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# Video Self-Modelling as an Intervention for Oral Reading Fluency In Year 3 Students

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A thesis presented in partial fulfillment of the requirements for the degree of

Master of Educational Psychology

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**Declaration**

I certify that the thesis entitled "Video Self-Modelling as an Intervention for Oral Reading Fluency In Year 3 Students" and submitted as part of the degree of Master of Educational Psychology is the result of my own work, except where otherwise acknowledged, and that this research paper (or part of the same) has not been submitted for any other degree to any other university or institution.

Signed_____

Date_____

## Abstract

Video Self-Modelling (VSM) is an intervention that allows individuals to observe exemplary instances of their own behaviour on video in order to increase the probability of that behaviour occurring again. VSM has been used to teach and strengthen various behaviours such as increasing verbal communications, reducing aggressive behaviors, improving written language skills, teaching cooking skills, and reducing fidgeting and distractibility. However little research has been conducted on VSM as an intervention to increase oral reading fluency. Therefore the intent of this study was to examine Video Self-Modelling as an intervention to improve reading fluency for Primary school students. The participants were four Year 3 students who were behind their peers in reading but not currently receiving special assistance in reading. Participants were video-taped reading a passage of text and any mistakes, pauses, and hesitations were edited out using iMovie. Each participant viewed themselves reading fluently on a DVD before school for 2 weeks. Oral reading fluency was regularly assessed before, during, and after the intervention. Results indicated that three out of four participants made immediate gains in reading fluency after viewing the DVD's but the positive effects appeared to diminish over time. Practical implications are discussed.

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# Video Self-Modelling as an Intervention for Oral Reading Fluency In Year 3 Students

Learning to read fluently is a vital part of the reading process. Research clearly shows there is a link between simple fluency measures and comprehension (Fuchs, Fuchs, Hosp, & Jenkins, 2001: Kim, Petscher, Schatschneider, & Foorman, 2010), with comprehension being the ultimate goal of any reading instruction. As Pikulski (2006, p. 73) points out

> "Reading fluency is a developmental process that refers to efficient, effective decoding skills that permit a reader to comprehend text. There is a reciprocal relationship between decoding and comprehension. Fluency is manifested in accurate, rapid, expressive oral reading and is applied during, and makes possible, silent-reading comprehension."

Therefore it is of utmost importance to ensure those children who are struggling to read are able to read fluently. There are a number of interventions that have shown to improve reading fluency that aim to increase students' accurate and automatic word recognition, assist with their comprehension, and promote the use of prosodic features such as stress, pitch, and suitable phrasing. A key aspect of these approaches is that they provide learners with scaffolded opportunities to read connected text with support through either adult feedback or modelling. Therefore, if modelling is a successful component of fluency instruction, would it be more effective if the participant themselves was the model?

Video-self modelling (VSM) is a cognitive-behavioural technique that enables participants to see themselves performing a target behaviour (in this case reading fluently) that is outside their usual repertoire. A student is video-taped reading a passage of text with assistance and prompting for words they don't know. The tape is then edited on the computer. The prompting and assistance is edited out and slow and halting speech is speeded up. What is left is a video of the participant reading fluently at an appropriate speed with no mistakes.

Hitchcock, Prater, and Dowrick (2004) used VSM in combination with tutoring to improve the reading fluency rates and comprehension of three students with special needs. Their results indicated that viewing the self-modelling video tapes was associated with reduced variability in the data and maintenance of increased performance. Dowrick, Kim-Rupnow, and Power (2006) used a combination of VSM and tutoring in an attempt to improve reading fluency for 10 students with special needs. Their results indicated significant improvements in reading fluency for all students and in 9 out of 10 cases the rate of improvement was greatest when VSM was used.

The purpose of this study is to examine whether VSM by itself can improve reading fluency on children who are not classified as special needs, but are simply behind their peers in reading. This group of "delayed readers" as defined by Catts and Kamhi (2005), eventually gain accurate and fluent word recognition skills, but at a considerably slower pace than their peers. Although they have the potential to learn advanced comprehension skills and strategies, they are usually less sophisticated than their peers. This will become more problematic when the student reaches High School and are faced with greater reading expectations. By using VSM to target this group the intent is to achieve two main objectives: (a) Improve reading fluency to a point where participants are equal to their peers, and (b) Avoid the "Matthew effects" in reading where poor readers find reading difficult and time consuming and so are likely to read less (Stanovich, 1986). Poor readers can be trapped in a downward spiral of decreased motivation, expectations, and reading practice which is difficult to escaping (Spear-Swerling & Sternberg, 1996).

# Reading Fluency

The concept of reading fluency has gained momentum in recent years and has been recognized as a critical component of reading (Samuels & Farstrup, 2006). It is now widely accepted that oral reading fluency scores in a child's first year of school are strong predictors of their reading comprehension scores in later years (Kim, Petscher, Schatschneider, & Foorman, 2010). Reading fluency is a complex construct that needs to be fully understood before assessment tools and comprehensive interventions can be used successfully. The way the construct is defined has critical implications for who is diagnosed and how interventions are constructed and evaluated. Most researchers argue strongly for a definition of fluency that is developmental- and component-based where rate and speed are characteristics of the components and sub-skills of reading, and where accuracy and automaticity are accessible outcome stages of reading and reading fluency (Wolf & Katzier Cohen, 2001). Within this complex view there is much debate over how much individual component processes contribute to fluency.

However, there seems to be consensus in the research that there are three main components to reading fluency: accuracy in decoding, automaticity and prosody (Kuhn & Stahl, 2003). Accurate decoding means the ability to generate a phonological representation of each printed word on the page (Samuels, 2006). There is overwhelming evidence to show that struggling readers do make progress if they are given systematic decoding instruction (Ryder, Tunmer, & Greaney, 2008).

