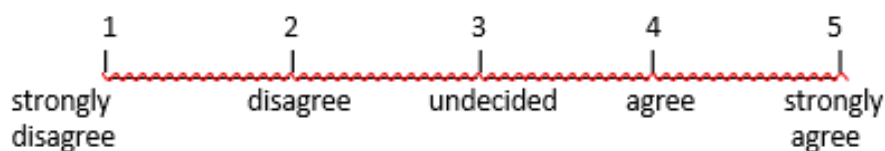
Appendix 4: Second Survey for End of Intervention Phase**Supporting Parents to Implement a Core Board with Children who have Complex Communication Needs: A Multiple Case Study Design***DRAFT SECOND SURVEY / MAIN STUDY*

To what extent do you agree or disagree with the following statements (questions 1-4)?

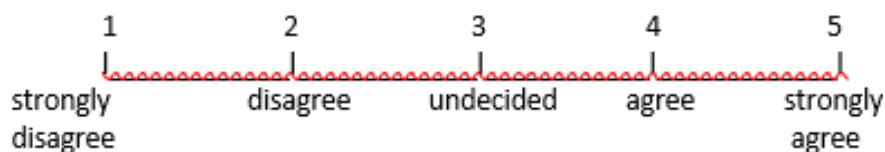
- 1) I feel confident to support my child to use a core board.



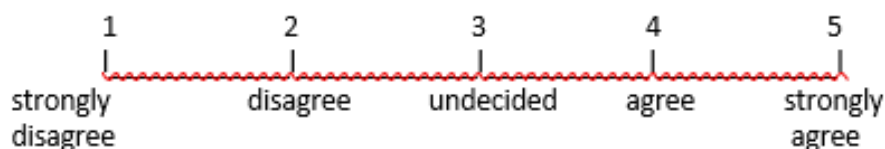
- 2) The core board is a useful tool for helping my child communicate.



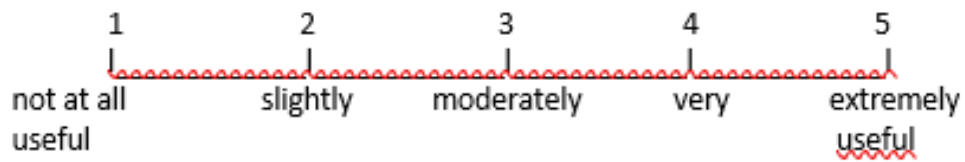
- 3) My child's communication has improved over the past 9 weeks.



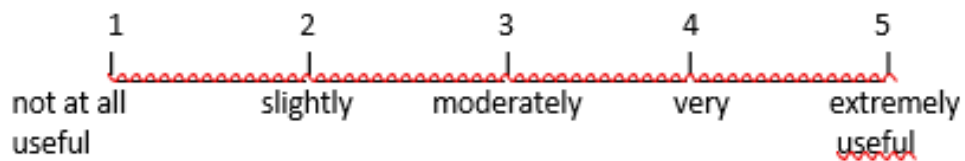
- 4) My skills when helping my child to communicate have improved over the past 9 weeks.



7) How useful overall were the group workshops?



8) How useful overall were the individual coaching sessions?



9) What did you like most about the group workshops?

.....

.....

.....

10) What aspects of the group workshops were not useful for you?

.....

.....

.....

11) What did you like most about the individual coaching sessions?

.....

.....

.....

12) What aspects of the individual coaching sessions were not useful for you?

.....

.....

.....

13) Overall, what changes would you make to this training and coaching programme to make it more useful to you?

.....

.....

.....

14) Describe two changes you have made when communicating with your child over the past 9 weeks.

.....

.....

.....

15) Would you recommend this training and coaching programme to another parent in similar circumstances, and why?

.....

.....

.....

16) Any other comments?

.....

.....

.....

.....

Appendix 5: Detailed Information Sheet for Potential Participants

Supporting Parents to Implement a Core Board with Children who have Complex Communication Needs: A Multiple Case Study Design

INFORMATION FOR PARENTS

General Information

Kia ora. You are invited to take part in a year-long study that will look at the effectiveness of using a communication system called a core board (see picture below) with pre-school children who have communication difficulties. During this study, the core board will be introduced alongside a training and coaching programme for you, where you will learn and practise skills to help your child use the core board successfully. The study will be a detailed examination (case study) of you and your child, and will look at a range of factors including the skills and strategies learned by you to support your child's communication, and any changes in the communication of your child. I will also invite you to share your experiences along the way, and explore the positives and negatives of the journey.



My name is Sam Brydon, and I am a Speech Language Therapist who trained in England, and moved to New Zealand in 2006. I have worked in a local special school for the past 12 years. I have qualifications in both Speech Language Therapy and Social Work. I have over 25 years of experience supporting children with communication needs and their families. I have a particular interest

in augmentative and alternative communication (AAC). This research is being carried out as part of the Doctoral programme offered by the Institute of Education at Massey University, under the supervision of Dr Sally Clendon, Dr Tara McLaughlin and Dr Elizabeth Doell.

It is important to note that this study does not provide any direct therapy for your child. If you decide to participate, you will be provided with training and support to help your child to use a core board to communicate. I will not be working directly with your child at any point during the study.

Participant Recruitment

I will be recruiting six children aged between 3-4 years and one of their parents for this study. The children will all have less than 10 spoken words, and need to have the physical ability to point to pictures. Participation in this study could be beneficial for your child's

communication. The core board will provide them with an alternative way to communicate their ideas, and you will be learning a set of useful strategies to use with your child to help them use the core board to communicate. You will have opportunities to plan and use these strategies in your home, in activities that are important to you, with support and feedback from me.

This study will involve the following steps:

- The parents selected to take part will be confirmed by March 2021 and will be informed of the dates and times of the four workshops.
- There will be a pre-intervention visit to all participating families at the start of the study, to meet the children and their family, answer any further questions and to carry out some assessments of the child's current communication skills.
- At this visit, you will be asked to complete a checklist of your child's current communication skills. This will be repeated at the end of the study. You will also be asked to fill out a short questionnaire regarding your thoughts and understanding of the intervention ahead.
- After this there will be a 9 week period where you will take part in the main training and coaching programme. This will involve four interactive group workshops, one per fortnight, led by me, lasting approximately 1.5 hours each. During each workshop, a set of strategies will be introduced and demonstrated. You will be given a core board to use at home during the first workshop. Over the course of the 9 weeks, this core board will be personalised for your child, with words and pictures that are important to you and them.
- After each workshop you will be given a one page journal sheet to complete over the following fortnight, to record how things are going at home as you try out the strategies. You will also receive a paper core board to keep a tally of each time your child points to a symbol. There will be a discussion at the start of each new workshop where we can discuss how the children are progressing and problem solve any issues as a group.
- During the time of the workshops, I will also arrange to make 4 home visits for coaching, one after each workshop. These visits will be an opportunity for you to practise the new strategies with feedback from me. You can choose the time and activity so it is useful for your family. Some video recording will be taken during each coaching session, and this will be watched back together as a basis for discussion and feedback.
- During this time, there will also be four separate visits for data collection. These will be made by either myself or a research assistant. A short video recording will be made of you and your child interacting in a daily routine or activity. These recordings will be analysed to gather data about the effectiveness of the core board and the training and coaching programme.

- After the four group workshops and four coaching sessions, you will be provided with a survey to complete, so you can share your experiences so far.
- After the 9 week training and coaching programme, the study will enter the 'maintenance stage'. During this time, I will continue to visit each family at home once every two months until the end of a year in order to provide ongoing coaching and support with helping your child to use the core board for communication. These visits will also involve the use of video for feedback and problem solving.
- During this maintenance stage, there will be 3 more data collection visits, where either the research assistant or I will collect short video recordings for analysis.
- The year-long study will conclude with an interview with you in a place of your choosing. You will be asked to reflect on the past year and the effects it has had on both your skills and your child's communication. These interviews will be transcribed (written down) and you will have the opportunity to read through what you have said and make any changes that you want to.

Please see the attached diagram for a visual representation of how the study will proceed.

The Use of Video Recordings

Short video recordings will be taken during the coaching sessions at home. Video feedback is a useful tool when practising new strategies. It will enable you to take a joint role in the coaching process. The video recordings will be watched back during the coaching session, and I will encourage you to think about what is working well, and what can be problem solved together. There will be a total of 8 coaching visits over the year.

Video recordings will also be taken on each of the data collection visits. These clips will be analysed to measure the effectiveness of the training and coaching programme along with the core board. There will be a total of 7 data collection visits over the year. I have lots of experience at video recording interactions between adults and children. I will ensure that both you and your child are comfortable during the recording, and I will stop immediately if your child becomes upset or you are not comfortable. The visits can be rescheduled if need be. You will be able to view these videos at any time. Videos can be deleted at any time if requested by you.

After completion of this project, I may ask to use some video clips for future training materials or dissemination of the research (e.g., a talk at a conference). This will only happen after you have viewed these specific clips and then given additional written consent for this. There will be no obligation to agree to this.

Confidentiality and Data Storage

Confidential information about this project will be stored securely in Dr. Clendon's locked office at Massey University, and/or on our password protected computers. It will only be accessed by myself, a trained research assistant and my supervisors. It will be kept for 5 years

following the completion of the final publication. When disposed of, the University confidential waste service will be used for any printed materials.

