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Symbiosis: A Holistic and ADHD-informed Fashion Design Process

Symbiosis - A Co-design Process

Sophya Tse-Lin Chambers

Symbiosis: A Holistic and ADHD-informed Fashion Design Process

Design Process as Outcome:
Symbiosis - A Co-design Process

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Sophya Tse-Lin Chambers
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Abstract

ADHD is a neurobiological difference that affects cognitive and nervous-system processing, resulting in a range of strengths and challenges. While it is often seen as a childhood behavioural issue, ADHD persists into adulthood. However, wearable designs for ADHD are currently focused on sensory processing needs for children, neglecting the experiences of adults with ADHD and their complex needs.

My exegesis aims to shift perspectives towards a human-centred fashion design approach that considers the holistic needs of individuals with ADHD. This design process will encourage a greater understanding of the complexities of the ADHD experience so that wearers can select, adapt, or create new clothing to support their experience of ADHD and gain a new relationship with clothes. It will also encourage designers to make informed, responsible, and inclusive decisions when designing for users with ADHD.

To generate designs, mutual respect, and a greater understanding of participants' holistic and embodied experience of ADHD, I used reflective and co-design methods within an interdisciplinary Soma Design methodology. Additionally, I implemented an empathetic and pragmatic approach to conducting secondary contextual research and primary findings from surveys and questions with a panel of adults with ADHD to identify individual design requirements, whilst considering potential

accessibility and usability factors for ADHD. This research enabled a thorough investigation of how to design for individuals' ADHD experience, resulting in a symbiotic design process based on understanding, ethics and responsiveness to individual needs.

Keywords:

Inclusive design

ADHD

Wellbeing

Human-centred

Fashion design process

Holistic

Soma Design

Co-design

Lived experience

Neuroaffirming

User-centred

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Glossary

ADHD	Attention-deficit hyperactivity disorder
ADHDer	An individual with ADHD
ADHD-informedness	<p>The principle of understanding other ADHDers' situated/lived experiences. In the fashion design context, this requires understanding:</p> <ul style="list-style-type: none">● the need for wearer involvement to understand whole-person needs;● the evolving perceptions of ADHD;● an inclusive fashion and critical neurodiversity perspective;● individual's subjective self-regulation challenges; and● a strength-entry point - acknowledging strengths alongside understanding challenges
Association sets	A collection of images, words or items that prompt associations to form.
Co-design	An extension of participatory design which involves users throughout the design development process to understand various levels of user knowledge, allowing a greater partnership when co-constructing knowledge
D4D	Diversity for design. The D4D framework is a participatory design framework developed by Benson et al.
DSM	'Diagnostic and Statistical Manual of Mental Disorders'
EDR	Emotional dysregulation- an affective or nervous system state where accessing emotions to achieve goals and necessary functioning is very difficult or not situationally viable
Expert	In this study, participants are considered experts of their own individual ADHD experience
FEA	Functional, expressive, and aesthetic. The FEA model is an apparel design model first proposed by Lamb and Kallal
Interoception	The ability to sense and recognise internal body states
Masking	Conforming to neuro-normative standards at the expense of one's wellbeing for self-protection
Neurodivergence	Brain functioning that differs from social norms and social, medical and economic expectations (e.g. ADHD and Autism)

Neurodivergent	Exhibiting neurodivergence
Neurodiversity	A collective noun signifying humanity's inherent diversity, including ADHD alongside all brain-behaviour compositions.
Neurodiversity paradigm	A theory which recognises how marginalisation emerges when an individual's processing differs from societal norms and promotes accommodating and accepting human neurodiversity
Neurotypical/ Neuronormative	The dominant neurotype or dominant expectations for functioning (aka neuronormative). Neurotypical is used for individuals, or to conceptualise ideologies of normative standardisation.
Participatory design	Participatory design involves users in the design process to understand user needs and achieve democratic and emancipatory goals
Roots-up design	The term I use to describe my design process, empowered by individuals' situated-experiences. Understanding the underlying challenges and needs of experiences (i.e. what is 'beneath the surface') to translate them into design requirements to guide design outcomes.
Self-concept	How people view themselves in relation to others, aka 'social identity'.
Self-regulation	Any action that an individual takes to change their behaviour in order to influence the likelihood of achieving a future goal or consequence
Situated experience	Considering one's lived experience situated within their surrounding context
Slowstorming	A critical, reflective and honest form of brainstorming
Soma	The mind and body connection (i.e. the mind and body as one)
Soma Design	A slow, qualitative design methodology emphasising the designer and end user's first-person experience
Toolkits	All materials and aids needed for the workshop activities and facilitation.
Translational design	The term I am using to describe my instinctual way of designing based on translating experiential information into design requirements through conceptual and tangential thinking
Wellbeing	Having the tools, support and environments needed to be who we are and to build and sustain lives worth living
Whole-person	A perspective/approach that considers individuals and their experiences holistically.

Positionality statement

I am a Malaysian-Chinese and New Zealand-British female, born and raised in Wellington. My key positionality in this research involves emic knowledge of the adult-diagnosed experience of ADHD. My positionality represents under-researched areas of the already under-researched ADHD. I, therefore, have a particular interest in being critical of the current understanding of ADHD and the Western biases of both ADHD and neurodiversity research.

Introduction

Attention-deficit hyperactivity disorder (ADHD) is a complex neurodevelopmental condition believed to be caused by neuromodulation differences with dopamine and norepinephrine (Plowden et al., 2022). These neurological differences can affect daily functioning across all areas of life (in positive, negative and neutral ways) and, when left unsupported, are hypothesised to lead to co-occurring conditions such as depression and anxiety (Barkley & Benton, 2022; see also Long & Coats, 2022). ADHD was originally considered a childhood disorder; this notion ceased with the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) in 2013, which officially recognised ADHD as continuing into adulthood (Long & Coats, 2022, p. 8).

ADHD has historically been viewed through a medicalised model that focuses on ADHD differences as “symptoms” or “deficits”; this remains the predominant perspective. The antithesis of this is the more recent neurodiversity-affirming strength-based perspective of ADHD. However, at times, this becomes a strengths-only perspective of ADHD, which risks dismissing the holistic experiences and needs of individuals with ADHD. Singular perspectives are similarly reflected in the few products and clothing designed for ADHD, which have proposed reactive interventions to reduce the impact of these perceived deficits, typically with no consideration of a potential user’s individualised requirements or real-world experiences. These designs mostly focus on children and sensory stimulation, overlooking most experiences and needs of people with ADHD. Additionally, there is little to no documentation of the design processes of products for ADHD. If designs for ADHD continue to fail to reflect the multi-faceted lived experiences of individuals with ADHD (referred to in this study as “ADHDers”¹), the risk of further marginalisation and continued stigma and misunderstandings of ADHDers and their needs will remain.

The lack of holistic design outcomes and documented inclusive design processes suggested a need for better design processes that are empathetic and user-

inclusive, which led to my aim and research question:

How can clothing designers take a holistic human-centred approach to understand adult ADHDers’ subjective lived experiences in order to generate appropriate design responses based on individual needs and experiences?

Additionally, to find the balance between deficit-based medical perspectives and purely positive perspectives of ADHD, this research applies neurodiversity-affirming and critical neurodiversity perspectives for a value-neutral approach to understanding ADHD. This aims to address the design gaps by advocating for a holistic user-centred fashion design approach to help those who identify with ADHD and clothing designers.

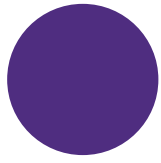
The scope of this study is limited to persons who were diagnosed with ADHD in adulthood (18 years and over) (discussed in the process section). While ADHD in adults has only been recognised relatively recently, the number of adults diagnosed and identifying with ADHD is rapidly increasing (Beaglehole et al., 2024). In addition, the findings of this study may be able to be applied more broadly to design for ADHD children or non-ADHDers facing similar experiences. It is also important to clarify that this project focuses on ADHD individuals’ subjectively identified experiences, needs and goals.

This exegesis outlines why a holistic, ADHD-informed design process is needed, how I identified a soma and co-design hybrid methodology as the most appropriate for this design process, the steps taken to develop the design process, and my reflections of the project. Ethical considerations are strongly advocated and carried out throughout the project process to ensure low risk ethics are adhered to.

¹ It is important to note that the term ‘ADHDer’ is used in this study purely for writing purposes. Everyone has different preferences, and an individual’s identification preferences should always be respected.

Context review

Attention-deficit hyperactivity disorder (ADHD) is a neurological difference and social phenomenon (Cortese et al., 2022), entailing a range of unique strengths and challenges (Spiel et al., 2022). However, these experiences often diverge from social expectations, hence the misleading word “deficit” in ADHD’s moniker. For example, people with ADHD do not experience deficient attention but rather struggle to filter their attention to innumerable inputs, more accurately reflecting challenges with focus (Hallowell & Ratey, 2024).



Fashion design processes for individuals with diverse needs

Presently, mainstream fashion operates within a 'capitalist mode of production' (Lehmann, 2023), which standardises clothing for mass production and increased profit. These fashion processes have led to the marginalisation of the wearer, particularly those whose clothing requirements deviate from the 'fashionable norm' (Chan, et al., 2018). In a capitalist society, fashion processes prioritise industry needs over wearer needs by encouraging the consumption of commodities to supplement the illusion that individuals are not enough as they are. Joanne Entwistle's (2015) book "The Fashioned Body: Fashion, Dress and Social Theory" exemplifies this marketed illusion when discussing fashion magazines' idealisation of the dressed body, the commercialisation of modern self-care, and "control [of consumers] by stimulation" (p. 11). It may then be postulated that mainstream fashion design processes diminish the value of wearer-input by indicating to wearers what their unmet needs are instead of the other way around. However, as Chan et al. (2018) state, "... human needs are much more complex and diverse than what has been assumed by the industry" (p. 31). This emphasises the importance and value of understanding wearers' authentic needs and calls for greater customer input in fashion processes.

Our current fashion landscape indicates that an increased understanding of human complexity

and diversity is crucial for inclusively designing for people with diverse needs. A broad review of 'inclusive fashion design' found that designers in this space approach the concept of 'exclusion' by rethinking societal/industry expectations in relation to functional (and sometimes aesthetic) dress needs that are marginalised or underrepresented in mass fashion. Examples include extended size ranges and designing for different body shapes, which may relate to a functional difference, such as being in a wheelchair or having non-industry-standard body dimensions. Compared to these body-based approaches, inclusive fashion has also addressed marginalised self-expression through dress. For example, designing for subcultural dress within queer communities (Geczy & Karaminas, Queer style, 2013). This approach goes beyond a body-focused approach and situates the wearer's identity in society; this demonstrates the possibility of designing for both function and emotions related to self-expression. However, there is limited research on the specific processes of inclusive fashion designs. Instead, fashion researchers have focused more on the cultural and historical significance of finished garments, and 'adaptive clothing' has developed as an isolated product sector (Chan, et al., 2018).

Research on general inclusive design processes tends to relate to product, service and healthcare

design. These sectors are solution-focused, and use user-centred design thinking and participatory design methods to gain insight into the so-called problem (Chan, et al., 2018). They provide some methods for empathising and ideating that can be transferred to fashion design for a wearer-inclusive fashion design process, such as empathy mapping, co-creating sessions, repeated feedback gathering, observation and immersion methods like shadowing and ‘a day in the life’, diaries, card sort, story-telling, user journey mapping and think aloud protocols (Interactive Design Foundation, 2016; Francés-Morcillo et al., 2020). However, the problem-solving mindset may not always be beneficial when working with divergent populations who do not always consider their differences as problems to be solved. Although the inclusive fashion approaches discussed above involve user-centred qualities, how the user is centred and addressed varies, i.e. body-centred versus expression-centred. User-centredness, therefore, appears to approach user-inclusion in a segmented manner.

While inclusive fashion design responds predominantly to peoples’ functional needs, user-centeredness requires fashion designers to consider the wearer’s experience in context; as such, the act of dressing is functional, expressive, and aesthetic (FEA). These three qualities make up the guiding user needs and the FEA model—first proposed by Lamb and Kallal (1992). The FEA model is implemented in consultation with the wearer, with the aim of identifying the target wearer’s clothing needs by considering satisfaction levels and user experience to facilitate the design of garments appropriate for the intended cultural and situational context (Chan, et al., 2018). The FEA model’s appreciation of the wearer’s experience constitutes a more holistic approach in fashion design and is well-suited to designing for ADHD, which is considered not only neurological but also a sensory and societal condition. However, evaluations of the FEA model have found that although centred around users and societal conventions, user safety and expressive needs remain poorly addressed for wearers with diverse needs (Stokes & Black, 2012). In response, Stokes

and Black (2012) propose a revised FEA model that additionally considers the relationship between body/garment/near environment for a more interconnected approach to the tri-segmented FEA model.

Conversely, the common segmented approach to user-centeredness in fashion design is further exemplified through ‘adaptive designs’. Adaptive designs often prioritise function over aesthetics, while fashion traditionally prioritises form over function (Chan, et al., 2018; Stokes & Black, 2012). This may be because adaptive clothing tends to be approached from a medical or ‘human-computer interactions’ (HCI) perspective. Although seemingly ‘inclusive’, functionally-focused adaptive clothing processes can be exclusionary with alienating effects (Chan, et al., 2018). Chan et al (2018) attribute this to designers’ disconnection from wearers’ genuine context, particularly concerning social stigma, due to a lack of wearer involvement beyond studio fittings and quantitative reviews, stating: “[fashion designers] ... lack the empathetic motivation and understanding of dress behaviours beyond the studio” (p. 31). This is problematic since designing for individuals with diverse needs requires inclusiveness, both in process and outcome. The divide between body-based and expression-based needs in fashion and adaptive clothing processes demonstrates that more qualitative, empathetic methods and contextual considerations are needed. Understanding how wearers behave and feel in their sociocultural and functional context is an apparent and concerning gap in fashion processes.

The body in culture: the fashioned body, a capitalist identity

Entwistle (2015) aids in addressing this gap by presenting a sociological framework for fashion. She frames dress as a situated bodily practice or ‘the body in culture’, emphasising the importance of considering our clothed bodies within their surrounding context. This includes social, political, technological, and aesthetic discourses. For instance,

Entwistle asserts that fashion in capitalism involves a complex negotiation of identity between social world demands and individual desires. This view of the ('fashioned') body as a place for negotiating social and cultural constructs and (social) identity demonstrates a strong connection between fashion and emotions. Furthermore, Geczy and Karaminas (2018) highlight that dress forges our individual identity within communication systems and social order. These interpretations highlight that identity is not just about appearance but represents ever-changing user needs according to expectations for communication and conformity.

It is crucial to acknowledge that identity should be self-defined. The interpretations of identity mentioned above are influenced by capitalism and the concept of a "public" versus "private self" (Entwistle, 2015, p. 129) rather than psychological frameworks. Thus, identity and its connection with fashion emphasise that dress is a process of embodying our complex social and emotional experiences in a capitalist world. In this sense, Entwistle's framework provides a whole-person/holistic lens for understanding the qualities of inclusive fashion for this study, where clothing is not just a practical object, but a social environment for identity and wellbeing.

However, there is limited documentation of inclusive fashion design processes in fashion design research beyond physical disabilities/differences. Furthermore, of the few established inclusive fashion processes, there is a lack of consideration for wearers' personal contexts and holistic experiences relating to their functional, expressive and aesthetic clothing needs. In other words, mainstream fashion design processes have not maximised fashion and dress, as Entwistle (2015) proposed, as a "situated bodily practice" (p. 217). These gaps highlight the need to integrate and adapt inclusive user-centred approaches across disciplines for a more qualitative, individualised design process that responds to wearers' genuine needs as situated within their sociocultural context. We must remember that the body is not just a physical

entity to dress and 'problem-solve', but a thinking, sensing, and social being, and each of these factors is an important consideration in the act of dressing.

Designing for ADHD

Designing for ADHD requires a strong foundational understanding of the history and evolving perceptions of ADHD as an important socio-cultural context. ADHD discourse has predominantly occurred within a Western context, with ADHD's causes being debated within a medicalised model. However, simplifying ADHD as either having a neurological or behavioural basis (Lange et al., 2010) leads to neglect and misinterpretation of ADHDers' lived experiences.

Lived experience refers to qualitative research on phenomena as they are subjectively lived and presented. (Valentine, 2020).

Misinterpreting lived experiences is a problem for developing an accurate understanding of how to support an ADHDer.

ADHD healthcare is scarce and inaccessible due to clinical misunderstandings, stigma and socio-economic factors (Parliament of Australia, Senate Standing Committees on Community Affairs, 2023). Moreover, the recent recognition that adults have ADHD, combined with inequities of care relating to gender, social class, ethnicity, etc., proves there is a significant need to support the many challenges experienced by ADHDers of all ages. For example, well-established gender disparities in ADHD research (Faraone, et al., 2021) combined with societal gender roles demonstrate how ADHD presentations in females are easily misdiagnosed or undetected (Young, et al., 2020). This is an opportunity for an adapted inclusive design approach to consider adults' whole experience of ADHD, in other words, a holistic approach.

Designing for ADHD with a whole-person or holistic

perspective of user experience requires expanding the medical understanding of ADHD to include understanding lived experiences. This perspective can allow fashion designers to understand tangential factors impacting wearers' expressive dress and behaviour needs. For example, Stokes and Black (2012) discovered that adolescent girls with disabilities may experience self-devaluation if their needs related to expression are incompatible with their status and self-image. Thus, a wearer's self-expressive needs depend on their cultural experience and feelings about fitting in. This demands a design process that directly consults wearers for a holistic perspective of user needs and to rethink exclusionary practices and expectations. Such a process can reduce misunderstanding around expressive needs, which is crucial when designing for and with ADHDers, due to the prevalence of stigma.

“Stigma is defined as the characterising of person(s) based on beliefs that devalue their social identity in a social context (as cited in Goffman, 1963).

Godfrey et al. (2020) discuss how misunderstandings can generate stigmas towards ADHDers, and this stigma “remains a constant presence” (p. 994). Therefore, user-centred and inclusive design processes for ADHD should prioritise understanding ADHD's stigmatising social backdrop to enable a contextually sensitive understanding of user needs. However, for an analytical perspective of what user-centeredness and inclusiveness mean for ADHD, we must first understand the neurodiversity paradigm in comparison to the more conventional, medicalised model of ADHD.

Evolving perceptions of ADHD

The medicalised model represents the context in which ADHD and stigma coexist and where the mainstream understanding of ADHD (in society, healthcare, and interventions) originates. The medicalised model perceives ADHD differences as deficits; a perspective prevalent since 1775 (although it was not then termed ADHD) (Faraone et al., 2021). Since then, ADHD descriptions from medical literature included: “borders on insanity”, “moral defect” (as cited in Lange et al., 2010, p. 242), and “terror of the family” (as cited in Warnke & Riederer, 2013, p. 4). These led to associating ADHD with visible differences in children’s behaviour, such as hyperactivity (Lange et al., 2010). However, ADHD differences or neurodivergence only exist compared to social norms (Bertilsdotter-Rosqvist et al., 2020). Standards for ‘normal’ functioning are based on medical, economic and societal assumptions (Bertilsdotter-Rosqvist et al., 2020). Therefore, the pathologisation of ADHD appears to be informed by social and cultural practices more than objective evidence.

The DSM can be considered the most tangible form of the medicalised model. While the diagnostic label may be helpful for some people to separate their ADHD-related struggles from their identity, the latest DMS 5 oversimplifies ADHD experiences as merely “functional impairments” (Godfrey et al., 2020, p. 994) and is criticised for not aligning with adult ADHDers’ lived experiences (Epstein & Loren, 2013). Most notably, emotion regulation and executive functioning challenges are excluded from the DSM’s ADHD criteria despite being widely considered core experiences of ADHD (Cortese et al., 2022). However, a small but growing number of studies within health science are documenting ADHD’s multidimensionality and encouraging multi-modal approaches (Barkley & Benton, 2022; Beaton et al., 2022; Champ et al., 2021; Cortese et al., 2022; Godfrey et al., 2020; Hansson

Halleröd et al., 2015; Long & Coats, 2022; Mak et al., 2020; Nyström et al., 2020; Young et al., 2008).

These underlying social and cultural elements of ADHD’s pathologisation are NOT to say that ‘symptoms’ themselves do not exist. However, they highlight the underlying stigma of ADHD’s pathologisation and its inaccurate representation. Additionally, they present an opportunity for fashion designers to offer an open-minded approach to rethink deficit perspectives by investigating alternative perspectives that support the sociocultural experience of ADHD.

Unlike the medicalised model, the neurodiversity paradigm recognises how marginalisation emerges when an individual’s processing differs from societal norms and promotes accommodating and accepting human neurodiversity (Chapman, 2021). Neurodiversity definitions can range from tokenistic to more nuanced perspectives of systemic marginalisation and inclusion that challenge the status quo.

For this study, I have worked with a ‘neurodiversity-affirming’ perspective and a ‘critical neurodiversity’ perspective:

- **Neurodiversity-affirming:** This acknowledges human differences and neurodiversity as essential, akin to biodiversity’s significance in maintaining a thriving ecosystem (Singer, 2016). Neurodiversity-affirming research values situated/lived experiences as essential for understanding an individual’s true lifeworld, goals and barriers (Bertilsdotter-Rosqvist et al., 2020).
- **Critical neurodiversity:** As the neurodiversity paradigm has various advocacy origins, it must be critically engaged with to work in an ADHD context. The critical neurodiversity perspective I am taking

aligns with Robert Chapman's (2020) reframing of Barnes' value-neutral model, which argues that, because various societal factors impact our understanding of wellbeing, we should consider neurodivergence as inherently wellbeing-neutral (instead of negative or positive). This model is significant to my aim as it highlights the importance of considering wellbeing by understanding individuals' situated/'lived' experiences instead of assuming the value of neurodivergence.

Given the last 250 years of deficit perspectives of ADHD, a neurodiversity-affirming alternative is groundbreaking and particularly relevant to ADHD-inclusive fashion design and my aim for a design process that improves the understanding of ADHD's complexities.

Both inclusive fashion design (per Entwistle's framework) and critical neurodiversity enable neurodiversity-affirming perspectives by prioritising persons over pathology and/or social systems, while acknowledging that these complex dynamics impact our life worlds.

Bertilsson-Rosqvist et al. take this one step further by arguing that recentring lived experiences is an ethical requirement. Whereas medical research primarily uses patient feedback for interventionalist purposes to determine whether a patient is fit for "economic productivity" (Bertilsson-Rosqvist et al., 2020, p.4), designers ought to use user-feedback to understand each user's goals and experience. Similarly, Spiel et al. (2022, p 17) argue that designers should be cautious of designing interventions from a "paternalistic" position that assumes ADHDers' goals are to minimise their medically defined 'deficits'. Instead, Spiel et al. (who identify as neurodivergent) encourage a more user-defined approach with a focus on finding ADHDers' subjectively identified goals.

Accordingly, designers must consider the purpose and outcomes of including lived experiences in design processes and the subjectiveness of individuals' goals and productivity.

Lived experiences of adult-diagnosed ADHD

ADHDers can have vastly different experiences from one another. It is essential to understand that ADHD affects each person uniquely. ADHD can also cooccur with other neurodivergent conditions, making for an expansive range of experiences. Failure to understand ADHD's diversity and multidimensionality risks inappropriate generalisation of ADHDers' needs and limitations, which can lead to complex stigmatisation and paternalistic or deficit-perspective-informed design interventions that do not align with individuals' lived experiences or goals.

The vast and complex experience of ADHD expands far beyond this exegesis' capacity and thus has been narrowed to focus on overlooked ADHD dimensions with the most significant risks for wellbeing. These dimensions are important to consider as they demonstrate how wellbeing is not at risk due to neurodivergence but rather the societal misunderstandings of neurodivergence. This aligns with Chapman's (2020) assertions that emphasising wellbeing alongside neurodivergence may help positively reframe the negative depictions of neurodivergence as contradictory to a good life. This is vital for an inclusive design approach that respects individuals' capacity to thrive in the right environment.

The following lived experience dimensions resulted from a thematic analysis of seven studies on adults' lived experiences (Sedgwick et al., 2018; Halleröd et al., 2015; Rowe et al., 2021; Beaton et al., 2022; Watters et al., 2017; Godfrey et al., 2020; Young et al., 2008) and one meta-synthesis of seven respective articles (Long and Coats, 2022). These studies were selected because they are qualitative

and focused on adults' experiences of ADHD (as opposed to symptom-based observations of ADHD) and are published by typically reliable sources such as medical journals and Oxford University Press, which ensures methods are rigorous and clearly outlined and the research has been peer-reviewed.²

² First-person accounts can be considered the most reliable source for understanding neurodivergent lived experiences that are highly misunderstood. Because the context review focuses on secondary research, a standard understanding of source reliability is applied.

1. Misunderstandings, criticisms and self-concept³:

ADHDers are at significant risk of experiencing criticisms and misunderstandings (Beaton et al., 2022). These misunderstandings appear to occur when ADHD differences are misrecognised as purposeful, inconvenient behaviour. Misunderstandings, stigma, shame, and self-protection are key themes identified across all seven studies. Misunderstandings of ADHD subjected ADHDers to unreasonable expectations and, in turn, criticisms from others and themselves (Beaton et al., 2022). Failure to acknowledge these misunderstandings leads to ADHDers receiving increased person-centred criticisms (as opposed to action-centred criticism) (Beaton et al., 2022), which induces shame, decreases self-worth and impacts self-perception and how they believe others perceive them (Long & Coats, 2022). This self-evaluation process influences 'self-concept', otherwise known in fashion studies as 'identity', and is considered a fundamental psychological wellbeing dimension (Mann et al., 2004). Since ADHDers' self-concept is (generally) beleaguered by a lifetime of misunderstandings, which can lead to the need for self-protection, enhancing ADHDers' self-concept is a wellbeing priority.

2. Courtesy, public and self-stigma:

A self-concept solely driven by self-protection can negatively impact self-expression (Long & Coats, 2022). According to Godfrey et al.'s (2020) research, a self-protective self-concept for ADHDers is, in part, a complex product of stigmatisation. Godfrey et al. (2020) consider public stigma the most impactful stigma to ADHDers' wellbeing because it can transmute into self-stigma. This can occur when public stigmas and predominant deficit attitudes/expectations are adopted without alternative neurodiversity-affirming perspectives, creating unsupportive environments for ADHDers.

Self-stigma can affect how someone expresses or represses their ADHD (Godfrey et al., 2020). Furthermore, Godfrey et al. highlight that stigmatisation is implicit and increasingly complicated to recognise in those who stigmatise, as stigma is usually concealed for social acceptability. Accordingly, it is imperative that designers be critical of unconscious or rather implicit biases, such as stigma towards ADHD differences, that create unsupportive environments, as this influences a user's protective needs and wellbeing. Additionally, Godfrey et al. recommended future studies to examine stigmatisation in the context ADHDers experience it (i.e. in social settings, healthcare, and employment) (Lebowitz, 2016).

3. Masking as self-protection

Unsupportive environments can result in self-protective coping responses such as "masking" (Saline, 2023). Saline defines masking (of ADHD) as conforming to neuro-normative standards at the expense of one's wellbeing. This self-protective measure further supports the need to prioritise neurodivergent individuals' subjective goals, as Spiel et al. (2022) similarly argued. Adult ADHDers are susceptible to situations where they need to mask, particularly in response to high socio-cultural expectations (such as being a 'good' mother or 'manning up', etc.). This can lead to "ADHD burnout" and a need to retreat (Saline, 2023). Masking and retreating are exemplified in a study by Rowe et al. (2021), who interviewed ADHDers employed by the UK National Health System. Participants mentioned needing to "change myself to fit in with work..." (p. 165) and expressed fears about "exposing myself" (p. 166). Masking and "escaping" (Rowe et al., 2021, p. 165) did not lead to sustainable feelings of safety for participants, nor did it reduce their shame. This is shown when some participants recall feeling compelled to resign. One participant encapsulated the emotional impact, by saying: "I felt fractured [...] escaping jobs rather than going to jobs..." (Rowe et al., 2021, p. 165).

³ Psychology has different theories about self-identity or self-concept, but I define self-concept as *how people view themselves in relation to others* without involving psychological theory. Identity is more commonly used in fashion studies, I will use the terms self-concept and identity interchangeably depending on context.

Overall, my analysis suggests that the impacts of stigma on self-concept can be more detrimental to ADHDers' wellbeing than ADHD's neurological differences in and of themselves. Furthermore, from a critical neurodiversity paradigm perspective, stigma from deficit perspectives of ADHD undermines neurodivergent individuals' wellbeing (Bertilsdotter-Rosqvist et al., 2020). This connection between stigma and wellbeing raises significant ethical considerations for ADHD-inclusive fashion design, amplifying the role fashion designers have in considering wellbeing care provisions for ADHDers' functional, aesthetic and expressive needs.

The need for self-protection due to an impacted self-concept can manifest as expressing or repressing (aka masking) ADHD symptoms. Masking exemplifies the importance of finding safety in self-expression. However, these experiential findings suggest that finding safety in self-expression likely depends on the amount of stigma surrounding one's specific ADHD symptoms. As per Stokes and Black's (2012) revised FEA model, which shows how wearers' expressive needs relate to the body-garment relationship that is influenced by their environments, a situated fashion approach recognises that wearers' inseparability from their social worlds tends to come with a 'performance' of identity (Entwistle, 2015). Accordingly, fashion and dress become props for impression management, involving contradictory dualisms, such as the desire to fit in and stand out (Entwistle, 2015). Clothing, situated in ADHDers' social world, can be a self-protective tool for concealing and revealing identity. Concealing/revealing one's authenticity is a recurring theme in fashion literature that reflects how ADHDers' safety and expression needs are in flux with their environment.

Designing for ADHD wellbeing

Until now, I have stressed the importance of prioritising ADHDers' lived experiences in the design process to enable the creation of inclusive designs for diverse needs. This design process must go beyond just consulting the wearer on functional or aesthetic garment needs. Understanding whole-person needs rather than catering to the needs of a system is imperative for ADHD-inclusive design. Adopting a whole-person and critical neurodiversity approach to inclusive fashion design that values the individual's lived experiences while appreciating their surrounding context—the body situated in culture—enables empathetic design and context-sensitive and neurodiversity-affirming perspectives of ADHD complexities.

Fashion and dress are not just about clothes, but also about our bodily demeanour and whether we conform to social standards or subcultures to be socially accepted (Entwistle, 2015). Such bodily demeanour is termed 'body-styles' by Entwistle (2015). Methods for movement analysis in the design precedents (see Jeon (2015) in Appendix D) exemplify links between body styles, emotions and self-protection. These reinforce earlier assertions that social acceptance may impact self-protection needs. This is an important safety consideration in the design process, as per Stokes & Black's (2012) revised FEA model. As such, the experience of having ADHD may impact one's 'body style' in which the body becomes a social environment for identity, and thus, one's protective self-regulation needs. When considering my analysis of research on lived experiences, the common thread is one of 'wellbeing', or lack thereof.

Wellbeing is defined as having “the tools, support and environments we need to be who we are and

to build and sustain lives worth living” (Mental Health Foundation of New Zealand, 2024). I use the term 'ADHD wellbeing' to broadly refer to the definition above with the additional consideration of self-regulation since ADHD is considered a condition defined by self-regulation differences (Barkley, 2022). Self-regulation refers to any action that an individual takes to change their behaviour in order to influence the likelihood of achieving a future goal or consequence (Barkley, 2022).

Clothing is a vital component of human wellbeing. It protects us from the elements and represents us to onlookers, but it can also be a tool for resistance and empowerment (Entwistle, 2015). Above all, clothes represent one of the oldest (Kittler, Kayser, & Mark, 2003) and most enduring forms of bodily and social protection. Reframing our relationship with clothing can potentially impact both our physical and mental wellbeing.

ADHD wellbeing is a concept rarely discussed in ADHD healthcare; instead, merely coping is promoted. It is essential to note that neither coping nor thriving (a term commonly used to signify wellbeing) is inherently better than the other. Depending on an individual's context, either coping, thriving, or both may be a valid goal/focus of designs, but assuming an ADHDer's competency is problematic. This distinction is helpful to bear in mind in the following discussion.

Precedents

Products on the market for ADHD (see Appendix B)

Tables B1-B12 in Appendix B consider 13 distinct products/product types currently available and marketed as addressing ADHD or symptoms that ADHDers may potentially experience.

While ADHD interventions that focus on coping involve responding to challenges as they arise in a neuro-normative world, designing so ADHDers can thrive requires a more proactive approach that anticipates* challenges (*to the extent healthy and feasible) (Barkley, 2022; Adamou et al., 2021). Distinguishing the uniqueness of individuals' emotional states and the purpose of reactive and proactive self-regulation is important for ADHD wellbeing because each should be implemented at the appropriate time (Yoon et al., 2019). Cochrane et al. (2022b) state that improper use of emotion regulation strategies may impact users' physical and psychological wellbeing. Despite this, the type of self-regulation is often overlooked in ADHD designs and thus was important to analyse when reviewing products for ADHD.