LaBerge and Samuels (1974 presented an automaticity theory of reading arguing that automatic recognition skills underlie fluent reading and fluency's role in adequate comprehension of text. According to Logan's (1997) work on automaticity theory, processes are considered automatic when they possess four properties: speed, effortlessness, autonomy, and lack of conscious awareness. Speed is thought to emerge concurrently with accuracy and

as a learner becomes more accurate they become faster. However this is subject to the "power law" which states that such gains are largest early on and diminish with further practice. Effortlessness in regards to reading fluency can be described as unitization, a process by which the sequential steps of word recognition are collapsed so that words or phrases are retrieved from long-term memory in larger units rather than sounding out the individual phonemes in a word. Effortlessness can also be seen in the way fluent readers decode text while simultaneously comprehend what they are reading. Inefficient word recognition means this process does not become automatic leaving inadequate resources remaining to focus on comprehension. Automatic processes are also autonomous: they occur without intention. Fluent readers have little choice but to recognize words as they encounter them. This is closely related to the lack of conscious awareness. Once the lower level word recognition skills become automatic, the conscious awareness of the sub-skills that comprise them disappears. Using automaticity theory as a base for a definition, reading fluency is defined as the ability to decode and comprehend at the same time (Samuels, 2006).

Although fluent reading is characterized by reading at an appropriate rate another critical component of reading fluency is the ability to read with prosody, that is; with appropriate expression, intonation, and phrasing (Kuhn, Schwanenflugel, & Meisinger, 2010). Some prosodic features important in language are pitch, duration, stress, and pausing. Prosody provides a variety of natural breakpoints in continuous speech for the listener to parse the information. Some studies have suggested a link between prosody and comprehension in later school years (Whalley & Hansen, 2006; Rasinski, Rilki, & Johnston, 2009) but there has been relatively little research that focuses on the role of prosody in reading fluency and its relationship to reading comprehension. Although prosody is usually mentioned in the literature, it is rarely assessed in classrooms or research (Rasinski et al.).

How reading fluency is defined will determine what interventions are used to improve it. The oldest and most commonly used method for facilitating fluency is the repeated reading technique, based on Samuels (1979) automaticity theory. Readers read a passage of connected text at a level appropriate to the learner several times until a particular reading rate (words per minute) is attained. The aim is to build a large repertoire of quickly identified words. However research has shown that although repeated readings can enhance reading speed, comprehension, and expression; this enhancement is not guaranteed and generalisation of these effects to new text is not automatic. This is especially the case where the new texts contain few or none of the words practiced (Topping, 2006). Lo, Cooke, and Starling (2011) used a repeated reading program combining several research-based components - error correction, adult modelling, and performance cueing and feedback. They found that this combination improved fluency on second-grade transfer for all three participants. However they allowed that it is not possible to determine the extent to which any particular component or combination of components contributed to the positive outcomes.

Other methods to improve fluency typically involve some combination of modelling, practice, prompting, scaffolding, and feedback. Listening-while-reading interventions include talking books, taped words, assisted reading, and computer assisted reading. Modelling, neurological impress (i.e., the theory that suggests listening while reading may occasion or "impress" neurological changes which may allow for more rapid readings), and drill and practice processes have been used to explain why listening-while-reading procedures may increase students' rates of reading (Skinner & Logan, 1997). It may be that such interventions are effective simply because of the additional opportunities to practice reading. Kuhn et al (2006) examined the effects of two instructional approaches designed to improve the reading fluency of 2$^{nd}$-grade children. One involved scaffolded repeated reading of three texts over a week (repeated reading) and the other involved scaffolded instruction

and reading of three different texts (wide reading) which provided much less opportunity for repetition. Both interventions produced useful gains in word reading efficiency and reading comprehension relative to a control classroom, although the wide-reading approach produced benefits earlier and included oral reading fluency skill. Kuhn et al (2006) emphasized that a key ingredient in both fluency interventions is the coherent focus on the oral reading of texts. They concluded that any intervention that increases the amount of time children spend reading challenging connected text with the proper scaffolds will lead to improvements in fluency.

Interventions that simply address the phonological, orthographic, and semantic deficits are only dealing with half the problem. One of the biggest hurdles facing struggling readers is their motivation to read and their engagement with language (Stanovich, 1986). For many children, negative feelings about reading can begin as early as the first year of school which can inhibit their self-confidence (Nicholson, 2003). Logan, Medford, and Huges (2011) found that intrinsic motivation (in addition to cognitive skills used in reading such as background knowledge, strategy use, phonological decoding skills) may explain significant variance in reading skill in groups of low ability readers. It is well established that the best thing for learning to read is reading. Children need to read large amounts of text to encounter words frequently enough to build word-specific orthographic representations (Troia, 2004). As children get better at reading they are exposed to more print and become better readers. Children who find reading difficult tend to avoid reading and so are not exposed to the same amount of print. As time passes they fall further below their peers and the gap between them widens. Their self-belief is eroded and their motivation reduced (Spear-Swerling & Sternberg, 1996). Allington (2006) discusses the importance of "high-success" reading experiences, which are those characterized by accurate, fluent reading, and good understanding of the text that was read. He argues that children fail to develop fluency

because they have limited reading practice, particularly in high-success texts. It is important to try to re-engage these children with reading before it is too late. Bandura's (1989) work on self-efficacy indicated that self-beliefs of efficacy can enhance or impair performance through their effects on cognitive, affective or motivational intervening processes. Video self-modelling is a cognitive-behavioural technique that specifically addresses this problem.

## Video Self-Modelling

Video Self-Modelling (VSM) is an intervention technique that allows individuals to observe exemplary instances of their own behaviour on video in order to increase the probability of that behaviour occurring again. The behaviour is seen from the visual perspective of the person who needs to acquire the behaviour. Much of the research in this area stems from Bandura's (1977) social learning theory with its emphasis on observational learning (modelling) and self-efficacy. According to Bandura's theory of observational learning, there are four components in the process of modelling: (1) the observer must attend to events that are modelled, (2) material must be retained, (3) symbolic representation of the behaviour is converted into appropriate actions similar to the originally modelled behaviour, and (4) there must be sufficient incentive to motivate the actual performance of modelled actions. Bandura (1986) argues the potency of the model in changing targeted behaviour is related to the similarities between the model and the observer. VSM maximises this similarity by using the individuals themselves as the model.