Video recordings will be made on my phone, which is password protected. At the end of each day, these will be transferred to secure data storage in the cloud, and will be deleted from my phone.

When the full research project has finished, the results of the main study may be presented at conferences or published in journal articles. Information related to the families in the study will not include any names or identifying details.

Your Rights

You are under no obligation to participate in this study. If you do choose to participate, you have the right to:

- Ask any questions about the study during the time of your participation
- Withdraw from the study at any time prior to signing the transcript release form for the final interview, and have any data relating to you and your child erased
- Review any video footage that includes you and your child
- Ask for any video footage that includes you and your child to be erased from the data set
- Ask for any video footage that includes you and your child to not be used in any other circumstances
- Decline to answer any question in the surveys or interview
- Ask for the recording device to be turned off at any time during the interview
- Be given access to a summary of the main project findings when it is concluded.

Contact Information

Thank you for reading this information and considering being a part of this study. If you would like to take part, please complete the attached consent form. This project is under the supervision of Massey University. Should you have any questions about this project, please contact me or my supervisor on:

Sam Brydon
Speech Language Therapist / PhD Student
Massey University


Sam.Brydon.1@uni.massey.ac.nz

Sally Clendon
Senior Lecturer
Institute of Education
09 414 0800 ext. 43537
s.clendon@massey.ac.nz

This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern A, Application 20/05. If you have any concerns about the conduct of this research, please contact Dr Negar Partow, Chair, Massey University Human Ethics Committee: Southern A, telephone 04 801 5799 x 63363, email humanethicsoutha@massey.ac.nz.

Appendix 6: Consent Forms for Participants



Supporting Parents to Implement a Core Board with Children who have Complex Communication Needs: A Multiple Case Study Design

PARENT CONSENT FORM
Main Study

I have read the information sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree / do not agree to video recordings being made of myself and my child interacting.

I agree to myself and my child participating in this study under the conditions set out in the information sheet.

Signature: _____

Name printed in full: _____

Date: _____

Appendix 7: Home Visit Protocol**Supporting Parents to Implement a Core Board with Children who have Complex Communication Needs: A Multiple Case Study Design****HOME VISIT PROTOCOL****Before the visit:**

- Phone the parent and check if they are still happy for the visit to go ahead. Remind them of time of visit. Check if any pets need securing.
- Plan what to take and place in a secure bag.
- Look up directions, plan journey.
- Check car has enough petrol and record mileage.
- Ensure phone is charged. Programme parent's number into phone.
- Inform the nominated person where you are going and approximately how long visit will take.

During the visit:

- Greet the parent warmly and check that it's still ok to visit.
- Remove shoes on entering house and observe Māori protocols where appropriate.
- State how long approximately the visit will take and remind the parent of the purpose of the visit.
- Be sensitive to signs of reluctance to take part in activities by either the parent or the child. Be prepared to postpone visit for a more convenient time.
- At the end of the visit, thank them for their time, remind them of the time for the next visit (if arranged) and ask if they have any questions.

After the visit:

- Contact the nominated person immediately to inform them that the visit is completed.
- Transfer any video recordings on to secure cloud storage and delete from phone.
- Researcher to write up coach log and field notes.
- Research assistant to debrief with researcher as soon as convenient.

Appendix 8: Research Assistant Confidentiality Agreement



**Supporting Parents to Implement a Core Board with Children who have
Complex Communication Needs: A Multiple Case Study Design**

RESEARCH ASSISTANT'S CONFIDENTIALITY AGREEMENT

I, (Full Name – printed), agree to keep confidential all
information concerning the above project.

I will not retain or copy any information involving the project.

Signature:

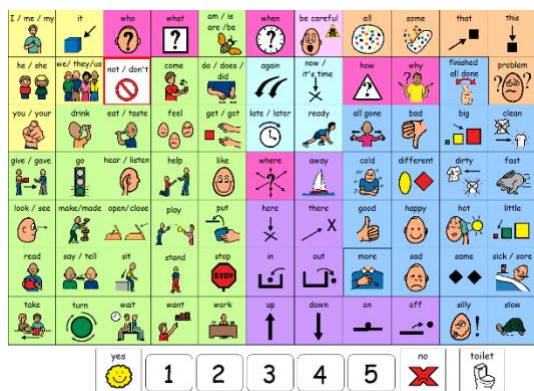
Date:

Appendix 9: Information Sheet for Ministry of Education Professionals

Supporting Parents to Implement a Core Board with Children who have Complex Communication Needs: A Multiple Case Study Design

INFORMATION FOR MOE STAFF

General Information



Kia ora. My name is Sam Brydon, and I am a Speech Language Therapist who has worked in a local special school for the past 12 years. I have qualifications in both Speech Language Therapy and Social Work. I have a particular interest in augmentative and alternative communication (AAC). I am currently undertaking research to look at whether core boards are an effective AAC tool for young children with complex

communication needs, and also to look at what supports parents need to implement core boards successfully with their children. This research is part of my PhD studies undertaken through Massey University.

In 2021, I will be recruiting families who have a young child (aged 3-5 years) with complex communication needs. The intervention will take place over the course of a year. After collecting baseline data, I will provide each family with a personalised 77 cell core board with fringe vocabulary. Then, during the first 9 weeks of the intervention, I will deliver four group workshops for one parent from each family. These will cover a range of evidence based strategies to support children who use AAC. I will also provide individualised, home-based coaching every fortnight during this time. After this, parents will continue to receive bi-monthly coaching in the home until the end of a year.

During the time of the study, I will be collecting both quantitative and qualitative data about the AAC journey for each family. This data will be collected via 2 surveys, videoed observations of the parent taking part in home routines with their child, coach logs, journal sheets and a final, semi-structured interview. Whilst the intervention should offer real benefits to the families involved, it will also involve a significant time commitment.

This study will involve the following steps:

- Initially, potential families will be identified by MOE staff. Typically, the child will be between 3-5 years of age, and using less than 10 spoken words. Some information about the study will be shared with the family at this point, and if they are interested in participating, they will be asked to sign an MOE consent form that will give permission for the researcher to contact them directly. The researcher will then

contact them and arrange to meet them to share more detailed information with them, as well as Massey University consent forms.

- The parents selected to take part will be confirmed by March 2021 and will be informed of the dates and times of the four workshops.
- There will be a pre-intervention visit to all participating families at the start of the study, to meet the children and their family, answer any further questions and to carry out some assessments of the child's current communication skills.
- After this there will be a 9 week period with workshops, coaching and data collection.
- After the four group workshops and four coaching sessions, parents will be provided with a survey to complete, so they can record their experiences so far.
- After the 9 week training and coaching programme, the study will enter the 'maintenance stage'. During this time, I will continue to visit each family at home once every two months until the end of a year in order to provide ongoing coaching and support. These visits will also involve the use of video for feedback and problem solving.
- During this maintenance stage, there will be 3 more data collection visits, where either the research assistant or I will collect short video recordings for analysis.
- The year-long study will conclude with a semi-structured interview with each participating parent.

It is planned that the researcher will share information, work alongside and in collaboration with the MOE practitioners and other agencies in the child's team for the duration of the study. This is dependent on permission from the family, which will be sought when the initial consent form is signed.

Contact Information

Thank you for reading this information and helping to move this research forward. This project is under the supervision of Massey University. Should you have any questions about this project, please contact me or my supervisor on:

Sam Brydon
Speech Language Therapist / PhD Student
Massey University


Sam.Brydon.1@uni.massey.ac.nz

Sally Clendon
Senior Lecturer
Institute of Education
09 414 0800 ext. 43537
s.clendon@massey.ac.nz

Appendix 10: Introduction Letter for Ministry of Education**Supporting Parents to Implement a Core Board with Children who have Complex Communication Needs: A Multiple Case Study Design**

Date

To whom it may concern

My name is Sam Brydon and I am a Speech Language Therapist employed at Patricia Avenue School, Hamilton. I am currently completing my PhD studies at Massey University, under the supervision of Dr Sally Clendon, Dr Elizabeth Doell and Dr Tara McLaughlin. My study aims to investigate the impact of a parent training and coaching intervention alongside the use of core boards as an AAC system. Core boards are widely used across New Zealand as an AAC tool, but research about their effectiveness is still emerging. I am hoping to contribute to this body of research.

Over the course of 2020, I will be carrying out two pilot studies in order to develop and refine the training and coaching intervention I intend to use, as well as the observational tools, measurements, and surveys that will be used to collect data during the research. These pilot studies will involve families who attend Patricia Avenue School and some of the staff.

I will then carry out the main study in 2021. This research will be a multiple case study involving at least four parent / child dyads. The research will take place over the course of a year, as I would like to include useful data about maintenance and generalisation following the main intervention. I am seeking participants who have not had any prior AAC input, and therefore I have chosen to work with pre-school children with complex communication needs.

I would like permission to recruit the participants for my main research project from the MOE waiting lists in the Waikato region. The child participants need to be between 3-4 years old, with less than 10 spoken words. They would also need to have the physical ability to point at symbols on a core board. At least one parent needs to be proficient in English.