While numerous products are recommended for adults with ADHD, such as those designed to assist with anxiety, working memory, organisation, and noise blocking, few are specifically tailored for ADHD. Most products focus on sensory regulation or stimulation and are primarily aimed at children. Appendix A clarifies how mass marketing for ADHD subjectively uses terms.

Despite being marketed for all ages, products do not consider adults' diverse aesthetic preferences and expressive needs. Research into ADHD fashion for adults has yielded limited results, primarily consisting of discrete fidget jewellery, weighted vests, and compression clothing. This highlights the pressing need for more inclusive and diverse designs in the realm of ADHD fashion 'interventions'.

THE GAP:

While designs address self-regulation as either a sensorial or mental process, self-regulation is bidirectional, meaning both sensory and mental processes can impact each other (Schulze et al., 2020; Lane et al., 2019; Brown, 2017). Therefore, understanding the intricate link between emotional and sensory experiences and how these dynamics unfold in the individual's lifeworld is essential.

Currently, existing designs for ADHD demonstrate that wellbeing and self-regulation are predominantly approached from singular perspectives of sensory-based or, sometimes, productivity-based approaches. This highlights a gap in designs to support the multifaceted adult experience of ADHD and a need for neurodiversity-affirming designs that consider ADHD experiences more holistically. The underlying theories and design processes that drive product outcomes should be considered to advance ADHD design and, more broadly, inclusive design for diverse needs.

Design outcome precedents (see Appendix C)

The table in Appendix C analyses 8 design outcomes, each developed to address self-regulation or wellbeing. These were not designed specifically for ADHD. However, the interconnectedness of the different wellbeing components of mind, body and emotions was an overarching theme across these design precedents. This raises important considerations for overall emotional health, the role of sensory and bodily awareness and the use of self-directed therapeutic practices.

The mind-body connection is addressed through different thematic categories of assistance: self-regulation, therapeutic, somatic awareness, and sensory processing. These focus on either emotional/affective experiences and/or sensory experiences and how emotions are embodied through mindfulness, movement, bodily behaviour, and body awareness (see Appendices C and D for my analysis of the design outcome precedents and design techniques and methods). These designs mostly consider wearers' context/experiential needs conceptually by considering embodied experiences, such as the need to disguise oneself to embody self-protection when feeling insecure (e.g. Jeon's (2015) disguise garment and Cochrane's (2022b) breathing scarf). This embodiment of emotions through the body and clothes presents opportunities for wearers to develop new relationships with clothing when individuals' emotional experiences and 'individual meaning-making' are valued, as shown by Karpashevich et al. (2022); Morcillo et al. (2020); Jeon (2015). This reinforces earlier assertions about the importance of considering whole-person needs, such as the emotional elements of one's experience, when situated in context. Considering the experiential needs of wearers alongside the interconnectedness of mind-body-emotions, highlights a more holistic and human-centred approach to designing with the aim to respect neurodivergent wellbeing. However, gaps are apparent when this approach is taken without respect for individuals and their subjective experiences/goals.

These gaps are particularly evident in Ji and Isbister's (2022) augmented reality (AR) glasses. The glasses

were designed to support self-regulation by using interactive visual-auditory motifs with fidgeting metaphoric counterparts. For example, to help calm anxiety, the glasses show the visual of a lotus that opens and closes when the user swipes left and right. The metaphorical lotus design concept is based loosely on experiences of mindfulness, and the AR-glasses design approach is based on one of the author's previous research that suggests certain affective states relate to fidgeting actions (da Câmara, Agrawal, & Isbister, 2018; Karlesky & Isbister, 2016). However, in the absence of user experiences, the design is not user-centred. The design process for scaffolding AR is based primarily on unsupported assumptions about the positive effects of fidgeting and only considers a "just-in-time" and "in-the-moment" (aka reactive) approach to self-regulation (Ji & Isbister, 2022, p. 2). However, compelling evidence (from lived experiences and medically published sources) suggests that intuitive fidget behaviour is an unconscious self-regulation strategy (Sarver et al., 2015; Fernandez, 2021). This logically implies that individuals probably do not require guidance on implementing naturally occurring fidgeting behaviour. Furthermore, the interactive AR glasses would likely attract significant attention. Thus, without lived experiences, the design lacks consideration for users' expressive and functional needs, appearing to simply prolong humans' natural responses and centralise fidgeting actions into glasses for no clear benefit to the individual. Despite presenting a valuable mind-body design technique for visualising emotional experiences (metaphorical visualisations), Ji & Isbister's (2022) disconnection from users' experiences in the design process highlights a significant gap in designs and design processes.

Conversely, Cochrane and colleagues (2022b) highlight significant opportunities for self-regulation designs with their unique design process that focuses on the lived experience of emotion regulation and 'individual over social meaning-making' for individualised designs. This design process is significant as it focuses on exploring individual experiences to guide the design outcome rather than imposing solutions. Consequently, their design outcome- the breathing scarf, demonstrated that

self-regulation strategies and design requirements for wellbeing could be embodied in clothing. However, they quickly learned that the prototype was only suitable for emotion regulation inside the home, due to the designer-researcher feeling nervous when testing the prototype in social situations. While this again reinforces the importance of whole-person needs, their ability to embody self-regulation and wellbeing design requirements in a wearable prototype presents the potential for clothing to support ADHD experiences as a supportive wearable environment.

Overall, the design precedents reviewed highlight that human-centred design is not just about having a valuable design concept; humans and their experiences must also be centred in the design process. Whole-person human-centredness in the design process may better support inclusive outcomes that are sensitive to emotions, accurately reflect individuals' lived experiences and appreciate the nuances of emotion regulation beyond emotion-shifting and reactive self-regulation (as discussed in Appendix B).

Each design outcome is reviewed in Appendix C, which documents important design techniques and processes. Therefore, these designs have been influential in developing a more holistic interpretation of design requirements when designing for wellbeing and the body, especially for critically evaluating ADHD wellbeing design processes.

The design outcomes described in Appendix C reflect the underlying design processes discussed in Appendix D.

Design systems and techniques (see Appendix D)

In light of the previous findings, the table in Appendix D considers 14 unique design systems, techniques and frameworks that are either directly or indirectly relevant to a process for ADHD-inclusive design. After first researching user-centred, participatory, and empathetic

design methods for phenomenological research, I selected these design systems and techniques on the basis of three user-centred considerations (discussed further in the methods section):

- 1. the level of applied empathy;**
- 2. the design stages implementing user inclusion; and**
- 3. user knowledge accessed.**

These processes consider either whole-person experiences or neurodiversity-affirming approaches. Design systems and techniques that consider whole-person experiences include Soma Design. Design systems and techniques that consider neurodiversity-affirming approaches are participatory design processes adapted for either autistic lived experiences or ADHD, based on neurodiversity perspectives and personalised processes that provide appropriate supports.

Among other things, my analysis involved assessing the transferability of these design systems and techniques to an ADHD-informed design process. My analysis identified the following overarching concepts:

- Soma Design;
- soma-wearable design
- designing for emotions;
- individualised design; and
- personalised participatory design adapted for neurodivergence.

I discuss each of these below.

Soma Design:

Soma Design is a slow qualitative design methodology that emphasises the designer and end user's first-person experience (Höök et al., 2018). It values one's lived body as a resource through mind-body attention and slowing down to understand lived experiences that may not otherwise be readily available (Höök et al., 2018). Soma Design offers methods for understanding lived experiences, such as body mapping (visual representations of embodied experiences) and slowstorming (like brainstorming but more 'critical,

reflective and honest') (Höök et al., 2018). The methods can be flexibly selected, but should serve the purpose of sensitising (becoming sensitive to bodily processes), priming (preparing one's attention to notice what we want to discriminate in our feelings) and probing (inquiring about material qualities) users (Höök et al., 2018). Soma Design is based on somaesthetics.

Somaesthetics is a discipline that appreciates and cultivates the body as a subject that perceives and learns aesthetic qualities of experiences (Shusterman, 2008). By appreciating the acts of perceiving and learning aesthetic quality as important human experiences, somaesthetics can be applied for a more culturally informed design approach. This approach is sometimes called 'somaesthetic appreciation' and is discussed under the 'soma-wearable design approach' below.

The theme of integrating mind and body supports using a Soma Design approach to achieve outcomes that holistically address ADHDers' needs. However, human-computer interaction (HCI) Soma Design approaches in design precedents have not always considered individuals' contextual needs effectively. HCI's electronic elements can limit the options for addressing aesthetic needs, and designers can prioritise conceptual soma principles over wearers' expressive and functional needs. As the technological elements of human-computer interactions restrict the translation of self-regulation and wellbeing in designs, there is an opportunity for fashion design (without technological restrictions) to better translate self-regulation and wellbeing within Soma Design according to ADHDers' genuine needs.

Soma-wearable design approach:

The design system in Appendix D that is most relevant to my thesis is Ståhl and Jung's (2018) 'soma-wearable design approach' for fashion designers, which aims to design for wearers' somatic wellbeing. They coin the term 'somatic wellbeing' to reflect the expanded shift in focus from our mental or physical being to our mind and body as one (aka our soma). By integrating somaesthetics and fashion

design perspectives, Ståhl and Jung identify body consciousness (awareness through mind and body) as a meaningful overlap and a potential gateway to designing for wellbeing 'somaesthetically'.

Ståhl and Jung (2018) complement somaesthetic appreciation with a system they term 'fashion-style-dress,' which emphasises the complex sociocultural context of fashion that influences individuals' lifestyles and shapes their wellbeing. This integrated perspective forms the aim of their soma-wearable design approach, which is to design for both the body and the space around the body. In other words, designing for somatic/somaesthetic wellbeing involves understanding the body-conscious process of self-perceptions and clothing performance. This is a significant consideration for the design process as it emphasises the relationship between an individual's environment and their expressive needs. Ståhl and Jung identify four key considerations for designers adopting the soma-wearable design approach:

1. Subtle guidance directing attention inwards
2. Creating temporal, interactive, and spatial spaces for reflection
3. Interactions following the body's rhythm and intimate correspondence with feedback (where applicable)⁴
4. Provisions for articulating the experienced bodily sensations

These qualities focus on enabling experiences of somaesthetic reflection and providing the means to articulate them.

These considerations focus on enabling experiences of somaesthetic reflection and providing the means to articulate them.

Appreciating aesthetics in relation to the body and lived experiences makes somaesthetics a unique whole-person perspective that fashion designers can adopt for a more holistic understanding of wearer needs. Furthermore, the shift towards considering wearers' somas provides a new mindset for designers to reconsider the meaning of user-centeredness within the space of wellbeing,

⁴ The third consideration is intended for designers working with HCI elements and was not a focus for this project.

particularly when aiming to design inclusively.

Designing for emotions:

Emotion regulation (ER) is key to ADHD wellbeing and was an underlying consideration in many of the design systems analysed. However, like the self-regulation types analysed in Appendix B, emotion regulation is approached in designs in ways that lack consistent meaning. While some designs/design processes appear to value emotion regulation as a process of keeping emotions under control for social acceptability (e.g. AR glasses), others focus on shifting negative emotions to positive ones, such as Jeon's (2015) disguise-garment. In these designs, emotion processing is predominantly considered a bodily practice (rather than cognitive), and the mental/mindful processing of emotions was rarely considered in designs (apart from Cochrane et al.'s (2022b) inside-out probe workbook).

Emotion regulation strategies that focus on achieving positive emotions are grounded in the idea that certain emotions, such as anxiety, boredom and anger (Ji & Isbister, 2022) should be replaced with embodied feelings of comfort for self-soothing. While this may be beneficial in the short term or situationally, it is usually not a long-term approach to improving wellbeing. Thus, this form of emotion-shifting is a reactive approach. As clarified, reactive approaches, such as shifting negative emotions to positive ones, are not necessarily adverse. However, Yoon et al. (2020) raise concerns about purely positive frameworks that ignore the potential to understand deeper concerns and cultural values by only focusing on positive emotions. Yoon et al. (2020) suggest that a narrow positive focus can inadvertently lead to designing products as assets rather than appreciating their "experiential value" (p. 177). Accordingly, it is important to mitigate the risk of neglecting or avoiding the negative lived experiences of individuals. Designing for human experiences is inevitably, to different degrees, emotional. Designs for emotional experiences highlight that a value-neutral approach to emotions (not seeing them as positive or negative) is a gap that requires learning the experiential value of individuals' subjective emotions.

A Soma Design process enables fashion designers to rethink user-centeredness towards a situated mind-and-body approach. However, soma-influenced fashion designs that consider the mind-body approach through playfulness and self-expression only consider emotion regulation as evoking positive emotions and embodying psychological comfort for emotion regulation, rather than self-reflection and self-connection, which are key elements of Soma Design. These approaches to emotion regulation differ based on whether they use Soma Design simply as an embodied design theory or additionally to guide method selection with participants.

Individualised designs:

Processes for fashion/wearables recognise the importance of individualised designs as a key factor for sustainability through emotional attachments or 'emotional durability' to circumvent fast-fashion culture (Huang et al., 2023; Cochrane et al., 2022b; Campbell, 2022). Of significance for this thesis is Cochrane et al.'s process of "designing for one" (Cochrane et al., 2022b, p. 5) to enable the appropriate selection of emotion regulation strategies during the design process. 'Designing for one' aims to respect the variation of emotion regulation needs that can occur across cultures, personal qualities, lived environment, etc. The careful selection of emotion regulation strategies aligns with earlier assertions regarding the importance of distinguishing self-regulation types.

Furthermore, designing for the multifaceted lived experiences of users improves the efficacy of the design outcome, thereby strengthening the user's emotional connection with the garment, lowering the likelihood of the user disposing of it and enhancing sustainability (Yoon et al., 2020). This is further supported by Cochrane et al. 2022b; Jeon, 2015; and Huang et al., 2023.

Personalised participatory design adapted for neurodivergence:

Participatory design involves a collaborative partnership with intended users and co-construction of knowledge (Gregory, 2003).

Appendix D includes three examples of participatory design for neurodivergence. These demonstrate the development of participatory design for neurodivergent communities. Key design process components across all three examples are 'adaptable methods' and 'providing support'.

Firstly, Benton et al.'s (2014) "D4D" (Diversity for design) framework adapts participatory design for children with ADHD through the approach of observing strengths alongside challenges. However, these strengths are not user-defined. The D4D framework was published in 2014, at a time when the neurodiversity perspective was relatively in its infancy, and its approach to neurodiversity is now outdated due to the use of pathologising language and the under-acknowledgement of lived experiences. Nevertheless, the framework's components of individualisation, consideration of environmental implications, and provision of appropriate support are consistent with other adapted participatory design frameworks. Benton et al. emphasise that designers must adapt processes to their specific contexts and constraints. They also emphasise that design processes for neurodivergent communities have universal benefits.

In addition, Kudryashov (2021) draws on lived experiences to determine design priorities and barriers, emphasising a personalised approach

to create solutions for ableist environments and expressive needs. However, this design process focused on redesigning an existing product to be more inclusive, making the design process less transferable to designing from scratch. Nevertheless, this approach demonstrates a reinterpretation of user-centredness in line with neurodiversity-affirming perspectives to achieve outcomes that value marginalised perspectives and afford users greater agency.

Finally, Frauenberger et al.'s (2017) 'blending methods' consider the diversity of needs and enable safe and inspiring participant engagement based on participants' needs and abilities. This methodology is grounded in empathetic understanding and proposes a repertoire of methods from co-design and other various perspectives.

These examples support how a design method's validity, when working with ADHDers and autistic individuals, comes from a genuine understanding of participants' needs instead of pre-selected methods.

Takeaways:

Re-centring ADHD self-regulation needs for a whole-person approach

Whole-person approaches to self-regulation, such as polyvagal theory (explained in Appendix E), consider one's nervous system and embodied experience (these generally relate to trauma and somatic disciplines). These broadly relate to coping versus thriving or the appropriate use of self-regulation strategies according to one's nervous system needs (summarised in Appendix A). To understand ADHD self-regulation needs, it is helpful to consider the nervous system alongside Barkley's (2022) theory of self-regulation.

Barkley's work is one of the top co-cited references in ADHD research and includes one of the most influential papers on diagnosing ADHD (Cortese et al., 2022). Barkley, having ADHD, is an insider researcher. While Barkley's work uses some deficit-based language; his framework for self-regulation is not deficit-based, and his self-help book for adults with ADHD encourages positive reframing (Barkley, 2022).

ADHD self-regulation encompasses a complex set of executive functions (Barkley, 2022): self-awareness, inhibition, nonverbal working memory, verbal working memory, emotion regulation, self-motivation, and planning/problem-solving. These underpin the ability to self-regulate (see Figure 9). These executive functions provide a framework for ADHDers to understand their self-regulation needs and goals and should be understood when designing for ADHD.

These design precedents demonstrate the potential for clothing to support ADHD wellbeing as a protective environment that can embody varying

self-regulation requirements. While the functional and social-emotional requirements for healthy ADHD wellbeing are complex and interconnected, this is underacknowledged and narrowly interpreted in the current designs for ADHD. The continual need for ADHD management strategies suggests that simply reducing negative emotions does not necessarily equate to designing positive emotions, as suggested by Yoon et al. (2021). Therefore, it is paramount to understand that opting for a strength-over-deficit focus and understanding lived experiences via a spectrum of emotions, values, culture, and subjective needs are not mutually exclusive (Spiel et al., 2022; Yoon et al., 2021). My thesis seeks to address these gaps.

Additionally, Soma Design examples highlight that designing for emotional wellbeing/self-regulation cannot be simplified down to an assumed one-way direction of body movement influencing emotions—rather it is an intricate bidirectional process of the body and mind. Approaches that consider individuals' experiences more holistically, such as the revised FEA model, Entwistle's framework, Soma Design, polyvagal theory, adapted neurodiversity-affirming participatory design and more, highlight that proximity environments impact our self-expression and self-regulation needs and play a significant role in the embodied experience of clothing and wellbeing. When geared towards individuals' subjective experiences, user-centred designs highlight users' self-compassion and safety needs, emphasising the importance of individualised and collaborative approaches for diverse and unique experiences. Furthermore, self-regulation requires

self-awareness. Developing and articulating this self-understanding in the context of ADHD self-regulation can be achieved within Barkley's framework of executive functions. Thus, this research has found that attending to individuals' lived experiences is necessary to generate inclusive design outcomes.

In light of this context review, I propose that the most ethical design process when designing for ADHD is one that focuses on wellbeing and considers:

- the need for wearer involvement to understand whole-person needs;
- the evolving perceptions of ADHD; and
- an inclusive fashion and critical neurodiversity perspective; and
- individual's subjective self-regulation challenges (alongside acknowledging strengths)
- a strength-entry point - acknowledging strengths alongside understanding challenges.

I will refer to these ideal standards as an **'ADHD-informed design process'**, which is referenced in the *process section*.

Methodology

Phenomenology, Soma Design and co-design

My design outcome for this Master of Design is the design process itself.

Research Aim:

This study aims to advocate for a holistic user-centred fashion design approach in order to help those who identify with ADHD and clothing designers to design with ADHD in mind.

This design process will encourage a greater understanding of the complexities of the ADHD condition so that wearers can select, adapt, or create new clothing to support the symptoms of ADHD and gain a new relationship with clothes.

This study's methods use elements from inclusive and embodied methodologies to understand participants' experiences holistically and inform a design process that enables translating experiences into designs. The methods selected and discussed in this chapter are influenced by the various considerations required for an ADHD-informed design process as established in the context review.

The context review established a lack of documentation of holistic user-centred clothing design processes for understanding adult ADHDers' lived experiences. Thus, it was necessary to develop such a process before proposing any 'design solution' to minimise the risk of inaccurately interpreting ADHDers' experiences and needs and to address this gap. **Therefore, my design outcome for this Master of Design is the design process itself.**

In response to the existing research gaps on adult ADHD experiences and designs, I determined that combining methods from a Soma Design methodology and Sanders and Stappers' (2012) models for co-design from their book *Convivial Toolbox: Generative Research for the Front End of Design*, would best achieve my aim. As shown below in Figure 1, this

theoretical framework’s guiding principles are empathy, ADHD-informedness, and a whole-person approach. These principles can be integrated within what I will now call a Soma Co-design process. Soma Design was selected for its empathetic and pragmatic approach to user experience and its allowance for adapted methods. This approach has been utilised in existing design research to achieve strength-based, co-design, and phenomenological approaches (see Kudryashov 2021; Spiel et al., 2022; Ståhl & Jung, 2018.)

Soma Design draws on phenomenological thinking and introspection from the researcher and participants to understand deeper experiences.

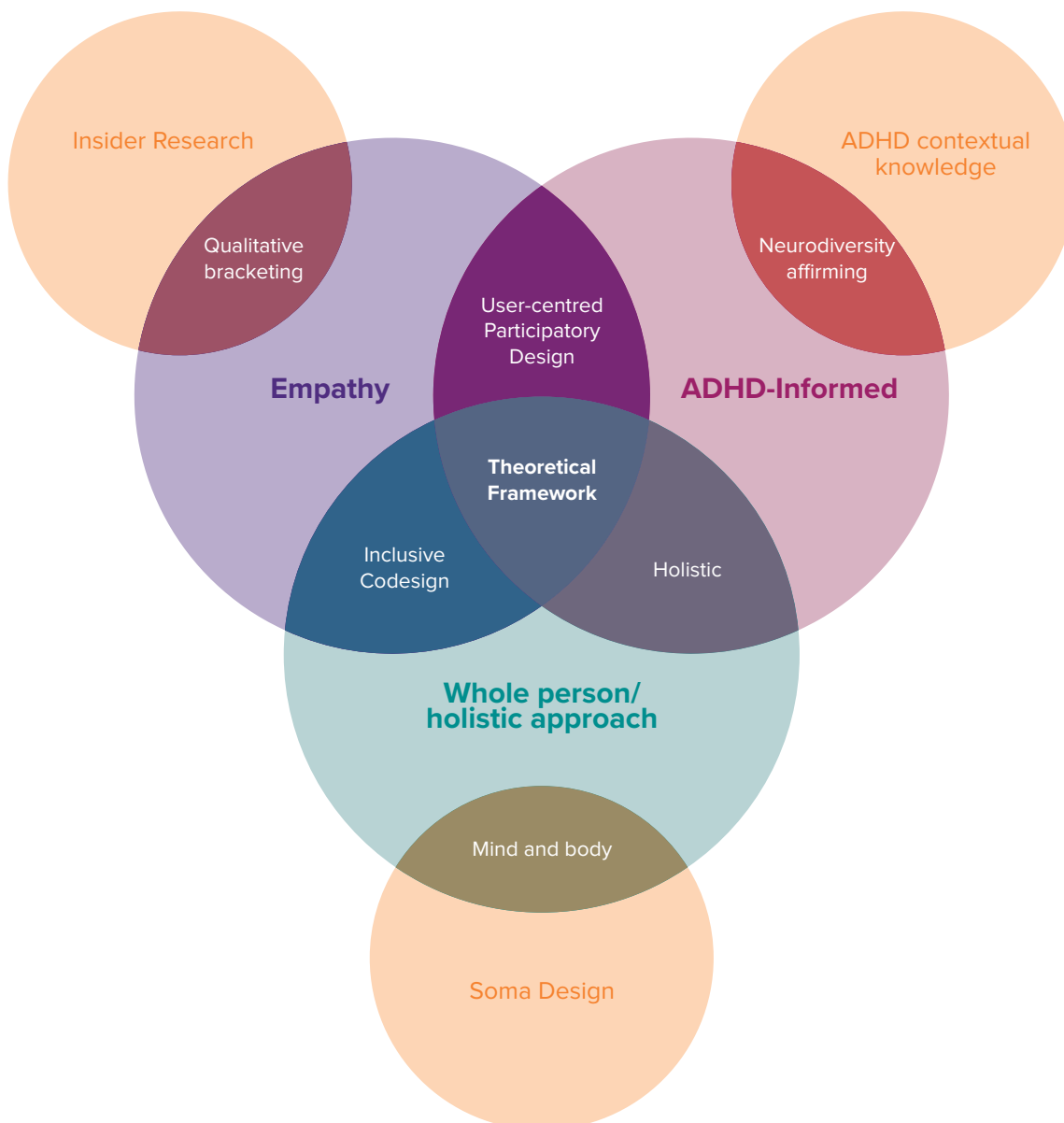


Figure 1: Methodology theoretical framework Venn diagram. Diagram by Author and graphic designed by Calvin Lai.

Phenomenology is the study of subjective experiences that considers “knowledge and understanding [as] constructed and interpreted” (Wisker, 2019, p. 195). This perspective appreciates the subjectivity and situatedness of individual experiences (Gray & Malins, 2016), recognising that experience can never be separated from context. This is an interactive inquiry process for co-constructing findings that necessitates involving users and their experiences as valuable guides. It requires researchers to critically reflect on their position and impact on the inquiry, reducing the risk of inappropriate inferences or generalisations.

Soma Design (or Somaesthetics) expands the phenomenological view of ‘lived experiences’ by focusing on them through ‘body consciousness’, which requires understanding both the thinking and bodily experience as well as the ‘embodied’ consciousness that one directs outwards and experiences within (Shusterman, 2009). This requires using first-person or participatory design methods to understand the soma experience and the design possibilities that follow (Höök, 2018).

Accordingly, I chose co-design as a key methodological element to achieve an ADHD-inclusive Soma Design process. Co-design is an extension of participatory design; both value user-inclusion, but have different methods and goals.

Participatory design involves stakeholders or users in the design process to understand user needs and achieve “democratic and emancipatory” goals, traditionally for workplace contexts (Simonsen & Robertson, 2013, p. 6). Its methods commonly involve focus groups and feedback collection. In comparison, co-design includes users throughout the design development process to understand various levels of user knowledge (Sanders & Stappers, 2012), which allows for greater partnership when co-constructing knowledge. Thus, co-design extends upon participatory design methods to understand experiences rather than getting feedback for democratic purposes.

Sanders and Stappers define ‘co-design’ as a generative “toolkit”. Co-design toolkits involve considering “appropriate” methods for the design

project’s nature and the participants’ traits. They are intended to maximise participant involvement, enabling greater power sharing to develop designs that respond to shared values and present designers with issues for further design evaluations. Adhering to Sanders and Stappers’ models for co-design, this project’s co-design process incorporates a flexible and blended method approach as seen in neurodiversity-affirming participatory design, as well as Soma Design’s key method components: sensitising, priming, and probing.

Strengths and Limitations:

Soma Design’s holistic, interdisciplinary focus on body and mind strongly aligns with Sanders and Stappers’ co-design processes and my research aims. This is in contrast to other relevant methodological approaches rooted in the social sciences (e.g. ethnography, action research, grounded theory, etc.). However, limitations of a soma co-design process include the lengthy process, substantial labour from participants and the subjective theory of soma practices in which participants’ openness or readiness for engagement with soma methods will always be in flux with their personal beliefs and experiences. Researchers should be cautious and respectful that mind-and-body processes are not within everyone’s comfort levels; thus, pre-screening for participants’ alignment with the project’s soma methods is essential.

While co-design aims and helps to neutralise power dynamics between the researcher and participants/co-designers, research inherently involves and instils a power dynamic, and co-design is not exempt. Furthermore, researchers cannot eliminate participants’ perceptions of power, which can be influenced by the awareness of oneself being researched (Hawthorne effect) (Kumar, 2019) and possibly by past negative social experiences (e.g. see the ‘lived experience’ section above). Thus, researchers should approach neutralising power by prioritising enabling participants’ feelings of comfort in the co-design process, such as empathetic communication and inclusive accommodation.

Nevertheless, these limitations constructively address the current gaps in adult ADHD designs by respecting users as experts of their own experience

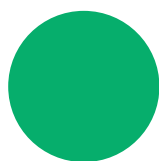
and allowing ADHDers' intuition, through soma, to be expressed. By rebalancing ADHDers' experiences in the design process (in comparison to traditional ADHD research), my methodology arose from an appreciation of ADHDers' ability to meaningfully contribute ideas and inform design directions when the opportunity to reflect, communicate, and generate ideas is enabled. This is exemplified by the 3 case studies analysed in Appendix D.

Soma Design is an embodied practice; thus, a thematic analysis method was selected to identify meaningful connections across the dataset that can be interpreted in a design context. This inductive method allows me to explore the complexities of ADHD experiences to identify ADHDers' self-identified strengths and challenges and understand wearer needs for more supportive clothing relationships.

The long-standing medical authoritative perceptions of ADHD will likely be entangled with ADHD lived experiences regardless of a neurodiversity-

affirming methodology. However, when analysing and interpreting results, it is essential to respect people's different perspectives of their ADHD, which may not align with a neurodiversity-affirming viewpoint, and acknowledge the limited 'Western' perspective of neurodiversity-affirming concepts. This can be due to numerous factors like learnt terminology, culture, and education.

These design methods were employed in this research project, along with my lived experience.



Ethical considerations- being ADHD-informed

Key considerations for being ADHD-informed are based on understanding other ADHDers' situated experiences. Thus, being ADHD-informed and assessing ethical risk for ADHD-related research requires an earnest understanding of the nuanced and diverse experiences of ADHD; this does not necessarily require one to have ADHD, although having lived experience can be advantageous. Additionally, Sanders and Stapper's models helped to guide ethical considerations for co-design methods.

For 'low risks', I adhered to the following ethical considerations:

- Participants are considered experts of their own experience- the notion that the researcher is learning from them is made clear
- Researcher positionality is communicated for participant comfort.
- Interactions with participants (such as surveys and workshops) are inclusively formatted to account for common ADHD needs (usability and accessibility) such as:
 - having time to think
 - reminders and or prompts
 - calming and engaging aesthetic
 - empathetically framed questions
 - option to say more
 - examples to offer clarification
- The research project is debriefed
- Information sheet guidelines are followed
- Participation is structured to enable recovery and processing time
- Anonymity using pseudonyms
- Data and all other identifiable materials are securely stored away
- Pre-screening
- Potential perceived intrusiveness of questions is considered. Considerations include the need for empathy and clarity, terminology, question type, environment for in-person and sensory needs
- Pretesting when applicable for researcher preparedness and usability


Design Process as Outcome: Symbiosis - A Co-design Process





This project's design process consisted of three main participatory elements, which together functioned as a symbiotic co-design process.

In this section, I will discuss the co-design components individually and sequentially. This section focuses on the 'what' of the design process components rather than the 'how'.

Overview

My initial research identified a 'strength-entry point' as the best method for identifying user struggles and easing into the soma co-design process with low risks while maximising support. A strength-entry point influenced the structuring of activities and reframing of language used when formulating questions. This applies from the pre-screening survey through to the final workshop. In this project, participants are considered 'experts' of their own experience.

 Researcher Exploration and Translation: Additionally, throughout the process, I concurrently carried out first-person soma design trials with diary reflections, design sketches, and soma prototypes. Trialling soma methods served as facilitator-'priming,' and the creative outcomes were potential workshop tools.

-  Surveys: A pre-screening survey established eligible participants and initial themes for design potential.
-  In-depth questionnaire- After the pre-screening, a customised questionnaire was administered to understand individual responses and potential risks better.
-  Panel: A panel of 10 participants was formed to gain a deep understanding of experiences via a flexible online process.
-  Co-design Workshops: The panel results informed the content and focus of the workshops. These were designed to assist the co-designer in reflecting and translating ADHD experiences into design priorities and potential design ideas. These workshops aimed to observe the co-designer's response and create tangible inspiration for design development and evaluation.

Each co-design component informed and supported the development of the proceeding component (much like symbiosis in natural ecosystems). Structuring the design process this way **enabled me to continuously develop it in response to the insights** learned from panellists, supplementary research, soma trials and pre-testing workshops.

This ensured that the 'how' of the process was thoroughly examined at each step, as opposed to following a standard design process that can restrict neurodivergent thinking styles (e.g. double diamond, design sprints). This allowed me to understand what worked and did not work for these ADHDers and make appropriate adjustments. This process structure also enabled me to include participants not eligible for the in-person soma co-design workshops by forming the panel as a lower-risk and accessible alternative.