Bandura also believed that self-efficacy is a unifying contribution in behaviour change. According to Bandura, self-efficacy is a belief in a person's own capabilities to organize and execute the courses of action required to reach certain goals (Bandura, 1986). He described self-modelling as providing the essential elements of self-efficacy. When observing a self-image the observer pays more attention, and if the demonstrated behaviour is

valued, it provides an obvious source of self-belief. By contrast, an image of someone else produces less attention and is a weaker source of self-efficacy (Dowrick, 1999).

Another guiding principle in the area of VSM research is Vygotsky's (1978) zone of proximal development. According to this theory learning is most efficient in the zone of proximal development; that is, when information to be learned is just beyond current knowledge but closely related to it. VSM shows the observed success as slightly above the individual's current capability so therefore creates learning in the zone of proximal development (Dowrick, Kim-Rupnow, & Power, 2006).

VSM has been used in a wide range of contexts and across many ages since the 1970's (see Buggey, 2007, for a review). The majority of research on VSM has been with individuals diagnosed with Autism Spectrum Disorder (ASD) (see Shukla-Mehta, Miller & Callahan, 2010, for a review). It has only been since the 1990's, however, that VSM has gained popularity as an intervention technique within an educational context. Hitchcock, Dowrick, and Prater (2003) conducted a thorough review of the literature on VSM in school-based settings. They identified 18 studies that met their criteria and represent a comprehensive selection of research looking at VSM in an educational context. Four studies defined their dependent variables as disruptive behaviour, four studies used compliant classroom behaviour, six studies included language responses, one study targeted quality of peer relationships, one addressed adaptive behaviour, two addressed mathematics skills, and two targeted reading fluency. Of the 129 participants across the studies, 58 were identified as having a disability and 71 were identified as being at risk because of low academic achievement. All participants were between 3 to 17 years. They found the data in all studies showed clear evidence of positive outcomes relating to the intervention. Sixteen of the studies assessed maintenance of treatment effects (reported from between 2 days and 2 years) and of those, 15 showed successful short- or long-term maintenance. Thirteen of the studies

assessed generalization of treatment effects, and 10 showed clear positive evidence of generalization. The remaining three showed mixed evidence.

This data indicate that VSM can be useful for looking at a variety of skills within an educational context and the likelihood of some measure of success is strong. The studies provide evidence for increases in rate or frequency of desired behaviours and performance of academic skills as well as decreases in inappropriate behaviour. Many studies also reported increased motivation and positive reports from peers, teachers, and parents. However it is interesting to note that only four studies to date have focussed on using VSM as an intervention for acquiring academic skills. Research in the area of VSM has primarily focussed on behaviour change.

VSM can be divided into two categories that define the difference between images of future and past success: *feedforward* and *positive self-review* (Dowrick, 1991). *Feedforward* (as contrasted with feedback) is a term that refers to video images of "future adaptive behaviour not previously evident" (Dowrick, p. 110). These images are created by prompting the appropriate skill, or editing component skills together to produce a sample of the desired behaviour (Hitchcock et al., 2004). It is consistent with Vygotsky's (1978) zone of optimal performance, and has obvious links to self-efficacy. Individual can see themselves performing the behaviour, and so develop the self-belief that they can do it. Feedforward is best used to acquire new skills. Conversely, *positive self-review* is best suited to improving the rate of behaviour that is below the desired level, whether it has not yet reached that level or has failed to maintain the behaviour at the desired level. It refers to the "selective review of superior performances drawn from the current repertoire" (Dowrick, p. 113). This process tends to result in images of adaptive behaviour as fine-tuned examples of the best the individual has been able to produce thus far (Dowrick). Positive self-review is often used to

improve sporting performance such as gymnastics. This study uses the concept of feedforward to create images of successful reading that the participant has yet to achieve.

**Summary**

It is clear from the literature that interventions to improve reading fluency are vital for poor readers in order to improve their reading comprehension (Kim et al, 2010). These readers who struggle more than their peers but who are not currently receiving any extra reading assistance may continue to struggle in later school years where the focus moves from learning to read to reading for learning (Catts & Kamhi, 2005). Poor readers may also experience decreased motivation to read, which means they read less and have fewer successful reading opportunities. It is important to provide these students with high-success opportunities encouraging the poor reader to read more (Rasinski, 2006). VSM provides an opportunity for the poor reader to see him or herself reading, and so increase his or her belief that he or she can succeed (Dowrick et al, 2006). VSM has been used successfully across many settings and behaviours (Buggey, 2007). Although much of the research has focussed on overt behaviours, it has yet to be fully examined for skill acquisition such as reading.

Thus, the purpose of the present study was to determine whether VSM alone can be used to improve reading fluency for students who are not reading disabled but who are behind their peers in reading. It is hoped that this intervention will maintain student engagement in reading and avoid the possible negative outcomes that afflicts many poor readers.

**Hypothesis**

A student with reading fluency difficulties who is behind their peers in reading but is not currently receiving any reading assistance other than the classroom instruction will watch themselves reading fluently on video for 2 minutes before school each day for 2 weeks. They

will improve reading fluency, as measured by the number of correct words read in one minute, by 15 words per minute.

# Method

## Participants and Setting

The four participants (three male and one female) were all Year 3 students at the same school in Napier, spread across two classrooms. They were identified by their teachers as being behind their peers in reading but were not being singled out for any specialized group or individualized reading interventions beyond the core reading instruction. In both classrooms, the participants were in the lowest reading group. In one classroom, another girl in the same reading group was excluded from the study as she was participating in the Reading Rainbow programme. In the other class two boys in the same reading group were excluded, one as he was in Reading Recovery and the other as English was not his first language. The ages of the participants ranged from 7 years, 3 months to 8 years ,1 month at the beginning of the study. Three of the children had previously been in Reading Recovery and had been discontinued from the programme at the end of the previous school year. None had disciplinary records.