I anticipate that suitable families will initially be contacted by a staff member at MOE to give an overview of the study and see if they would be interested in taking part. I will then meet with each family that has expressed an interest in person to talk through the project in more detail and share the information sheet with them (see attached). I will make it very clear to them at this stage that they are under no obligation to participate, and their decision to participate or not will not affect the services they receive from MOE at any time.

I would very much appreciate your support and collaboration for this research, which I hope will further the knowledge base and understanding around the use of core boards and

parent training and coaching programmes in a New Zealand context. Thank you for considering this request. Please feel free to discuss the project with me at any time. You can also contact my main supervisor, Dr Sally Clendon on 09 414 0800, ext. 43537.

If you are happy to assist me with the recruitment of the participants for my study, please complete the attached agreement form and return to me.

Kind regards

Sam Brydon
PhD student
Massey University

Sam.Brydon.1@uni.massey.ac.nz

This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern A, Application 20/05. If you have any concerns about the conduct of this research, please contact Dr Negar Partow, Chair, Massey University Human Ethics Committee: Southern A, telephone 04 801 5799 x 63363, email humanethicsoutha@massey.ac.nz.

Appendix 11: Case History Template**Present:**

Topic	Discussion
Background history -Family background -Support people / networks -Cultural /Religious	
Strengths & Talents	
Problem solving skills	
Likes	
Dislikes	
Social skills Friends How do they play and interact with others	

Communication -Any alternative communication	
Behaviour	
Medical History -Diagnosis -Hearing & Vision - Procedures - Medication	
Previous Therapy & Current Programmes -External agencies involved & contact -Permission to contact if required - Early Years services - Education	

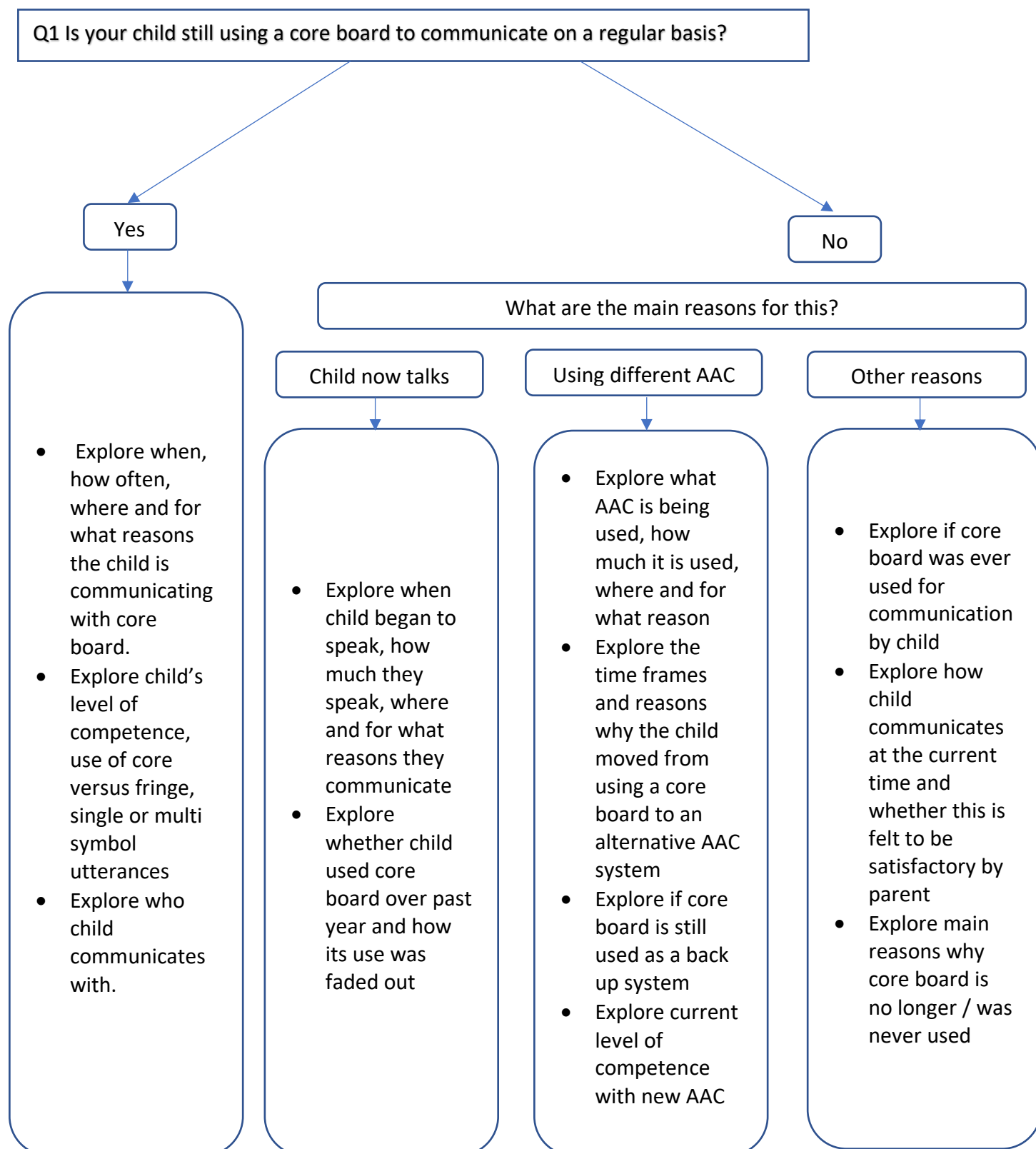
Gross Motor - Mobility	
Fine Motor Skills	
Sensory Information	
Eating and drinking	

General routines Toileting Sleep Self care	
Further Information	

Appendix 12: Interview Question Guide

Supporting Parents to Implement a Core Board with Children who have Complex Communication Needs: A Multiple Case Study Design

DRAFT INTERVIEW GUIDE



Q2 In your initial survey, you ticked the following statements about being the key person to help your child with their communication difficulties (read them). Have your ideas about this changed over the past year?

- Probe – go through each statement and explore how and why feelings have changed e.g. Can you tell me a bit more about how your feelings have changed about this (name the statement)?
e.g., Can you give me an example of something that happened that made you feel differently about this (name the statement)?

Q3 In your initial survey, you ticked the following statements about using an AAC system (alternative communication system) with your child (read them). Have your ideas about this changed over the past year?

- Probe – as above in Q2

Q4 Tell me about how significant people in the child's life supported or did not support the use of the core board with your child? (Prompt for spouse/partner, close family, wider family, siblings, friends, education workers)

Q5 Have you had any significant events that have affected the family over the past year that may have had an impact on your ability to support this intervention?

- Explore the impacts and the support they received if they are comfortable to talk about it.

Q6 Tell me about any experiences you have had when you have been using the core board outside the home with your child, e.g., in a shop or at the playground.

- Explore where, reactions of public, positive and negative

Q7 Thinking back to the main strategies you learned to support your child, what have been the most useful?

- Prompt – remind of key strategies
- Explore when and how they are still used

Q8 Thinking back to the workshops you attended, what are the key things that you took away from them?

- Is there anything you would change about the workshops?
- What was the most helpful aspect of the workshops?

Q9 Thinking back to the coaching sessions you have had. Let's start by thinking about the coaching visits during the time of the workshops.

- What was most helpful or useful about these visits?
- What was challenging or difficult about them?

Now think about more recent coaching visits since the workshops finished.

- What has been most helpful or useful about these visits?
- What was challenging or difficult about them?

Q10 What has been the most challenging aspect of this whole intervention?

Q11 What has surprised you most over the past year in regards to your child's communication?

Q12 Anything else you would like to share?

Appendix 13: NVivo Thematic Analysis Codebook

EPAAC Interviews / Survey data Code Book

Codes

Name	Description	Examples
AAC	Major topic - covering all interview data that relates to the use of AAC	
Child and AAC	Sub category of AAC topic - all references that relate to the child and AAC	
Attitudes to AAC	Category of codes that reference how the child reacted to core board, including acceptance and resistance.	
Positive towards AAC	References to the child reacting positively to the core board, or finding it useful or necessary.	<p><i>And he was just so stoked when he can get his word across. Like he does, like super running dancing things like he just, because he has a lot to say</i></p> <p><i>he was really into it</i></p> <p><i>but also the reward he likes when he sees that we understand what he's saying.</i></p>
Reluctant user	References to the child showing resistance to using the core board or disliking it.	<p><i>Just the strategies of how to kind of get him to, to try and use the core board, because at first he was a bit stubborn. And I guess, you know, a lot of kids don't want to sit down and try and use the board.</i></p> <p><i>So even Tina, right in the beginning, she was pushing it away. Like: what is that?</i></p> <p><i>Because she's so determined, and very independent and has her own mind that</i></p>