Symbiosis: A Co-design Process

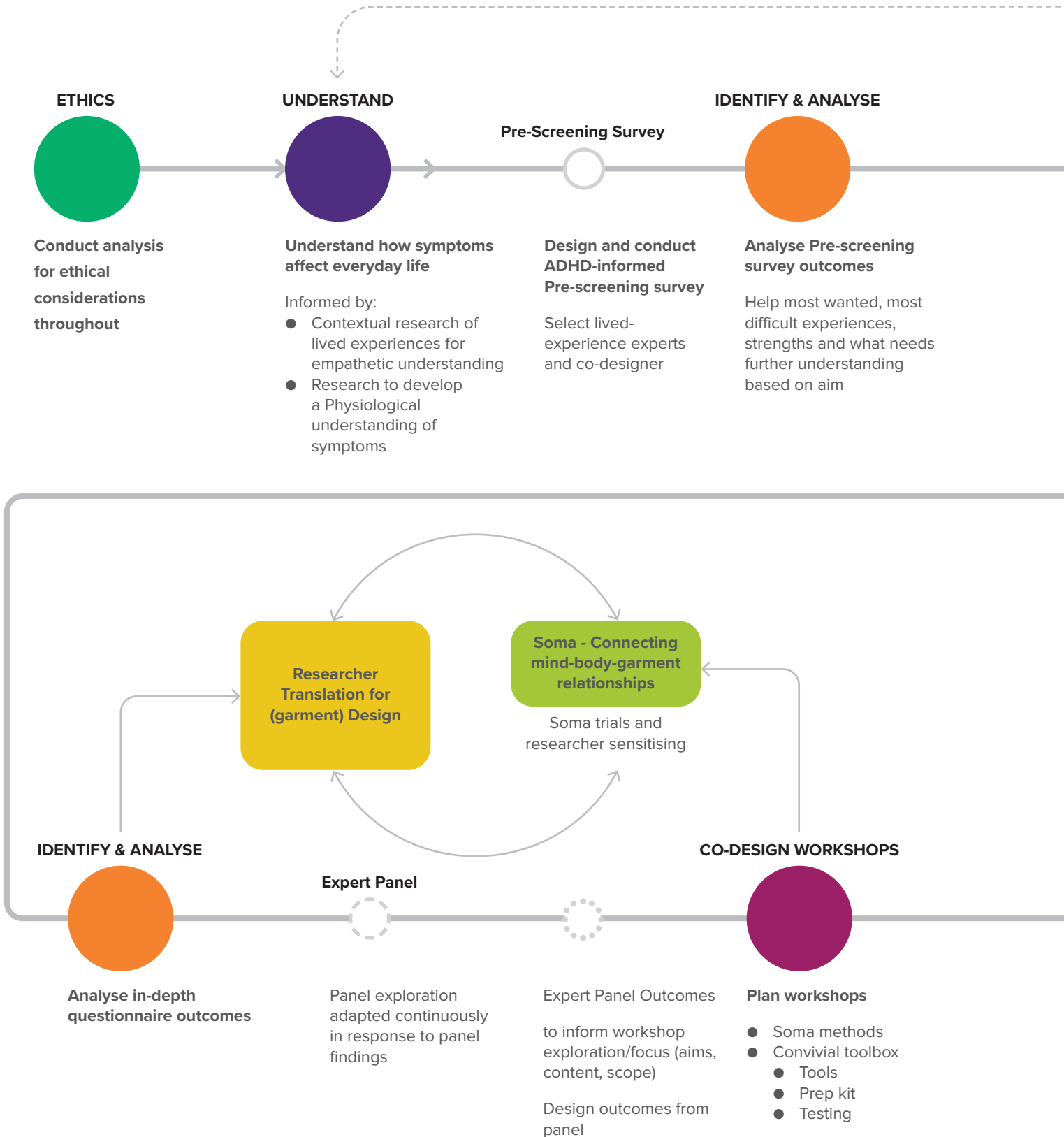
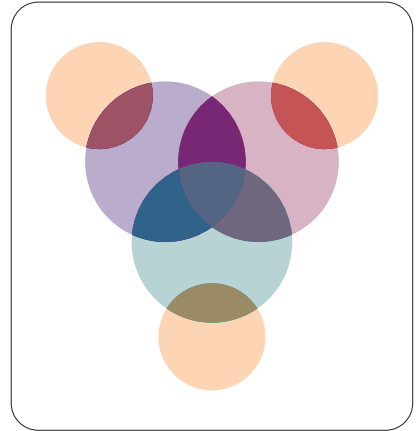
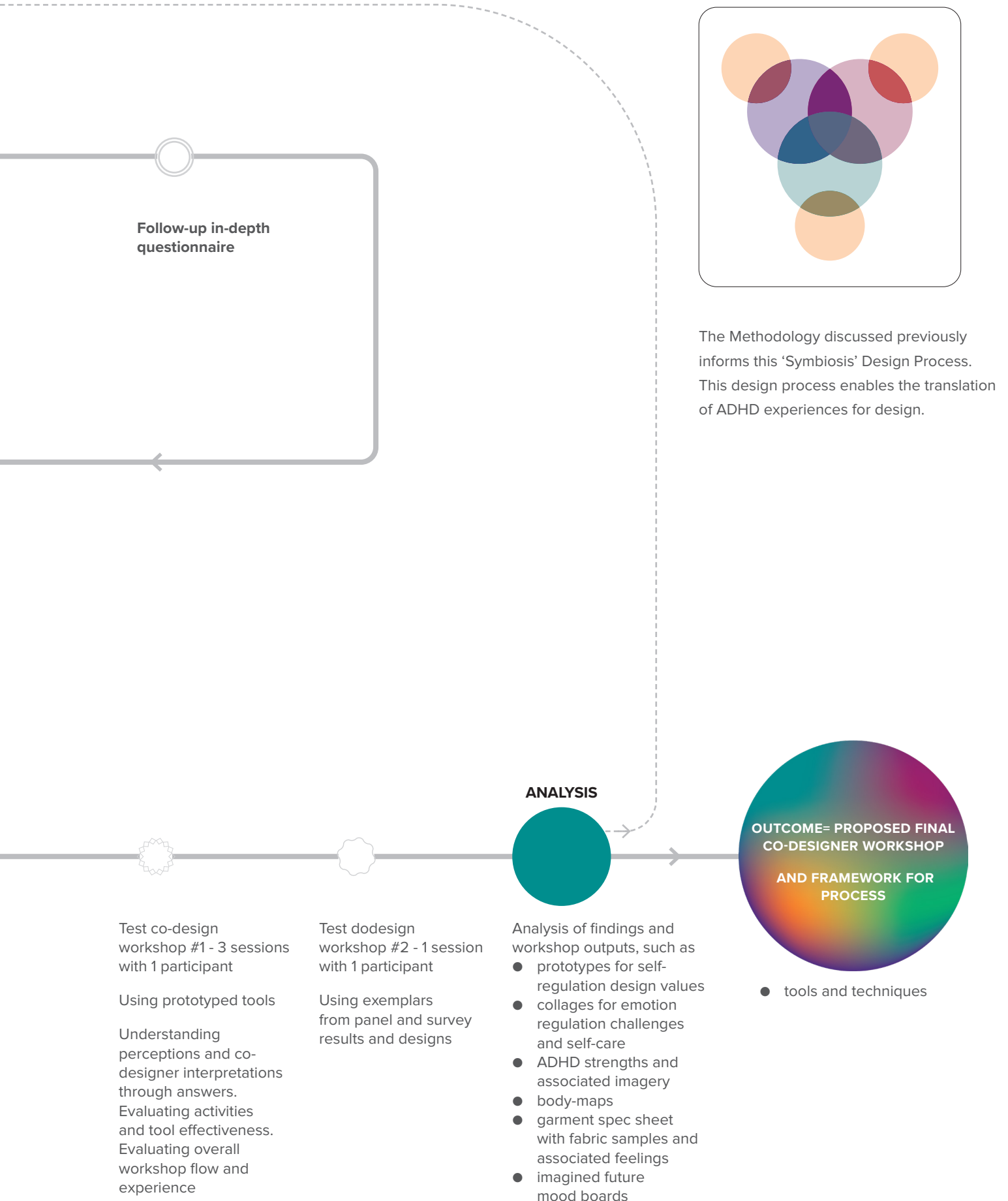


Figure 2: Symbiosis: A Co-design Process - Flowchart. Diagram by Author and graphic designed by Calvin Lai.









The Methodology discussed previously informs this 'Symbiosis' Design Process. This design process enables the translation of ADHD experiences for design.

Symbiosis: A Co-design Process

(sequential version)

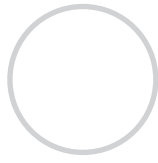
★ = Crucial Participatory element

Process	Action	Notes
 ETHICS Conduct analysis for ethical considerations		
 UNDERSTAND Understand how symptoms affect everyday life	★ Design and conduct ADHD-informed Pre-screening survey ★ Conduct Follow-up in-depth Questionnaire	Informed by: <ul style="list-style-type: none"> ● Contextual research of lived experiences for empathetic understanding ● Research of Physiological understanding of symptoms
 IDENTIFY & ANALYSE Identify help most wanted, most difficult experiences, strengths and what needs further understanding based on aim	★ Conduct Panel exploration from confirmed lived-experience experts and co-designer	Panel Exploration comprised of two weekly questions over four months Responses continuously analysed and following questions developed in response. Panel findings inform following workshop exploration/focus (aims, content, scope) and design sketches as exemplars
 CO-DESIGN WORKSHOPS Co-design workshops	Plan Co-design Workshops	Informed by: <ul style="list-style-type: none"> ● Design sketches based on contextual research and Soma trials ● Soma methods ● Convivial toolbox <ul style="list-style-type: none"> ● Tools ● Prep kit ● Testing
	★ Test Co-design Workshop #1	Using prototyped tools Understand perceptions and co-designer interpretations through answers. Evaluate activities and tool effectiveness. Evaluate overall workshop flow and experience.
	★ Conduct Co-design workshop #2	Exemplars from panel and survey results and designs are used to conduct Co-design workshop.
 ANALYSIS Analyse findings	Analyse findings and workshop outputs	Analysis of findings and workshop outputs, such as <ul style="list-style-type: none"> ● prototypes for self-regulation design values ● collages for emotion regulation challenges and self-care ● ADHD strengths and associated imagery ● body-maps ● garment spec sheet with fabric samples and associated feelings ● imagined future mood boards
 OUTCOME=PROPOSED FINAL CO-DESIGNER WORKSHOP AND FRAMEWORK FOR PROCESS <ul style="list-style-type: none"> ● Tools and techniques 		

SOMA - CONNECTING MIND, BODY, GARMENT RELATIONSHIPS

RESEARCHER TRANSLATION FOR (GARMENT) DESIGN

Note: Symbiosis: A Co-design Process the sequential version. Process by Author and graphic designed by Calvin Lai.



Design ADHD-informed Pre-Screening Survey:

Sampling and selection

The pre-screening survey aimed to understand respondents' self-identified strengths and struggles and what ADHD experiences they wanted help with. The pre-screening was crucial for determining the project's scope and direction for the co-design process. Its primary purpose was to identify potential experts based on their understanding of ADHD and how they translated their experiences into ideas. This required a purposive sampling method to select those likely to have the relevant understanding and openness to share their ADHD experiences and explore how to have better relationships with clothing.

The survey was conducted online and accompanied by a short research statement and information sheet (see Appendices H and I), provided in audio and written form, explaining the purpose of the pre-screening, what results would be used for, and the project. Advertisements were posted on New Zealand-based social media platforms, and ADHD New Zealand posted an ad on my behalf in their community Facebook group. Additionally, physical ads with scannable links were displayed around universities in Wellington. Refer to Appendix G for the selection criteria and Appendix K for the pre-screening survey.

Secondary research informed the questions and the list of strengths, struggles, strategies, and tools for the multiple-choice options, helping me determine what else I needed to find out. It also informed a potential co-design workshop storyboard (drafted from initial methodological research), co-design-related survey questions and disclaimers.

Two key significant survey design elements were:

1. Enabling autonomy through self-identifying individual strengths, support wants, and challenges (related to social perception and stigma). This aims for an ADHD-affirming approach to contextualising challenges and identifying design potential.
2. Reframing certain questions to focus on individual feelings and values rather than conformity and objectivity. For example, Q3.1 asks,

'What **aspects of your ADHD** do you consider your strengths and/or **would miss** (If you had the option to live a neurotypical life)?'

- This aims to enable respondents to think beyond what society considers 'positive' traits of ADHD and consider what they cherish.



Survey Outcomes:

I closed the survey with 37 responses⁵. A thematic analysis was undertaken to broadly understand the effectiveness and barriers of current ADHD management approaches. This informed potential design requirements and considerations for my design process and outcomes; see Figure 3. Survey findings helped identify accessibility requirements and reinforced the context review findings.

Key themes influential for my design approach were:

- Executive functioning influences self-reflection and accessibility requirements.
- Participants expressed varying levels of introspection and self-awareness.
- Pressure and internalisations may be interdependent with 'functional' capacity and usability factors.

It is important to note that these findings should not be considered generalisable to the wider population with ADHD, and ADHD is likely more common than what existing data says.

Self-reflective awareness of challenges was interpreted as both a strength and a challenge, emphasising how respondents communicated varying abilities in identifying, compensating for, and responding to their executive functioning needs and

barriers. Respondents' discussions/ideas of managing these functional differences exemplified their creative adaptations for visualising memory and time. For example, many participants mentioned pockets as an effective external memory aid; the example I provided may have influenced this. However, one participant took this idea further with the idea of visual and tactile association, stating: "Clothing with lots of pockets that zip/close fully and are each differently textured & coloured so you can more easily remember/associate where you put a thing"-36. Thus, executive functioning differences presented barriers and opportunities, indicating that one's executive functioning needs influenced accessibility requirements.

Various levels of self-awareness and introspection regarding needs, barriers, and self-beliefs were communicated across responses. While some identified and described reactions to undesirable experiences (primarily sensory stimulation and boredom), others expressed awareness of one's strengths, challenges, and abilities, and some also expressed learning to adapt expectations and strategies to match their ADHD experience. When asked how something wearable could help with their self-identified challenges, one respondent suggested: "Something like jewellery that can recognise the environment getting louder that perhaps begins to pulse calm light in time with how I should breathe in order to stay regulated. Something like this would help as I often don't realise I'm getting overstimulated until I explode"- 32. These nuances of self-awareness and introspection highlight that the range of ADHD experiences that can be self-identified and introspected upon (and external factors, discussed next) can limit or expand design

⁵ Survey respondents were listed by number for data analysis. Pseudonyms were used after participant selection.

possibilities, especially when designing for self-regulation (as opposed to short-term gratification).

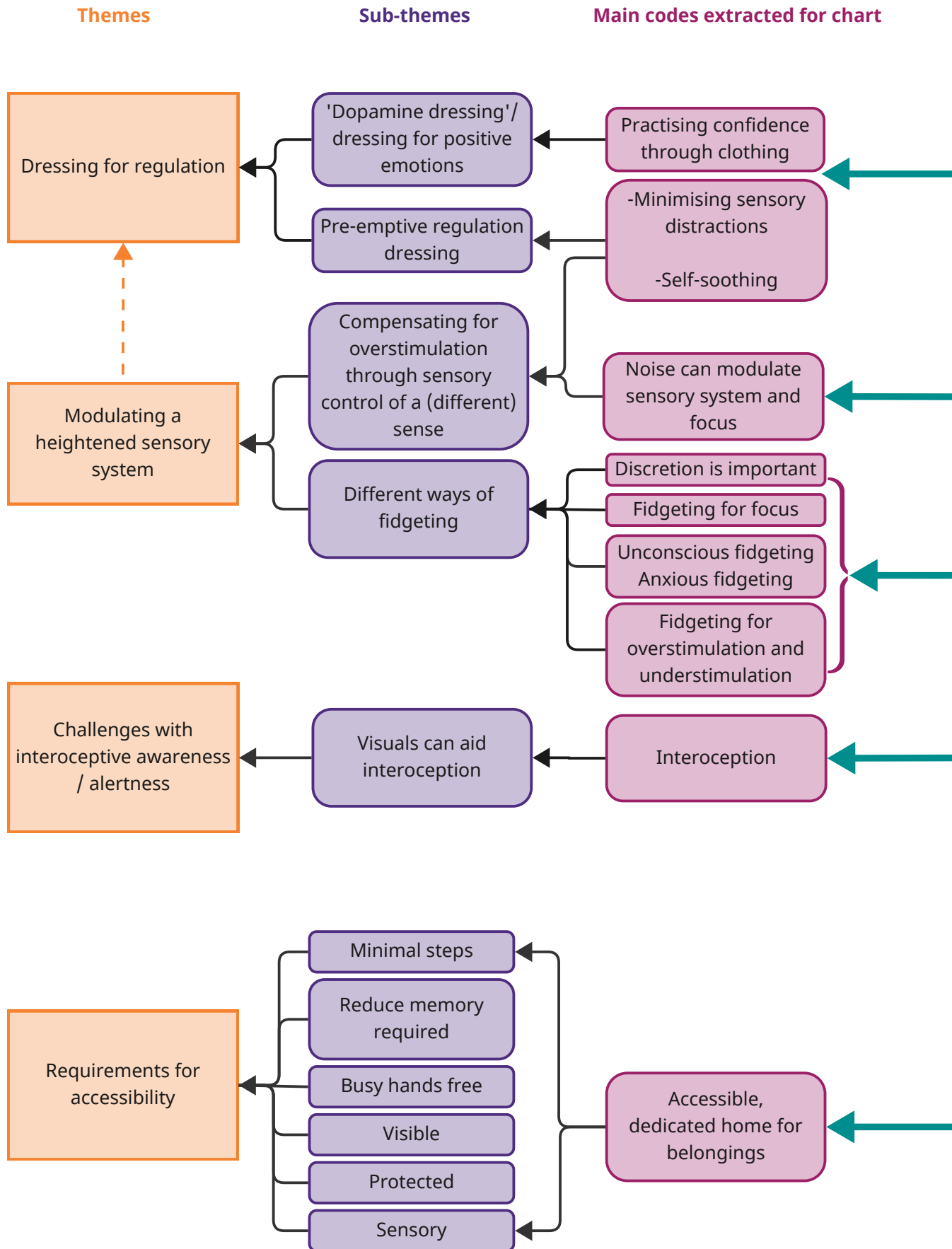
Lastly, external factors and personal beliefs appeared to influence respondents' self-described 'functional' capacity, affecting usability factors. For example, when asked about 'situations ADHD felt like a burden', the top result (that was not executive functioning-specific) was sensory overload, and the most selected answers related to 'feeling misunderstood' and 'letting others down'. Thus, external factors, especially perceptions, appear to impact how people experience their ADHD significantly. While some respondents discussed adaptive strategies for social and emotional needs, such as using dress to embody authenticity and confidence or as a conversation starter by 'standing out', others expressed a desire for discreteness. However, outside of dressing for emotional safety and empowerment, adaptive strategies with a balanced view of self were rarely communicated. This is seen in the misconceptions and unreasonable self-expectations expressed regarding meditation. 14 respondents selected meditative practices as NOT effective; some of the optional comments left were:

“My brain wanders too much.”-25

“Found myself unable to focus and got frustrated when lost track. Get bored.”-7

Respondents' expectation to focus and feel satisfied during meditation was most striking as it contradicted what I had learnt meditation is- a practice of observing one's natural internal state without judgment. This reflection led me to speculate that internalised pressure and/or unreasonable expectations may affect engagement with self-care practices, highlighting a potential design usability factor. Thus, I postulate that external factors that impact an individual's experiences of self-compassion and unreasonable expectations are equally significant design considerations as function-related requirements for holistic ADHD-inclusive design. This may be crucial for usability, design efficacy and long-term use. However, I recognised that expressing a self-compassionate view of oneself might not be well-received in a New Zealand society with deficit-based perspectives of ADHD and 'tall-poppy syndrome', and that responses were likely quick and surface-level feelings. Thus, I conducted a brief follow-up questionnaire to avoid making assumptions and gain more details.

Thematic Analysis (TA) Coding Chart:



Data extracts / quotes

"Embracing who I am (bright clothing, fun clothing)"
 "Educating others about ADHD via clothing, fun designs...Cool designs that can advertise ADHD so start conversations"
 "Emotional intelligence starters (like emotion wheel on t-shirt, for my teacher aid work would be amazing."
 "Bright clothes to express myself, little dopamine hits when people comment!"-2

"...textures and shapes of what I'm wearing play a big role in my ability to operate in the world."
 "...oversize clothing that isn't constricting means i'm not distracted by my clothes during the work day." -5
 "Layering clothing to keep textures I don't like away from my skin, while still being able to look right."-17
 "Cotton t-shirts so I don't get too hot as I'm always moving."-2

"I find soft knits to be a really soothing texture if I'm stressed."-5
 "Something like a smartwatch but specifically only for reminders. Alternatively, maybe a wrist-worn tiny note-taking device as opposed to writing on my arm"-8
 "I currently make sure that the things that I wear complement the way that I feel and cope with the world. I have to be comfortable, easy to move, breathe, fidget and play with things, and not worry about the things I'm wearing are going to break or need care (as I cannot care for many things)"-27

"I listen to alpha wave sound in my noise cancelling (NC) headphones at work in a busy office which has helped me focus better" -12
 "Sound blocking hoods are cool (like with fluff or thick bits near your ears" "An odd one but sometimes jingly earrings help to distract from lots of background info" -36
 "Headphones made in a way that doesn't irritate ears or weigh down on head and glasses" "NC headphones have been amazing, they help me block out distractions at work and help to control my emotions by playing calming music" 29
 "When I worked in an office/reception setting I would often use NC headphones without any music playing. I found this helped reduce overstimulation and allow me to focus on the task at hand better. Being able to adjust to hearing levels was especially useful since I was unable to reduce the bright fluorescent lights" -24
 "Headphones are a must to block unwanted sounds so I can focus on my work as well as managing day to day life" -22
 "My NC headphones have helped with my sensory overload, but they need proximity sensors that tell others to go away because people always want to ask you something when you have them on" -23

"I once had a fidget ring with three balls on it which you moved around. I enjoyed this but the design and build of it was very flimsy and it broke quickly which frustrated me! I liked that it wasn't noticeable though and looked professional so no one in a formal meeting would know it was helping me to concentrate."-32
 "I don't want to annoy people, and I don't want to be noticed."-17 Fidgeting where it's easiest- hands, face, clothes
 "[My bangles] can help to ground me a bit, when I feel a bit anxious or worried about something, I can sort of tune that out and calm down a bit, with the bracelets to calm me."-13.
 "...if I am fidgeting/moving my hands it helps me to focus- I usually have to be writing/typing or fidgeting with something to focus better" Nail biting and picking skin: "...helps me focus/ also do that one when I'm stressed"-34

"Something like jewellery that can recognise the environment getting louder...begins to pulse calm light in time with how I should breathe in order to stay regulated. Something like this would help as I often don't realise I'm getting overstimulated until I explode."-32
 ADHD symptom or experience I want help with: "Recognising my body's signals better eg, hunger, overload."
 "Ways to treat the ADHD at different parts of my cycle since our hormones impact it so much"-34

Pockets are an effective dedicated home for possessions (valuables/essentials)
 1, 2, 3, 5, 6, 25, 36, 30

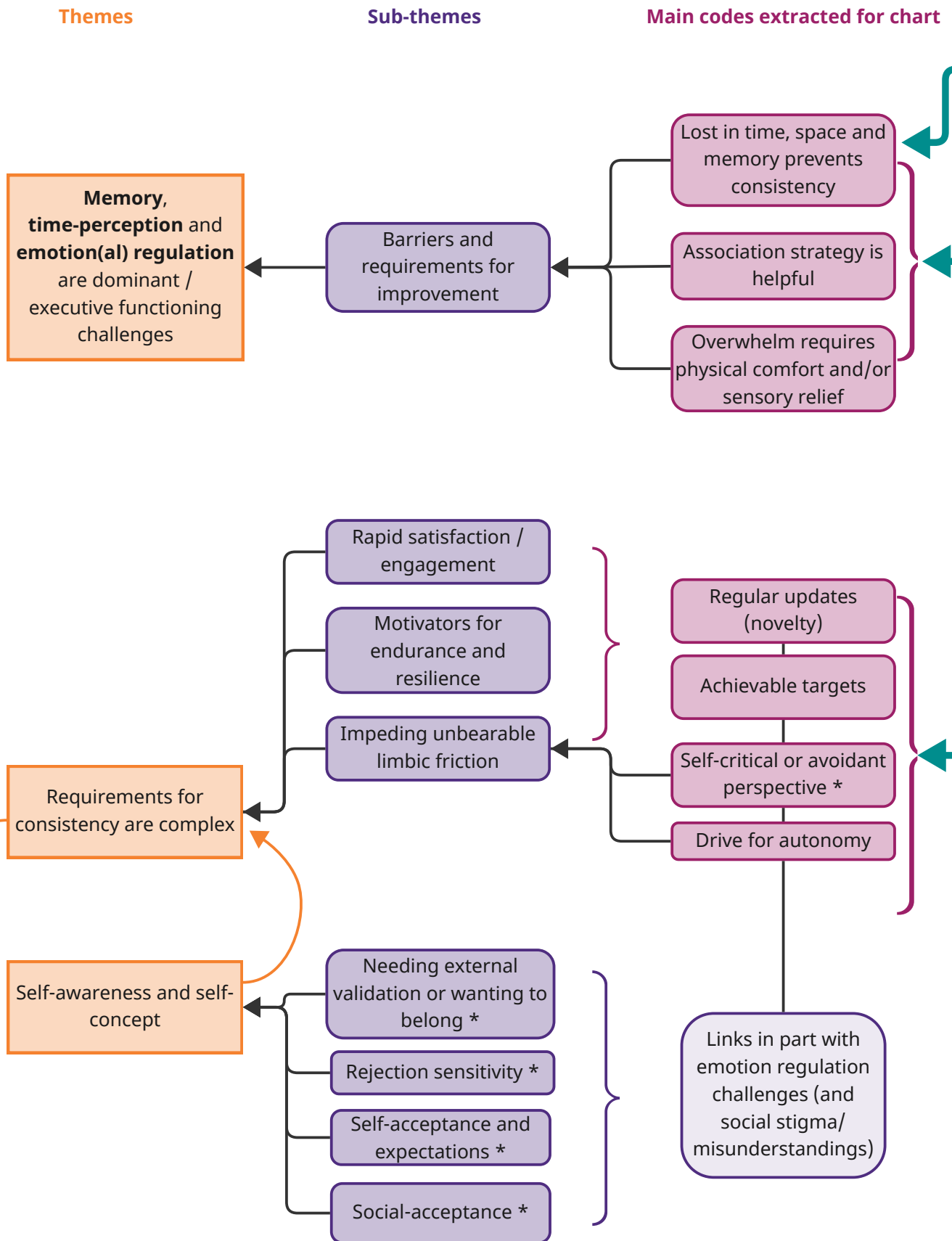
Pockets dedicated home for external memory

Hangability / seeing everything

"...Uniform had a narrow chest pocket for a single pen. It was fantastic." "I like having three pockets. Like on the federation brand trackies. Phone down the side, wallet on the left, keys on the right."-1
 "My workbag has multiple pockets for snacks, meds, pens, paper, gym towel, headphones etc." "My Lulu pacemaker is short, with a great zip pocket for my phone and keys, so I don't drop my phone. LOVE these shorts. And wearing activewear helps me move, stretch etc throughout the day"-2
 "I have a small bag with a comfortable shoulder strap with everything I need to walk my little dog, treats, poop bags, spare collar, lead and harness, ball, small dog water bottle. It's one of the few things I hang up in the exact same place every time I use it. Otherwise, it takes me forever to find everything before we leave the house. My phone case, it holds my bus pass, eftpos card, phone obviously, paper money, any appointment cards or prescriptions, important info/letters i will need I put them in there straight away."-3
 "...big/multiple pockets help me remember all my stuff..."-5
 "Handbag with numerous pockets so I can keep things in the same place and orderly and have easy access too- has kept me sane especially when travelling."-6

"In my work life as a teacher I wear a self-made apron with multiple large pockets to store my supplies such as pens and whiteboard markers, scissors tape etc, and my phone. It means I have somewhere to put things that is consistent and always have things accessible."-25
 "Clothing with lots of pockets that zip/close fully and are each differently textured & coloured so you can more easily remember/associate where you put a thing"-36 " ...My trousers always have pockets as I like to keep my meds on my person sometimes."

"I always have a backpack with me. It has one main pocket and a sleeve for my computer. It's important that it's weatherproof, not only for the Wellington rain, but I like to wipe it down if it looks a bit gross (I have had this one backpack for years). In my backpack, I have a second smaller bag that contains my meds, my keys, headphones, ear plugs and anything else small that I need. I choose to do it this way because I can see everything in my backpack, and two, the smaller things are somewhere I know they won't get lost."-30
 "Because I misplace things or like I say, I hide it from myself. I carry a small purse thingamajig with 3compartments: one for my cards, phones (work and private) in the middle and car keys, lip balm and gum in the front. Fits nicely under my arm if I need my hands"-4
 "My Kanken Backpack has been a lifesaver. A separate pocket for my iPad/Laptop and different pockets for all my different things - they all have zips. I keep essentials in there all the time and it means I have less to think about in the morning and just chuck backpack regulating my morning and decreasing stress."-16 "Things that repeat with little ongoing involvement from me are usually the long-term successes eg. Apps that are automated, the 2 week pill box etc."-3



Data extracts / quotes

New concept of time needed
 Minimise memory with association

"The watch I used to have, had minute-markers, so I could be more accurate with my times."-1
 "There are very few that I have stuck to long term, even if effective, after a while strategies just disappear from my consciousness."-3
 "...visual timers and hourglasses have always been helpful, maybe a watch that you can set a timer on and it visually drains colour away as it counts down?"
 "...my little shoulder bag ensures I forget things less, like my wallet or keys, because it's harder to forget a whole bag than a few small items."
 "Physical exercise- I'm sure this would be more effective if i could remember or motivate myself to do it"-8

Ways wearables can help:
 - "visual timer on wrist-16
 - "alarm letting me know i need to check my diary"-20

Task breakdown and prioritising tasks:
 - "Work for a few days but becomes part of my environment and I forget about it."-35
 - "Clothing with lots of pockets that zip/close fully and are each differently textured & coloured so you can more easily remember/associate where you put a thing."-36

Association stacking: "My phone case, it holds my bus pass, EFTPOS card, phone obviously, paper money, any appointment cards or prescriptions, important info/letters I will need. I put them in there straight away."-3 "big/multiple pockets help me remember all my stuff"-5
 "My handbag has a specific clip for holding my keys. No matter what, I know that so long as I have my handbag, I also have my keys."-14
 "Something physical to provide stimulation to aid with concentration or something that feels physically comforting when I'm overwhelmed"-14 22

Shifting thinking or interrupting thinking: "Shifting thinking is something I don't think I could've become this good at without ADHD medication but now its second nature which is awesome"-36
Breathing techniques/ practices: "Made me much more stressed."-18
Organisation techniques: "They get boring and then I need a new one" -11
Following a routine:
 - "Works until I get bored and need a new routine"-11
 - "While there are benefits to routine, I get bored easily and this undermines any potential benefits of having a routine." -14
 - "Don't stick to it, keep changing"-27
 "A parrot on my shoulder to remind me what I am procrastinating on and why."-9
Task breakdown and prioritising tasks:
 - Not effective-"Overtime and then quit or not start"-10
Meditative practices:
 - "My brain wanders too much. I have not tried it since being medicated"-25
 - "Found myself unable to focus and got frustrated when lost track. Get bored." -7
Positive mindset:
 - "Tends to not last"-7
 - "A positive mindset doesn't help me remember to take my pills or stop being overwhelmed" -12
 - "My inner critic is stronger than my ability to counter him sometimes"-21
Self-motivation:
 -"Can talk myself out of it"-7
 - "Just can't, unless I am passionate about it"-11
 - "One of the biggest things though was learning how much of a difference it makes just to be kind to yourself. My functioning increased so much when I was told it's ok to be lenient to myself when I make mistakes and struggle instead of punishing myself."-8
Body doubling: - "Stresses me out more, feel more pressure" -12
Communicating needs and boundaries to others: - "People don't understand adhd enough to support me"-12
ADHD symptom or experience I want help with: "The trauma of living 39 years thinking I was faulty" _"Making and keeping friends" -21
In which situations (if applicable) has your ADHD felt like a burden?
 "Most of my life up till I realised what I was dealing with." -21

Taken from survey *additional comments* for the following multiple selection questions:
 ← *'Select any strategies you have tried that were NOT effective'*

'Please nominate your 3 most effective tools AND 3 most effective strategies for managing your ADHD'

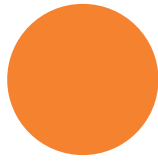
-Assistance to get "good" at something can increase consistency and satisfaction and therefore effectiveness
 -Too much pressure on performance or too much attention on internal state = not enough satisfaction = can increase stress + decrease resilience = unachievable
 -Misconceptions of meditation

Figure 3: Survey response thematic analysis chart - Flowchart. Diagram by Author.



Follow-up in-depth questionnaires

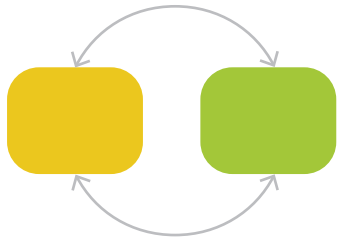
The follow-up questionnaires were individualised based on survey responses. Their purpose was to help deepen my understanding of respondents' experiences and understand any risks associated with participating in the panel. These questionnaires resulted in thick data. After identifying important themes and assessing them against the survey TA, I used these findings to formulate a criterion for accessibility and usability (shown in the following section). The Accessibility and Usability criteria thus reflect the broad findings relevant to design from the pre-screening stage.



In-depth questionnaire outcomes

Three people met the co-designer selection criteria. I requested to call or meet them each at their preferred location to ask some follow-up questions and answer any questions they had, offering reassurance that it was casual. Two withdrew, leaving one participant whom I met with; this was also an opportunity for them to express any concerns and needs in the co-design process.