## Measures

Oral reading fluency was regularly assessed with pairs of 1-min probes as a curriculum-based measure (CBM) of progress, as used in Dowricket al. (2006). *Curriculum-based* means the passages from which the students read orally were selected directly from the curriculum of the school. This ensured a close connection between the materials used for instruction and how student progress was measured (Deno & Marston, 2006). Curriculum-based measures provide data that are reliable, valid, simple to use, and easy to understand whether adequate progress is being made (Ditowsky & Koonce, 2009). Fuchs, Fuchs, Hosp, and Jenkins (2001) found this type of fluency measure correlates strongly with standard reading comprehension measures and Jenkins et al. (2003) found it an especially strong predictor of reading comprehension with weaker readers.

One of the most important features of CBM is that passage oral-reading performance is repeatedly sampled. The repeated observations of performance require the student to read passages that are of the same difficulty level, but that each passage is different. Different passages from the same text can be used. In this way the skills the participant are learning can be seen to be generalised, which is how we know the intervention is achieving its desired outcomes (Deno & Marston, 2006). The extensive research that has been done on CGM has "provided a basis for concluding that the number of words read aloud from text in one minute may be the best available measure of reading fluency" (Deno & Marston, p180). Oral reading fluency was assessed before, during, and after the video self-modelling intervention.

**Equipment**

Participants were videotaped using a Sony Handycam DCR-DVD605E digitial video camera recorder. A tripod was used to maintain stability. Video footage was downloaded to an Apple Macintosh computer and edited with i-Movie (2011) software.

**Procedure**

Baseline data were gathered on all the participants in the study. Passages without illustrations were randomly selected from the PM Benchmark series widely used in New Zealand primary schools. Each passage was two levels above the students reading level at the beginning of the study (Level 21 for three of the students, Level 19 for one). This was done to ensure the students in the study had never before seen the text they were reading. If the students had already encountered the text it could greatly improve their reading fluency. In a review of fluency practices, Kuhn and Stahl (2003) found that the most successful approaches to fluency involve students reading at instructional-level text or test at the frustration level with strong support.

Each student was asked to read aloud for one minute. If he or she hesitated for more than 3 seconds, the child was given the word and encouraged to go on. If they student said a

word wrong, he or she was corrected and encouraged to go on. At the end of the minute the number of correct words was added up. To reduce variability of performance, each student was given two passages to read per session and the mean of the two was recorded as a single data point (Dowrick et al., 2006).

After baseline was established, the video self-modelling intervention was put into place. The students were given a passage to read, this time slightly more difficult at PM Reading Level 22. According to Vygotsky's (1978) theory, learning is most efficient in the zone of proximal development. This is where the information to be learnt is just beyond current knowledge but closely related to it. With reading this relates to performance that is possible with some adult support.

The students were video recorded reading the more challenging passage, and the tape was edited to show the student reading the passage fluently. Each finished tape was between 1 minute, 55 seconds and 2 minutes, 15 seconds long. Buggey (2007) states that self-modelling tapes need not be longer than 2 or 3 minutes to get the desired effects provided the student can attend to the video. The images of each student reading fluently were achieved by capturing the child's echo reading and editing out parts where the researcher helped the student with a word. Where the student's reading was slow or halting pauses were cut from the edited copy to show the student reading at a fluent pace. The finished DVD had a menu screen that played music and had images of the student reading with their name on it. From the menu the student can access the actual "movie" of them reading. As Dowrick (2006) pointed out, it was important to show the student successfully reading difficult words rather than the easier choice of selecting better known words, based on the principle of feedforward.

Each student was shown the finished DVD before school for 2 weeks. This was done in a room without distractions. No comments were made about the DVD while the student

was watching it, although the researcher remained in the room with the student to ensure they attended to it. (Buggey, 2005; Wert & Neisworth, 2003).

**Design**

A multiple-baseline-across-individuals design was used for the study with four participants. Video self-modelling was the independent variable and oral reading fluency as measured by number of correct words per minute was the dependent variable. The multiple-baseline design makes it possible to analyse how the intervention affects more than one subject, and draw conclusions about the functional relationship between the independent variable and the dependent variable (Alberto & Troutman, 2009). Buggey (2005) used a multiple baseline design across individuals to evaluate the effectiveness of video self-modelling to instruct positive social interactions with middle school boys diagnosed with Asperger's syndrome.

Data were analysed using visual analysis and percentage of non-overlapping data( PND). PND is determined by calculating the percentage of intervention data point that do not overlap with the highest baseline data point. Scruggs and Mastropieri (2001) advocate the use of PND in synthesizing single-subject research for two reasons. Firstly, conventional effect size computations are derived theoretically from procedures used in inferential statistics. This is problematic as data in single-subject research is non-independent, violating the primary assumption of inferential statistics, independence. Secondly, many single-subject studies include relatively few data points that may inflate the effect size. Scruggs and Mastropieri (2001) suggest that PND scores above 90 represent very effective interventions, 70 to 90 represent effective interventions, scores from 50 to 70 are questionable and scores below 50 are ineffective.

**Inter-Observer Reliability**

For 21% of the one-minute fluency probes (4 out of 19 sessions for each participant) a teacher aide at the school also listened to the participants read to provide inter-observer reliability. She timed the session and recorded the number of correct words per minute just as the researcher did. However it was only the researcher who corrected the participant or helped with a word. Dividing the number of sessions where both recorders agreed by the total number of sessions and multiplying by 100 calculated the percentage of agreement. The percentage of agreement for all sessions was 93.75%.