Name	Description	Examples
		<p><i>she's like, well, I don't need to do this, because if I just do this and action it out - you know what I mean and I know that I'm gonna get what I want. But something just clicked and she was just okay, dun dun dun.</i></p>
Outcomes and use	Category of codes that reference how the child communicated after introduction of AAC; the outcomes of the project for them.	
Communicative functions	Outcomes where different communicative functions are referenced.	<p><i>And so for him to be able to chat with us just like about monsters, like because once we knew the word, then we could have like, the conversation about it. And yeah, it was really cool</i></p> <p><i>When Eli did his first sentence with the core board, that was really special, because he got the board out himself and was able to tell us that, you know, he was feeling a bit grumpy. Yeah and he hadn't said something like that before. So it was really new for our family. Exciting.</i></p> <p><i>Sometimes he'll tell us that he's sad, or if he's happy. He'll tell us if he's hungry, or thirsty.</i></p>
Improved communication - AAC	Any references to the child's communication that relate to AAC and improved communication from the start of the project.	<p><i>once he knew how to use it confidently, he kind of just takes control over it anyway. Blaine just takes control of the core board and he kind of tells you what he needs, and how he wants you to do it.</i></p> <p><i>But I think it took him really far in his communication this year. Like to get to where he was to where he is now</i></p> <p><i>Yes, I think, he, I think that he got quite good at it, and so I was kind of wanting to</i></p>

Name	Description	Examples
		<p><i>go a step up with an electrical, electric kind of iPad or something.</i></p>
Spoken language	All references to using spoken language during or after the intervention	<p><i>So we'll need him to get the core board to like, kind of remind us what the word he's saying, because he will switch it up a little bit on us. But yeah, so he uses it out of necessity sometimes. When it's convenient.</i></p> <p><i>It's just like the fact that he's even talking and like that we can understand him and that we can all like have a yarn together and have a joke.</i></p> <p><i>She does not shut up. (both laughing) She does not shut up. No, she's very curious, she's still very determined, very independent in the way of what she wants and how she wants it, but now she vocalises it all. She's heard it all her whole life, but now she's like: I know that word, I'm gonna say it.</i></p>
Personal factors	Category of codes that reference the child's personality, skills, abilities and unique communication style, including diagnosis.	
Challenging personality traits	Aspects of the child's personality that made it difficult to introduce AAC	<p><i>Because he thinks fast. He thinks fast, he acts fast, unless it's really, really important and he's going to continue talking about that one thing until you understand it, he's gonna move on to something else, or he will just start a different conversation.</i></p> <p><i>Just the strategies of how to kind of get him to, to try and use the core board, because at first he was a bit stubborn.</i></p> <p><i>When Grace didn't do anything, when she just flat out refused. It just took ages to be able to get something. But then like, that's</i></p>

Name	Description	Examples
		<p><i>understandable, it was new, it was something different, and she doesn't, didn't cope with change at all very well.</i></p>
<p>Communication abilities</p>	<p>How the child communicated before the study, their diagnosis, their abilities and communication style</p>	<p><i>When he used to talk, he probably gets talking fast from me, but he would talk so fast and words that don't really make any sense, and it just ended up becoming like babble</i></p> <p><i>some of the teachers would get it out every little while if they couldn't figure out what he was trying to tell them. Yeah, but they've kind of got, ah Sam will usually sign to them or you know, he's quite good at making his needs known otherwise.</i></p> <p><i>I found it very helpful at the start, because even though I knew what he was trying to say to me, I was trying to get him to say it himself, but he couldn't. He couldn't say it until I got the core board.</i></p>
<p>Smart, lots to say</p>	<p>References to AAC showing that the children had lots to communicate about</p>	<p><i>Well, because he is just so smart. Like, I know everyone says that about their kids, but like, I look at where Blainewas when he was three, and I look at my current three year old who I don't believe has speech delays or anything like that. And though I love them, but they both have different skill sets</i></p> <p><i>There was a lot of things that he pointed to that I didn't, actually, I didn't know that he knew. So that was surprising for us that he actually understands a lot more than we thought.</i></p>
<p>Daycare and AAC</p>	<p>Category of codes that reference how the children's day cares reacted to and used the core board</p>	

Name	Description	Examples
Challenges	Relating to the challenges of using a core board in a day care setting	<p><i>They don't have the time to do that, some of the teachers would get it out every little while if they couldn't figure out what he was trying to tell them. Yeah, but they've kind of got, ah Sam will usually sign to them or you know, he's quite good at making his needs known otherwise.</i></p> <p><i>I have sent it a couple of times but I think they need to teach as well, to how to use the core board. I'm not sending my core board to the day care.</i></p>
ESW	Any references to the child's ESW and their role in using the core board at day care	<p><i>His speech therapist, I guess, oh his daily teacher aide and speech therapist? She tried, she always had the board at the kindy and she would try and draw his attention to it at kindy as well. It's a bit more difficult there because there's so much to do and he doesn't kind of want to stop, and, you know, he's always on the go. But yeah, she really tried to use it with him.</i></p> <p><i>But before that she was just very determined: I don't want it, nah. For me, no, but for her ESW, her old ESW, Jacob, she would use 'more' for him way before she would ever use it for me. So, yes, she'd look at it and watch me do it, and I'd use all the strategies and everything she was just like: nah! She'd just push it away or yeah, yeah.</i></p> <p><i>So at childcare, he's got Ministry of Education. And so they've sorted out that someone comes in for like, one hour or two hours a day when he's at childcare. Just to help him.</i></p>

Name	Description	Examples
frequency and function	How much the core board was used in day care, and how it was used.	<p><i>So but we kind of introduced it to day care once again, he was already really familiar with it, and he knew when to use it and how to use it. So it was kind of used for the same thing that it is now in our house, so he used it at a daycare when he needed it, not to develop his language. So we used it at home to develop his like skills of the core board at that time. We were doing the nightly ones to use it properly and develop his language. At daycare it was there as a tool for understanding him.</i></p> <p><i>some of the teachers would get it out every little while if they couldn't figure out what he was trying to tell them. Yeah, but they've kind of got, ah Sam will usually sign to them or you know, he's quite good at making his needs known otherwise.</i></p> <p><i>Yeah, and then I wasn't sure whether, you know, should I send it or should I not send it. I have send it a couple of times but eventually I stopped sending it, and I've never, I never want to know.</i></p>
Positives	References to the positive aspects of using a core board in a day care setting.	<p><i>So his teacher, Danielle, his main daycare teacher is really, really, really supportive of him. She's amazing, actually. She's not a student aide or anything, she's just been assigned to him.</i></p> <p><i>oh we're lucky because we have a really good daycare and they were really willing to do that and do the necessary work to try and learn.</i></p> <p><i>No, I just feel that it needs, that ECE teachers especially, need this as part of their training because you can see that there's such a need, especially now, with extra support and stuff and so until that extra support comes in, there should be other avenues that we can do in the</i></p>

Name	Description	Examples
		<i>meantime. And each centre needs to have a core board, in my opinion, but that's as a teacher speaking now, not as a parent.</i>
Parent and AAC	Sub category of AAC topic - all data that relates to the parent and AAC	
Beliefs and feelings	Category of codes that reference the parents' beliefs and feelings in respect to AAC	
Cultural differences	Ideas expressed by parents that relate to cultural differences towards disability / AAC	<p><i>Maybe in India, they're not so open about the things. But in New Zealand, people are so open about the things.</i></p> <p><i>I have never seen these things in India, like back home. And it is totally new thing for me and I was so amazed.</i></p>
Effects on child	Beliefs or ideas about the effects using a core board will have on their child	<p><i>Honestly, I didn't know if he was gonna pick it up at all at the beginning. I remember sitting in the first workshop being like, I don't know</i></p> <p><i>Like I was: I'm not gonna take it and I don't want Tina to be dependent on a core board like that's her communication.</i></p> <p><i>It's just me, I think it was in my mind that I don't want Tina to be dependent on something,</i></p>
Evolved over time	Beliefs or feelings that changed over time during the programme and because of the programme	<p><i>in some ways I did think at one point, I was like: oh, how long is he going to be using this for? Is this like a forever thing?</i></p> <p><i>Actually, I don't know what this core board is. I was just going there with my open mind, and seeing what it is like, I have no clue. Because that's a totally new thing to me. I have never heard about the thing and I was like: okay, I will go. I was like: it's</i></p>

Name	Description	Examples
		<p><i>okay, if it will help Tina, I will be happy to do that.</i></p> <p><i>It's not like I can say like yeah one thing is right and one thing is wrong, yeah? And you know me and from the beginning I wasn't sure about I'm gonna open about the thing but I am so open now.</i></p>
<p>Negative feelings</p>	<p>General negative feelings such as worry, anxiety or distress that they felt in relation to the programme, AAC or any other part of the study</p>	<p><i>So I tried to teach him, but he just wasn't, both my Mum and my husband, like, I taught them like the really basics, but I also was aware that I didn't want them to learn badly, to teach him how to do it badly.</i></p> <p><i>And I was so scared in the beginning to talk about Tina to anyone. Like, my daughter is not talking. Like everyone is thinking like, you can see her you know, but like, my friends were asking, like Tina's not talking? And I wasn't really open about the things.</i></p> <p><i>At the start I was a bit worried, but then as it went on, I was getting more confident.</i></p>
<p>Positive feelings</p>	<p>Positive beliefs or feelings expressed about the programme or AAC in general</p>	<p><i>I guess I got more confident at using it. I kind of don't mind what other people, (laughs) I guess, think about it.</i></p> <p><i>After this thing, like meeting other mums, they're talking, they're talking openly, like in the group and sitting in there saying things about their kids. And then that gave me a little bit confident to talk to anyone, like now I'm so open about Tina.</i></p> <p><i>At the start I was a bit worried, but then as it went on, I was getting more confident.</i></p>
<p>Benefits of AAC</p>	<p>Category of codes that reference the parents' perceptions of how</p>	