For minor reasons, 19 people were considered unsuitable for the proposed Soma co-design workshops. However, they gave insightful descriptions of their experiences, so I proposed the guidance panel as a more flexible and low-commitment participation option. They were sent follow-up questions, and eventually, a panel of 10 was confirmed.



Researcher translation for garment design

Understanding challenging ADHD experiences led to an ongoing translation process of identifying what support was needed to alleviate these challenges and how this support could be translated into a garment through design.

Design sketches based on contextual research

While the survey was open, I conducted Soma Design trials and preliminary design sketches. These sketches were based on secondary research and soma experiences of ADHD. These sketches supported my explorative and translation design skills and were a physical example of the design lens through which I see the potential for garments to support ADHD experiences.

Sketches based on secondary research

FAB LAB IDEAS

ADHD STRATEGY USED:

- VISUALISATION
- BREATHING EXERCISE
- VISUAL PROMPT

LEDs - individual sew on - uses conductive thread
- Strips
- needs 2 continuous connections

LED Filament - Very sensitive (breaks easily)

EL Wire - needs complex power system
- very bright
- can't let but noisy noise
- 3 colour
- on or off only

OLEDS - Flexible e-paper display
- Flex display (new tech)
- Adafruit.com
- Can't continuously flex it
- Arduino compatible micro controller
- programmable using existing code libraries
- can insert SD card
- displays images no animation
- would need app to be customisable
- uses a LOT LESS POWER

AH = Cast LED's into Silicon sheet / "Potting"
- can use clear silicon
- high temp wire, heater wire
- 2 halves to encapsulate wire
- need to hold own Jig

Fibre Optics - conducts light (looks like fishing wire)
- can "sand" it to let off more light
- more light through bending
- LED's at each end (nose-to-ear)
- A "pipe for light"
- 1mm, 0.75mm (can't go through digital printer)
- coarse weave only - by hand.
- or Ask textiles department...

Light moves from A-B = 4seconds travel time
4 seconds
4 seconds
BOX BREATHING LIGHT
BOX LIGHT ON CUFF

could program it to flash to prompt you or Add 'finger button' to push whenever feeling triggered or anxious & light will flash (x minutes later) until you have completed breathing exercise

When pressure is applied to inner circle, LED's go off in an outward circle motion
I.E: circle A gradually lights up then circle B, then C, then D...
Creating an inbale visualisation that can suit anyone's length of inbale...
Removing finger triggers reverse effect for exhale.

This circular motion could be printed Surface pattern 2D or adapted into other rotational patterns

using pressure sensor circle with micro controller
- or Can buy premade sensor
↓
With micro controller design circuit board and use sewable LED's..

Sketch Pattern

hidden extension opened over face
flexible panel has the panel on side (hidden panel)
extendable face
portable breathing tube

Hooded Scarf

- Led lights inside hood with a fabric overlay for filter
- sponge ring eyemask with semi-transparent eyemask fabric for eye protection
- Can also be used for a moment to withdraw x to focus in interception

Inspiration:
- Light therapy, chromotherapy
- Light therapy, chromotherapy

Limitations
- may not be acceptable for sensitivity to lights
- skin sensitivities,
- skin cancer - need covered lights.

metal clasps/ buttons - helps keep jacket stable when using resistance band push
roll up to cuff
Happy Baby Socks attached to pants been a hidden under brought leg part
silver clasp hook

button or clip keeps pants together for sitting up easier
like invisible zips open for comfy sitting & happy baby

And Inlet Box for incorporating led and that modular

Figure 4: Preliminary design translation sketches. Designs by Author.

Soma trials and researcher sensitising

The soma trials aimed to test and select soma methods for the workshop, explore design ideas through soma, and serve as researcher sensitisation.

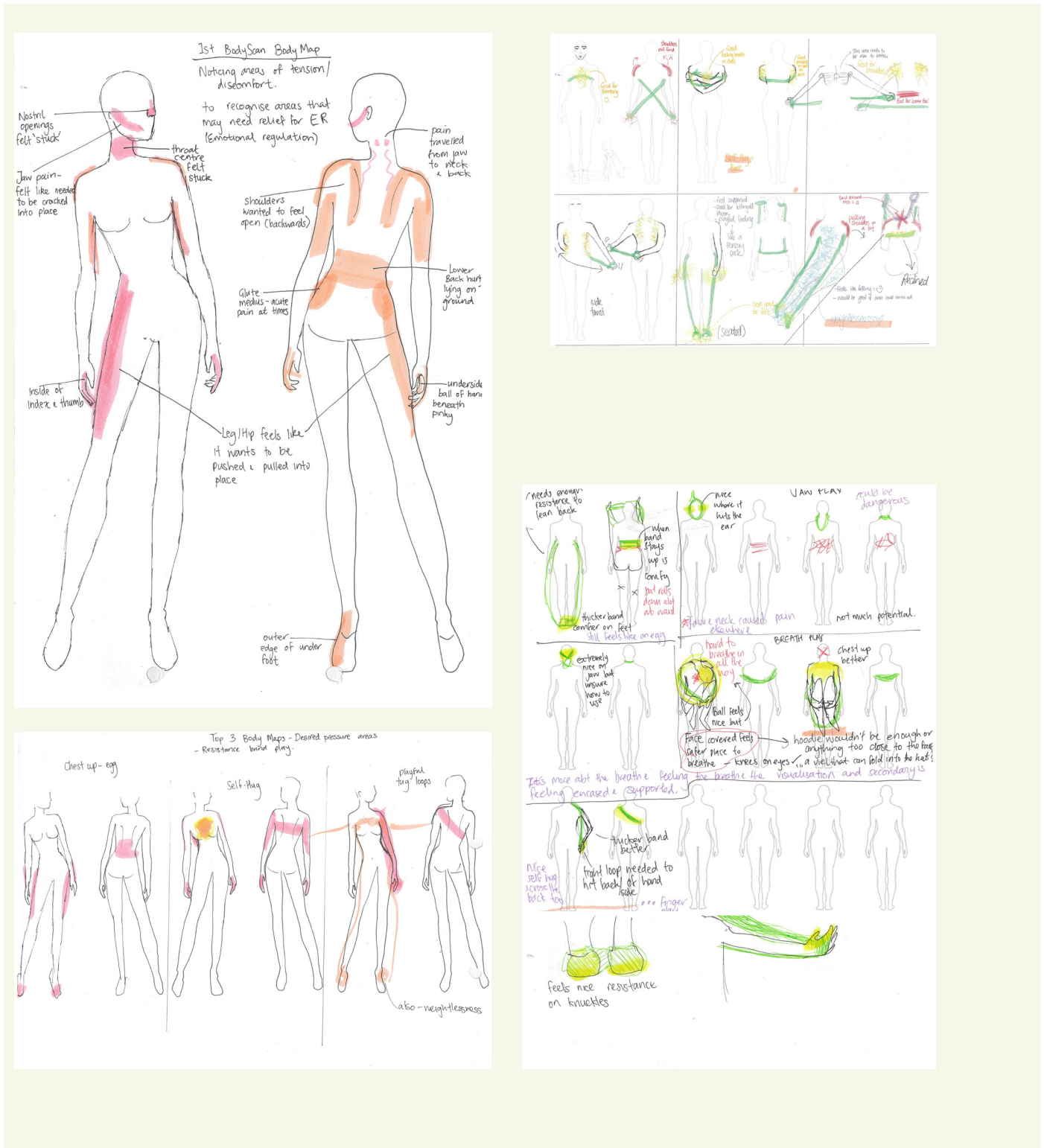


Figure 5: Body maps from soma trialling / Researcher sensitising. Photographs by Author.



I experimented with various types of resistance bands in a variety of positions and areas on the body, this made for an interactive experience that allowed me to engage with my soma. In combination with the body maps that I did afterwards (see Figure 5) this allowed me to gain a deeper understanding of how (my) different body areas need to be interacted with to feel supported- on a physical and embodied level. Ultimately the resistance band soma trials and body maps helped me develop my somaesthetic appreciation skills which would enhance my design ideas.

Figure 6: Screenshot of soma trial with resistance bands video with author's annotations. Photograph by Author.

Examples of soma trials to design for the soma and with the soma:



This involved trying out different ways of experiencing my body-and-mind together. The key to this was experiencing body awareness or body movement and sensory engagement that were new (to me) or experiencing things in a new way.

Figure 7: Author's soma play and design translation process pages. Photographs by Author.

Diagrams, frameworks and charts for understanding and clarity

After analysing the survey and questionnaire, the findings provided a more holistic idea of respondents'

experiences with self-regulation. Translating these findings for design involved ideating diagrams, frameworks and charts to understand the various levels of ADHD self-regulation needs and clarify the viability of receiving support through a garment design. These are outlined below.

The Accessibility and Usability Criteria:

Accessibility

Usability

Designs incorporating strategies to support ADHD wellbeing need to:

- | | |
|--|---|
| <ul style="list-style-type: none"> ● involve minimal steps ● not rely on memory or require minimal memory ● enable (busy) hands to be free (without fear of losing things) ● consider the need for visibility and subtlety of strategies incorporated ● be durable (with minimal user involvement) ● have optional components for catering to sensory needs/ or provide compensatory sensory control options ● be easily accessible and provide a dedicated home for things | <ul style="list-style-type: none"> ● use already effective strategies, such as visual association and visual metaphors ● consider sensory-soothing options for feeling 'overwhelmed' or dysregulation ● support the externalisation of working memory (i.e writing things down) ● consider discretion/ be context-appropriate ● provide assistance to master subjective goals ● be modular to enable high customisability and for individualised designs for individual needs ● have multiple interaction options ● ethically consider that self-soothing and avoidance are context-dependent and can be conflated, consider the implications of not addressing this when marketing designs for ADHD. Acknowledge that long-term avoidance requires self-compassionate accountability or self-care. |
|--|---|

Table 1: Accessibility and usability criteria. Table by Author.

The overarching takeaway from the results was that self-regulation depends on many functional and emotional factors, influencing accessibility and usability needs. Therefore, I created the Accessibility and Usability Criteria by identifying and extracting key themes related to designing for accessibility and usability from the thematic analysis coding chart.

To gain an even deeper understanding of design potential and viability for ADHD experiences,

my natural process was to map out the potential requirements for addressing ADHD challenges while considering their complexities.

This resulted in a series of hypothetical frameworks for ADHD self-regulation designs (refer to Appendix J), which assisted me in working through the challenges regarding the order in which requirements for meeting ADHD needs may need to occur.

Visualising Barkley’s self-regulation theory:

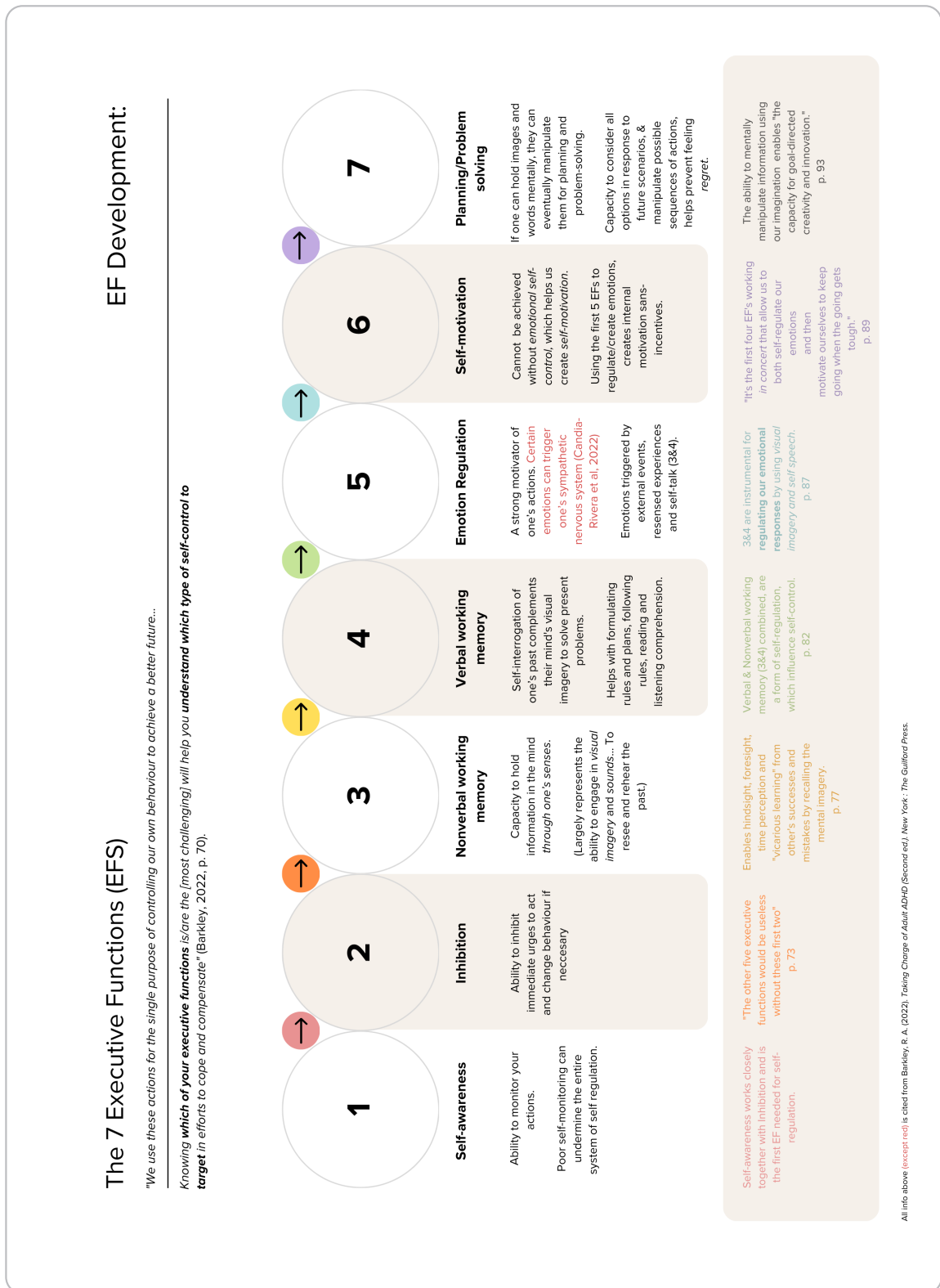


Figure 9: Russel Barkley’s self-regulation theory- the 7 Executive Functions. Flowchart by Author.

Barkley’s (2022) self-regulation theory, from his book *Taking Charge of Adult ADHD*, helped resolve these challenges and was extremely valuable for understanding the sequence of ADHD support requirements. Thus, I illustrated Barkley’s self-regulation theory, showing the seven executive functions and their associated steps (see Figure 9). This was extremely beneficial for streamlining the design translation process and understanding how executive functions could influence wearer needs.

Supportive Design Viability Tables

How design can address experiences/symptoms people want help with (from Survey responses)

What symptoms/ADHD experiences do you want help with the most?	Viable?	What symptoms/ADHD experiences do you want help with the most?	Viable?	What may need to be addressed first...
Time management/ Time perception	Y	Task initiation completion, ability to stop a task	N	This first requires self-awareness and self-control so is tricky to address directly through design.
Focus/Distractability	Y			
Memory/ Losing things	Y	Future planning, scheduling, routine	N	Time management/perception...
Sensory overload/ overstimulated	Y			
Emotion Regulation (ER)	Y	Sleep issues	N	Complex. Calming the mind by managing the day time struggles of ADHD may help.
Discrete fidgeting/"hyperactivity"	Y			
Painful sensory stimulation. i.e. biting skin	Y	Social perception/situations. "Oversharing/talking too much"	N	Relates to self-awareness, inhibition and monitoring behaviour which requires self-speech and visual imagery to address verbal working memory deficits, according to Barkley (2022). Self-awareness and inhibition are too complex requires many points of intervention beyond the scope of wearables.
Relaxation/overwhelm	Y			
Embracing self/being different through clothing	Y...			

Table 2: Supportive design viability table 1. Table by Author.

What symptoms/ADHD experiences do you want help with the most?	Partially viable	Design potential ideas
Task initiation completion, ability to stop a task	Task initiation and completion is tricky to address due to other skills that first need to be developed. Assistance to stop a task is partially viable.	Reversible garment form start and completion- different sensory exp each side Accountability alerts.
Anxiety, Rejection/RSD, Overwhelm	Can't be directly addressed as many influential factors. But can address emotion regulation and trauma-informed approach to comfort.	Trigger buttons. Vagus nerve stimulation (VNS) wearables
Trauma from being undiagnosed	Too big to tackle but physical sensations may be partially addressed through comfort. Requires much more research. unique to every individual with many other contributing factors.	Sensory soothing deisgns, Trigger buttons. VNS wearables
Explaining experience to others and the impacts	Could design something in the future to help explain experiences. Explaining the impacts is more subjective and can sometimes relate more to self-acceptance.	Support cards. Support card prompts.
Organising	Broad area different for everybody. For physical organisaton, it can be partially addressed using association techniques as a design principle.	e.g. shape of pocket associated with shape of item that belongs there
Social perception/situations. "Oversharing"/"talking too much"	-Developing non-verbal working memory skills is the starting point. This may feel too insignificant for some to stick to. -self-compassion	Journal" associated with wearable to encourage self-monitoring with self speech and visual imagery prompts.
Friendship (making & keeping friends), Belonging	Keeping friends may relate to above or other underlying challenges which cannot be directly addressed. Designing something, like an app or toolkit, to enable making friends and belonging is possible (not for this project) but is still complex.	A subtle symbol (not desirable for everyone) an app, interactive clothing alerts to ppl nearby etc.
Motivation	Barkley says this can be addressed through emotion regulation, creating internal imagery and self-talk.	Accountability reminder

Table 3: Supportive design viability table 2. Table by Author.

To (more) convergently consider and organise the viability of designing for the experiences that respondents wanted help with, I categorised the responses to input into tables. As shown above, I organised their potential viability based on broad design ideas and what may need to be addressed first (based on Barkley’s self-regulation theory). The sequencing of requirements described above involved considering how challenges arise and branch out on the surface by understanding their potential underlying roots. Approaching design for ADHD self-regulation in this ‘roots up’ manner should support designers in understanding user-needs for a prepared approach to self-regulation and enable wearers to select, adapt, or create new clothing to support their unique experience of ADHD.

As a result of this roots-up translation process, I identified the following key challenges that lead to dysregulation and potential design techniques for alleviating these self-regulation challenges:

Key self-regulation challenges that lead to dysregulation:

- Memory and losing things
- Difficulty with focus
- Time-perception
- Working memory impairments

Design techniques for alleviating key self-regulation challenges:

Requires Self-awareness & Inhibition/ (Executive Functions 1 & 2)

- enable **self-monitoring** (i.e. diary) **with a reminder alert system**
- provide reminders or a trigger **button to support self-identified inhibition goals** – could also provide/ or support an existing, associated user action (i.e. when I want to talk/not talk, I will open/close this zip*)
- Support endurance with goals by providing encouragement with personal meaning- improving working memory and designing for their motivators (potentially by designing a motif according to their personal motivators)

Key challenges leading to dysregulation:

- **Memory & losing things:** provide dedicated home for essentials with closures and attachments, use visual and sensory association between object and home.
- **Focus:** provide refocus alerts
- **Time perception:** provide a new concept for tracking time- visual or sensory (feeling time)
- **Working memory impairments:** Incorporate visual working memory aids

Table 4: Design techniques for alleviating self-regulation challenges. Table by Author..

Prioritising for Panel exploration

Upon planning the initial panel exploration, I returned to the survey results and aimed to prioritise which ADHD experiences were most important to focus on by identifying the overlapping themes of respondents' self-identified 'burdens' and what they wanted help with to narrow the scope of ADHD challenges to design for. These overlaps are shown in the following Venn diagrams..

The top results from: what people want help with the most and the identified burdens, share the same themes

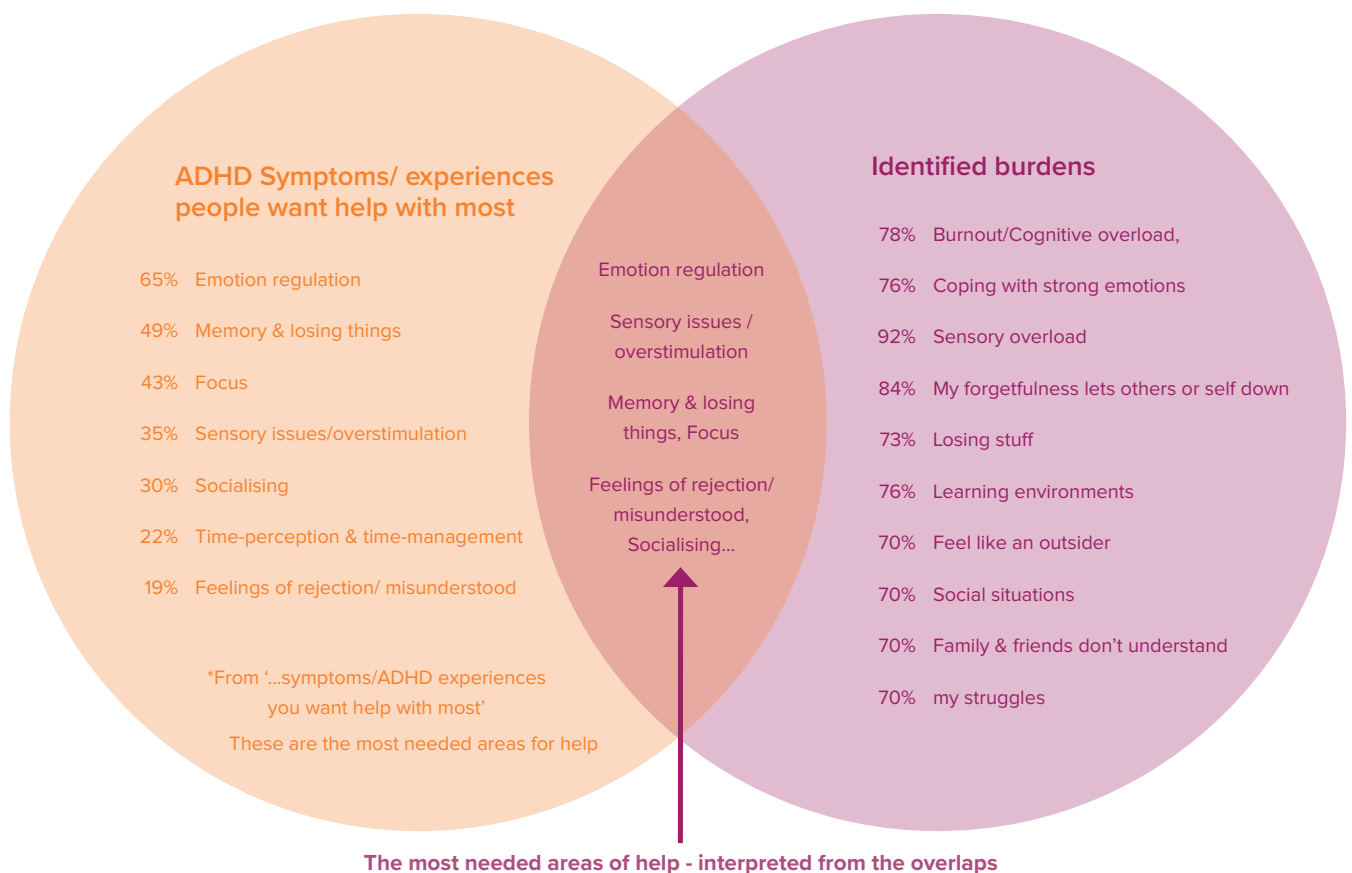


Figure 10: Survey themes for symptoms/ experiences help is wanted for vs self-identified burdens venn diagram. Diagram by Author.

The most mentioned contexts for help wanted, and the help wanted for burdens share the same themes

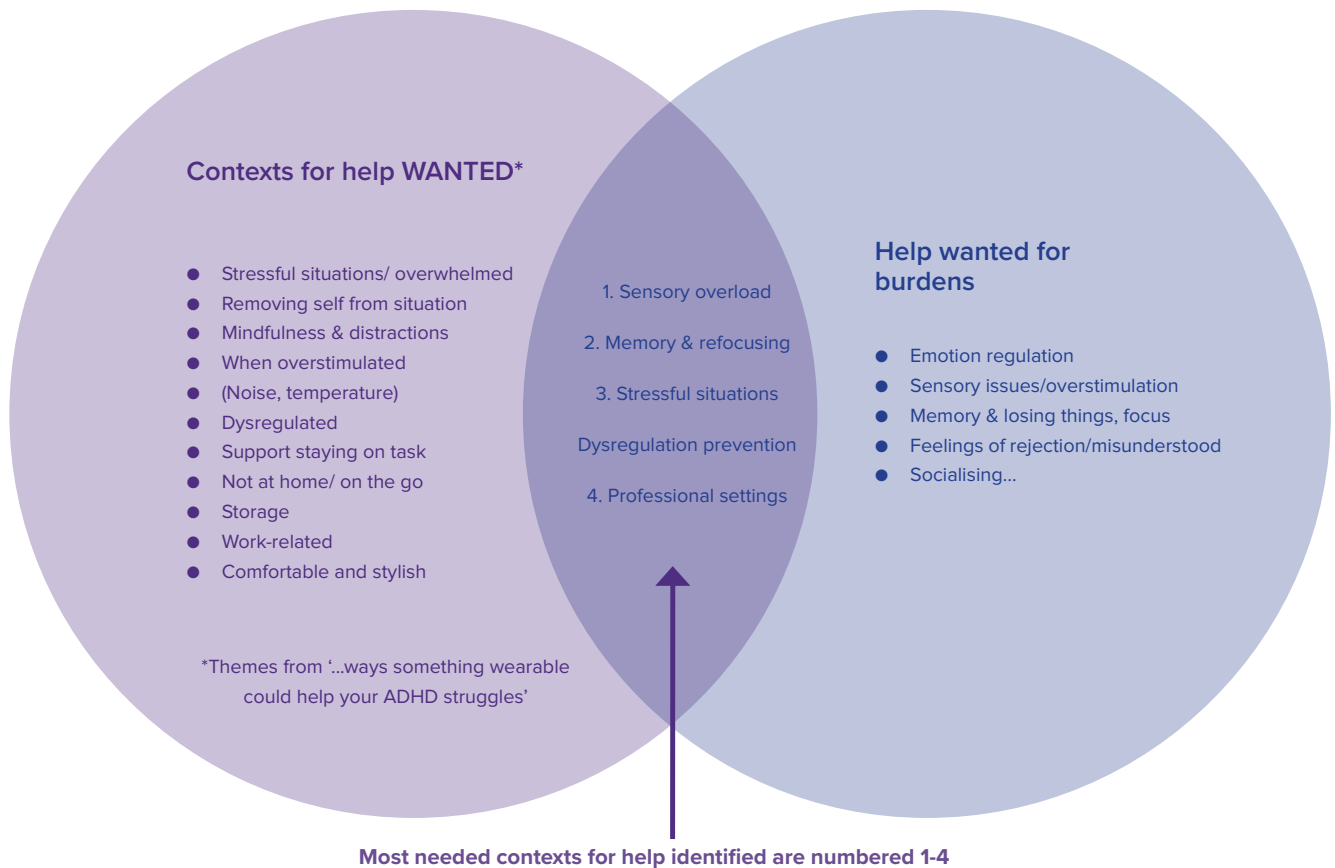


Figure 11: Survey themes for contexts for help wanted versus self-identified burdens venn diagram. Diagram by Author.

The ways that wearables have helped people and the contexts of help most needed expose the areas that I need to find out more about

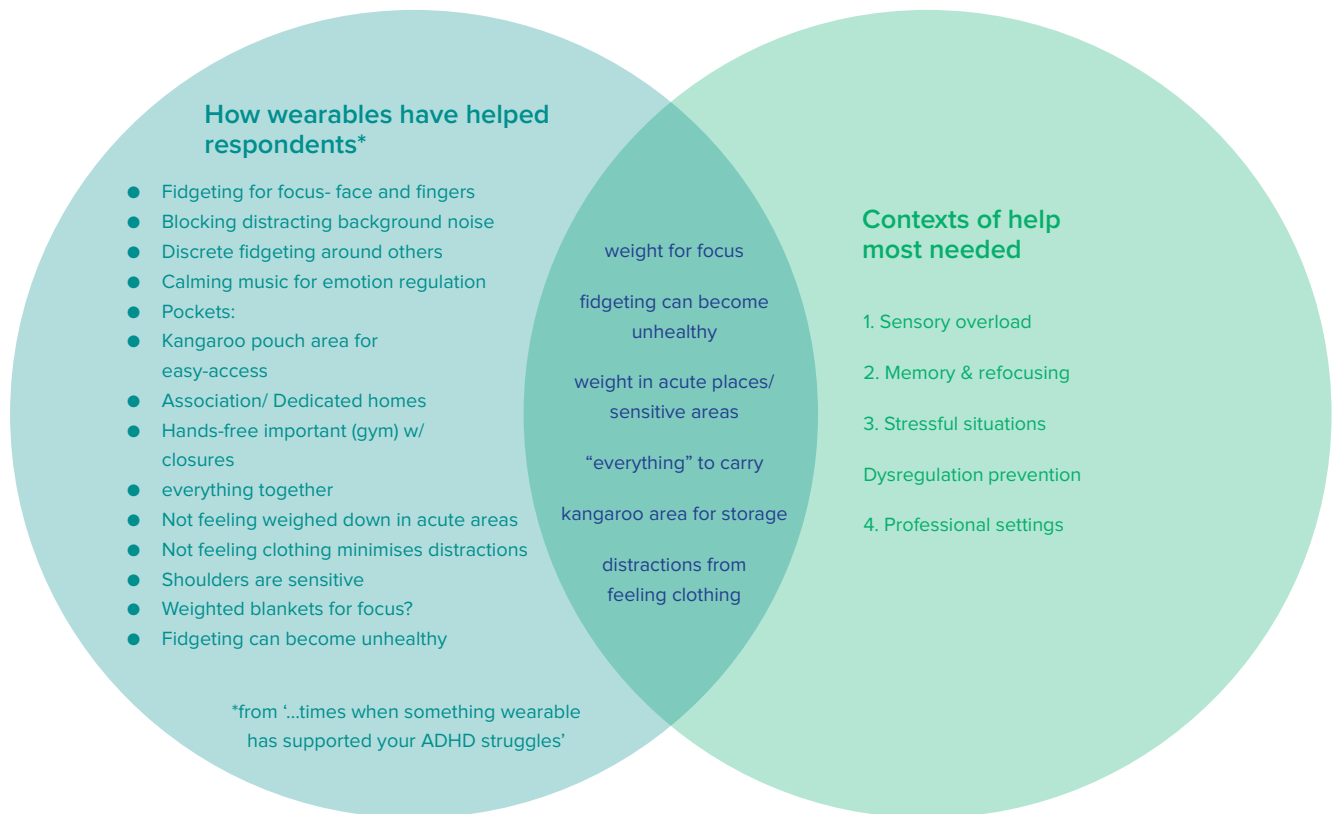


Figure 12: Survey themes for ways wearables have helped vs context of help-needed Venn diagram. Diagram by Author

Overall, the complexity and sequencing of requirements for supporting ADHD experiences highlighted the significance of modularity in addressing individuals’ unique and diverse executive functioning needs.



Expert Panel

The purpose of the panel was to provide a more in-depth understanding of survey insight themes and contextualise challenging experiences to inform and guide the design criteria. Based on the panellists' experiences, I aimed to identify and prioritise the most important areas for self-regulation support to inform the workshop's explorations. This measure is a pragmatic approach to understanding ADHD wellbeing needs and design requirements, compared to designs that focus on purely positive user needs or symptom reduction based on societal standards- both inaccurately reflect ADHD experiences.

How it worked

The panel process was insight-driven and included feedback-based tasks (i.e. 'upload images of...'). The panel process was entirely online; panellists could not see each other's responses or identity. Panellists were sent up to two weekly questions over four months (with breaks) via email or Google Forms. Panellists could always opt in or out of questions to suit their capacity, preferences and relevant experiences.



Expert panel outcomes

I identified consistent interconnected themes related to emotion dysregulation (EDR), self-concept, and nervous system responses across the panel data set. The panel questions and analysis were iterative. Throughout the analysis, it was persistently clear that (reasonable) prevention and alleviation of EDR was a design priority.

Theme 1: EDR and feeling understood

Questions 1, 3 and 5 asked about challenges with emotion regulation and sensory regulation. The results showed that down-regulating heightened emotions is profoundly important because it can impact relationships, self-concept, public identity, and, at times, personal impact due to being difficult for others to understand. Additionally, responses showed that the impacts of EDR were greater than sensory dysregulation. This Sympathetic Nervous System response (see Appendix A) was specifically described by some panellists with comments like:

“I need to be listened to... seen and supported to regulate my emotions. I recognise that my [children] need support...too, but I can't do this if I am in 'lizard brain' also.”

“...dysregulation just instantly happens. It's like my reptile brain kicks in.”

The key underlying feelings that appeared to lead to EDR and Sympathetic Nervous System responses were feeling misunderstood, unsupported, shame, and injustice. Post-EDR, some panellists described feeling guilt and embarrassment when dysregulation occurred in front of others.