**Ethical considerations**

This study involved children who were unable to give informed consent. Informed consent was obtained from their parents (Appendix A) and the Principal (Appendix B) , and written consent was obtained from the participants themselves (Appendix C). Their names have been changed in the study to protect their identity. A cultural advisor was appointed to advise on any cultural issues that may affect the participants (Appendix E). Data were kept in a secure drawer and video footage was deleted and destroyed after the duration of the study. The study has been fully considered by the Human Ethics Committee: Northern and was approved on 29th June 2011, MUHECN 11/038 (see Appendix D).

## Results

Figure 1 shows the graphic display of the participants correct words read per minute before, during and after the VSM intervention. Effect size was measured using percentage of non-overlapping data (PND).

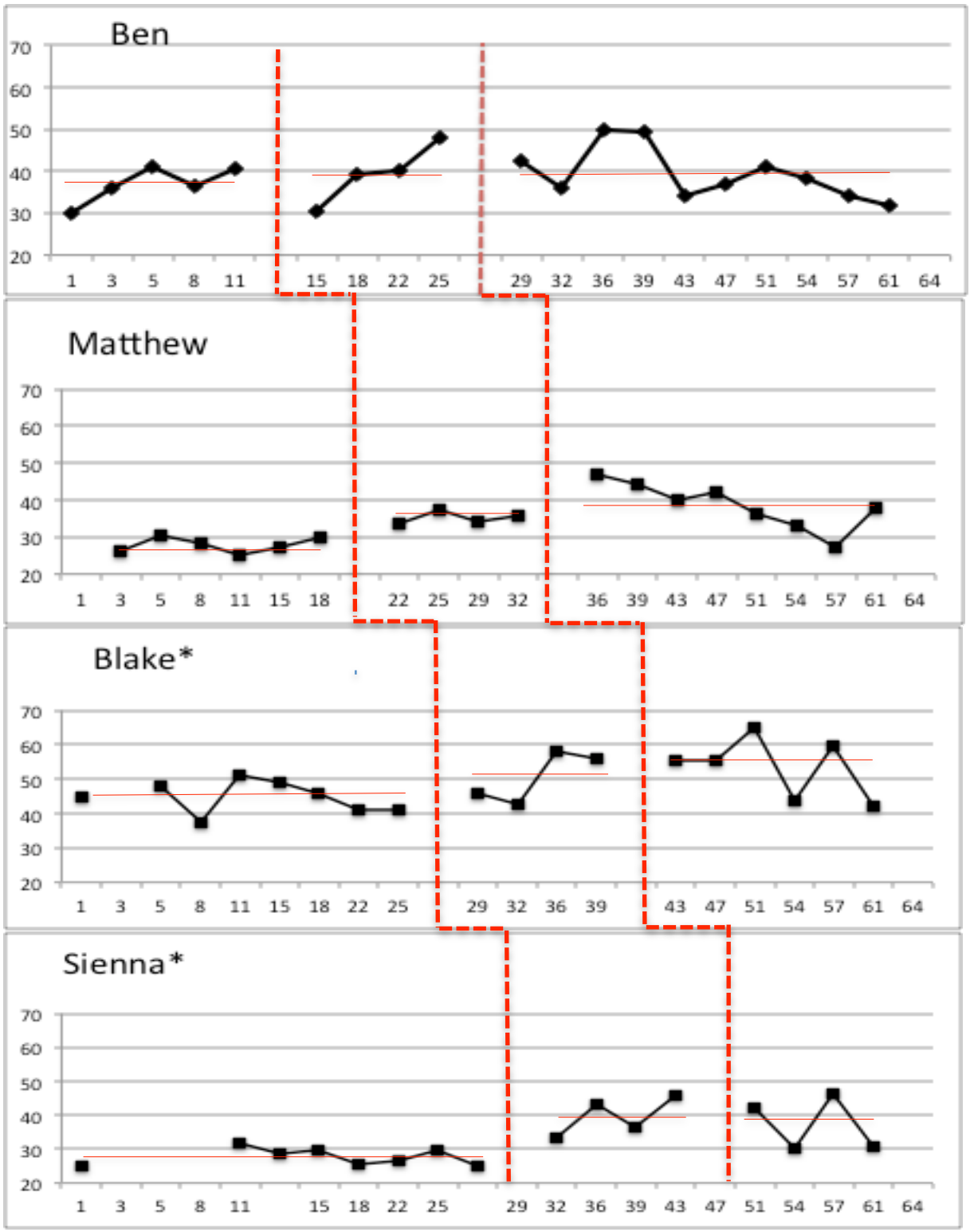
**Ben**

As can be seen in Figure 1, during baseline Ben scored between 30 and 41 words per minute with a mean of 36.8 (see Table 1). He had an ascending baseline which you might expect with reading, as the child is expected to make some improvement with regular classroom instruction. During the implementation of VSM he initially went down but then made some improvements. However the PND was 25% (see Table 2) indicating he did not move far from baseline. His mean score during the intervention was 39.4 (range 30.5 – 48). After the intervention his scores were erratic, returning to baseline in some cases. His mean score in this phase was 39.5 (range 32-49.5). From baseline to post-intervention the PND was only 29%, indicating this was not an effective intervention for Ben. Over the 2 month course of the study Ben improved his reading fluency scores by 3.5 words per minute, the smallest effect of any of the participants. His erratic patterns of behaviour meant no conclusions could be drawn about the efficacy of the intervention from his data.

**Matthew**

Figure 1 shows Matthew's baseline data were relatively stable with a mean score of 27.8 words per minute (range 25-30.5). During VSM implementation his mean score went up to 35.25 words per minute (range 33.5-37.5) an increase of 7.45 words per minute (see Table 1). The PND was 100% (see Table 2). After the intervention his scores were initially higher again, with the mean of the first four data points post-intervention increasing by 8

*Fig 1 Participants number of correct words per minute before, during and after VSM*




**Number of Days**

* Blake was absent on Day 3 and Sienna was absent Days 2-10.