Name	Description	Examples
Core board-specific benefits	<p>introduction of AAC led to improvements</p> <p>Expressed benefits of using AAC that are specific to the core board.</p>	<p><i>But I think it took him really far in his communication this year. Like to get to where he was to where he is now</i></p> <p><i>Yes, so I prefer that he started with something like this than to go straight onto the technology like because then he still has that basic understanding of ... rather than just getting lost in technology, which is what he would do, because he would just like, go on this deep dive and somehow end up on like, some inappropriate YouTube video within the TouchChat.</i></p> <p><i>I found it very helpful at the start, because even though I knew what he was trying to say to me, I was trying to get him to say it himself, but he couldn't. He couldn't say it until I got the core board.</i></p>
Improved communication	Any benefits expressed about AAC that relate to how it improves the child's ability to communicate.	<p><i>I think it was always really exciting for me when Blaine would (checks she's allowed to say his name) when Blaine would like pick up the core board and use it actually for a word that we have never really talked about before, and he was able to, like communicate that on the core board</i></p> <p><i>There was a lot of things that he pointed to that I didn't, actually, I didn't know that he knew. So that was surprising for us that he actually understands a lot more than we thought.</i></p> <p><i>With the core board, she is using quite good. She has the capability to use it. She can use it very efficiently</i></p>

Name	Description	Examples
Special time for child	Using AAC meant that the parent gave the child quality time	<i>Because Blaine obviously is one of three, now, and when we're in the core board, besides the times, Ax, my three year old, would come over and try and join in, he kind of just got that one on one undivided attention, and he liked that and he needed that. Even though he gets it other times as well. But for him, it's like a way for him to be like: remember - we need to just chill out together and do this?</i>
Understand child better	The parent references how using AAC has helped them understand their child.	<p><i>it's really kind of, yeah, it's cool as a parent for him to see that he's able to be able to communicate, what interests him and get that knowledge out somehow, because he just didn't</i></p> <p><i>I cannot understand my child? And then that day I think she needs a communication help, she needs another thing to convey her message.</i></p> <p><i>Being able to understand what he wants when you can't understand what he's asking for. And he can tell you. And that he will just go to it himself instead of me asking him to do it.</i></p>
Challenges of AAC	Category of codes that reference the parents' perceptions of negative aspects of AAC	
Core board specific	Aspects of the core board that were reported as challenging or off-putting.	<p><i>But sometimes it just can take a little bit too long for him and he gets frustrated, and he will just like move on, or he'll just start like acting it out</i></p> <p><i>For me, remembering where everything was. Like, I could do one sentence almost constantly for like three weeks, and then he'll go on to another topic or something, we'll go on to something else. And then I'll go back to that same sentence that I was</i></p>

Name	Description	Examples
		<p><i>like, super good at like three weeks ago. And all of a sudden, I can't remember where it is. Like on our final assessment date, the word 'open', which I have touched on the core board like 3000 times, no less. You know, open this please, open please, like Blaine and I just like sat looking at the core board, like where the hell is 'open'. (Laughs) He eventually found it. We're like: that's right! And then like he used it all the rest of the afternoon, because he's like: That's right, there's open.</i></p> <p><i>I have to carry it everywhere?</i></p>
Needs proper training to use	References to the need for training and support to learn the skills needed to use AAC with a child, and how this can go wrong.	<p><i>So I tried to teach him, but he just wasn't, both my Mum and my husband, like, I taught them like the really basics, but I also was aware that I didn't want them to learn badly, to teach him how to do it badly.</i></p> <p><i>I didn't want him to learn the wrong way</i></p> <p><i>I think, yeah, it'd be so weird if you just like got it and didn't have any training. Like, I don't think I would ... I would literally never use it like.</i></p>
Using in community	References to how using AAC in the community is difficult, challenging or stressful	<p><i>Yeah, we took it to the park a couple of times, we take it on our walks. Yeah. Yeah, he likes using it while we're walking so he could point out what he saw. Yeah, so it was nice. In the grocery store, he didn't really want to, or I guess places, like malls, he wasn't really keen to. He's more just, wants to sit down or go for a walk if it's not really about telling us what he wants.</i></p> <p><i>Yeah, a lot of people were kind of looking at us (laughs). And yeah, I guess it kind of drew a lot of eyes. Not that Eli notices that kind of thing. But yeah, I guess it was a</i></p>

Name	Description	Examples
		<p><i>little bit uncomfortable at first, to have so many people looking at us and trying to, I guess, figure out what's happening. Yeah.</i></p> <p><i>And so, yeah, I think that was the hardest part and being out in the community with it. I don't know, it's probably me, but the looks I felt that I would get because it's something different that other people don't see. So, you always feel like all eyes are on me, because I have this child that is different and I'm holding this thing, trying to get her to communicate. Because it's not known out there, and it should be. Yeah, but that's my issue, not theirs, like I felt that, not Grace. Grace probably was just like: pfft whatever.</i></p>
Obstacles	Category of codes referencing the parents' perceptions of things that made it difficult to implement AAC	
Child response	References to how the child's response to the AAC made it more difficult to implement and use it.	<p><i>Just the strategies of how to kind of get him to, to try and use the core board, because at first he was a bit stubborn.</i></p> <p><i>So even Tina, right in the beginning, she was pushing it away. Like: what is that?</i></p> <p><i>But I think those first initial few months of me like going: okay, we're gonna do this! and her going: nope. Flat out refusing, it was like: oh, (unintelligible) Yes we are! We just got to figure out a different way around it.</i></p>
COVID-19	References to how the restrictions from the pandemic acted as a barrier to implementing and using AAC	<p><i>I mean, the pandemic was obviously a hit. That just felt like the gift that keeps on giving (laughs)</i></p> <p><i>There were obviously some weeks where like, especially in the week that my</i></p>

Name	Description	Examples
		<p><i>grandfather passed away. He like took two weeks to pass away. He passed away from Covid actually. Fun fact. Gifts don't stop giving, in the Philippines. So, yeah, that week or two, that I was just kind of out of it.</i></p> <p><i>Oh it is hard for everyone I think, it is really hard. Because I changed my job and then the market goes slow because of this Covid thing. It was hard, but still we are coping it. It's a, what you can say, it's a part of life now, we have to carry with us. It's our whole life and it's not going anywhere.</i></p>
Life busy time	Obstacles that relate to other demands in the parent's life, including life events, family demands on time, lack of time and general busyness.	<p><i>But she also did start working full time as well. Like she was just really busy and she didn't have time to do it.</i></p> <p><i>I mean, finding time was always hard.</i></p> <p><i>I would say the most challenging part was remembering to, at first was remembering to keep up with our plan. Yeah, just because, you know, you have work and other kids, and I get busy. So it's kind of like that extra that you have to do. Yeah, so that was hard for me.</i></p>
Other people's reactions	References to how other people made it more difficult to use AAC: either family, or the wider community. Covering lack of support from family and friends or negative reactions from strangers.	<p><i>So, Brian, my husband, he struggled with it a lot at first. Honestly, he didn't really use it until Blaine knew how to use it.</i></p> <p><i>And: what is this? Like, people will judge me, whenever we go to the supermarket or any other place, and I have to carry that thing. Like people will ask me: what is that? You know? And I don't want my child to be treated differently, or like people looking at her differently. I don't want that.</i></p> <p><i>and I think Tina's father even wasn't, I never get any support from him as well. It</i></p>

Name	Description	Examples
		<p><i>was only me who was doing the things and he does like come and go kind of thing. I think it was quite hard for me when the other person at home is not using it, you know, it's really hard, to get, like with anything off, it's only I am doing it, you know? Sometimes you'd say "look, I don't give a damn, like you can do it if you don't want to do it, we can even", you know?</i></p>
<p>Parent's attitudes to AAC</p>	<p>Examples of where the parents' beliefs about AAC are an obstacle to accepting and using it.</p>	<p><i>Like I was: I'm not gonna take it and I don't want Tina to be dependent on a core board like that's her communication.</i></p> <p><i>It was just me in the beginning who was like pushing it back, but now</i></p> <p><i>She did in the beginning but now she is doing really nice now, she is not like: oh I don't wanna do it. It's not like that at the moment. She is using it very nicely, it was just me I think (laughs).</i></p>
<p>Requires skills that need to be taught</p>	<p>Parents express that it is too difficult to use AAC unless you have been taught the skills.</p>	<p><i>I think, yeah, it'd be so weird if you just like got it and didn't have any training. Like, I don't think I would ... I would literally never use it like.</i></p> <p><i>So, at first he was a bit confused for a while. And then when he finally got the hang of it, he knew what to do.</i></p> <p><i>They knew how to understand what he wanted, but they didn't necessarily know that they needed to like say the words as he said it or like, I didn't make them use the core board to write sentences or anything.</i></p>
<p>Supports</p>	<p>Category of codes referencing the parents' perceptions of what helped to support the use of AAC</p>	