Theme 1 key insight for fashion design

Being perceived negatively and/or having negative feelings from a lack of understanding from others appear to impact EDR and self-concept significantly.

Therefore, garments may need to be designed according to the individual's style preferences for positive feelings about self around others and with embedded self-soothing tools.

Theme 2: Self-concept based on personal values determines critical self-regulation contexts

Questions 1 and 4 explored the most impactful contexts for challenges with ER, memory, and focus to inform the design criteria and establish links between challenging situations and clothing requirements. The themes of these most impactful contexts related to multitasking and task completion with family—particularly children, self-advocating, relationships, and friendships, and not wanting to be seen as unprofessional- particularly when being relied upon, experiencing 'justice-sensitivity', and during conflict management. Overall, essentially every social environment was mentioned and seemed to depend on lifestyle and essential needs.

Theme 2: Self-concept based on personal values determines critical self-regulation contexts

Questions 1 and 4 explored the most impactful contexts for challenges with ER, memory, and focus to inform the design criteria and establish links between challenging situations and clothing requirements. The themes of these most impactful contexts related to multitasking and task completion with family—particularly children, self-advocating, relationships, and friendships, and not wanting to be seen as unprofessional—particularly when being relied upon, experiencing ‘justice-sensitivity’, and during conflict management. Overall, essentially every social environment was mentioned and seemed to depend on lifestyle and essential needs.

Theme 2 key insight for fashion design:

The most impactful contexts were not location- or event-specific but were predominantly related to self-concept/external perceptions. Therefore, clothing requirements should be individualised based on the lifestyle needs of the wearer’s most valued and challenging contexts, such as parenting, workplace stigma and self-advocacy.

General clothing requirements might be:

- adaptable aesthetic (i.e. ‘smart-casual’);
- full range of movement enabled; and
- allows discretion in public.

Given the significant impacts of external perceptions, the design approach should prioritise wearers’ internal feelings of safety and support.

Theme 3: What helps

Questions 2 and 3 asked about the panellists’ ideal states in the challenging situations they identified and what they found helpful for achieving their ideal state and preventing and alleviating dysregulation. The key findings represent important requirements for self-regulation. They were compiled in a mind map to guide designs (see Appendix L) and later consolidated into the flow chart below for the workshop (Figure 13).

The most common ideal responses were ‘calm’ and ‘confident’. Some panellists identified preliminary steps to achieving calm, such as “pause, process, regulate,” self-compassion and self-acceptance, or being with emotions instead of becoming emotions. Many panellists described their ideal response as pausing, de-escalating, and “detaching” from certain emotions.

The panellists’ experiences in self-regulating to their ideal state and down-regulating EDR described grounding through body awareness and revealed that nervous system regulation and self-compassion were fundamental requirements. Additionally, the panellists’ ideal responses to identified EDR situations align with the principles of mindfulness. These were significant for the design criteria and determining the workshop focus.

Theme 3 key insight for fashion design

Clothing design requirements may require incorporating principles of mindfulness. Additionally, self-compassion prompts could be incorporated as a personalised design feature.

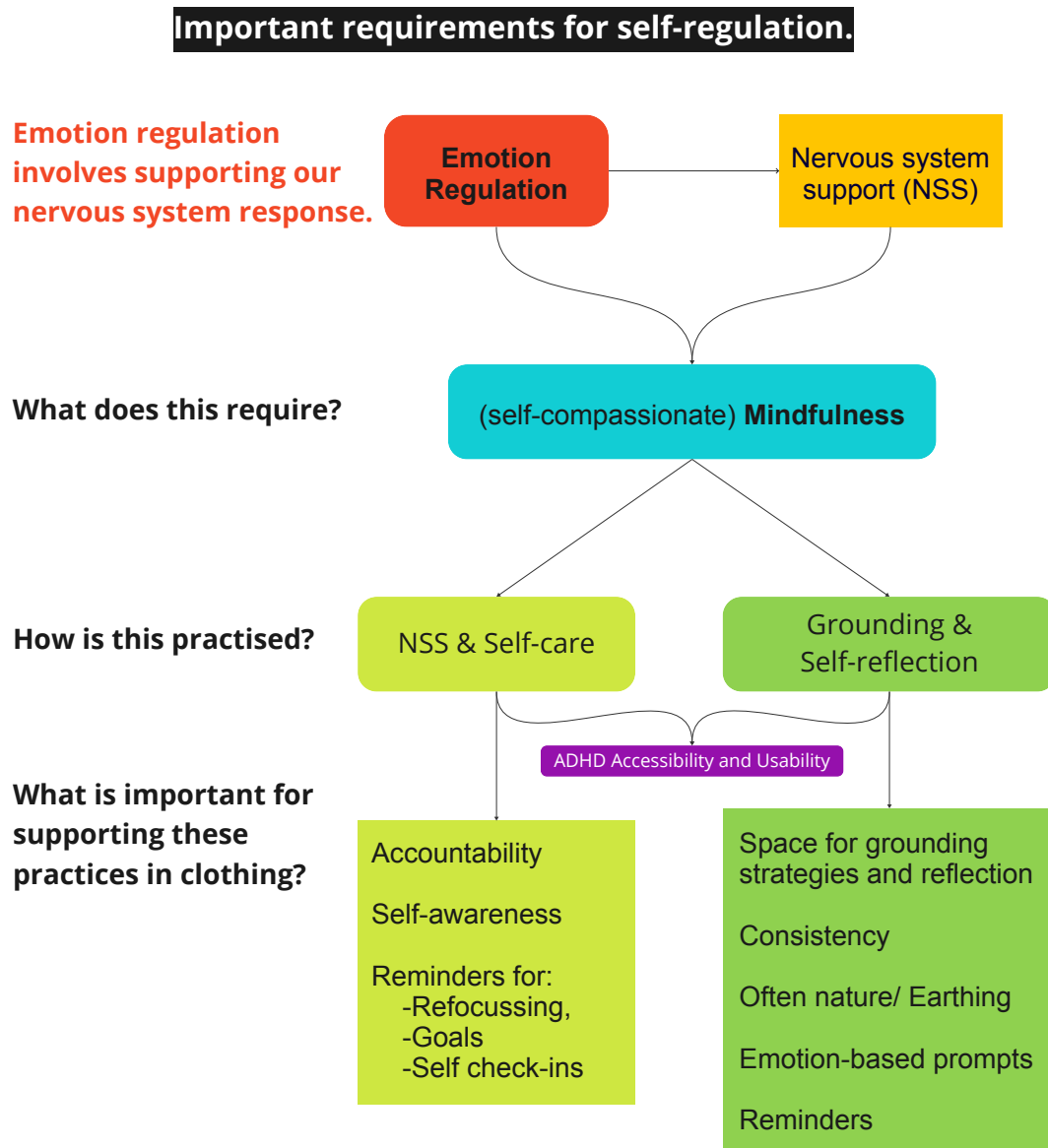


Figure 13: Important requirements for self-regulation. Diagram by Author.

Theme 4: Strengths

Questions 6, 7, and 8 focused on the panellists' strengths and sought findings that could be translated into clothing design elements. I asked how they used their strengths to cope and achieve their ideal states. I aimed to explore the possibility of supporting wearers' internal feelings of safety and support through clothing by valuing personal strengths. This was inspired by one panellist's comment (question 6 response).

"...a beautiful reminder that I have more strengths I can rely on."

Determination/problem-solving was the most identified helpful strength. I asked about how this felt in the mind and body, the motivations for determination/problem-solving, and any challenges maintaining this motivation. This aimed to explore if these feelings could be recreated in clothing as an empowering reminder of individual strength. Feelings lists were provided to assist panellists.

From the panel insights, supported by additional research as per responses, I designed a Self-Regulation Requirements Cycle, which was used to guide designs and in the workshop.

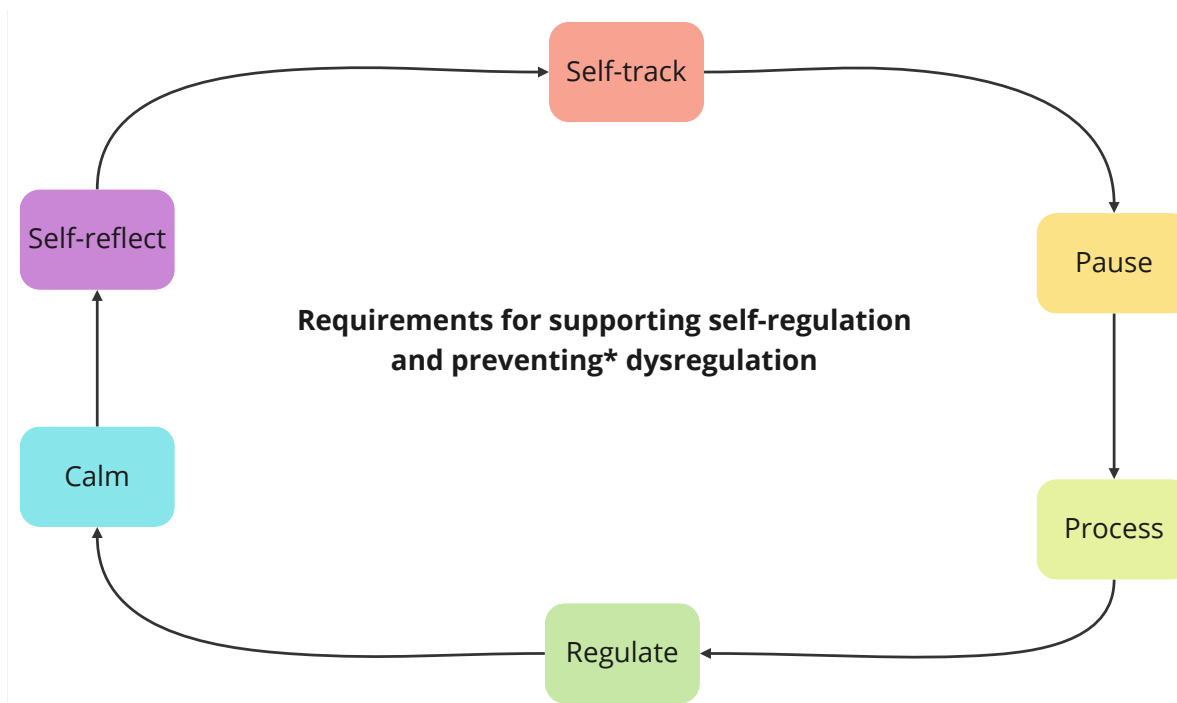


Figure 14: Self-regulation requirements cycle. Diagram by Author.

Other key findings from the panel emphasise the crucial role of reflective self-awareness in self-regulation, especially in identifying triggers and understanding their underlying causes. A key insight was that combining mindfulness and self-reflection strategies with self-compassion to prevent feelings of shame and support improved self-regulation. Additionally, while grounding, mindfulness, and

meditation were identified as beneficial, maintaining consistency can be challenging due to barriers such as lack of enjoyment, forgetfulness, and low motivation. However, it is essential not to rely on these practices solely, as this does not support long-term self-regulation. Thus, there is a need to make self-regulation strategies, before dysregulation occurs, more usable for individuals with ADHD.

Above all, the most vital takeaway from the panel and this entire project is that:

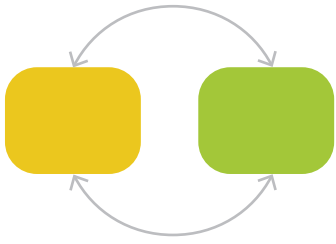
Self-compassionate accountability is crucial for ADHD self-care, and neither one is beneficial for self-regulation without the other

Summary of results

Results revealed important nuanced requirements for self-regulation, providing insights into potential fashion design requirements. Furthermore, they highlighted that a design approach for ADHD should prioritise wearers' internal feelings of safety and support, nervous system support, and self-compassion. Most importantly, the insights highlighted that implementing self-regulation strategies before reaching dysregulation would most benefit the panellists' experiences/needs and desires. However, due to numerous obstacles caused by ADHD, this type of prepared approach requires carefully evaluating and addressing usability factors. These findings informed the design criteria and resulted in refining the design aim for the workshop to:

Understand how clothing can help prevent dysregulation (within reason)
by supporting and enhancing self-regulation skills.

Thus, the panel process was evaluative and helped narrow the project scope and focus for the workshop, resulting in a co-design aim and workshop content.



Researcher translation for garment design

During the panel process I continued first-person soma trialling to sensitise and connect with my soma (mind-and-body as one) to inspire more holistic designing. This resulted in design ideas that prioritise provisions for wearers to experience a grounded soma relationship with themselves in their clothes.

Additionally, throughout my analysis of the panel responses I was inspired with translational ideas based on quotes, themes and detailed experiences from the panel. I kept a diary of these ideas and near the end of the panel process I combined them with my ideas and experiences from soma trials, and research to generate some exemplar design responses.



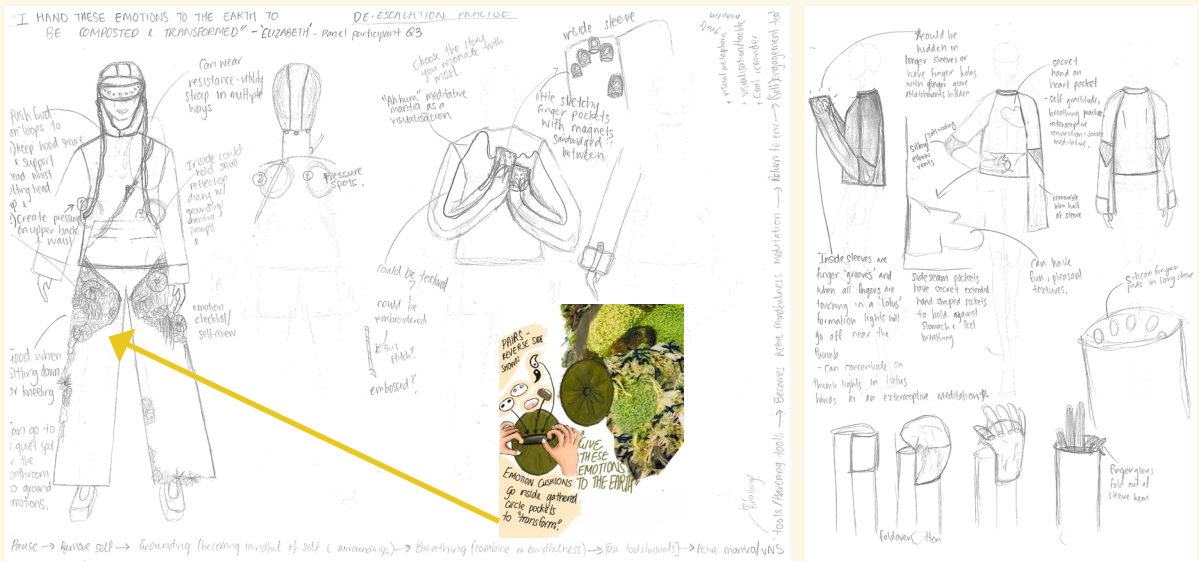
These photos are from a soma trial I did with an extremely stretchy and soft fabric scrap I found. I aimed to experience how different fabrics felt on different body areas.

It reminded me of a 'body-sock' (a lycra tube that provides proprioceptive input) which I had seen during my design precedent research. This led to sewing the fabric into a tube and experimenting with as many body-movements and wearable interaction with the fabric I could think of.

I attended to being aware of how the fabric felt on me and how I felt in the fabric, this enabled a connected mind-body experience and reframing of clothing as a regulatory environment on an embodied level.

The design page above shows an exemplar sketch of different elements from the soma trial above incorporated with panel experiences and translated into garment designs.

Figure 15: Designer translation sketch from panel findings and Author's soma trial photographs. By Author.



These design examples were inspired by the panellists experiences of what helps them when they are "overwhelmed" or experiencing EDR along with ideas from various soma trials and experiences.

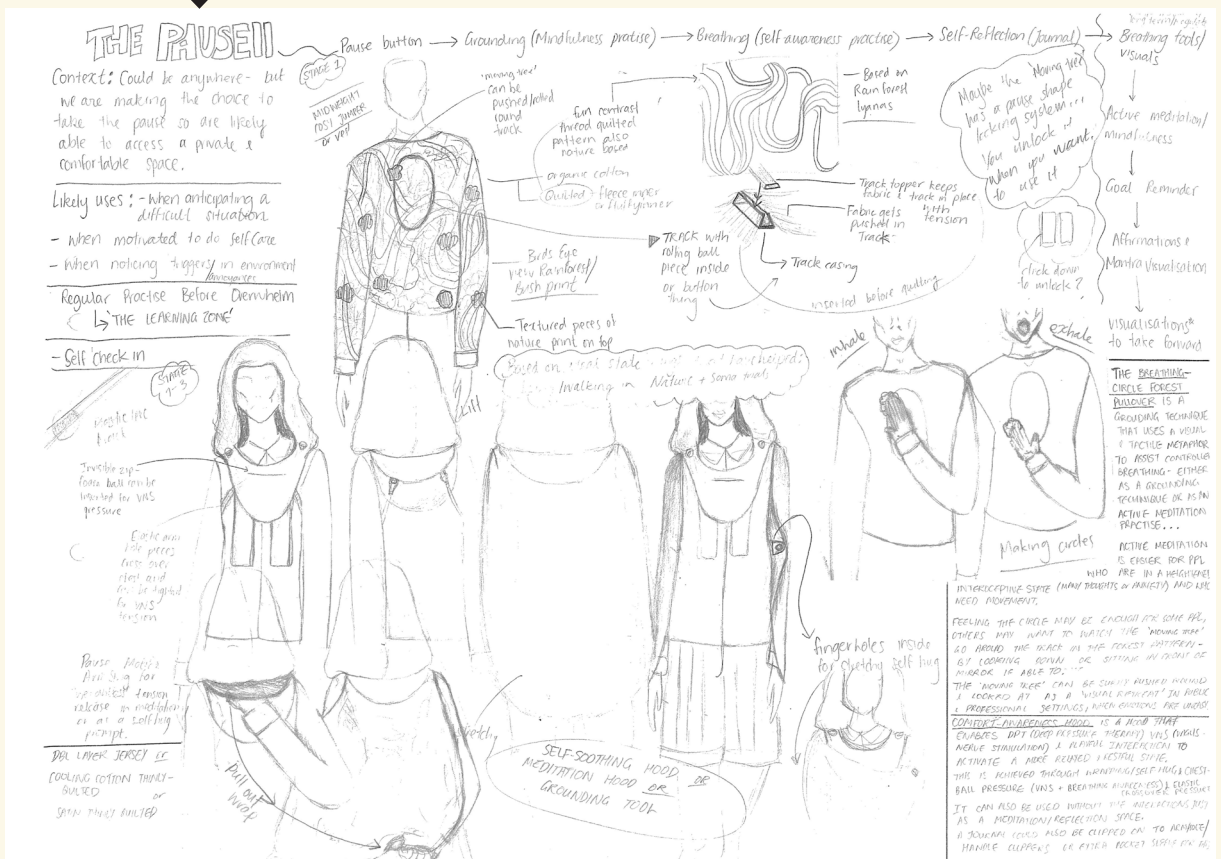
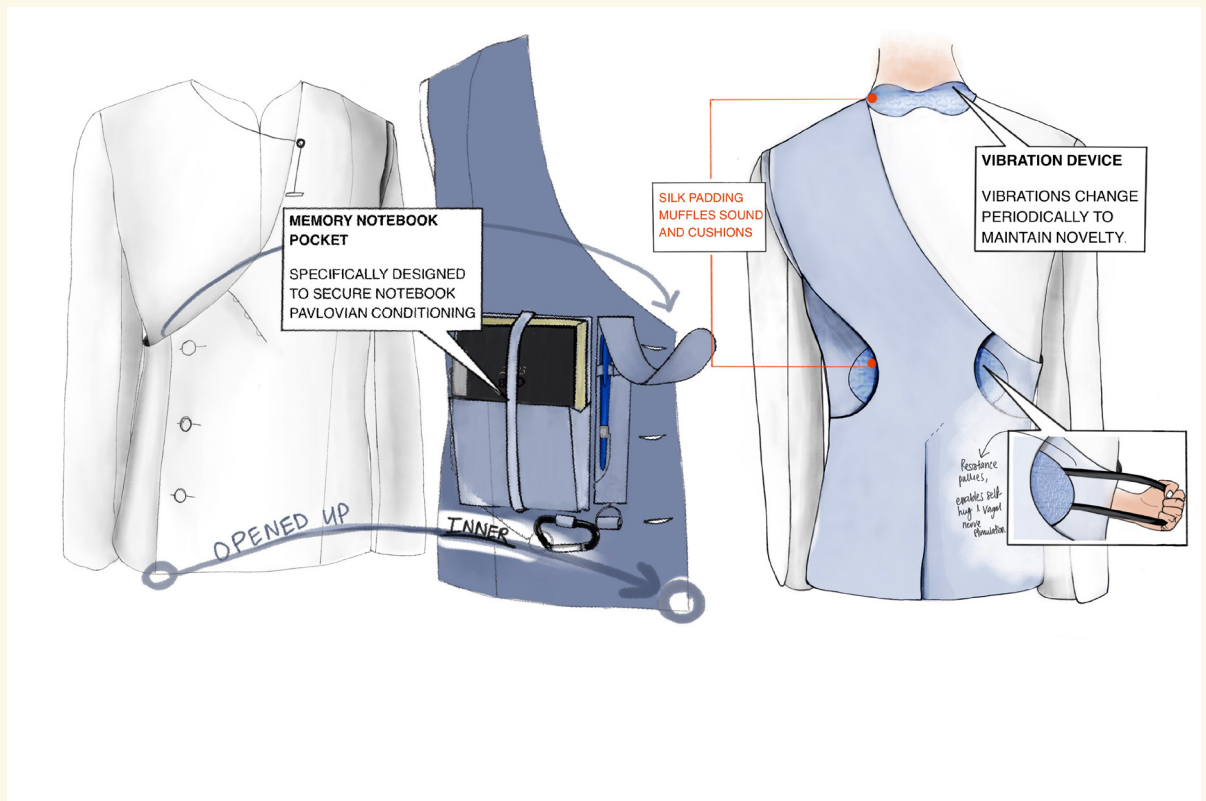


Figure 16: Designer translation sketch developments from panel findings. By Author.

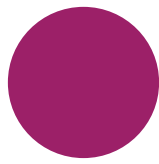


This jacket concept was my very first idea related to this research topic, based on my own lived experience, and it was the starting point of this Master's exploration.

I had put the idea aside to focus on generating designs from learning about the participants' and respondents' experiences. However, throughout the participatory process, what I learnt about the participants' experiences and needs along with the ideas they expressed, strongly reinforced the basis of my initial jacket concept. These images show iterations to the original idea based on soma trials and panel and survey insights.

Figure 18: Designer translation – ADHD jacket concept drawing. By Author.

Co-design Workshops



Co-design Workshops

Overview

The co-design workshops comprise the final component of this symbiotic design process and generative exploration of the research insights, which also generates garment design examples representing the co-designer's ADHD needs/wants for clothing.

Framing the test workshops as a case study is important to emphasise the expectations of workshop findings: to learn from challenges, understand feedback, and contribute to a broader field of ADHD-informed co-design processes. To develop the proposed final workshop, test workshop #1 (three sessions) (Test #1) and test workshop #2 (Test #2) were iterated a number of times, and summaries of findings and adjustments are discussed in this chapter. This was essential to ensure that the co-design workshop was adapted to be ADHD-supportive.

Test#1 was completed with a test participant as co-designer, who has relevant experience working with neurodivergent people. This ensured a safe space to practise and prepare for workshop development and facilitation. Low-risk ethics was sought and

approved (see Appendix M for participant consent form). The participant met all the co-designer criteria and pre-tested the survey, following the same process as the proposed workshop co-designer.

The test workshops were primarily aimed to assess the effectiveness of workshop planning and activities from both the facilitators' and participants' perspectives.

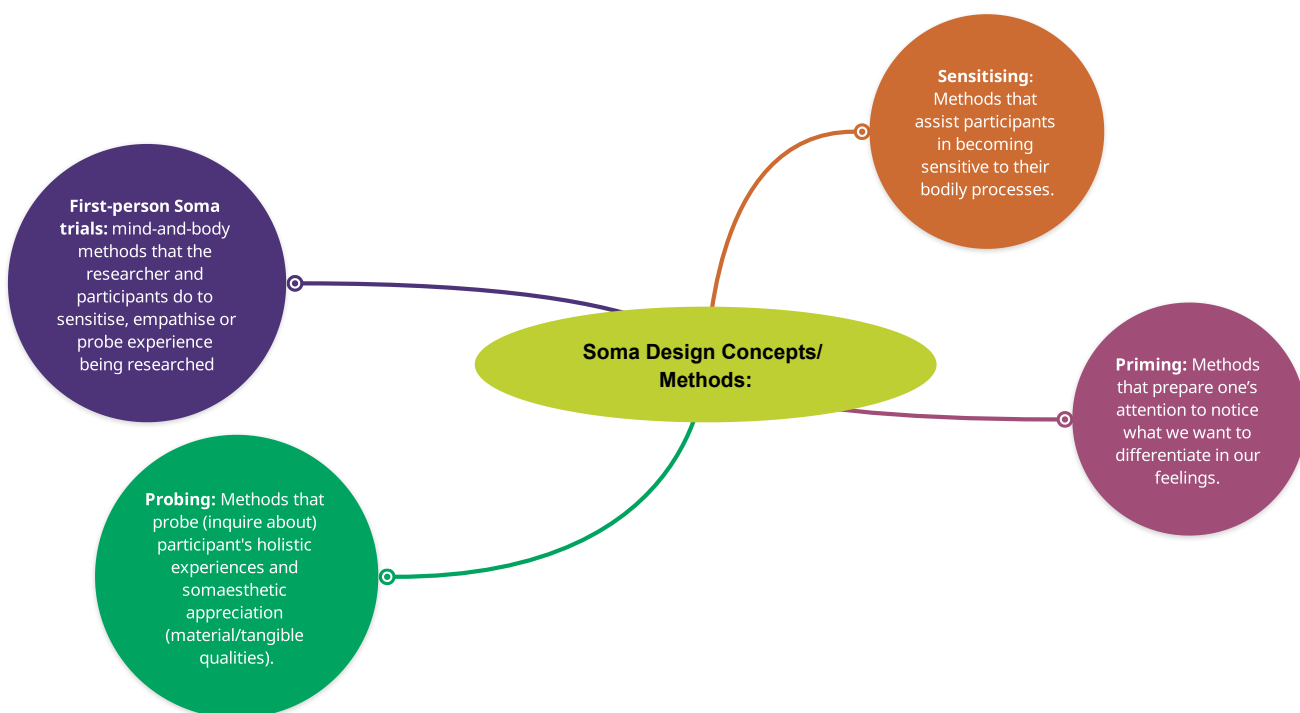
The more refined Test #2 (with test participant 2) utilised finalised toolkits with outcomes (see Figures 42-56).

Planning a soma co-design workshop

The test workshops aimed to provide a safe space to reflect on experiences with our somas, enabling us to review experiential insights from the panel and explore any emerging design possibilities. Creating this soma-respecting space for participants is significant for an ADHD-affirming design workshop as it allows their individual holistic experiences to influence the design exploration. Soma methods can also have a calming effect. Thus, the co-design workshops allow (conceptual) space for others to influence the design process and outcomes, revealing alternative soma experiences of garments and design processes beyond the researcher’s interpretations.

Planning the workshop involved:

- Applying concepts/methods from Soma Design research (see Figure 19 below), including first-person findings from my soma trials.
- Following the ‘path of expression’ model and guidelines from chapter 6 of Sanders & Stappers’ (2012) *Convivial Toolbox* book for planning the structure, toolkits, and “trigger sets” (which I will now refer to as association sets).
- Making adaptations according to feedback and analysis from test workshops
- Designing a preparation kit (prep-kit) for the Co-designer (see Figure 20)



(Based on Designing with the body : Somaesthetic interaction design, Höök et al., 2018).

Figure 19: Soma Design concepts/methods diagram. Diagram by Author.

Preparation Kit

The preparation kit proved to be a significantly beneficial workshop element based on test workshop results!

The preparation kit is...

- a kit of activities and relevant supplies sent to the co-designer to complete before the workshop to support their workshop readiness.
- a visual aid and prompt during the workshop (once completed)

The activities were designed to sensitise the co-designer towards the workshop's soma methods and prime them towards the workshop aim and contents via associations and soma reflection.

Final Prep-kit:



Figure 20: Workshop preparation kit. Photographs by Author.



Figure 21: Workshop preparation activity booklet. Photograph by Author. (see Appendix N)

The Final Prep-kit included:

- Association set #1
- Pencil case of stationery for completing collage and body-map
- Paper clips
- A3 card with 2 prompts for 2 collages
- Activity booklet with instructions, reminders and resources as shown
- An eye-mask



Test co-design workshop #1

3 sessions:

The journey map below outlines the three sessions.

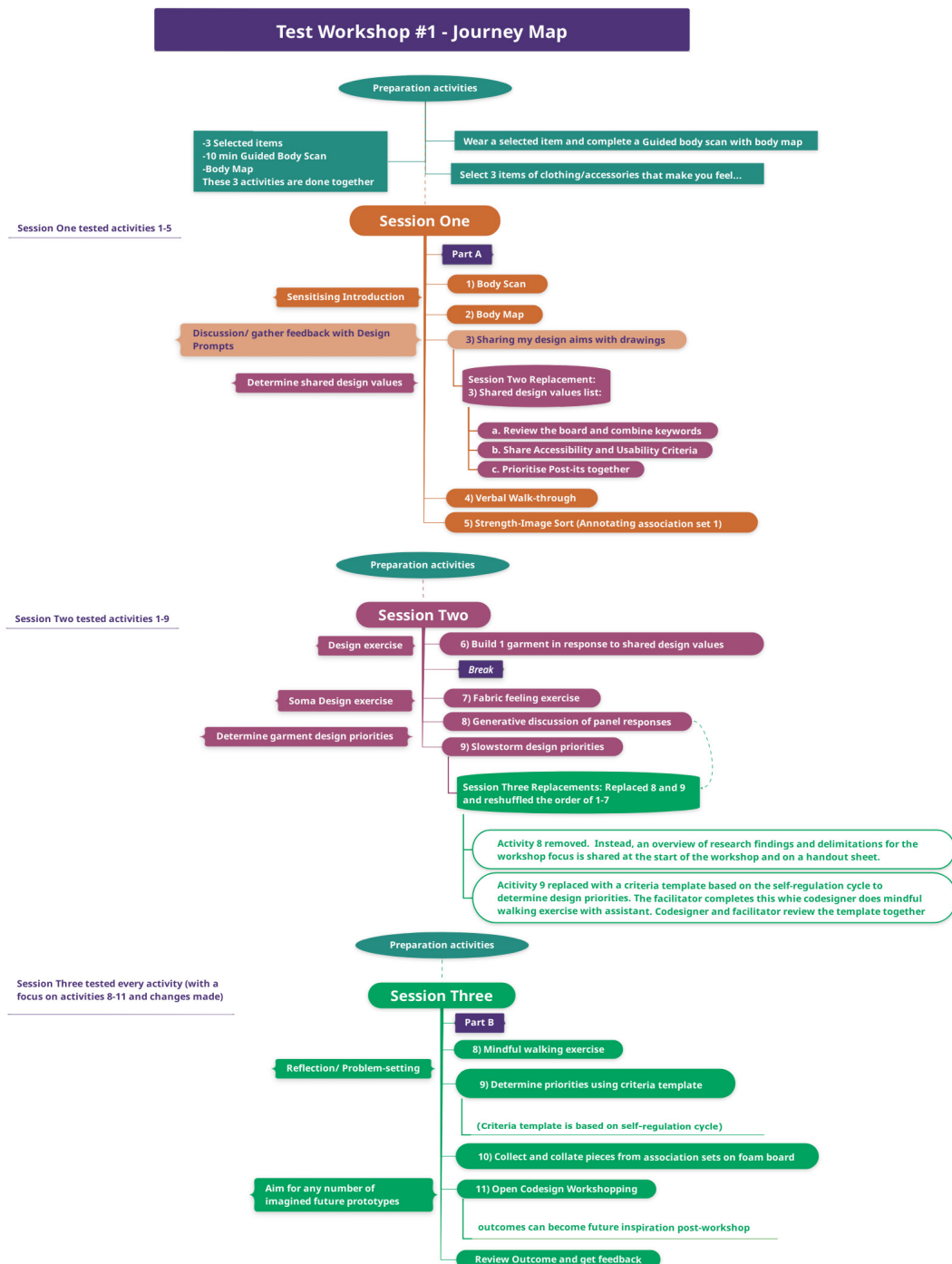


Figure 22: Test co-design workshop #1 journey map. Summation of three sessions. Diagram by Author.

Session One

Activities:

1) Body Scan

[A progressive body relaxation exercise usually completed lying comfortably with eyes closed and with audio guidance for 'scanning' the body. 'Scanning' involves becoming aware of singular body parts and progressively focusing awareness on more parts until the whole body is in mind. I.e. becoming aware of fingertips, hands, forearms, elbows, etc.]