*Table 1: Mean Words Read Correctly Per Minute before, during and after VSM*

| | **Mean Words Per Minute** | | | |
|---|---|---|---|---|
| | Pre-VSM | During VSM | Post-VSM | Tot Increase |
| Ben | 36.8 | 39.4 | 39.5 | 2.7 |
| Matthew | 27.8 | 35.3 | 38.5 | 10.7 |
| Blake | 44.8 | 50.6 | 53.6 | 8.8 |
| Sienna | 27.7 | 39.9 | 37.4 | 9.7 |

*Table 2: Percentage of Non-Overlapping Data Points*

| | **Percentage (%) of Non-Overlapping DataPoints** | |
|---|---|---|
| | Pre-VSM to VSM | Pre-VSM to Post-VSM |
| Ben | 25 | 29 |
| Matthew | 100 | 91 |
| Blake | 50 | 60 |
| Sienna | 100 | 75 |

words per minute to 43.4 words per minute. Once again the PNDs was 100%. However over the next few sessions his scores decreased steadily until they were nearly back at baseline levels. The mean of all of Matthew's post-intervention scores was 38.5 words per minute, which was an increase of nearly nine words per minute. Visual inspection of the data shows a general lessening of the effect the further Matthew went away from the intervention phase. Although the PND from baseline to post-intervention was still 91%. The intervention

appeared to be successful for Matthew at first but the effects diminished after the intervention was completed and the effects were not maintained.

**Blake**

Baseline data for Blake had some variability at the start but became relatively stable over time (see Figure 1). His mean score during baseline as shown in Table 1 was 44.8 words per minute (range 37.5 – 49). During the intervention his scores remained at baseline at first but showed a sharp increase halfway through the intervention. The mean score during the VSM implementation was 50.6 (range 42.5 – 58), an increase of almost six words per minute. Post-intervention his scores remained higher than baseline for all except two data points, with the overall mean increasing to 53.5(range 42-65) words per minute. Table 2 shows from baseline to intervention the PND is 50% but baseline to post-intervention is 60%. Over the course of the study his mean scores improved by almost nine words per minute. The intervention did seem to have an effect on Blake's scores, albeit not a strong one.

**Sienna**

Figure 1 shows Sienna's baseline data was stable and she showed very little improvement in the 25 days before VSM was implemented. Table 1 shows her mean score during baseline was 27.8 words per minute (range 25-32). During intervention her scores immediately increased with a mean of 39.8 words per minute (range 33.5 – 46). The PND from baseline to intervention was 100% (see Table 2). During the post-intervention phase her scores were a little more erratic and her mean decreased to 37.4 words per minute (range 31-46.5). However her mean score still increased by nearly 10 words per minute. The PND from baseline to post-intervention was 75% showing the intervention was successful for Sienna.

Overall, all participants made gains in their reading fluency with the mean scores increasing between 3.5 and 10 words per minute. Three out of four of the participants' mean

scores increased between 8.5 and 10 words per minute. The PND scores were 29%, 91%, 60%, and 75% respectively, showing the VSM intervention was not successful for one participant, questionable for one participant, successful for one participant and highly successful for the other participant. The effects are particularly noticeable in Matthew and Sienna's data where the baselines were relatively stable. All participants did not appear to maintain their gains over time and there were some inconsistent performances by Blake and Sienna as they moved away from the intervention. For Matthew and Sienna who had the highest PND scores the effects of the intervention appeared to diminish gradually over time.

## Discussion

Despite the evidence that VSM can be useful in the area of skill acquisition it has been under-utilised in schools for literacy development. This is due in part to the technological difficulties that have always been associated with producing the DVD's. As put by Dowrick and colleagues (2006, p. 205) "school personnel have made it clear they seldom have the time and inclination to pursue additional technology, even when the empirical evidence is clear that it will help their students in leaps and bounds." However technology is constantly improving and much of the technology required to edit the tape recording is now available on home computers. Hand held video devices are now commonplace which paves the way for "real-time" VSM that can be applied to direct situations as they arise. Cihak, Fahrenkrog, Ayres, and Smith (2010) examined this concept in terms of using someone else as a model, so it is only a matter of time before it is applied to a study using VSM.

While the effects of the VSM intervention are not dramatic in this study, there is enough of a pattern of improvement across three out of four participants to draw some positive conclusions about the efficacy of VSM as an intervention for those children who are slower to learn to read than their peers. Three out of four participants made some improvement immediately or soon after the VSM was implemented. For two of these participants, the improvement was immediate and significant with 100% PND from baseline to intervention. With the other participant the effect was apparent after one week of intervention. This is significant bearing in mind the lack of improvement these students had shown previous to the study. All three had relatively stable baselines especially in the case of Sienna, who showed almost no improvement in the weeks prior to the VSM intervention.

Although there were short-term immediate gains for most of the participants, the problem seems to be maintaining these gains over time. In every case as time passed their reading fluency rate gradually decreased which indicates the gains were not maintained. This lack of maintenance is in stark contrast to most of the literature on VSM which shows the gains made by VSM are usually immediate, are maintained over time and are often generalized to other settings (Wert & Neisworth, 2003; Bellini & Akullian, 2007; Buggey, 2007). Both Hitchcock et al. (2004) and Dowrick (2006) used VSM in conjunction with tutoring and found the gains made using VSM and tutoring were greater than the gains made by tutoring alone. In the former, viewing the VSM videotapes was associated with reduced variability and maintenance of increased gains.

Despite this evidence, the present study suggests that the gains made by VSM alone may be time-limited. It is possible that the students simply caught up to the level of the recorded passage which meant the principle of feedforward was no longer applicable. However none of the participants had progressed within their class reading groups to PM Benchmark Level 22 (the reading level of the passage) so this is unlikely. It seems that while the participants were actually watching the DVD it had positive effects on their reading fluency and these effects diminished the further away from the intervention they got. Ideally if time permitted, the VSM would have been reinstated to see if this had a further impact on the results.