Name	Description	Examples
Coaching	Any direct references to how ongoing coaching helped support the parent to keep using AAC with their child.	<p><i>But yeah, I found them really helpful because I could ... Because Blaine's ... she just gave like, techniques that were different to the ones we'd done in the workshop</i></p> <p><i>Rewarding, yeah and more getting into the core board. So those visits helped Tina to get into the core board, like she is thinking: oh, that's working, you know? At home she can get things without even touching, but when Sam is around, she knows that I have to touch, and then only things will work. So with that with those visits Tina is getting into the core board.</i></p> <p><i>It is, it was really helpful for me and because I can see it, like how anxious I was in the beginning, and how, what word I can use for that, like, I wasn't really ready to use it, you know? You can see that in my videos as well that I was like, reluctant to use it. But now I'm quite confident in using the core board. So watching yourself in there and then seeing the last one is like completely different.</i></p>
Community	Any references to using the core board outside the home that are broadly positive.	<p><i>Yeah, we took it to the park a couple of times, we take it on our walks. Yeah. Yeah, he likes using it while we're walking so he could point out what he saw. Yeah, so it was nice. In the grocery store, he didn't really want to, or I guess places, like malls, he wasn't really keen to. He's more just, wants to sit down or go for a walk if it's not really about telling us what he wants.</i></p> <p><i>Having the core board helps when out in the community</i></p>
Other people	Any references that include people other than the participating parent as a support for using AAC, including family members,	<p><i>It makes sense to me to have the skills and me to also be able to teach my husband the skills, and my mother, who lives with us, so that everyone in our family, the</i></p>

Name	Description	Examples
	day care and other professionals.	<p><i>people that he interacts with the most, are able to communicate with him in a way that like he can understand and that he can communicate with us in a way that we understand.</i></p> <p><i>So his teacher, Danielle, his main daycare teacher is really, really, really supportive of him. She's amazing, actually. She's not a student aide or anything, she's just been assigned to him.</i></p> <p><i>So my sister, has been involved so to speak with Grace, with her language and with her movement, and appointments and all that sort of stuff, so she used to do it. So if she picked up Grace, she'd take the core board with her. Yeah, so Elizabeth, and my parents as well. Dad would look through it with her, and even though I showed him how to do it, that's just not his thing. So, at home it was me, and then at day care it was me and Jacob, and then my sister and my parents. They'd look through it with her, Elizabeth was more in depth, like how me and Jacob were, whereas, nobody else was.</i></p>
Positive attitude	Having a positive attitude towards AAC acts as a supportive factor	<p><i>It wasn't that difficult. It's just, it's really easy to use it, you don't need any masters to use it. It's just if you really want to use it then that's the main thing. And if you really want to use it, you will learn really quickly.</i></p>
Regular practice	References to how the family made AAC use into a routine or practised it on a regular basis.	<p><i>And so yeah, because I would spend like 20 minutes a day with him doing it, well most days,</i></p> <p><i>Yeah, it's been a big year, but we always kind of like, the core board just kind of</i></p>

Name	Description	Examples
		<p><i>became part of like a routine.</i></p> <p><i>Good. I did find it useful because it was fun doing those games with Eli and he really enjoyed it. Some weeks were harder than others just because things pop up and we'd get busy, but he really enjoyed it. And when we could do it, we'd do it.</i></p>
Strategies	References to how using the strategies taught in the workshops acted as a support for AAC use in general.	<p><i>creating opportunities was good, because you know, it's easy to just get it out at certain times, like evening, but finding creative ways to incorporate it in normal day stuff. Yeah</i></p> <p><i>Tina has done those things as well, with the strategies that Sam taught me and then I have used on Tina, and it's been working.</i></p> <p><i>Like, it was always around on a table for any of the children to look at and explore. So, in my mind, I was like, okay, so it's just going to become a fixture. So it's not just always on me, or on Jacob or anything like that, because Jacob is only here two hours a day. So it's just anywhere, anyone can have a look at it, that it's okay and it's not going to bite her or anything.</i></p>
Vocabulary core board specific	Category of codes relating to vocabulary on core board - how it can be used, core, fringe.	
Core words	References to using core vocabulary in relation to AAC.	<p><i>Especially to be able to say those core words right, (stumbles on words for a while) is really important because they make up so much of like sentences</i></p> <p><i>at the start I was using more core words than fringe words. But now that he's saying more core words, he's basically just</i></p>

Name	Description	Examples
		<i>using the fringe, so.</i>
Fringe words	References to using fringe vocabulary in relation to AAC	<p><i>One was 'monster', like he recently, not recently, probably about three or four months ago became quite obsessed with like zombies and monsters and werewolves and stuff</i></p> <p><i>more than just like, eat, drink. Like, you know, the basic stuff. He didn't just want stuff. He wanted to be able to, like, chat with us about all this stuff that he knew</i></p> <p><i>But he sometimes likes to play around when we play games. And he'll point to different animals ask us to make them for him with playdough and stuff.</i></p>
Function and use	Data that refers to how the core board functions and how it was used.	<p><i>He was like determined to tell me, but eventually got there like and because monster's not on the core board, so we had to use like those different strategies that we'd already learned to be able to communicate that with him</i></p> <p><i>So we used it at home to develop his like skills of the core board at that time. We were doing the nightly ones to use it properly and develop his language</i></p>
What's next	Category of codes relating to the core board and the future, after this study, transition to other AAC or change of use	
High tech	References to the parent considering or wanting high tech AAC for their child as a next step.	<p><i>like he's a real technology-driven kid as well. And the core board is obviously like this cardboard board (laughs). And so probably the next logical step for us is to move to like something like You Chat, TouchChat, or something like that, because he's already got an iPad, he has like a certain amount of iPad time each night.</i></p>

Name	Description	Examples
		<p><i>And he picks up that stuff sort of like super, super, super quickly. So that would be the logical next step for us. Because it would just be easier for him going forward with like, talking faster.</i></p> <p><i>Yes, I think, he, I think that he got quite good at it, and so I was kind of wanting to go a step up with an electrical, electric kind of iPad or something.</i></p> <p><i>Instead of core board – I would prefer laptop so a person can carry anywhere and when you go out people will not judge you or look at child differently.</i></p>
Multi-modal	Parent expresses that they would prefer to use more than one AAC system, or they already are using more than one means to communicate.	<p><i>So she's going to use the core board and the sign language. So we have started using both,</i></p> <p><i>I'm not saying it's the only best thing, like there are some other things as well.</i></p>
Not long term	Relating to core board being a starter tool, part of an AAC journey, or not suitable for a lifetime tool.	<p><i>Yeah, I think it was really right for the time.</i></p> <p><i>Yes, so I prefer that he started with something like this than to go straight onto the technology like because then he still has that basic understanding of ... rather than just getting lost in technology, which is what he would do, because he would just like, go on this deep dive and somehow end up on like, some inappropriate YouTube video within the TouchChat.</i></p> <p><i>But it's the perfect tool for the time that he needed it. It was the perfect starting tool.</i></p>
Outgrown it	Comments relating to how the child does not need to use the core board	<p><i>Like do I think it would be the right tool for Blainemoving forward as he gets older?</i></p> <p><i>No, I don't believe it's the ideal tool for him</i></p> <p><i>Yes, I think, he, I think that he got quite</i></p>

Name	Description	Examples
	anymore, or has outgrown certain aspects of it.	<p><i>good at it, and so I was kind of wanting to go a step up with an electrical, electric kind of iPad or something.</i></p> <p><i>Yeah, just because he started getting bored. I guess, cause it got a bit too easy for him</i></p>
School	Direct references to the child starting school in relation to AAC use and communication.	<p><i>my feelings like that changed a bit because I was like, yeah, it's not a forever thing for him. It's not the right tool for him to go into school with</i></p> <p><i>No. I feel like it'll help him in school when he goes, because it's gonna be a whole lot of new people, whole lot of new teachers, and they won't understand what he's trying to say. So it'll help him explain to them what he wants to say.</i></p>
Good quotes	Good quotes for use in thesis	
Training and coaching	Major topic - containing all interview data that relates to the training and coaching aspect of the intervention	
Coaching	Sub category of the training and coaching topic, relating to 1 to 1 coaching sessions at home	
Challenges	Category of codes relating to parents' perceptions of the challenges of participating in coaching sessions	
Child's behaviour	Where the child's behaviour negatively impacted the coaching or made it more difficult.	<p><i>because then we don't have get Blaineall worked up about a game that he was only allowed to play for, like 15 minutes and then had to go so that we could talk about</i></p>