2) Body Map

3) Sharing my design aims with drawings

4) Verbal Walk-through

[A verbal walkthrough is a detailed and descriptive explanation of one's thinking and feeling process, which is verbally shared. It can be done to recount past actions and experiences or to describe a process as it occurs.]

5) Strength-Image Sort

Make free associations with images in the association set. Select images and annotate any connections/interpretations made around these on a cardboard base (in Test #1 we had a large visual diary to write on instead). A participant explains or does a verbal walkthrough of their connections; meanwhile, the facilitator writes down keywords for design values.

Session One tested the first five activities, which involved an introduction to sensitise somas and orient us towards what we would be exploring, sharing my designs and design aims to generate discussion and feedback, and determining shared design values by discussing pre-selected personal garments and using association set #2. All these activities were guided by prompting or orienting questions.

Preparation:

As the 'Preparation Kit' was being developed alongside Test #1, the participant was sent page 2 of the preparation-kit (see Appendix N) and a body map template with instructions and examples as shown.

They were asked the day before to:

- Select three or more items of clothing/accessories that make you feel positive emotions

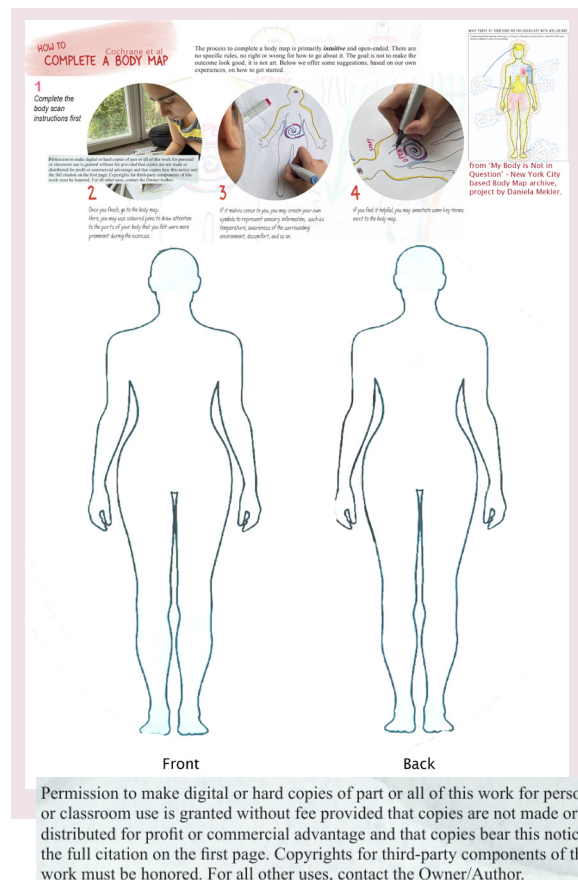


Figure 23: Body-map template from Test #1 workshop preparation.

Example image (top right) from Daniela Mekler (2017).

How to complete a body map instructions along the top of page are from Cochrane et al. (2022a), full citation below

ACTIVITY	DETAILS:	'PATH OF EXPRESSION' STEP:
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1. Body Scan

Orienting question: "What are our divergent ways of understanding the world...?"

Reflecting on memories



Figure 24: Photograph of test-workshop station one: introduction and body scan area. Photograph by Author.

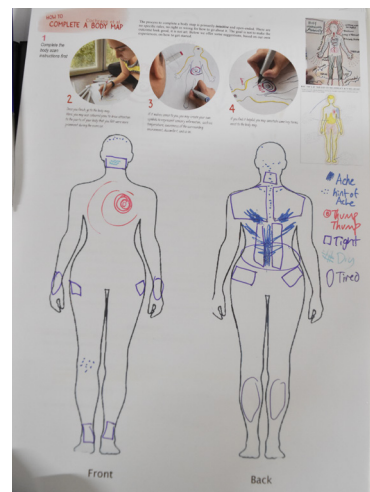
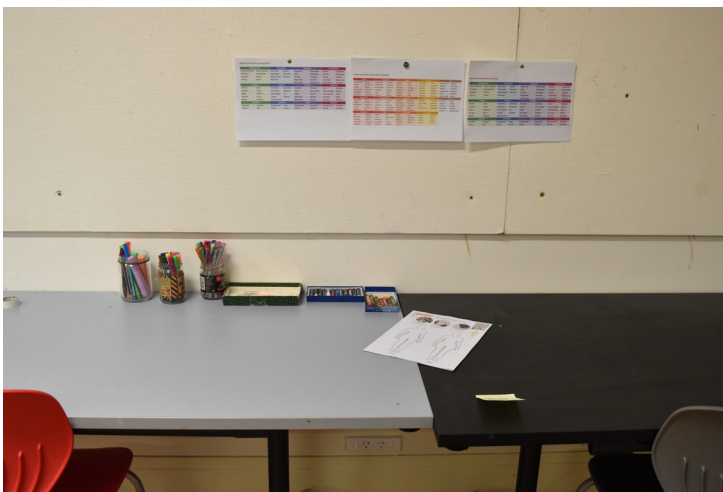
Body scan on yoga mats in 'chill area'. Ambient, calming lighting and comfort props, such as eye masks, neck pillows, and blankets, are provided. The windows are covered with a card for privacy.

2. Body Map

Prompts:

1. Are your memories triggered by stories or colours?
2. Do you value texture, patterns, and symbols that others don't?
3. Is anything coming to mind that makes us feel safe and supported?

Reflecting on memories



Body Map Station includes body map templates with instructions, feeling words on the wall, and different mediums and colours to draw with – crayons, pastels, gel pens, and felt markers.

Figure 25: Photograph of test-workshop station two: body-map. Photograph by Author.

Figure 26: Photograph of test co-design participant's body-map outcome. Photograph by Author.

ACTIVITY

DETAILS:

'PATH OF EXPRESSION' STEP:

Discussion to gather feedback & share the design aims to generate ideas

3. Sharing my design aims with drawings

- Prompts: 1) Design drawings
 2) Low-opacity photocopies of my designs and base garment designs for them to draw and write on
 3) Fabric samples

Reflecting for possible futures.



Figure 27: Photograph of test-workshop station three: sharing my design aims with prompts. Photograph by Author.

Sitting next to each other, facilitator describes the design drawings at the table and what these designs aimed to achieve. E.g. “These were generated by me with the aims of ... these came from extensive prior research and panel and survey feedback.” Generate ideas on low-opacity photocopy bases or designs.

Determine shared design values

4. Verbal walkthrough

Orienting question: “How can we leverage strengths through clothing...”:

Reflecting for possible futures.



Selected positive items from preparation are hung on mannequins. Participant does a ‘verbal walkthrough’ of their item(s). The facilitator asks guiding questions as prompts and notes down any keywords for design values; these are later written on the whiteboard.

Figure 28: Photograph of test-workshop station four: verbal walkthrough. Photograph by Author.

ACTIVITY	DETAILS:	'PATH OF EXPRESSION' STEP:
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5. Strength-image sort

Using association set #2

Reflecting for possible futures.



Figure 29: Photograph of test-workshop station five: images from association set #2 laid out on table. Photograph by Author.

Make free associations with images in the association set. Select images and annotate any connections/interpretations made around these on a cardboard base (in Test #1 we had a large visual diary to write on instead). A participant explains or does a verbal walkthrough of their connections; meanwhile, the facilitator writes down keywords for design values.

Successes:

Overall, the preparation activities, body scan, and verbal walkthrough were intended to sensitise and prime the participant's soma, and they appeared highly successful. The participant completed the body map thoroughly and easily without prompts and verbally explained her selected garments easily in the verbal walkthrough. The verbal walkthrough enabled the participant to think about how clothing supported her, which primed her to associatively think about supportive clothing and ADHD strengths in the proceeding 'strength-image sort' activity. Findings suggest that the preparation activities effectively primed the participant for the workshop and familiarised her with the first three activities. This supported her ability to relax and successfully engage with her soma.

The aspects of selecting garments for the specified feeling states- which were determined by the panel findings, and explaining the selection appeared to support the participant in becoming attuned to what she valued in her clothes. This successful clarification of design values through a soma-based approach (forming an understanding through connecting thinking and feeling) was a promising finding. I speculate it is potentially more effective than directly asking laypersons (someone not experienced with fashion design and soma-experiencing) to identify their clothing design values.

Challenges and adjustments:

Challenges were encountered with Activity 3 - 'Sharing my design aims with drawings', which aimed to gather feedback for my designs and generate discussion and design ideas. The participant stated that she might not feel comfortable drawing over or critiquing my designs and that this activity felt out of place and should come after the 'strength-image sort'. Upon further discussion, it became clear that the participant felt this activity was too early in the workshop as the co-designer might not feel comfortable expressing design ideas or opinions that they believed differed from the researcher's. This was valuable to consider.

In this session, I found it challenging to explain my highly research-driven and conceptual designs concisely. I did not want to inadvertently instil expectations of complexity, as that would likely inhibit their soma

engagement and, thus, the authenticity of results in a soma-design workshop. These challenges and feedback helped clarify that activities needed to be structured to progressively ease participants into sharing their opinions and experiences. I moved this activity to after the ‘strength-image sort’ (activity number 5), and kept the same aim but replaced activity 3 (‘Sharing my designs...’) with sharing my Accessibility and Usability Criteria as a low-pressure and more straightforward way to share the fundamental design requirements for the design aim and generate discussion. This aimed to reduce the risk of inadvertently restricting the participant’s creative exploration, while establishing the project’s necessary design parameters. It also served as priming to support the part of the activity where post-it notes with design values on them are prioritised.

Changes to activity 3 (which is activity 5 in session 2) are shown here at Figure 30:

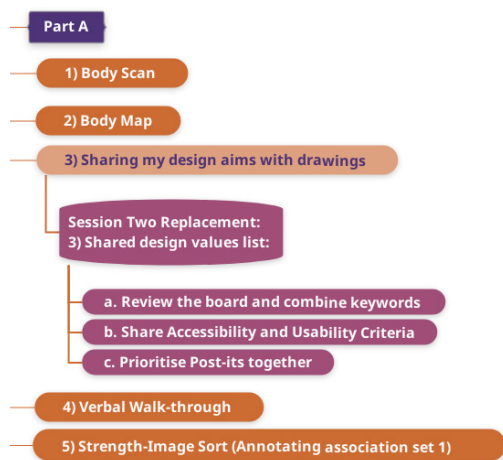


Figure 30: Extract from test co-design workshop #1 journey map, showing changes for session 2. Diagram by Author.

Overall, Test Workshop Session 1 clarified two key takeaways for adjustments:

- 1) Discussions may require a significant amount of time. Timings would need to be tested and estimated in Session 2.
- 2) The researcher needs a script to provide the best prompting questions for discussions and to help keep explanations concise for the participant’s sake.

Test #1 Session 1 successfully tested part of the workshop, resulting in constructively refining and developing the workshop plan. Tacit knowledge and feedback were gained, which provided valuable insights about the test co-designer’s experience, which informed adjustments needed for a more ADHD-supportive co-design process.

Consequently, changes to the workshop plan for Test #1 Session 2 were made according to Session 1 feedback and analysis.

These changes included (but were not limited to):

- Prompting and orienting questions, including location and delivery (written or verbal)
- Backup prompts and activity options
- Facilitator script
- Precise toolkit checklists for each activity/‘station’ (tangibles needed in the workshop)
- Toolkit materials to improve participation, reduce explanation time and improve usability
- Toolkit and prompts for facilitator and assistant for Test #2⁶
- Assistant plan –Key responsibilities
- Determining when answers should be ‘automatic’ or ‘slow and thoughtful’ and structure activities accordingly (in keeping with soma and co-design)
- Estimating timing per activity
- Finalising association sets (images and words) and preparation kit

6 Test participant #1 acted as an assistant in Test #2.

Session Two

Activities:

- 1) **Strength-Image Sort**
- 2) **Shared Design Values list:**
- 3) **Review the board and combine keywords**
- 4) **Share Accessibility and Usability Criteria**
- 5) **Prioritise Post-its together**
- 6) **Garment Reconstruction exercise**
- 7) **Generative discussion of panel and survey findings**
- 8) **Fabric feeling exercise**

[Various fabric samples are hidden under a large sheet on a table. The participant feels the fabric- without looking and then matches the felt experience to the feelings words provided.]

9) **Slowstorm design priorities**

Test #1 Session 2 helped clarify the aims and parameters and determine what panel insights I needed to share in the workshop and the tools needed. While challenges were encountered in activities 8 and 9, which focused on discussing my findings and determining shared design priorities, my redirection in approaching these activities with the participant proved to be extremely helpful for them and successful for the aim. This led to breakthrough realisations and findings for future workshops. After I explained the difference between self-care and self-soothing (see 'Designing for ADHD Wellbeing' section above), we established that the challenge of understanding my project/aim lies in misunderstanding self-care. The participant explained their new realisation that it was easy to misunderstand 'self-soothing' and misidentify this misunderstanding as self-care due to mainstream marketing advertising relaxation activities such as massages and the concept of 'treating yourself' as self-care- without acknowledging that self-soothing for self-care versus self-indulgence are different

concepts. They were upset about this marketed conflation upon realisation. This is an insightful and potentially ethical consideration for future ADHD design outcomes and marketing. The findings from this conversation enabled me to identify

Definitions to provide:

- Define and distinguish self-soothing for nervous system support from sensory enjoyment/relaxation
- Explain self-care defined as 'self-compassionate accountability' based on Panel findings.

The Design should...

- Prioritise self-monitoring and grounding as forms of accountability for self-care
- Encourage a mindset shift to internal safety and support by valuing personal strengths.

The Design will...

- Enable discreet in-moment support for self-soothing but we are not focussing on this in the workshop

Preparation:

Same preparation as session one, but with the following refinements for garment selection:

Select three items of clothing that make you feel...

- 1) *motivated and optimistic*
- 2) *mindful and centred*
- 3) *safe and supported*

ACTIVITY

DETAILS:

'PATH OF EXPRESSION' STEP:

Making interpretations and connections- generating ideas

4. Strength-Image Sort

Orienting question on wall: "How has clothing supported your strengths..."

Reflecting for possible futures.



Figures 31-32: Photographs of strength-image sort activity outcome with test co-designer participant. Photographs by Author.

Association set #2 includes ADHD 'strength' words. Select strengths that resonate and match with images using free association. Explanation of matches after.

Shared design values list:

5. a. Review keywords list to determine values (remove or combine words)

Prompts:
 -Heading on wall: 'Design values for supporting self-regulation.'
 -Design criteria list
 -Accessibility and Usability review
 -Design Values definition on wall

b. Share Accessibility and Usability Criteria and get feedback

"Which of these are most valuable and relevant for designing for your ADHD experience?"

c. Determine top shared values (5 max) together (re-arrange Post-its)

"Which of these are most important to be catered for in a design?"

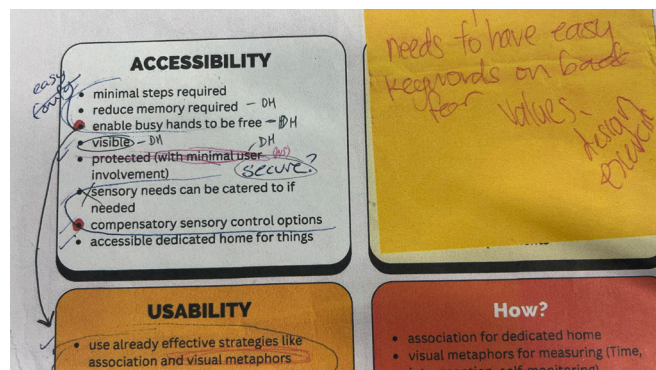
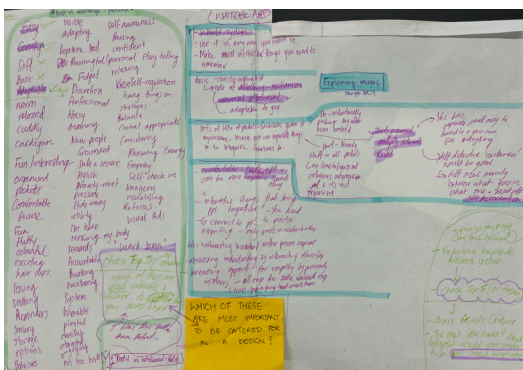


Figure 33: Photograph of key-words written by facilitator in visual diary. Photograph by Author.

Figure 34: Photograph of accessibility and usability criteria that test co-designer participant annotated their feedback on. Photograph by Author.

(Top design values Participant selected: Comfort, interesting, easy (to wear), adaptable, prepared/ organised/ in-built system.)

Instead of using the whiteboard, we used a visual diary for better accessibility for the facilitator and to test the activity's effectiveness with prototyped toolkits rather than the outcome of finalised toolkits

ACTIVITY	DETAILS:	'PATH OF EXPRESSION' STEP:
----------	----------	----------------------------

Determine shared design values

6. Garment Reconstruction exercise

Prompts: "Quick-fire challenge": Build one prototype that responds to our shared design values

Expression for future experiences'



Figures 35-36: Photographs of test co-designer participant's outcome of garment reconstruction exercise. Photographs by Author.

'Search through the chest of modular parts from deconstructed garments and reconstruct these in response to our top shared design values.'

Determine shared design priorities

7. Generative discussion of panel and survey findings

- Prompts:
- Share mind map/ hierarchy of focused Panel and Survey findings (Emotion regulation- current challenges and desired state, balancing self-care and self-soothing)
 - "Does this resonate with you?"
 - On the wall: How do we move from exploration refining
 - On the wall: 'WHAT NOT HOW'

Share 'collective current state'.

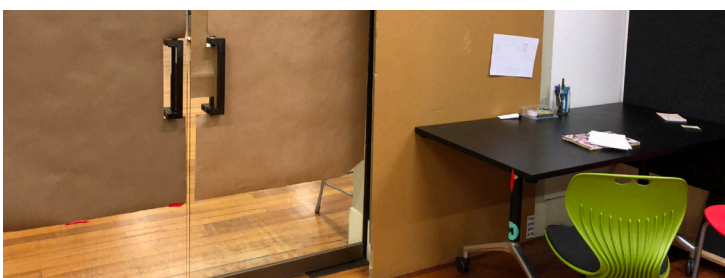


Figure 37: Photograph of focused panel and survey findings shared with test co-designer participant as mind-maps, flowchart and graph. Photograph by Author.

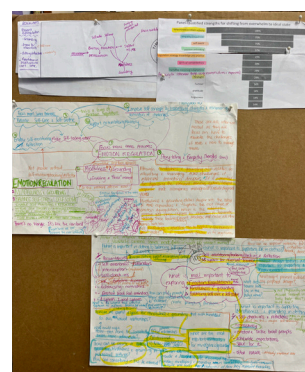


Figure 38: Photograph of determining shared design priorities station with pin-board and slowstorming tools next to doors covered in card for privacy. Photograph by Author.

Explain the mind map of findings, then prompt a discussion using prompting questions about their understanding of these themes and how they relate to their own experiences. Determine through discussion what their priorities of panel themes are.

8. Fabric feeling exercise

Orienting question: "What are our divergent ways of understanding the world..."

Moving towards
'desired state/
imagined future'



Figure 39: Photograph of some outcomes of fabric-feeling exercise. Photograph by Author.

Figure 40: Photograph of fabrics hidden under sheet on table for fabric-feeling exercise (with hand feeling under sheet). Photograph by Author.

Large fabric samples are hidden under an opaque sheet.

Begin by doing a guided breathing exercise (e.g., square/box breathing) for 30 seconds; continue this breathing while feeling the fabric under the sheet for 30 seconds. Match the felt experience with the sensation/feeling/emotion word cards on the wall. Write down the matching feeling, move on to the next fabric, and repeat

9. Slowstorm design priorities

Prompts:
- keywords from activity 7 are written down on Post-it notes to prioritise
- written on card base: 'How do we get from current collective state to desired state'

-Reflecting on
memories

In this session activity 9 led to a deep conversation about misunderstandings and misinterpretations around self-care in the media.

Successes:

In Test #1 Session 2, I attended to the finer details to identify nuanced improvements for a more ADHD-supportive workshop, including usability and emotions. This resulted in key takeaways for facilitating discussion, enabling participant comfort, and making the aim and activities more intuitive, time-efficient, and easy to understand.

These key takeaways include:

Prompts:

- Prompting questions are essential for active participation and should be thoughtfully used to bring participants' values to the surface and help them if they are stuck.
- How-Why-What approach to questions

Facilitator self-awareness and mindfulness:

- The facilitator needs to actively guide the conversations back to the aim and in keeping with time.
- The facilitator should avoid repetition of topics and remember what not to focus on.
- When prioritising, ensure design values are brought back to the aim.

Usability and focus:

- Use card templates as a visual base for relevant activities to make them more intuitive.
- Include definitions of key relevant terminology on the wall to help avoid different interpretations.
- The design aim should always be visible.

Enabling participant comfort:

- Be aware that co-designers may be highly attuned to subjectively perceiving and anticipating conflict or rejection. This can be heightened by "Rejection Sensitive Dysphoria", which some ADHDers correlate with their ADHD (Dodson, 2020). Cultivate sensitivity towards this and adjust communication style accordingly.
- Co-designers may experience difficulties when prioritising/decision-making (due to varying ADHD executive functioning differences). Facilitators should put helpful parameters in place to support these challenges but must be cautious that they do not feel restrictive. Otherwise, they will be counterproductive.
- Provide the co-designer with a workshop journey map so they know what to expect and where we are heading.

Challenges and adjustments:

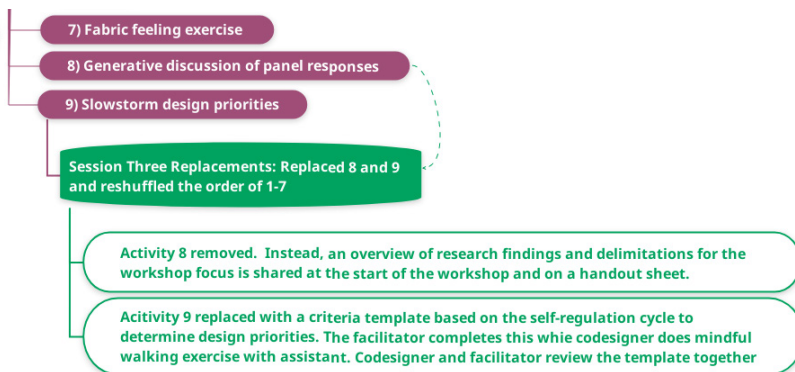


Figure 41: Extract from test co-design workshop #1 journey map, showing changes for session 3. Diagram by Author.

Activities 8 ('Generative discussion of Panel responses') and 9 ('Slowstorming how we get to our desired state/what is most important for the aim'), naturally ended up merging. In these activities, I shared mind maps based on panel insights that overviewed key panel themes for 'what helps prevent dysregulation' and 'important requirements for self-regulation'. Afterwards, they were asked, 'Which of these is most important for you to design for?' The participant appeared to have difficulty answering this (prioritisation is a common executive functioning challenge for individuals with ADHD). After some silence, I intervened using a how-why-what questioning approach to go through the themes to support them in figuring out:

- how she felt about/experienced the panel themes,
- why this was important for the aim*, and, lastly,
- what this may mean for a design that addresses the aim*.

(*the aim, enhancing self-regulating and preventing dysregulation, was specifically stated).

This backwards-mapping approach successfully generated discussion and design priorities and stimulated insightful responses. The how-why-what approach's success in helping move the participant to insightful responses suggests a few possibilities. Firstly, how-why-what questions may be beneficial for prioritisation and task-breakdown challenges (both are common challenges for ADHDers, as found in my survey responses and supported by Barkley). Secondly, it seems possible that one may need to mindfully comprehend how the themes in question are experienced in one's own life before being able to answer any what-based (actions or results) questions. Additionally, linking their personal experience to the aim may be a required externalised step to connect these two concepts, which may feel "separate". While this reflective discussion via how-why-what was effective for helping us slowstorm, I recognised that others may prefer reflecting independently. Thus, for Test #1 Session 3, I made various template sheets for independent slowstorming. I responded to this challenge with supportive adjustments, but was concerned whether my support had taken over the co-design element.

However, the participant stated that she felt this was helpful. Lastly, the discussion and reflection from activities 8 and 9 offered insights that helped me formulate better prompting and evaluative questions.

The workshop successfully achieved its objectives, with the test participant demonstrating a clear understanding of the techniques introduced. Test #1 Session 2 successfully informed a critical evaluation for an ADHD-informed co-design process and supported the development of ADHD-supportive tools and communication considerations for the co-design workshop. After witnessing the deep answers and in-depth discussion resulting from the how-why-what approach, I realised that following this format and having effective prompting questions was likely better than my providing personal demonstrations in activity 4, which might influence the co-designer. To reduce these steps, for Test #1 Session 3, I consolidated the most relevant panel findings for the aim into a single flow chart for easier comprehension (see Figures 13 and 14 in Expert Panel Section).

Session Three

Activities:

- 1) Summary of exploration topic and scope
- 2) Body scan and body map
- 3) Verbal Walk-through
- 4) Strength-Image Sort
- 5) Shared design values list
- 6) Reconstruction design exercise
- 7) Fabric feeling exercise
- 8) Guided mindful walking exercise and reflection
- 9) Determine priorities (with criteria template)
- 10) Collect and collate pieces around the room on foamboard
- 11) Open Co-design workshoping

[This activity focuses on achieving a creative response to the aim. The creative methods options are open and collaborative- the previous tools and stations can also be returned to.]

Review and feedback

Summary:

Test #1, Session 3 was a run-through of the entire workshop, focusing on the changes and activities not yet tested. A summary of notes was taken after session 3 to inform Test workshop #2.

My approach to ADHD self-care (proactive self-regulation) is not a mainstream marketed approach and is, therefore, easy to misunderstand and challenging to comprehend unless explained. The need to share the multiple layers of information in easy-to-understand points was extremely important. Accordingly, it is imperative to focus on the findings most significant for clothing.



Test co-design workshop #2

A second co-design test was created with feedback from the previous findings. There was more focus on the toolkit used in order to generate material in the workshop. Images below show examples of the activities.

Test Workshop #2

'Chill Zone'

- Introduction
- Prep-kit discussion
- Body Scan
 - Body Map
- Verbal Walk-through



hypoallergenic plants

Blanket option



Box of comfy items
(for Body Scan & for Sensory regulation in workshop)



Neck Pillow

Big silky Shirts

Fan

Wheat bag for weight



(they really liked the sleeves.)

Hoodie they selected from Box.

Range of Eyemasks



fidget Cube

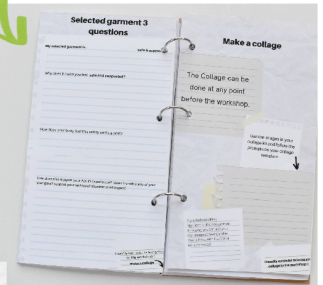
Facilitator's garments for Verbal Walk-through



Test Participant's Selected Garments



Prep-Kit



Selected garment 1 questions

My selected garment is: **motivated & optimistic**

Why does it make you feel **motivated & optimistic**?

How is this motivation & optimism felt (or not felt) within your body?

How does this support your ADHD experience? (does it enable any of your strengths? support your self-care? alleviate challenges?)

Friendly reminder to bring these to the workshop! p10

Selected garment 2 questions

My selected garment is: **mindful & centred**

Why does it make you feel **mindful and centred**?

How is this mindfulness and centredness felt (or not felt) within your body?

How does this support your ADHD experience? (does it enable any of your strengths? support your self-care? alleviate challenges?)

Friendly reminder to bring these to the workshop! p11

Selected garment 3 questions

My selected garment is: **safe & supported**

Why does it make you feel **safe and supported**?

How does your body feel this safety and support?

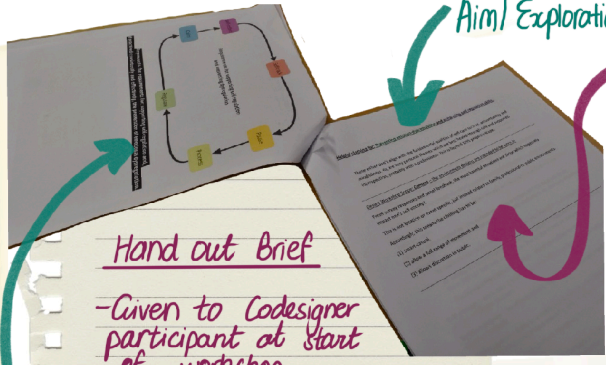
How does this support your ADHD experience? (does it enable any of your strengths? support your self-care? alleviate challenges?)

Friendly reminder to bring these to the workshop! make a collage p12

Verbal Walk-through

Questions in the Prep-kit help prepare the test-participant to verbally 'walk' through their garments in the Test Workshop.

Aim/ Exploration topic at the top of each page



Hand out Brief

- Given to Codesigner participant at start of workshop.

key takeaways from Research findings are simplified into easy to understand flowcharts and are on hand out and shown on projector during Intro.

Hand out Includes:

- Journey Map
- Disclaimers (for reassurance)
- Exploration Topic/Aim
- Findings
- Project Scope
- Glossary

Introduction= Summarising the AIM/ exploration topic and the KEY TAKEAWAYS from panel and survey findings

- Introduction

Going over plan for the day with Journey Map & Hand Out Brief.

- Discuss Prep work
- Body Scan & Body Map

Only Audio played



https://youtu.be/_noquwycq78?si=TrScEV41N8LJr2rp

Body Scan



Lighting

Main lights off and ambient light comes from projector scenery - For Body Scan & Body Map.

Body Map Guidance / Tips on the wall

Body-map exercise

Body Map Station / station 2

- Soma probing & priming
- visually representing the Body Scan Experience

Show location of body sensations and how they felt to you

Tips: You can use...

- Different coloured stationery
- Symbols and patterns to represent sensory or emotional information
- Annotations
- The feelings list can help



Range of different drawing mediums.

Example Outcome:

The codesigner participant's

Body Map from Test workshop #2

Feelings

- Activated
- Accentuated
- Admiration
- Alert
- Amusement
- Armoured
- Dislikeful
- Bumpy
- Breathable
- Calm
- Cold
- Comfortable
- Compressive
- Constricted
- Hopeful
- Hugging
- Invigorating
- Joyous
- Light
- Liberalizing
- Live'y
- Lush
- Luxurious
- Motivated
- Optimistic
- Padded
- Pleasant
- Flush
- Tranquil
- Translucent
- Yuletely
- Vibrant
- Warm
- Waxy
- Weightless
- Woolly
- Armoured
- Dulky
- Bumpy
- Burning
- Cold
- Confused

Feelings

- Cosy
- Crisp
- Delicate
- Doors
- Draping
- Elastic
- Electric
- Expansive
- Facilitated
- Faithery
- Fowing
- Fuzzy
- Happy
- Heavy
- Radiant
- Recharged
- Renewed
- Scorched
- Shimmering
- Silky
- Steak
- Smooth
- Sing
- Spongy
- Spacious
- Stretchy
- Tender
- Thick
- Tingly
- Disappointed
- Droopy
- Grity
- Heavy
- Hostile
- Knotted
- Prickly
- Rejected
- Resentful
- Restrictive
- Rough
- Scratchy
- Slouchy
- Stuck
- Swooty

Feelings Lists on wall

Emotion wheels

Orienting question

How has your clothing supported your strengths...

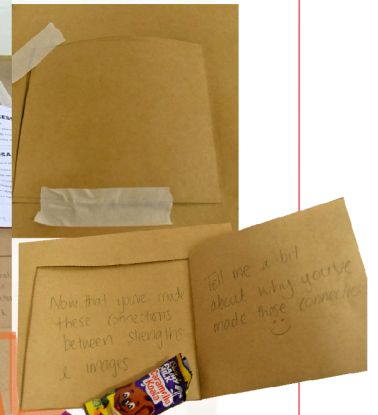
Orienting question on the wall
this helps to orient & prime them towards making connections/associations with the images provided.

Strength-Image Sort

-Association Set #2

• Relating strengths to garment images or imagery that can be translated into garment designs

MAKING INTERPRETATIONS & CONNECTIONS



Simple interactive elements and 'rewards'
(ADHD is widely theorised to be a dopaminergic difference that affects the 'brain-reward system')
ADHDers can need more frequent rewards to thrive & stay motivated.

Understand their connections

- option for them to explain their connections or annotate around their selections on the card.

Station 3

Making Interpretations & connections through free association of images with self-selected strengths.

The card base had 4 spaces for a strength to be placed in each and dedicated space for associated images to be placed.

- Determined
- problem-solving
- Empathy
- Self-aware
- Positive-reframing
- Strong sense of self
- Self-honour
- Growth
- Spiritual connectedness
- Narrative reasoning
- adaptations
- Hindsight
- Humour
- Gratitude
- Forgiveness
- Self-compassion
- Intrinsic values
- Passionate
- Authentic
- Hindsight
- Strategy knowledge

← 'ADHD Strength' words

Narrative reasoning: the ability to remember things using examples, stories, experiences



Example Outcome:

Codesigner Participants selected Strength(s) and associated images.