It is important to remember that these students were in the bottom group in their class and had not made reading gains consistent with their classmates. This suggests that their oral reading fluency scores would be resistant to change with regular classroom instruction. Therefore even though the success in this study was minimal, the fact that there was movement at all indicates that VSM could be an effective intervention for children who are slower learning to read than their peers.

It is interesting to note that the fourth participant, Ben, whose results do not show any improvement as a result of the VSM intervention, was the participant least enthused about watching his DVD. He did not react when first shown the movie and appeared reluctant when called to watch it in the mornings. This was in stark contrast to Sienna, who was visibly excited when she first saw herself reading on the movie. She laughed, clapped her hands, and pointed to the screen. In the mornings when it was her turn to view the DVD she rushed up to the researcher, wanting to watch the DVD immediately. Her mean scores increased by 12 words per minute during the intervention, which is a startling change when looking at her baseline data. Matthew was also enthusiastic about his DVD although he was a reserved child so his reaction was less obvious. However, when he first saw the DVD he broke into a beaming smile, indicating to the researcher that he was excited to see himself on video.

The ability to attend to the video has been examined by researchers but work in this area has primarily focused on children with Autism Spectrum Disorder. Shukla-Mehta, Miller, and Callahan (2010) found that video-modelling might be more effective for students with good attending skills. Also VSM appears to be more effective for students who are motivated by viewing themselves on tape but not so effective for students who are more fascinated with their own image rather than the target behaviour that should be observed. The afore-mentioned study looked at the ability of participants to attend to the video. In the present study each participant was functioning in a class environment so presumably the ability to attend was not an issue. However it seems that it is not only the ability but the motivation to attend that is an issue. In Bandura's (1977) work on observational learning he pointed out that a key element to modelling is there must be sufficient motivation to actually perform the modelled behaviour. The present study supports this hypothesis, as Ben appeared not to be motivated by seeing himself on DVD but the other participants were.

How this motivation translates into increased performance has been explained by Dowrick (1999) in terms of the afore-mentioned social-cognitive theory of self-efficacy as espoused by Bandura (1977). That is, an individual watching themselves on video enhances his or her belief that he or she can perform the behaviour and so is more likely to perform it. The social-cognitive model emphasizes the reactive effects of cognitive factors (e.g. awareness) and behavioural factors (e.g.: observable actions, consequences). This theory is widely held (Bellini, Akullian, & Hopf, 2007). This is of vital importance when it comes to reading as motivating poor readers to read is difficult as they become trapped in the "swamp" of negativity and reduced motivation surrounding their reading difficulties (Spear-Swerling & Sternberg, 1996). Share and Stanovich (1995) stress the importance of reading volume for poor readers, and note that virtually every study of reading volume indicates that struggling readers engage in far less reading activity than do more successful readers. Therefore VSM could be a vital tool in encouraging these readers to read more, and hopefully catch up to their peers. Allington (2006) emphasise the importance of "high-success" reading experiences characterized by accurate fluent reading with good understanding of the text that was read. He suggested this is in short supply in the reading experiences of struggling readers. If not available in their natural environment, it therefore makes sense to manufacture these successes on DVD's using VSM. The goal of any reading intervention for struggling readers is to catch up to their peers. An intervention such as VSM that motivates a student to read more and provides opportunity for high-success reading experiences goes some way in allowing this to happen.

**The Role of Prosody**

Although the present study did not specifically examine the role of prosody in reading fluency, the results could shed some light on its usefulness in an intervention designed to improve reading fluency. When making the DVD's the participants were recorded reading a

passage and slow, hesitant speech was speeded up and any assistance rendered by the researcher was edited out. What was left was the participant reading out loud at the correct rate and speed. What was not able to be altered was the prosody of the participants speech. The speech still sounded monotonous and flat, although it was accurate and at an appropriate speed. As has been discussed previously prosody as a component of reading fluency has been largely ignored in the classroom and by many researchers. However Rasinski et al. (2009) found substantial links between prosodic fluency and silent reading comprehension, and suggest instructions aimed at improving expressive oral reading may have an even greater impact on comprehension than instruction that is aimed at improving reading rate and automatic word decoding.

Results from a study on repeated reading conducted by Lo et al. (2011) suggest that introducing a prosodic element could enhance results. They found that students' oral reading fluency improved on transfer passages when an adult modelled expressive reading of a passage of text prior to repeated reading of the same or multiple passages. However the difficulty lies in constructing a DVD that includes prosody. It might be possible to encourage the participants to read with expression after many readings of a passage. Rasinski (2006) stated that through repeated readings, even dysfluent readers are more able to capture the prosodic and syntactic essence of the text. Further research needs to be done to determine what effect introducing some prosodic element to VSM would have on the results.

**Limitations**

As with many single-subject designs the results of this study must be interpreted cautiously due to the small sample size ($n$=4). The participants were all in the same school so it is difficult to generalise the results to children in other schools. All the children at the school were involved in a school production near the end of the study and spent a lot of time

in rehearsal. As a result, they spent less classroom time on the usual reading instruction so this could have impacted on the results.

Another limitation was the quality of the finished DVD's. Through editing it was possible to eliminate the assistance given by the researcher to the participants and to speed up slow and halting speech. Although the finished product showed participants reading accurately at an appropriate rate (but without prosody as discussed previously) the editing process meant the picture quality was at times jerky. This was allowed for by having the participants sit at a comfortable chair at a table in a room with a plain background, but not eliminated altogether. The age of the participants meant they moved around in their seat from time to time and when large pauses were edited out this showed as a jump from one position to the next. This may have interfered with the effectiveness of using the self as a model.

Although variability in the reading probes was controlled for by having the participants read two passages and the mean score of the two counted as one data point, there may still have been some variability in the difficulty of the passages. The passages were chosen randomly from books at the same PM Benchmark reading level but there was no explicit measure of the difficulty of the text. Logan and Petscher (2010) discussed this in their study and found evidence that there could be significant differences between passages that were presumed to be equivalent based on readability and difficulty estimates. This could lead to incongruent oral reading fluency scores. The results of the present study do show some evidence of this (Days 8 and 61) where three out of four scores were lower on these days.