Name	Description	Examples
		<p><i>the coaching</i></p> <p><i>There was a I guess a bit of time when Eli didn't want to, he kind of got put off with it I think, so that was a bit hard, so we kind of had a try again.</i></p> <p><i>Sometimes, Conrad would be happy to see her. And then sometimes he'd be like, a bit upset, or frustrated, because he'll just be hungry, and I didn't give him any food to eat. But as soon as he got the food, he was like, happy as.</i></p>
COVID	References to how Covid-19 interfered with the coaching process or made it more challenging.	<p><i>No, not really. I mean, obviously, it was harder during COVID times. But that's no one's fault. Literally no one's fault.</i></p> <p><i>No, I think, no, I don't think it did. I mean, COVID, and lockdown sort of put a damper on in between the sessions and stuff like that, but, I think maybe motivation-wise, when it was longer periods, because of outside influences, such as the lockdowns and COVID, I think that's what sort of changed my feelings towards it, like, God, it's been so ages. It was ages ago.</i></p>
Life busy time	Any challenges of coaching that relate to finding time, managing other commitments and family demands.	<p><i>with my family, because my family is very chaotic with like, so many kids. I've only got three, but it feels like so many kids and Blaine's very, like full on.</i></p> <p><i>No, I think, no, I don't think it did. I mean, COVID, and lockdown sort of put a damper on in between the sessions and stuff like that, but, I think maybe motivation-wise, when it was longer periods, because of outside influences, such as the lockdowns and COVID, I think that's what sort of changed my feelings towards it, like, God, it's been so ages. It was ages ago</i></p>

Name	Description	Examples
		<i>However, sometimes they went for quite a long time.</i>
Paperwork	References to the amount or nature of the paperwork involved in the coaching process being a challenge.	<i>But I remembered the plan, I never went back to it. Like I never was like, I'm gonna do this three or four times a week, I just kind of did it when the time was right. So it was kind of useful to just like, again, this is just me, some parents might have really enjoyed having it written down, but for me, like a conversation I could have just taken away from, do you know what I mean? Like the same thing, just from a conversation rather than writing it down.</i>
Video feedback	Aspects of video feedback that parents found challenging rather than helpful during coaching.	<i>Oh, I hated it, because I was like, so pregnant. I didn't like hearing my voice.</i>
Positives	Category of codes relating to parents' perceptions of the positive and helpful aspects of coaching	
Accountability	Relating to the coaching process having an effect on the parent's amount of practice or adherence to the strategies, or delivering on the action plans	<i>Good. I did find it useful because it was fun doing those games with Eli and he really enjoyed it. Some weeks were harder than others just because things pop up and we'd get busy, but he really enjoyed it. And when we could do it, we'd do it. And in workshops, you only can see the theory part, you can use that, you can use the strategies, you can cheat. But when she comes home she show us exactly how to use it. I think they were very helpful, and it put me back on the track of using the core board.</i>
General praise	Non-specific praise for coaching	<i>I think they were very helpful, and it put me back on the track of using the core</i>

Name	Description	Examples
		<p><i>board.</i></p> <p><i>Oh they were very helpful.</i></p> <p><i>I thought the coaching was all useful.</i></p>
Good outcomes	Coaching led to an improvement in adult's skills and child's communication skills	<p><i>it's like, I think I've got a lot better at communicating with him during the past year.</i></p> <p><i>there was one where she showed me how I could, if Eli did say sentence, how I could go back over and feed more words by saying the same thing but maybe adding a little extra.</i></p> <p><i>I think I have been using really good now, I have mastered, not mastered, but yes, I am really good at it now. Not mastered - I'm not like you are Sam but yes, definitely I know how to use it now.</i></p>
Growth and skill development	Relating to any references to learning new skills, developing confidence and autonomy, changing attitudes, increasing self-awareness or taking a more active role in the coaching process.	<p><i>it was weird, because I think watching the video back was probably the first time I've realised how fast I talk. Like, I know I talk and I'm comfortable with talking fast with you right now because you're an adult. But watching how I was like speaking to Blaine at the beginning. Like I was loving him, obviously. I wasn't like, that way. Anyway. But I would talk really fast like. So for a kid who was already having communication difficulties with his sounds and everything, it probably didn't help. So, but then, you know, it did force me to slow down as the time went on. So I do slow down when I talk to him now</i></p> <p><i>It was helpful to go back over through the videos, cause it's kind of good to look at what you were doing, if that makes sense? Because, in the moment, you can kind of just get caught up on trying to respond to what Sam is doing. But going back, I saw</i></p>

Name	Description	Examples
		<p><i>that he was actually trying to communicate more than what they saw in the moment. But I was just missing it because he was a bit too fast for me (laughs).</i></p> <p><i>Patience, I didn't have patience in the beginning. Because there's so many things going around in your life. And Sam always tell me like, if you ask her something to do, or she wants, then wait, wait. If you pointed something, wait for her to point it back.</i></p>
Personalised	Relating to coaching being individualised for each family, across environments, everyday situations, flexible in terms of time and activities, and personalised feedback	<p><i>I found them really helpful because I could ... Because Blaine's ... she just gave like, techniques that were different to the ones we'd done in the workshop, especially towards the end, where Blaine's language was developing.</i></p> <p><i>I think the personalised feedback is like super important.</i></p> <p><i>And I really like Sam's effort, like meeting other families and you know taking the time out and working around our time.</i></p>
Processes	Aspects of the coaching process that were found to be helpful	<p><i>It was helpful to go back over through the videos, cause it's kind of good to look at what you were doing, if that makes sense? Because, in the moment, you can kind of just get caught up on trying to respond to what Sam is doing. But going back, I saw that he was actually trying to communicate more than what they saw in the moment. But I was just missing it because he was a bit too fast for me (laughs).</i></p> <p><i>when Sam was doing some videos, he would say some words and I wouldn't even notice until she's mentioned it to me</i></p>

Name	Description	Examples
		<i>afterwards.</i>
Process and structure	Category of codes relating to the process of the coaching in this study	
Action plan	Specific references to the process of making and implementing an action plan.	<p><i>And then we'll talk about some strategies that maybe we could look at going forward and our goals for the next like, month or two, or longer between coachings. And then we would do a, honestly I can't remember, a spreadsheet, no, not a spreadsheet, a worksheet. I don't know, it was like a worksheet, we had to come up with activities.</i></p> <p><i>but like then she tell me I can get more words, like you can see what her favourite thing is, then then use the core board, she will use it with you.</i></p> <p><i>So it was like planning for next visit and so I could practice with him before Sam came.</i></p>
Coaching conversation	References to the process of discussing the video, receiving feedback and problem solving through a coaching conversation.	<p><i>And then Sam, we'd either meet over zoom during COVID or in person and we'd go over the video, and then we would go over ... she would say what do you see yourself using?</i></p> <p><i>she would watch me play with Eli and give me a couple tips if she thought I could do something a bit better.</i></p> <p><i>If there was any questions, or I felt like I wanted to work towards something else, or strengthen something else in the way of all those strategies, then we'd go through that. She just explained different ways to try and get Grace to learn,</i></p>
Evolution of	References to how coaching changed over time, whether due to adult	<i>Towards the end, we kind of developed a better routine of how it worked</i>

Name	Description	Examples
coaching	skill development, or changes in the child's communicative abilities.	<p><i>I mean, I just became more relaxed by the end of it. I just didn't really have any... like, Sam was just like normal by then (laughs), no, like, I just didn't really have any concerns.</i></p> <p><i>because she was already learning, it was more to extend her awareness and understanding of language and the process, so to speak, like the formation of the words. Like this is after the core board, because she'd started talking. So it was just, yeah, we ended up not even being able to use, needing the core board at all. So yeah, it was just all those extra open ended questions and just different stretches.</i></p>
Observation	References to the process of being observed, or observing the coach.	<p><i>she would watch me play with Eli and give me a couple tips if she thought I could do something a bit better.</i></p> <p><i>So in those visits, firstly, Sam see me what I am doing.</i></p> <p><i>it helped me practice while being observed, so that I could receive feedback after,</i></p>
Parent as key role	How the parents felt about being the key person to implement AAC and support it with their child.	<p><i>I guess I always thought that was that was my role anyway. So I never really thought about ... It's quite nerve wracking, like doing it, because you don't want to make it worse. But it's cool though. It's cool, because then you're actually like a part of it. And it makes more sense for me, who is with him more of the time and knows him better than anyone to be able to have the skills to do it myself as well, like, so if he was to need more speech therapy, which he probably does, like more specifically designed, not alternative, anyway. That's great, but at least I also now have more skills to be able to communicate with him. It makes sense to me to have the skills and</i></p>

Name	Description	Examples
		<p><i>me to also be able to teach my husband the skills, and my mother, who lives with us, so that everyone in our family, the people that he interacts with the most, are able to communicate with him in a way that like he can understand and that he can communicate with us in a way that we understand. And it just makes for happier whanau. So yeah, so I think it just made sense, honestly, like, it would be a little bit weird to like, just get someone in to come in and teach him like a core board or something, like once a fortnight, and then for me to not actually know how to do it for him. It just wouldn't make sense.</i></p> <p><i>I don't mind learning that stuff. Cause, you know, it's good as much people who are around him to kind of show him that.</i></p> <p><i>I find them helpful when something isn't working well and brainstorming ideas etc. because Sam has the education experience and I'm an expert in my child so it's always really useful and practical. Like ASD, not everything will always work for your child and their needs so it's personalised.</i></p>
Scene setting	The parents make reference to the coaching process of scene setting on arrival for a coaching session.	<p><i>So she would come, she would record, or she'd sit down and play with Eli for a bit</i></p> <p><i>So it would probably, Sam would arrive, she'd have a chat and a play with Grace. Then we'd talk about our plan, and everything like that.</i></p>
Video	Any references to the process of video feedback as part of the coaching process.	<p><i>And so I'd take a video and the video would be about 5/10 minutes long, just with him using the core board.</i></p> <p><i>it was weird, because I think watching the video back was probably the first time I've realised how fast I talk. Like, I know I talk and I'm comfortable with talking fast with</i></p>