(Participant) Quotes noted by by facilitator as codesigner Participant explained matches verbally.

Refine Design Values

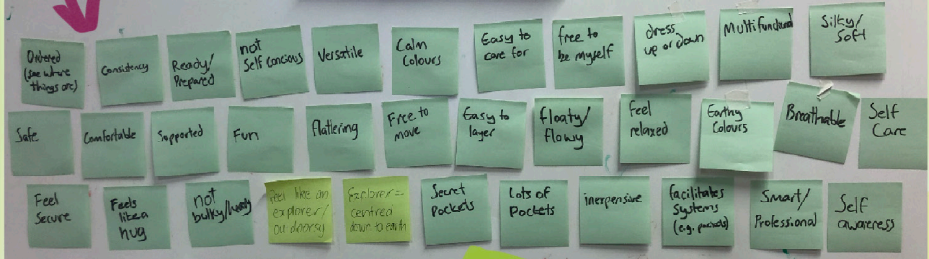
- Share A+U Criteria
- Review Values* (on Post-its)
- Prioritise Design Values

Review Post-its- Do quick YES/NO sort to decide if they are personal values for supporting ADHD self-regulation.

Which keywords do we value most for supporting ADHD self-regulation?

These values have been * identified by the facilitator and the assistant from the Codesigner Participant's responses throughout the Test Workshop AND from their Prep-work responses.

Post-its have 'Values' written on them.



Prioritise values for aim by Eliminating all but 5 Post its

OR

Use the prioritisation card base to prioritise top 5-10 values

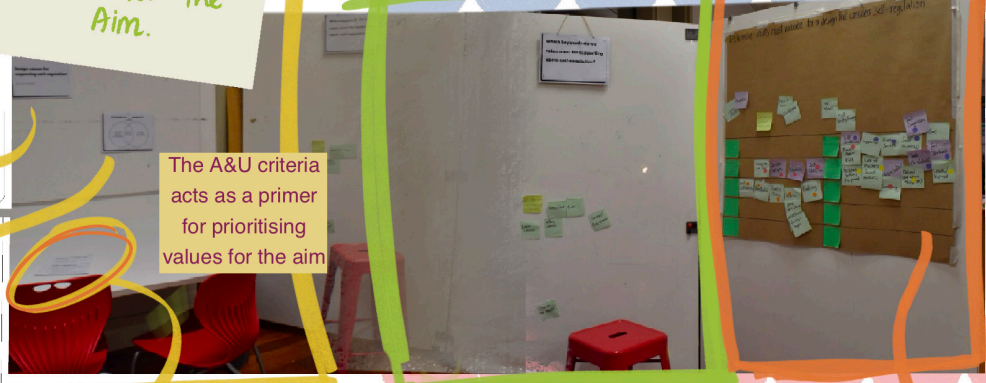
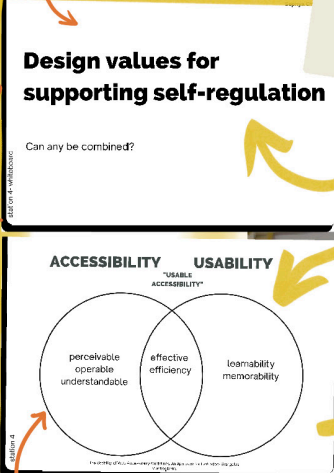
Activity focus and prompting question on wall.

Facilitator asks codesigner participant:

1. To read the A+U criteria (after, facilitator explains how it was generated)
2. If it makes sense to them?
3. If there's anything they think should change?

they are invited to use the checklist to tick what they would change and/or write notes on it.

Station 4
Determining and prioritising Design Values for the Aim.

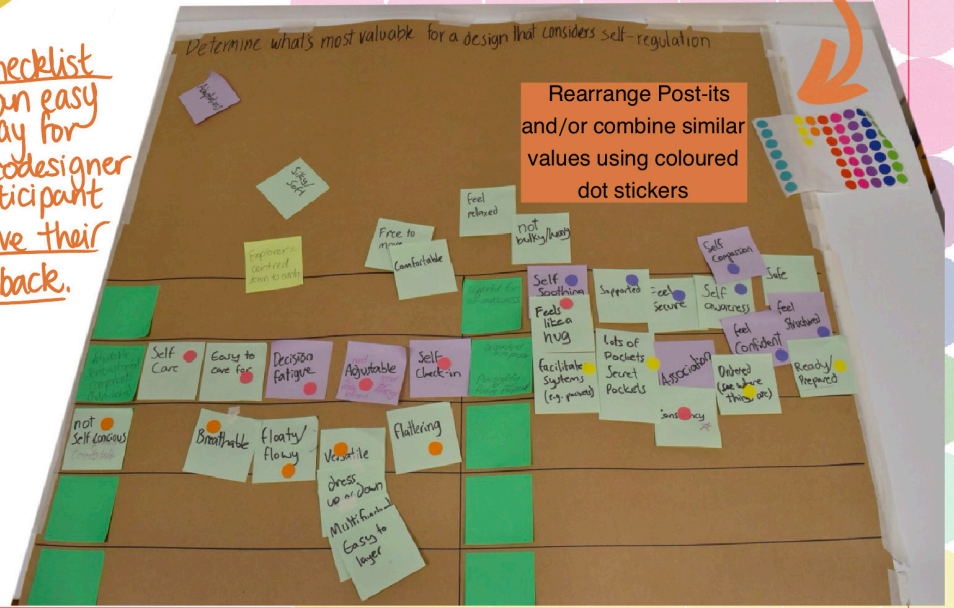


The A+U criteria acts as a primer for prioritising values for the aim

Easy definitions on wall.

A+U Checklist is an easy way for the codesigner participant to give their feedback.

- ADHD ACCESSIBILITY**
- minimise steps
 - visible secure storage for essentials
 - sensory needs considered
 - minimal memory exertion
- ADHD USABILITY**
- sensory control options
 - narrative reasoning e.g. visual metaphors
 - externalise working memory
 - enables accountability
 - self-soothing for overwhelm
 - context-appropriate
 - multiple functions & configuration options



Rearrange Post-its and/or combine similar values using coloured dot stickers

Codesigner participant is advised facilitator will be their assistant during the challenge- facilitator can grab any pieces they need or pin things as instructed etc.

Codesigner participant is invited to do a think-aloud to enable facilitator to assist if they want to.

Top Design Values from previous activity are written on a sign & placed in clear view for codesigner participant to refer to during this activity.

'Rummage Chest'

Chest is filled with deconstructed garment pieces and other modular bits.

Rummaging is some priming for the codesigner participant before they reconstruct.

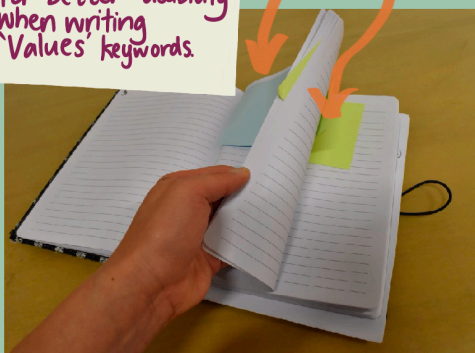
Sign on inside of chest provides activity instructions and definition of Think-aloud.

Station 5

- Put together deconstructed / modular garment pieces in response to shared design values (determined in last activity)

Assistant's notebook filled with singular post-its
For better usability when writing 'Values' keywords.

Different coloured post-its per activity
For better Analysis



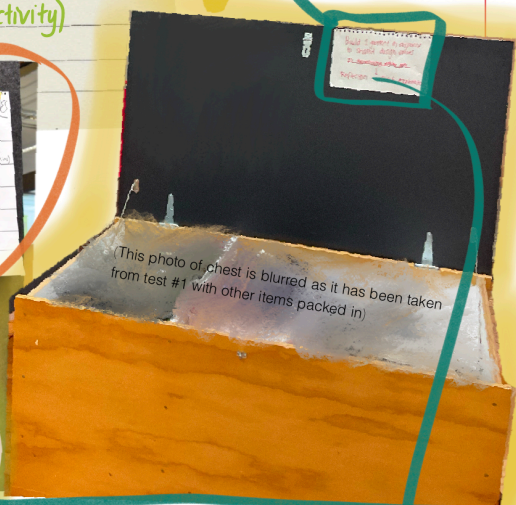
Garment Reconstruction Design Exercise

- 2 minute rummage
- 5 minute Challenge
- 2 minute Review
- 3 minute Annotate on Tablet

The pinboards at this station also include a range of belts, ties, elastic & connector pieces zips, pockets etc.

Self Track
+ Pause
+ Process
+ Regulate
+ Calm
Self-reflect

SHARED DESIGN VALUES
Comfort + Comfortable
Adjustable, semi-formal (casual)
Supported (in self awareness)
Practicality (in being prepared)



(This photo of chest is blurred as it has been taken from test #1 with other items packed in)

Definition:
Think aloud- (An experience-design method)
- verbalising your thoughts as you move through the process.

Sophya Chambers
MDES

5 minute quick-fire challenge!

x2

- Build 1 garment in response to shared design values, by reconstructing modular parts
- Reflect- 60 second explanation!

more prompting pieces for reconstruction activity
- felted samples, waist-bags with lots of pocket types, sponge, ribbon

Mannequins for this exercise were placed at the station each with prompting cards on the ground for easier reviewing and analysis.

(Assistant fills card out during 2min Review, when facilitator asks codesigner participant prompting questions)

Design value responded to:
Supported, Comfort + comfortable
Key values, features:
- Big pockets - fun + badass
- Billowy look - Reversible
- Silky soft inside
- Elasticated cuffs
- Button fastening
- Big hood (detachable) (ties up)
- Waterproof

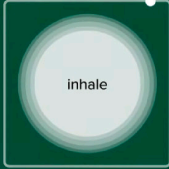
Example Outcome



3 minute Guided Square breathing video
- played on projector

(Dim lights for Soma Activities)

1.



THE UNIVERSITY OF BIRMINGHAM

Square Breathing Visual

https://www.youtube.com/watch?v=ubF_1ZiFta-E

Station 6

A soma exercise to help us recentre ourselves after break. (and explore fashion design potential.)

Fabric feeling station...

Spec sheets with a range of garment types & areas eg:



Fabric feeling Exercise

- Facilitator does Demo first-
- Guided breathing exercise
- Fabric feeling...

1. After the guided breathing video, continue with breathing pattern for fabric feeling
2. Feel fabric under the sheet (no looking) for approx. 30 seconds-ish
3. Choose word which matches feeling from fabric. → Write word on post-it template.
4. Match with spec garment(s) using coloured dot stickers.
5. Discussion from prompting Questions
6. Repeat per fabric

(After Completion) Fabrics the codesigner participant selected under fabric with selected 'feeling' words and keywords / 'values' from discussion. Specs and 'feelings' on post-it template are stickered correspondingly.

A range of seating options were available around the workshop.

[Quick Annotate on Tablet-facilitator]

BREAK

Garment Reconstruction Design Exercise continued

- 2 minute Review/Reflection
- 3 minute Annotate on Tablet.

After each 5 minute garment reconstruction challenge, there is a review and reflection where the codesigner participant explains their outcome/what they envision.

Prompting questions are asked to specify the design values and important key design features.

Lastly, the outcome is photographed on tablet and details and descriptions can be quickly added on tablet by facilitator.



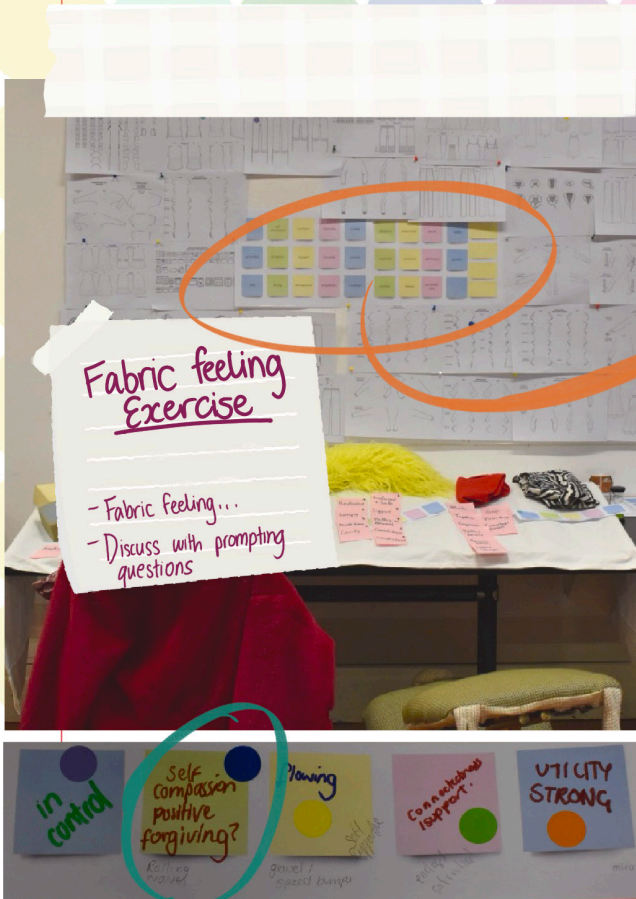
Various easy to use attachment tools are laid out to use:

- mini plastic clips
- mini magnets
- safety pins
- bulldog clips - various sizes
- pins
- Stapler

calm	self-compassion	confident	optimistic	mindful
grounded	energised	engaged	focussed	centred
safe	strong	introspective	empathetic	in control
detached	determined	secure	utility	
supported	committed	self-honour	growth	
positive	flowing	connectedness		

Feeling words for matching fabric with

These words are keywords taken from the Panel responses, they represent the pannelists' desired states.



Selected fabric for section 2

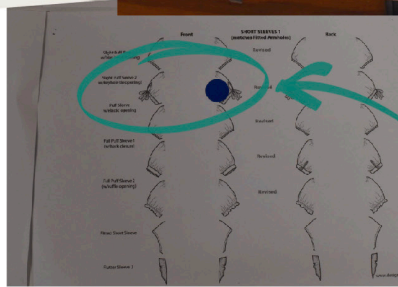
keywords written by assistant during Discussion after each fabric is felt.

Facilitator asks prompting questions for discussion: (See bottom of page)



Example Outcome (in workshop): See post-workshop example outcome on following page.

UNDERNEATH THE FABRIC COVER:



Specs codesigner participant selected for fabric 2.



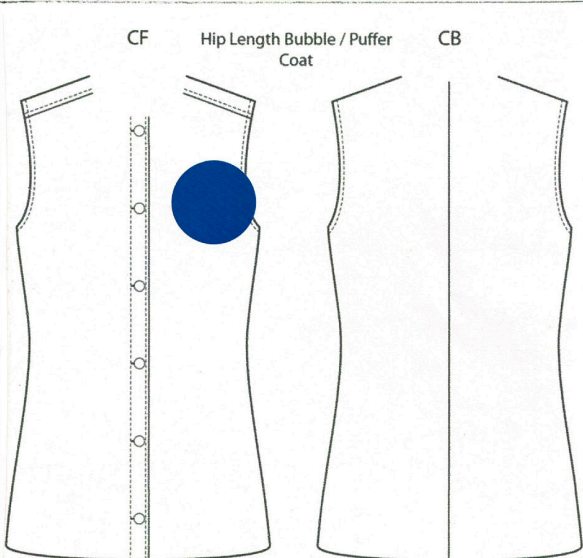
Under the fabric cover there are wooden separators stuck down. Inside each section there are multiple fabrics. The codesigner participant responds to 1 fabric per section.

- How does this word(s) impact your life currently, or your ability to self-regulate?
- Why did you match this word to the fabric? How did impact you feel this way?
- Why did you match this fabric to this garment outline (spec)?
- What is the importance of this to self-regulation? Or to preventing dysregulation? Or to your ADHD experience?

Fabric feeling Exercise

Example outcomes
- Post-workshop
Spec pages

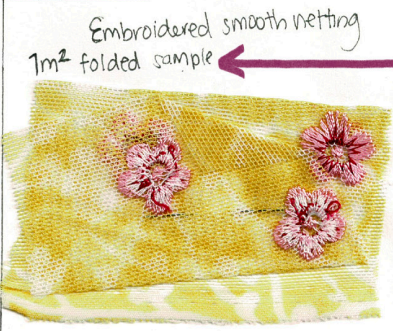
FABRIC FEELING EXERCISE - WORKSHOP



Slight Puff Sleeve 2
(w/keyhole tie opening)



FABRIC #2



Embroidered smooth netting
1m² folded sample

(this is the measurement of the sample used in the activity)

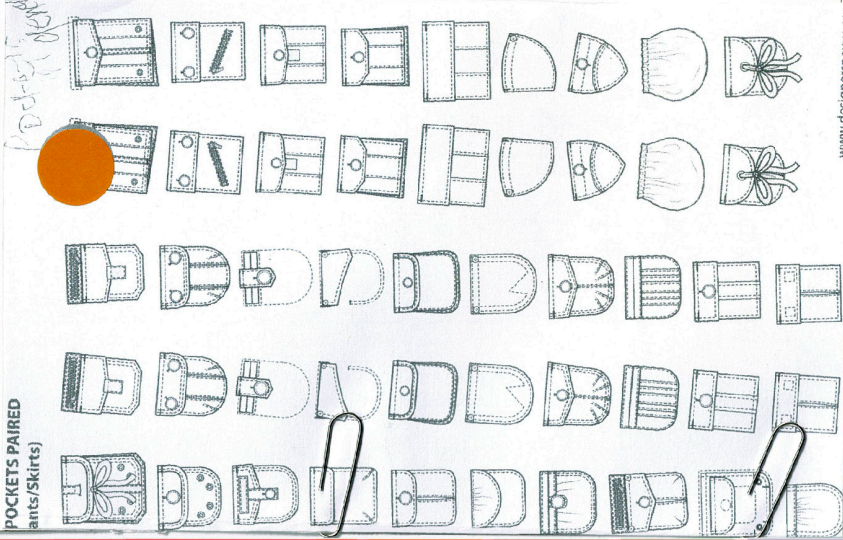
Assistant's keywords from discussion with CD of word match:

- Forgiveness
- like a hug
- Flowy
- Count the flowers
- Reminder to be present

word match:

FABRIC FEELING EXERCISE

POCKETS PAIRED
ants/skirts



Assistant's keywords from discussion with CD of word match:

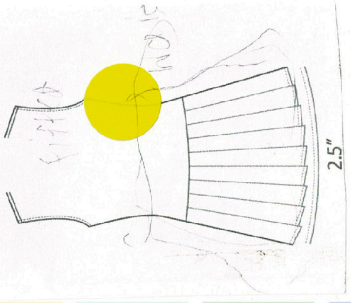
- Connected / Present
- Firm Hug
- holds shape
- Bounces back
- Grip
- Pants & pockets

word match:

- Organised
- together
- definite

FABRIC FEELING EXERCISE

A-Line Mini



WORKSHOP

FABRIC #3

2.55 x 2.55mm Sample



Assistant's keywords from discussion with CD of word match:

- Moves easily
- options
- contrast
- supported structure

word match:



word match:



FABRIC FEELING EXERCISE

MBRSMOP

FABRIC #4

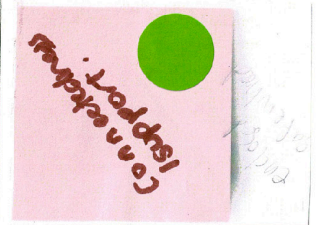
Fake fur long
1.6m x 900mm - Rolled up



Assistant's keywords from discussion with CD of word match:

- Enclosed & safe
- Support
- Patting an animal
- Connectedness
- Restricted
- lumpy
- Quiet time
- Comfy
- conflicted

Word match:

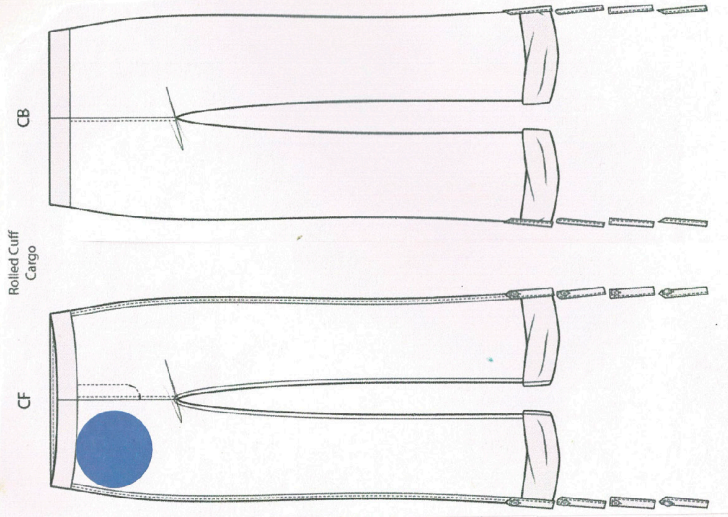
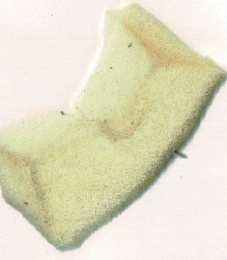


FABRIC FEELING EXERCISE

FABRIC #1

Memory Foam

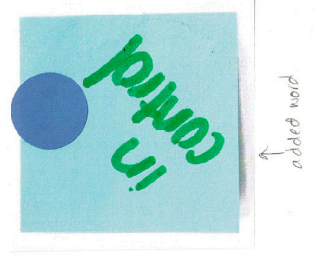
135mm x 110mm x 51mm Simple



Assistant's keywords from CD's discussion of word match:

- Breathable

Word match:

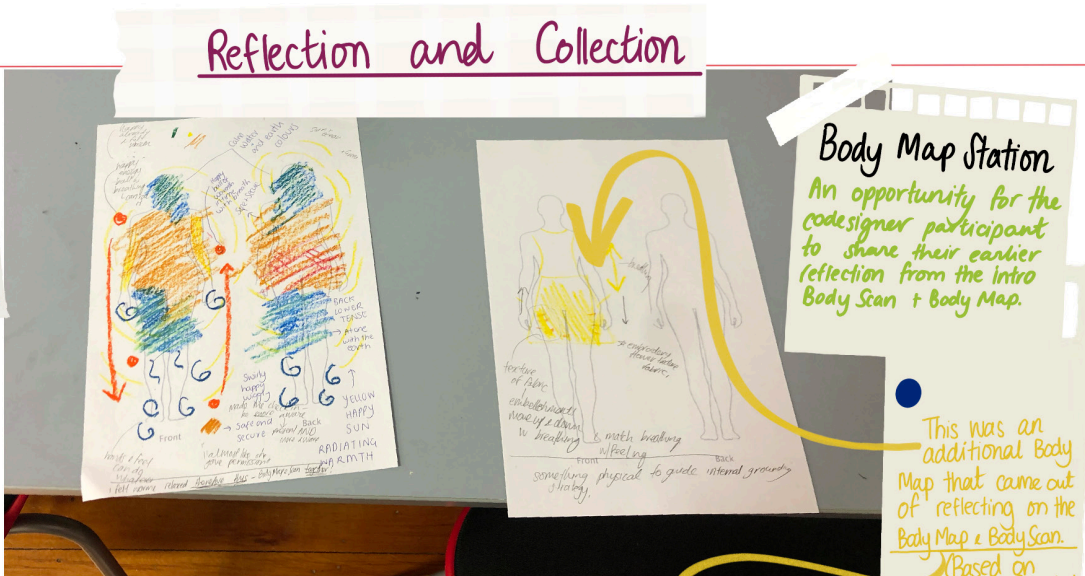


Reflection and Collection

Body Scan / Body Map Reflection

- Can read their notebook reflection if they used this
- Or discuss how they found the Body Scan + Body Map experience.

We returned to the Body Map station and the codesigner participant explained their Body Map and how they felt in the Body Scan. They described the the Body Scan. They also made connections between what the speaker in the guided body scan was saying and how that made them feel and why.



Body Map Station

An opportunity for the codesigner participant to share their earlier reflection from the intro Body Scan + Body Map.

This was an additional Body Map that came out of reflecting on the Body Map + Body Scan.

(Based on fabric 2 from last exercise.)

The codesigner participant described how knowing that the Body Map was after the Body Scan enabled them to engage in a deeper understanding of their feelings and make connections between their mind + body. The awareness of the upcoming Body Map made them consider the 'whys' and 'whats' of their experience beyond the surface-level feelings.

"It kind of made me check in, more, or like be more aware of what was going on... [the Body Map after the Body scan] is a good reflection... like 'oh, I felt this, therefore this'... Otherwise [without Body Map + Scan together], I'm just like, 'oh, this is nice!'"

Image Collection

- Return to the previous stations and collect anything you see as inspiration for a potential prototype for supporting self-regulation &/or preventing dysregulation.

"Collect anything you think could be inspiration for a potential prototype..."



"In a couple of activities we will be at the end of the journey map! -when we will be working on a prototype (or a few)..."

The codesigner participant was given a container to collect images and words in from around the room/ previous stations, and a blank 'word card' flip book and marker for adding their own words.

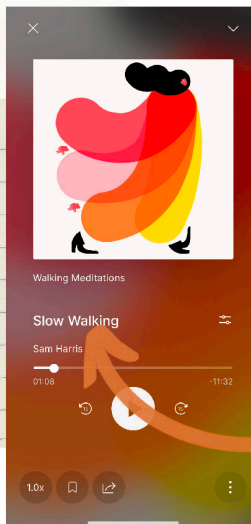
* the codesigner participant was given a phone on a cross-body strap to wear during the slow-walk the assistant set everything up for them and they started the exercise at the same time to complete together.

Outside

(+ backup inside option if weather was unpleasant)

A Soma priming exercise for grounding, awareness & reflection

Orienting prompt given verbally before Slow Walk: While doing the slow walk, think about what you consider to be the design priorities for the aim...



Slow Walk & Determine Priorities

- Guided 'slow walk' exercise (aka: walking meditation) with orienting questions
- Facilitator prepares first draft of priorities using criteria template.

The 'Walking Up' App was used for the guided slow walk exercise

The assistant did the slow walk exercise with the codesigner participant outside.

They both had a phone with the app & exercise ready to go and noise-cancelling headphones.*

Slow Walk & Determine Priorities

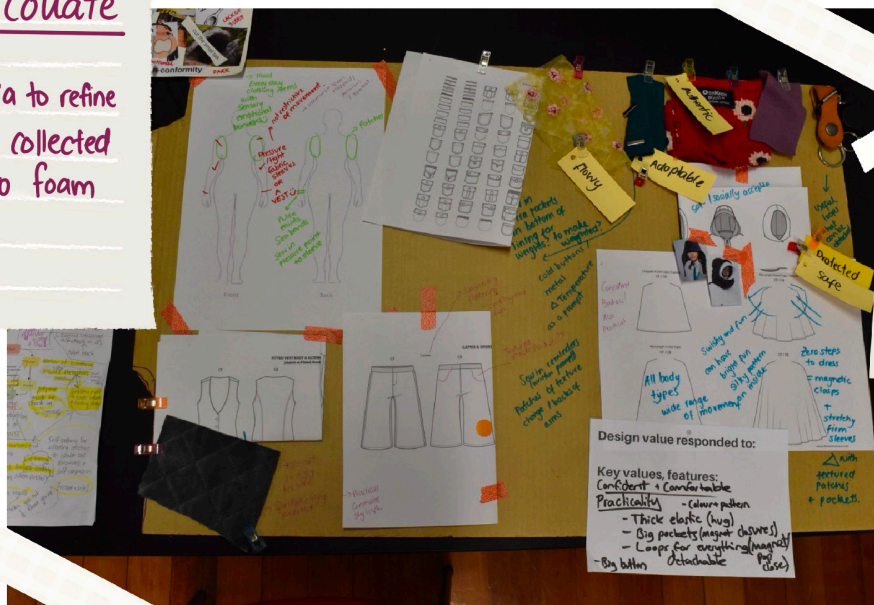
- Facilitator prepares first draft of priorities using criteria template while codesigner participant is doing slow walk exercise.
- Priorities on criteria template are reviewed together and adjusted according to discussion/feedback

The criteria template uses the self-regulation cycle that was created as a result of the panel & Survey findings & supported by secondary research, and shared at the start of the workshop.

The facilitator needs to arrange ideas & themes that came from the codesigner participant's responses into each section of the cycle. This aims to ensure our outcomes align with the aim & respond to the panel findings.

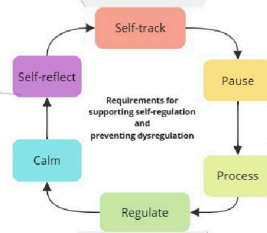
Refine & Collate

- Use the criteria to refine and collate the collected images on to foam board.



Station 7

Determining Priorities for a design that supports ADHD self-regulation, using Criteria Template.



Reviewing draft Criteria together:

- Facilitator explains what they have written, the interpretations they made, or how it was inspired by codesigner participant's responses and how and where these fit into the Self-regulation Requirements cycle.
- After sharing draft criteria ask for codesigner participant's feedback and adjust as needed.

Codesigner participant had already collated everything on foam board during collection
 Discussion of Collation instead...

Discussion of Collation instead...

Workshopping Station

- Review foamboard collation
Understanding the codesigner participants ideas and response to the aim.

Now:

Open Codesign workshopping
-Review foam board

Previous activity recap:

- Collect images etc from around the room
- Slow Walk exercise
- Meanwhile- facilitator completes draft Criteria Template
- Review draft/get feedback of Criteria Template to determine priorities for aim.

~~-Refine and collate collected pieces on foam board - *~~

Next:

- Open Codesign workshopping
- Create a prototype (independent of guided)

Criteria re-reviewed after Aim and scope reminder.

Explicit return to aim & scope
↓
Refine & Re-collate foamboard

They asked for a second board

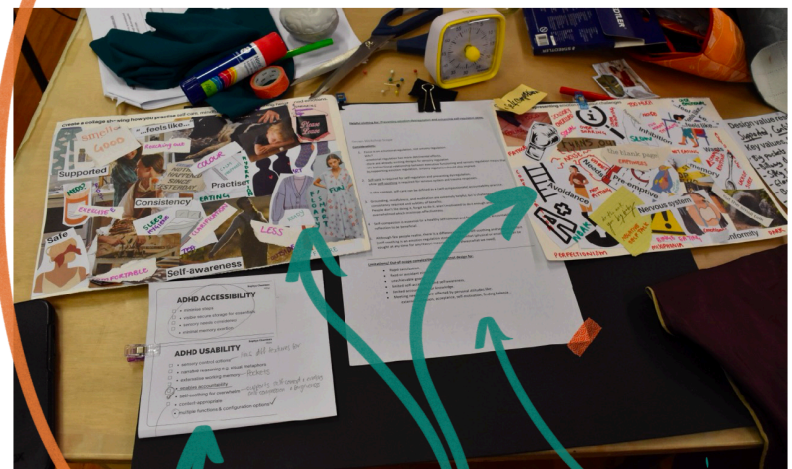
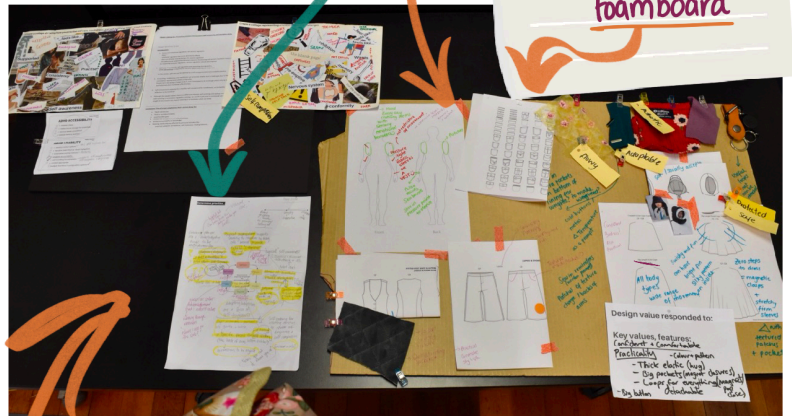
*After discussing the Criteria Template together, the 'Refine and Collate' step was skipped as the codesigner participant already collated their pieces on foam board during their collection (no photo). Therefore the next step was: **'Review foamboard collation'**

The codesigner was asked to explain what was on their foam board...

The facilitator asked clarifying questions to understand the codesigner participant's ideas, experiences and how their collation responds to the Criteria (aka design priorities for the aim) ...

Their foamboard items were collated before reviewing the Criteria (template draft) together instead of after. Therefore, the review of the foamboard collation also involved a discussion to try link their ideas and responses back to the self-regulation requirements cycle on the criteria template, with prompting questions.

The codesigner participant had a strong interest in and focus on, designing for self-soothing. (However, self-soothing was not the focus for the workshop exploration. Thus, the facilitator provided a reminder of the aim and scope explicitly, by reading out these out from the hand-out sheet



ATU criteria photocopied for them

Hand out sheet with:

- Aim
 - Considerations
 - what's outside the scope.
- They added their collages from their Prep-work to remind themselves of what dysregulation and self-care are like for them.