Finally, although we were using oral reading fluency as the dependent variable, some researchers argue that in order to determine whether there were benefits from fluent text reading there needs to be an assessment of reading comprehension (Schwanenflugel et al,

2006). Such an assessment may have yielded useful data especially in light of the lack of maintenance of the oral reading fluency gains. Whether or not there were improvements in comprehension as well as short-term gains in oral reading fluency could be the subject of further research.

**Practical Implications**

VSM as an intervention on its own showed the immediate gains made by participants in this study were not maintained over time. However as part of an instructional package VSM could become a vital tool in providing students struggling to read with the motivation to read and the opportunity to enjoy high-success reading experiences. As the positive gains made while watching the DVD appeared to wear off over time, the VSM could be reinstated every few weeks, using different passages so the student does not become bored and increasing the difficulty level where appropriate.

**Future Research**

More research needs to be done to determine what other ways of improving reading fluency work best in conjunction with VSM, and whether combining VSM with other forms of fluency instruction provides maintenance of gains. It would also be interesting to look at the frequency and duration of VSM, and examining whether repeated showings of the same DVD have an effect, or whether showing a different DVD of similar or increasing difficulty has an effect on the results. It would also be helpful to try VSM on students at different ages and reading abilities to determine whether there is an "ideal" age or stage it would be suited to. Future research should also address the question of whether introducing a prosodic element to the DVD will improve the gains made, and again, maintain them. This is important in light of the growing importance of prosody to reading fluency research. As has also been pointed out previously, further research might also consider incorporating a

measure of reading comprehension in order to ascertain whether gains were also made in comprehension and whether or not they were maintained.

An important consideration for any future research on VSM and reading fluency is the quality of the DVD. Although it was possible to hear the participants reading fluently, the finished DVD did jump a bit and appear jerky in places. It remains to be seen whether this can be eliminated totally.

**Conclusion**

All the participants in the study made overall gains in their mean oral reading fluency scores, with three out of four making progress immediately after the VSM intervention was implemented. Using the PND scores it is possible to conclude that VSM was an effective intervention for two out of four participants. The participants were all students who were behind their peers in reading and had shown little improvement in their oral reading fluency scores prior to the intervention. This would suggest their scores were relatively stable and resistant to change. The fact that their scores improved after watching their DVD's shows how an individual watching themselves read fluently on video enhances his or her belief that he or she can perform the behaviour and so is more likely to perform it. The problem is the gains were not maintained over time and the effectiveness of the intervention seemed to diminish as time passed. This has practical implications for the use of VSM within schools. As part of an instructional package VSM could be a valuable tool in both providing the student with opportunities for high-success reading experiences and motivating the student to read more.

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Appendix A

# Video Self-Modelling and Oral Reading Fluency

## Parent Consent Form

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 my child being sound recorded.

I agree / do not agree to my child being image recorded.

I wish / do not wish to have the recordings returned to me.

I agree / do not agree to allow access to data concerning my child's current reading level.

I agree for my child _____ to participate in this study under the conditions set out in the Information Sheet.

Signature: _____ Date: _____

Full name –printed : _____

Appendix B

# Video Self-Modelling and Oral Reading Fluency

## Consent form for Principal

I have been given information on the project to be undertaken as part of the academic requirements for the Masters in Educational Psychology and I understand the requirements and processes involved in this project. I have had the opportunity to ask questions and I have received answers to these. I understand that I may, at any time withdraw access to school staff and students. I understand that I may be contacted by university staff to discuss the student's field practice.

I agree that _____ is able to recruit participants from your school _____ for the purposes of carrying out this study.

Signature : _____

Print Name: _____

Contact Telephone Number: _____

Date: _____

# Appendix C

## Child Consent Form

I agree to participate in the study run by Rochelle Montgomerie on reading

I agree to be video-taped.

I know that I can ask questions any time.

Signed: _____

Date: _____

Appendix D

MASSEY UNIVERSITY
ALBANY

29 June 2011

Rochelle Montgomerie
c/- Associate-Professor S Little
College of Education
Massey University
Albany

Dear Rochelle

**HUMAN ETHICS APPROVAL APPLICATION – MUHECN 11/038**
**Video Self Modeling for Students who have Difficulty with Oral Fluency**

Thank you for your application. It has been fully considered, and approved by the Massey University Human Ethics Committee: Northern.

Approval is for three years. If this project has not been completed within three years from the date of this letter, a 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

Dr Ralph Bathurst
**Chair**
**Human Ethics Committee: Northern**

cc: Associate-Professor S Little
College of Humanities & Social Sciences

Te Kunenga ki Pūrehuroa
**Research Ethics Office**
Private Bag 102 904, Auckland, 0745, New Zealand Telephone +64 9 414 0800 ex 9539 humanethicsnorth@massey.ac.nz

# Appendix E

MINISTRY OF EDUCATION
*Te Tāhuhu o te Mātauranga*

**SPECIAL EDUCATION**
**-Central North Region**

Hawke's Bay District Office
8a Lever Street
Ahuriri, Napier 4110
PO Box 147, Napier 4140
Hawke's Bay
New Zealand

Phone: 06 831 0650
Fax: 06 833 6731
www.minedu.govt.nz

1st June 2011

Dear Rochelle,

In response to our conversation, I have spoken to my District Manager, Grant Gunning and my supervisor Andrew Rae regarding your request.

This letter confirms that I am willing to act as a cultural advisor for your research on Video Self-Modelling and Oral Reading Fluency.

Ko Anita Johansen

No Ahuriri au

Ko te Wairoa te awa

Ko Whakapunake to maunga

Ko Whakiirangi te marae

Ko Takitimu te waka.

Ko Ngati Kahugnunu te iwi,

Please do hesitate to contact me.

Anita Johansen
Intern Psychologist

7-6-11

Andrew Rae
Supervisor