Name	Description	Examples
		<p><i>you right now because you're an adult. But watching how I was like speaking to Blaine at the beginning. Like I was loving him, obviously. I wasn't like, that way. Anyway. But I would talk really fast like. So for a kid who was already having communication difficulties with his sounds and everything, it probably didn't help. So, but then, you know, it did force me to slow down as the time went on.</i></p> <p><i>Yeah, it was good. So when I watched myself back over the videos, because I saved some myself, I was able to kind of see what I could work on more, and then try and apply it for maybe that that little time between the videos or the next session with Sam.</i></p>
Zoom coach	References to coaching sessions held via zoom due to pandemic restrictions	<i>Yeah, we had a couple of sessions over zoom. But that didn't really bother me. You know, that was actually fine. It was just like, kind of difficult working out which one was better off?</i>
Relationship	Category of codes relating to the relationship developed during the coaching process.	
Building trust	The parent discusses how the coaching relationship built trust.	<p><i>Sam keep on telling me if I don't want to continue I can back off anytime I want. But I was like: no, if I have started it, I will finish it as well.</i></p> <p><i>with the help of Sam. She been amazing with me, and supporting me all the time. She never get frustrated with me, (laughing) I don't know maybe she did, but she never showed it to me (laughing). But yeah, she be amazing with me, I think.</i></p>

Name	Description	Examples
		<p><i>That I can open bit more with Sam when she is at my place. Share more about Tina and she helps in improving my strategies.</i></p>
Coach personal qualities	Where particular personal qualities of the coach helped to build the relationship	<p><i>But yeah, she was really helpful and yeah my kids adored her, so it was really cool.</i></p> <p><i>I just want to say thank you to Sam, that she been so nice to me and always, always supporting me with my decisions. And she never forced anything on me. And she always keep on saying that it's your decision if you want to continue you can and you can stop any time that you want.</i></p> <p><i>And yeah, just like her fun demeanor (laughs), her fun personality broke Grace really well, like it took a little bit, but she broke her to the point where Sam was now her friend. So yeah, Sam is now her friend (laughs).</i></p>
Coach skills and knowledge	Where the coach's professional skills and knowledge helped to build a positive relationship during coaching.	<p><i>I think Sam's ability to like, work out what he was saying in the end, was really cool as well. Because, I guess she listened to him so often on those recordings over and over again that sometimes she was able to pick out what he was saying when I was like: I have no idea what just happened.</i></p> <p><i>actions plans are really good because they can be wider, because I cannot think the way Sam thinks, and with those action plans at least I have something in writing and I can use those things to get more into core board with Tina. And those action plans are quite good and she can tell me "and you can use this and do this and you can use this" and I was like: oh yeah, I didn't think of that much but, yeah, those action plans do work a lot.</i></p> <p><i>Sam Brydon is a wonderful teacher who has created such a helpful means of</i></p>

Name	Description	Examples
		<p><i>communication for children with communication difficulties. If more parents were to take her course, there is no doubt that their children would be greatly benefitted by her knowledge and help. Thank you Sam.</i></p>
Effort	Comments about the effort and time put in by coach	<p><i>And, you know, it's it is really good effort of Sam to coming and teaching us and Tina and how to use the core board.</i></p>
Reciprocal	Where the parents reference that the relationship was equal or reciprocal between the coach and coachee.	<p><i>And hopefully we, as a part of this workshop, I think I help her, a little bit help her with her studies. Yeah, hopefully I been a good contribution in that study.</i></p> <p><i>I find them helpful when something isn't working well and brainstorming ideas etc. because Sam has the education experience and I'm an expert in my child so it's always really useful and practical.</i></p>
Relationship with child	Relating to a positive relationship between the coach and the child	<p><i>and Sam was great with Eli. Yeah.</i></p> <p><i>Oh, that was Tina's favourite thing. Like, Tina loves when Sam is around, like when she comes to our home and because she bring the box.</i></p> <p><i>And yeah, just like her fun demeanor (laughs), her fun personality broke Grace really well, like it took a little bit, but she broke her to the point where Sam was now her friend. So yeah, Sam is now her friend (laughs).</i></p>
Workshops	Sub category of the training and coaching topic, relating to the taught workshops / training / group sessions	
Benefits	Category of codes relating to aspects of the group	

Name	Description	Examples
Content and delivery	workshops that parents found beneficial Where aspects of the content or delivery of the workshops was described as beneficial.	<p><i>actually doing it in pairs and stuff was helpful. For me anyway.</i></p> <p><i>Yeah, definitely her teaching us strategies. Yeah, that was really useful. Because, you know, it's not something that you would kind of be able to learn by yourself.</i></p> <p><i>Yeah, the best thing is that for these workshop is they are giving so many equipments, or I don't know what the word I should use, to kids like Tina, or other like, they are giving strategies to tell them how to talk, you know, and it is the best thing.</i></p>
Peer support	Where the parent referenced that they gained benefit from support from other parents who have children with communication difficulties.	<p>it's been a really good experience with other mums, meeting other mums. Like talking to them, how they are feeling with the child.</p> <p>After this thing, like meeting other mums, they're talking, they're talking openly, like in the group and sitting in there saying things about their kids. And then that gave me a little bit confident to talk to anyone, like now I'm so open about Tina.</p> <p>they helped in the way, because you're learning alongside the other parents, you're learning alongside, with the prompts, with the objects, the to and fro between other parents as well, because they're in the same boat. We're all in the same boat, so just figuring out how it would work best for our kids.</p>
Challenges	Category of codes relating to aspects of the group workshops that parents found challenging	

Name	Description	Examples
Content and delivery	Aspects of the content and delivery or the workshops that could be improved or changed, or presented a challenge (other than time related)	<p><i>Some of the videos that we saw, were like the same videos (unintelligible), I think we have the same parents and stuff and each video would show us different examples. And I don't know if like, it just would have been cool to see videos of different types of examples for each thing. Because I would like watch a video and Sam would be like, so how do you see them doing this thing? Now, I'm too busy thinking about the same video you showed us last week where we were looking for a different thing like it's just for different things.</i></p> <p><i>You need to put more stuff on the computer! Like, it's 2022, why are you doing papers? Far out, that would be my main piece of advice, is go into 2022. But no, it was cool.</i></p> <p><i>And in workshops, you only can see the theory part, you can use that, you can use the strategies, you can cheat.</i></p>
Time related	Any references to the timing of the workshops that is presented as a negative or a challenge	<p><i>Finding time for the workshops was quite as hard as well. Well the workshops themselves were easy, it was finding time that was hard for them and getting out of work. That was challenging.</i></p> <p><i>I feel it could have been longer, like the workshops could have been longer.</i></p> <p><i>I definitely think this will only be as useful as the people / parents / caregivers putting in the effort. It's been a big commitment but it's already so worth it.</i></p>
Information	Category of codes relating to knowledge gained through the intervention and the taught AAC support strategies.	

Name	Description	Examples
Increased knowledge	How access to information increased knowledge and understanding during the workshops / coaching	<p><i>We realised that like Blaine loves people games and I just like never really played them with him because, well not properly, because I didn't really understand how he like communicated properly. I don't know. But yeah, he really loves using them. Yeah, so that was something we did a lot of</i></p> <p><i>Yeah, definitely her teaching us strategies. Yeah, that was really useful. Because, you know, it's not something that you would kind of be able to learn by yourself.</i></p> <p><i>But then as I was using it, I'd get in to learning, get into knowing where all the symbols were.</i></p>
Strategies	Any reference to the strategies that were taught in the workshops and reinforced during the coaching sessions.	<p><i>So what about repetition? (mutters to self) so repeat, correct and act, so responding to communication. So the repeating back was helpful, like when he like touched a word and we would repeat the word, like I think that's what it was. Yeah, and another one that was, people games</i></p> <p><i>I would say, he likes, well sometimes we kind of have to shake the board in front of him and remind him to use it,</i></p> <p><i>creating opportunities was good, because you know, it's easy to just get it out at certain times, like evening, but finding creative ways to incorporate it in normal day stuff. Yeah</i></p>

Appendix 14: Ethics Acceptance Letter



Date: 30 March 2020

Dear Sam Brydon

Re: Ethics Notification - **SOA 20/05 - Supporting Parents to Implement a Core Communication Board with Children who have Complex Communication Needs: A Multiple Case Study Design**

Thank you for the above application that was considered by the Massey University Human Ethics Committee: Human Ethics Southern A Committee at their meeting held on Monday, 30 March, 2020.

Approval is for three years. If this project has not been completed within three years from the date of this letter, reapproval must be requested.

If the nature, content, location, procedures or personnel of your approved application change, please advise the Secretary of the Committee.

Yours sincerely

Professor Craig Johnson
Chair, Human Ethics Chairs' Committee and Director (Research Ethics)