The aim and scope reminder led to the codesigner participant reorganising/collating their foam board with the criteria & hand-out sheet.

The workshoping station for the final 'Open Codesign Workshoping' activity was set up with everything required to make and inspire a prototype. The preceding activities also built up the exploration towards this final exploration and sensitised the codesigner participant. They were encouraged to take breaks, eat, go outside, or whatever they felt they needed anytime during the workshoping, and that how we/they can prototype or codesign is completely open.

All prompts at this station and the codesign options were explained before starting.

Open Codesign Workshoping

- Create a prototype, or a few prototypes (independent or guided)

The Workshoping Station

Workshop or prototype a design that supports ADHD self-regulation - open methods-

The final station is set up to be a child and creative space, with multiple options for prototyping. - The codesign workshoping of a prototype is open to what works best for them.

Self Track
 ↓
 Pause
 ↓
 Process
 ↓
 Regulate
 ↓
 Calm
 ↓
 Self-reflect



Early prototypes as prompts → the design process & idea is explained
 A range of garments on a rack are available to deconstruct/reconstruct, use as a base or for inspiration



The self-regulation requirements steps were written on a sign at the start of this activity to support the codesigner participant.
 The shared design Values Sign & Trims board from the reconstruction exercise is brought over to enclose this workshoping space.

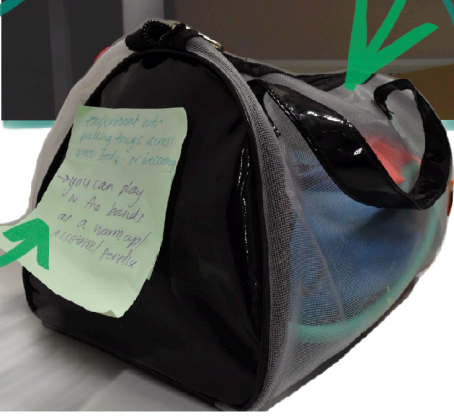
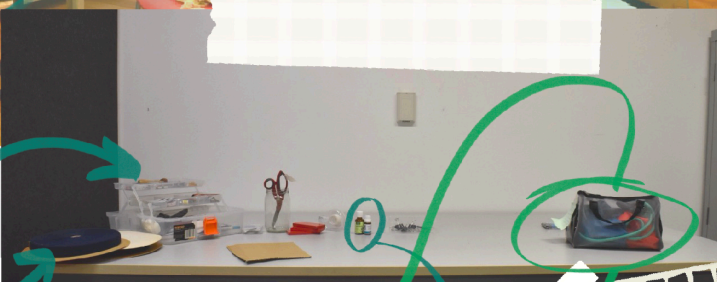


Sewing Toolbox

Velcro rolls

modelling clay

Prompts left on bag and bag is explained verbally.



Bag with a range of different size & resistance thera-bands for some probing.

Chest of modular garment pieces from Garment Reconstruction Exercise - Various

mannequins

orange and lavender essential oil

Several reflective points between the test workshop sessions led to valuable researcher learning and workshop adaptations, including the realisation that the ‘self-regulation requirements cycle’ also represented the workshop structure that achieved deeper engagement and experiential results from test participants.

Below are some key evaluative diagrams that were generated as a result.

1. The self-regulation requirements cycle:

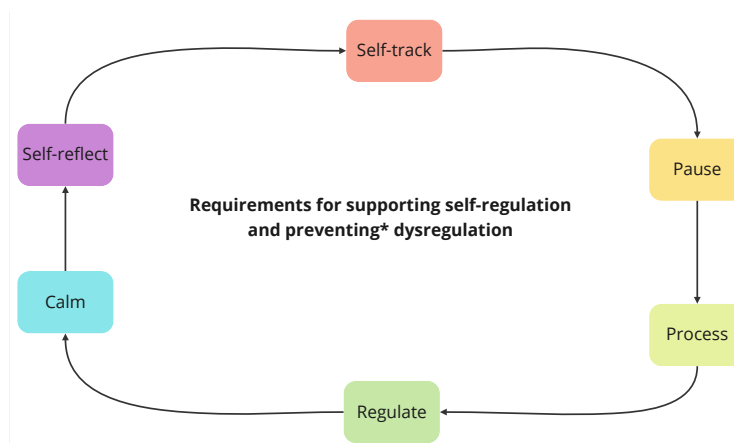


Figure 57: Self-regulation requirements cycle. Diagram by Author.

Note: Panel findings consolidated into key points and visualised into a single flow chart.

Generated from: Analysis/reflection of Test #1 Session 2.

Purpose: To enable easier comprehension of findings and project scope for co-designer participants.

2. Implementing the self-regulation requirements cycle in a workshop:

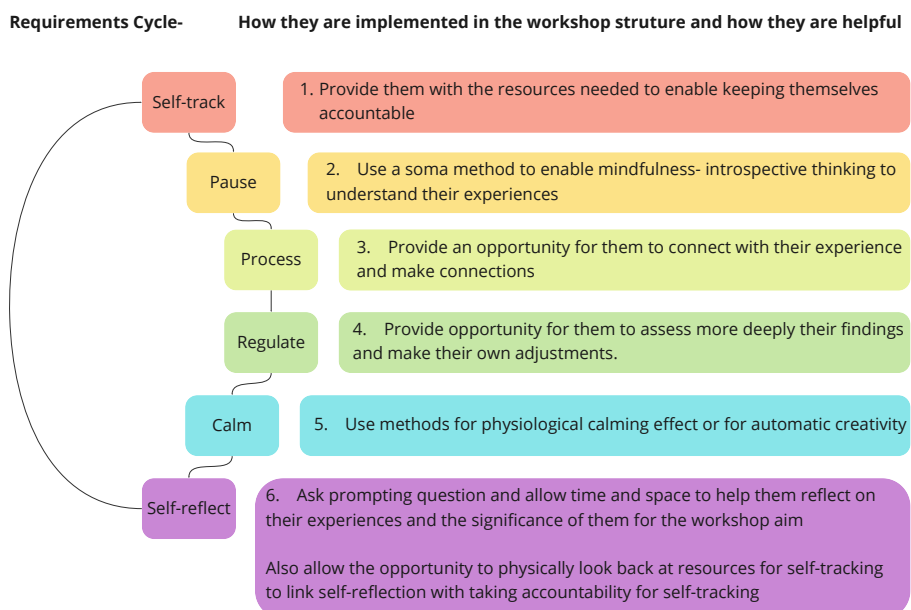


Figure 58: Diagram showing how self-regulation requirements cycle components are used in the workshops' structure. Diagram by Author.

Note: A brief explanation of how the self-regulation requirements cycle elements could be implemented in a workshop. (Researcher translation for future workshops).

Generated from: Analysis/reflection of Test #1 -all sessions.

Purpose: To help guide the planning of Test #2.



Figure 59: Sequence of self-regulation requirements cycle elements with corresponding workshop activities. Diagram by Author.

Note: Test #2 activities in order matched with the self-regulation requirements cycle elements.

Generated from: Analysis/reflection of Test #2.

Purpose: To evaluate against the results and initial analysis of Test #2. This helped me make sense of the possible reasons for the workshop outcomes.

SIMPLIFIED SEQUENCE OF THE ABOVE:



Figure 60: Simplified sequence of figure 59. Diagram by Author.



Final journey map of proposed co-design workshop:

Reflecting on the test workshops and analysing Test #2 alongside the self-regulation requirements cycle again led to adaptations, resulting in the 'Proposed Final Co-design Workshop' shown in this journey map below (Figure 61)

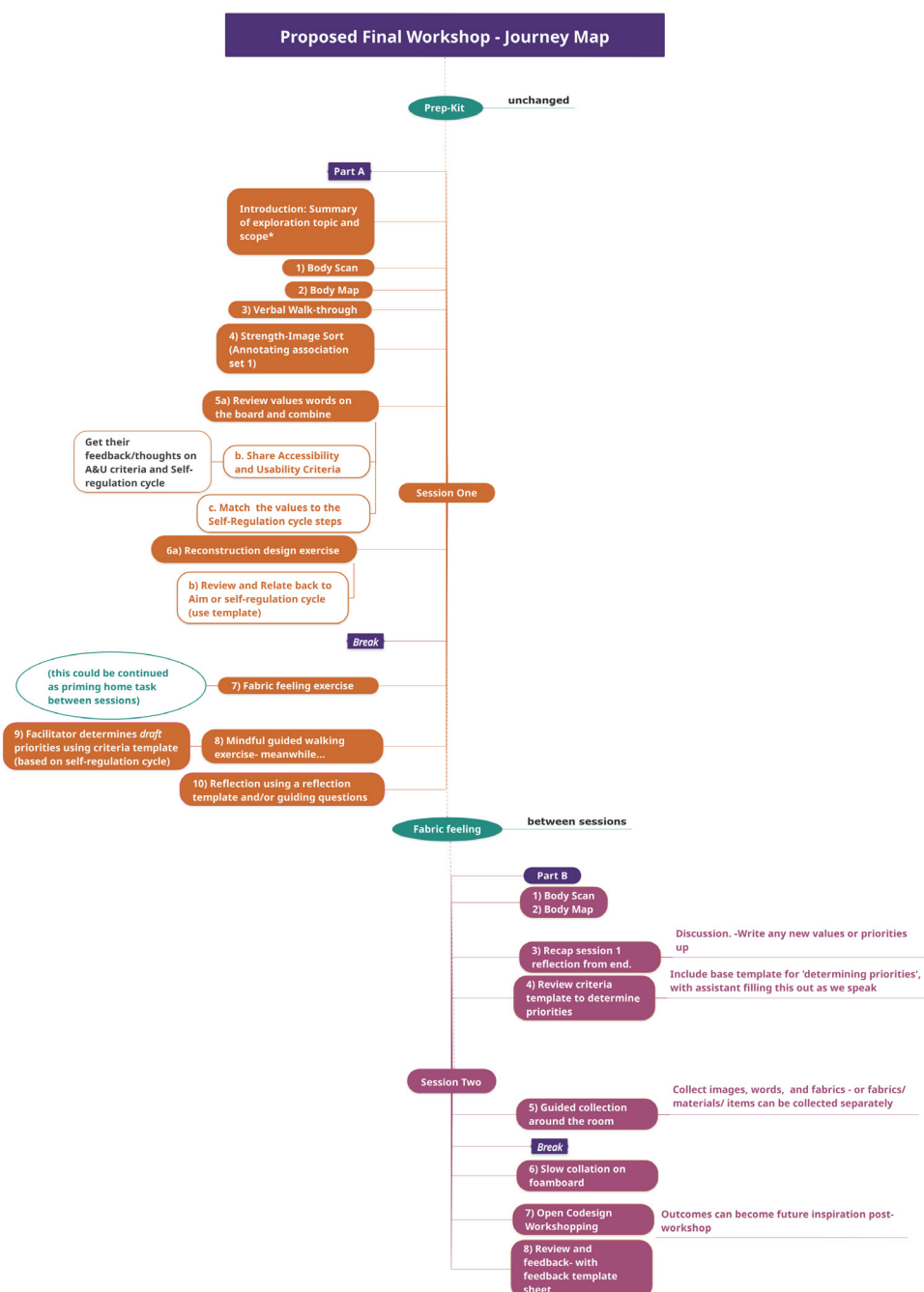


Figure 61: Proposed final co-design workshop journey map. Diagram by Author.

Summary of Symbiotic design process

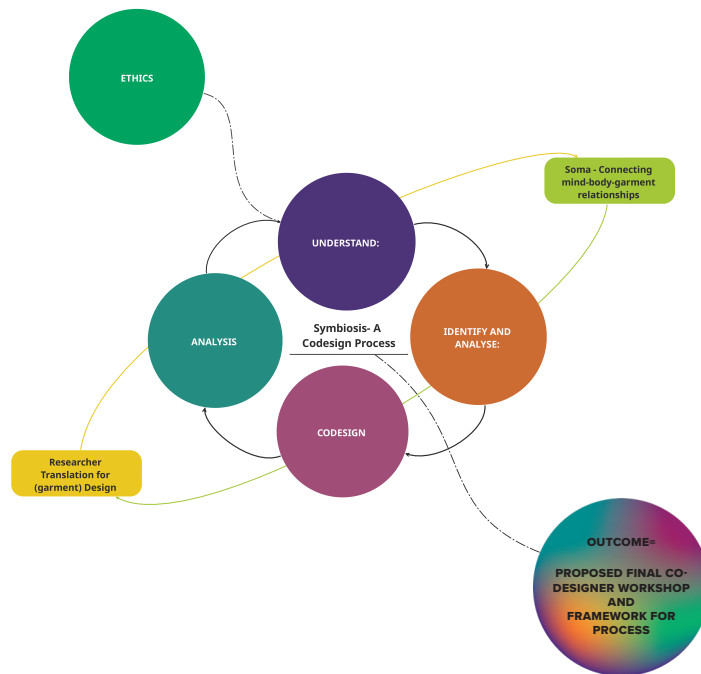


Figure 62: Symbiosis – A Co-design Process – Simplified visual. By Author.

The design process was titled Symbiosis to reflect the interdependence of all the components—the panel, survey, co-design workshops, design translation, and soma methods—and the collective enhancement that could come from all the components supporting each other. This took the form of mutual understanding and the researcher empathetically responding to the research/participant findings through iterative adaptations.

Each of the participatory components (survey, panel, and co-design workshops) yielded invaluable insights, helping to shape and inform the final design process and the exploration.

- The survey resulted in the Accessibility and Usability Criteria and an initial understanding of how respondents experience self-regulation.
- The follow-up questionnaires gave me a more individualised understanding and offered reassurance that assumptions would be mitigated from the outset.

- The panel enabled an in-depth exploration of lived experiences and enabled mutual trust and empathy to grow, resulting in a more targeted aim.
- The workshops enabled me to understand how a co-design participant may respond to the symbiotic design process and a soma co-design workshop and observe what this could generate for design translation.

The panel process was the most influential component in developing an understanding of participants' experiences to inform design needs and for participants' self-identification of deeper goals and emotions—this was vital to this project's *'roots-up approach'*⁷, refining the co-design exploration and, offering potential ethical considerations for future design processes for adults with ADHD.

The panel process ultimately resulted in an understanding of how panellists provide themselves with safety and support and how this can be enhanced.

⁷ A roots-up design approach is the term I am using to refer to the translational design process empowered by individuals' situated ADHD experiences. By 'roots-up approach', I am referring to understanding the underlying challenges and needs of experiences, which may involve understanding what is 'beneath the surface' before translating for design.

The panel's most successful features were its slower, stretched-out email question process and its commitment to participants for a longer, consistent period. These factors helped build trust and mutual understanding, allowed more processing time, enabled panellists to open-up naturally, and likely helped build a supportive, authentic environment for these qualities to grow.

Singular researchers should allow a lot of time for a slow soma process with panels and workshops. The panel responses were incredibly detailed and long. This was highly beneficial for design translation, but required considerable time to analyse adequately. I recommend spreading workshops across multiple sessions to enable developing and using toolkits that respond to participants' challenges and enable improving results.

I am incredibly honoured by all the panellists, participants and respondents who generously shared their experiences and the depth to which the panel

described the contexts of their challenges and incredible strengths. This was likely made possible by the empathy and curiosity both the researcher and the panellists extended. This curiosity and, thus, openness about one's experiences allowed for this project's roots-up approach to flourish!

In future I would select co-design participants from the panel so that trust, openness, and interdependence can naturally form. (For this Master's project, the co-designer participants did not participate in the panel because participating in both was likely too demanding in a low-risk process.) Having panellists as co-design/workshop participants would enable the researcher to understand what the aims mean to the participants and whether participants are comfortable disagreeing with the researcher/designer as part of the workshop selection process. This would enhance the symbiosis/interdependence between the panel insights and the workshop co-designing.

Reflection

The background of the page is a solid teal color. Overlaid on this is a large, abstract, organic shape in a darker blue and purple hue. This shape has a wavy, irregular border and a gradient that is darkest in the center and fades towards the edges. The overall effect is a layered, textured look.

For this Master's project, I designed a holistic user-centred design process entitled Symbiosis—A Co-design Process. This process respectfully responds to a glaring gap in current designs for ADHD—the genuine lived experiences of adults with ADHD.

Initially, I set out to understand what adult ADHDers considered their strengths and the challenges that they needed help with, and how fashion design could support these strengths and alleviate these challenges. I successfully learnt from primary and secondary research what ADHDers subjectively identified as their strengths and challenges and what they needed support with the most. However, in terms of designing, it became clear that developing a suitable (co)design process was first required. Thus, the aim evolved to focus on developing this process to address the gaps in existing documentation of designs for ADHD.

The development of a design process aimed to change perspectives to a holistic human-centred design approach to support individuals with ADHD and clothing designers by encouraging an improved understanding of ADHD's complexities and new relationships with clothing.

By addressing these needs, this project's outcome—'Symbiosis-A Co-design Process'—enables a reframing and redesigning of relationships with clothes to enhance how individuals can provide themselves with ADHD wellbeing support.

This design process is advantageous for:

1. Individuals with ADHD interested in developing a new perspective and relationship with clothes through insights that may enhance their abilities in proactively supporting their ADHD experiences; and
2. Fashion designers or any designer/researcher interested in engaging in a more ADHD-informed co-design process and inclusive human-centred design for adults with ADHD.

I have documented some complexities of ADHD and proposed ideal standards for a design process

informed by contextual and literature research on ADHD as a condition and a lived experience. This appreciation of ADHD as a holistic experience informed my use of a soma-co-design methodology to respect people's experiences of ADHD as situated within their personal context. This contextual research and holistic human-centred approach combined with soma design and codesign enabled my Symbiosis Co-design Process to embrace the core values of the methodology's theoretical framework: Empathy, ADHD-informedness, a holistic/non-dualist approach, and valuing the mind and body as one (see Figure 1).

Embracing the methodology's core values to inform my research and design process was demonstrated through the following:

- I centralised ADHD self-regulation needs for a whole-person approach that reframes wellbeing for ADHD;
- I critically reviewed and analysed various perspectives of ADHD and their entanglement with social perceptions, establishing the need to consider ADHD as a situated experience (inseparable from society and culture);
- Based on the above actions, I proposed a list of considerations when designing for and with ADHD individuals to ensure a more ethical design process;
- I developed an 'Accessibility and Usability Criteria' (which is by no means conclusive),
- along with other significant diagrams for understanding ADHD experiences; and, most significantly
- I developed a holistic human-centred clothing design process that offers more thoughtful alternative ways of designing for ADHD based on designing for the often-neglected concept of long-term ADHD wellbeing following Soma Design and co-design methods.

By continuously adjusting the design process in response to the participant insights, from the macro details, such as deciding to include a panel, down to micro details, like thoughtfully formulating each question, this design process is focused on achieving success through human-centredness and interdependence. Co-design and Soma Design methods enabled me to prioritise participants' strengths to create a supportive and inclusive environment. Soma methods and ADHD-informedness enabled empathetic engagement with ADHDers and their unique experiences and supported individuals to connect with and share their somas/experiences comfortably.

Overall, this study has found that a soma co-design methodology can offer designers a new mindset for designing for wellbeing and user-centredness. Furthermore, due to my methodological choices, my Symbiosis Co-design Process demonstrates that a deeper exploration of individual experiences can inform nuanced design requirements and concomitant design concepts.

Future Recommendations/ Important considerations:

'Symbiosis - A Co-design Process' is centralised around understanding and ethics.

My research appreciates that to benefit and improve the lives of the ADHD community, the researcher's goals must be underpinned by a desire to understand and empathise. In this way, understanding is a critical requirement to achieving inclusive aims, as the controversial perspectives discussed in the context review highlighted that explanations and declarations of meaning are not always the same as truly understanding, which is required to address the needs of ADHDers' experiences appropriately.

Symbiosis Co-design Process- Core Values:

My future recommendations for other designers to consider are:

- ensuring genuine understanding is always aimed for;
- interdependence between components and people;
- continuously developing and adapting the process in response to insights along the way;
- thoughtfully and reflexively formulating questions in response to analysis and understanding of participant findings;
- translational design empowered by understanding situated experiences / a 'roots-up design research approach' to design for situated experiences; and
- continuing to be adjust ADHD-informed ethical considerations according to ever-growing critical neurological and neurodiversity-affirming research on ADHD.

Participant selection could include a broader range of people.

The inclusion criteria for this study likely resulted in a more privileged group of respondents due to the scope and delimitations for keeping the process low-risk and achievable as a singular and novice researcher. The project was advertised around Wellington Universities (because they were accessible to me) and on social media including ADHD NZ's Facebook page which likely encouraged respondents with both education and technology privilege. The study, required a formal diagnosis, which is generally a financial and healthcare privilege to non-marginalised and singularly-marginalised groups.

An existing relationship with co-designers/panellists, whether through the panel process or a pre-existing connection, appears potentially beneficial for increasing openness to discussions and potentially reducing the risk of participants feeling self-protective when asked questions. While prior relationships are typically considered a risk for introducing bias, in the case of individuals with ADHD who often face criticism, rejection, stigma, and internalisation, having a pre-existing or gradually built trusting relationship can be beneficial for enabling open, honest feedback. This may help reduce social desirability bias and misperceived conflict, which might otherwise lead to unnecessary self-protective behaviours during the research process.

Insider research

Insider research proved advantageous for engaging with these core values. The main advantage of insider positioning is the ability to consider critically: who really benefits from the research?

Insider researchers' lived experiences can be beneficial for increased awareness of related systemic considerations compared to those not (as greatly/negatively) impacted by these systems. However, insider positioning is not necessarily a requirement. My recommendation for future related research is that it is most important for the researcher/designer to genuinely and critically prioritise the needs and goals mentioned above.

Further Developments and Personal Growth:

There is immense potential to continue translating insights from this project into designs and for this symbiotic design process to be adopted and adapted (according to individualised user requirements and research updates) by other designers hoping to gain deeper insights into the ADHD community's genuine experiences for an experience-informed design process. I hope that in the future, I can further develop and refine the insights and the beginnings of my design translations into designs for wearers,

so that individuals can perceive, customise, and adapt clothing to support their ADHD symptoms.

The designer translation and soma trialling were humbling, empathy-building processes that grounded me in my experiences, research findings, and the participants' experiences on a connected mind-body level. Soma Design methods instilled the importance of curiosity about experiences (my own and the participants') and reminded me of what it may feel like to be researched and to turn inwards and share one's personal experience with someone else. The non-dual nature of designing with the soma was beneficial for keeping me grounded as a researcher and designer, while considering the experiential value of ADHD, clothes and everything in between.

Through this Master's project, my ability to understand my own experiences self-compassionately and extend this compassion and understanding to others' experiences deepened throughout the iterative nature of the symbiotic process and will continue to grow. Overall, Soma Design enabled me to slow down and deeply reflect on the understandings I had formed before acting upon them as a designer, enabling a more human-centred, empathetic and self-compassionate approach.

Additionally, my contextual research into ADHD far exceeds what has been documented in this exegesis, and my understanding of ADHD has grown from a neurology-informed understanding to a vast understanding of the social, political and historical subjective and objective interpretations and theories of ADHD. This understanding was undoubtedly significant for the outcomes of this Master of Design and the prioritisation of ethics and understanding in the Symbiosis Co-design Process. I hope this exegesis's commitment to this research topic helps readers better understand ADHD's complexities and the in-depth understanding required to design for ADHD wellbeing. Looking forward, I hope my valuable collection of ADHD knowledge can be combined with my passion for design and learning to contribute to designs and processes that achieve inclusive outcomes for everyone, especially communities surviving multiple marginalisations. For now, I am grateful to continue contributing to

advancing perceptions of ADHD as a participant (as of 2024) on the Lived Experience Advisory Panel for ADHD New Zealand. I hope to continue supporting ADHD organisations in the ways I can.

The outcomes of this research project are advantageous for other designers and the ADHD community as I have rigorously outlined and exemplified the steps, considerations, requirements, and key principles and values of designing for/with

adults with ADHD based on understanding their lived experiences, which encourages a more inclusive and ethical design process and improved understanding of ADHD wellbeing needs. To my knowledge, this is currently a novel contribution to inclusive fashion design and designs for ADHD, making this research project a valuable contribution towards improving designs/design processes for the ADHD community.

“This has been an interesting experience, and I thank you for holding our thoughts, concepts, and experiences with respect, dignity and care. I wish you all the best as you continue this journey. I look forward to hearing about results.”

“This has been a tool for reflection. Think about me, how I see myself, my goals Think about misunderstandings and intentions Think about what tools I need in my life to support me to be me. That brings hope!”

“I found the experience great, you always provided an abundance of information and support around answering questions and I liked it when you provided some feedback on the questions I'd answered.”

-(closing comments from Panellists)

These are all mutual feelings. Thank you *all* so much for trusting me with your experiences and for this interdependent empathetic symbiosis. It has been my honour to learn from you and alongside you.

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Appendices

Appendix A

Clarification of how *mass marketing* for ADHD subjectively uses terms

Term	Generally, referring to:
Fidgeting	Instinctually performed stimulation: for those who have challenges with under-stimulation or as a focus tool
Sensory input	proprioceptive and vestibular feedback that assists with down-regulating* emotional states such as anxiety, overwhelm, and stress to achieve a sense of relaxation, relief, and calm.
Sensory stimulation	Upregulating* in the context of experiencing restlessness
Proprioceptive	muscle/skin sensory system related to movement, balance, force
Vestibular	Balance and spatial orientation sensory system
Down-regulating	decreasing arousal and activation in your nervous system (relates to PNS. Hypoarousal if overused)
Up-regulating	Increasing arousal and activation in your nervous system (relates to fight/flight SNS response. hyperarousal if overused)
PNS	Parasympathetic nervous system - responsible for rest and digestion functions.
SNS	Sympathetic nervous system- responsible for fight/flight functions for responding to stressful and life-threatening situations
ANS	Autonomic nervous system (PNS and SNS) Neurodivergence and trauma can make the ANS more rigid, meaning we get more easily dysregulated (hypo/hyperarousal)

Table A1: Clarification of terms commonly used in mass marketing for ADHD. Definitions of 'Down-regulating', 'Up-regulating', 'Parasympathetic Nervous System', 'Sympathetic Nervous System' and 'Autonomic Nervous System' from Neff (2024a, 2024b). Table by Author.

Appendix B

Table Group 1 – Products on the market for ADHD (adults)

Product	Corresponding Table
Weighted vest and hoodie	B2
Compression/pressure garment	B3
Calm Strips	B4
Timers	B5
Swinging chairs	B6
Future ADHD planner	B7
Busy blankets	B8
Dubbii and My Sensa health app	B9
Sensory/fidget items (non-toys)	B10
Loops	B11
Products on the market not specifically designed for adults with ADHD	B12

Table B1: Table index for products on the market for ADHD. Table by Author.

Table B2: Weighted vest & hoodie

Product Details:	<p><i>Category: Weighted clothing</i></p> <p><i>Weighted vest – reviewed from Fun & Function website (Fun & Function, n.d.-b)</i></p> <p><i>Weighted vest – reviewed from Sensory Sam website (Sensory Sam, n.d.)</i></p> <p><i>Weighted hoodie – reviewed from Sensory Direct website (Sensory Direct, n.d.)</i></p>
Function/Purpose:	<p>Provides proprioceptive input to help self-regulatory grounding. Based on Deep touch pressure (occupational therapist technique).</p> <p>Vests can provide weight and/or compression.</p>
<p>Expression: (level of person-centredness, user-involvement and context considered in design)</p>	<p>Vests:</p> <p>No evidence of user involvement in design development.</p> <p>The aesthetic is not person-centred; the images make the vest's aesthetic look awkward, like an obvious assistive garment.</p> <p>Hoodie:</p> <p>No evidence of user involvement in design development.</p> <p>Some aesthetic and expressive considerations were taken. Sensory Direct states that the hoodie design was selected to not look like a therapeutic aid.</p>
Aesthetic:	<p>Vest: Assistive or Outdoor aesthetic.</p> <p>Weighted vests tend to be neoprene with adjustable side closures -inevitably, can look like a wetsuit singlet.</p> <p>-Basic block with a closure system has no design features</p> <p>-doesn't look like something that could blend into a person's existing wardrobe</p> <p>Sensory Sam sells a weighted puffer vest with a hood, similar to a weighted blanket. It looks like it could blend in with casualwear.</p> <p>Hoodie: Comfortable aesthetic.</p> <p>A weighted hoodie that looks like a normal zip-up hoodie but has 7 weighted pockets inside</p>
Self-regulation type:	<p>Proactive for focus</p> <p>Pre-emptive/self-soothing for anxiety.</p> <p>Reactive when used in the moment.</p>

Strengths/ Design opportunities:	<ul style="list-style-type: none"> - internal pockets for removable weights -mesh sides for breathability, adjustable shoulder and trunk -neoprene could be a good base for adding design features and fabrics -Full side-seam closures for easier dressing with neoprene. -quilting filled with weighted beads
Limitations:	<p>Hook-and-loop closure down the entire side seam- difficult to dress and can be uncomfortable to wear for long periods</p> <p>Weighted pockets in the hoodie would create weight bearing on the shoulders when upright as the hoodie is not fitted. Sensory Direct does not explain their weight placement choice (shoulders, waist and hood)</p>
Marketing:	<p>Marketed for Autism and ADHD, predominantly for kids, but adult sizes are sometimes available and shown alongside the child (presumably marketing towards parents of neurodivergent children who may also be neurodivergent).</p> <p>Sometimes marketed for 'personal confidence', mostly advertised for focus, stress and anxiety</p>

Table B2: Weighted vest and hoodie – ADHD product analysis. Table by Author.

Table B3: Compression/pressure garment

Product Details:	<p>Category: Compression/pressure garment</p> <p><i>Jettproof</i>- seamless-feel compression wear</p> <p><i>Squease vest</i> - pressure-inflatable <i>squeasewear</i> - made to measure. (SensoryCorner, 2016).</p>
Function/Purpose:	<p>Provides proprioceptive feedback (information received from muscles and tendons concerning body movement and position).</p> <p><i>Jettproof</i>- seamless-feel for tactile sensitivity to help filter sensory information.</p>
Expression: (level of person-centredness, user-involvement and context considered in design)	<p>Jettproof:</p> <ul style="list-style-type: none"> -It appears to be person-centred but is a parent- and specialist-led brand. -no evidence of user involvement in design development. <p>Squease vest:</p> <ul style="list-style-type: none"> -The 'About Us' statement implies no user involvement or person-centeredness in design development: "With an extensive background in educational psychology, we understand how certain equipment can help with sensory regulation." (SensoryCorner, 2016) -context considered but not in terms of expressive and aesthetic needs
Aesthetic:	<p>Jettproof:</p> <p>Basics aesthetic</p> <p>Squease vest:</p> <p>Assistive aesthetic</p> <p>neoprene designs</p>

Self-regulation type:	<p>Jettproof: Pre-emptive self-soothing for sensory profiles requiring proprioceptive feedback.</p> <p>Squease Vest: Pre-emptive and reactive self-soothing since the wearer needs to pump the garment to create the pressure manually</p>
Strengths/ Design opportunities:	<p>Jettproof: Neutral design and comfortable fabric.</p> <p>Squease Vest: -A non-electronic interactive pressure garment. -The design has been upgraded so that the PVC air chambers are now concealed behind a plain fabric.</p>
Limitations:	<p>Jettproof: Not self-regulatory for sensory profiles that don't require proprioceptive feedback</p> <p>Squease vest: - The vest pump function could be physically taxing and potentially loud - Claims to deliver discreet hug-like pressure because it can be worn under a t-shirt or hoodie, but the pump feature is still not discreet or realistic for most situations. A self-hug may be more accessible and possibly have the same effect.</p>
Marketing:	<p>Jettproof: Marketed for Anxiety, ADHD, Sensory Processing Disorder, PTSD and Autism, predominantly for kids, but adult versions are available too.</p> <p>Squease Vest: Marketed for people of all ages with Autism and 'sensory difficulties', photographed on children.</p>

Table B3: Compression/pressure garment – ADHD product analysis. Table by Author.

Table B4: Calm Strips

Product Details:	<p>Tactile textures (tactile= perceived through touch).</p> <p>Calm Strips Textured Sensory Stickers (Calm Strips, n.d.).</p>
Function/Purpose:	<p>Provides 'anxiety relief'/ sensory stimulation</p> <p>Textured sensory stickers, offered in 4 unique textures.</p>
Expression: (level of person-centredness, user-involvement and context considered in design)	<p>First-person approach with no other user involvement. Based on the founders' personal experience, using painter's tape on fingers as a tactile sensory grounding tool for his anxiety.</p>

Aesthetic:	Graphic design aesthetic- wide range. and customisable
Self-regulation type:	Reactive, short-term relief/grounding during moments of anxiety
Strengths/ Design opportunities:	<p>-It can be stuck on commonly used hard surfaces like a phone or drink bottle. It could also be made wearable by sticking on a headband, glasses, a collar, a bag, etc.</p> <p>-Tactility: easily transferable clothing design element for grounding.</p> <p>Considers a range of textures and uses biophilic descriptors that are easy to imagine the tactility of:</p> <p>Smooth Satin - smooth matte finish</p> <p>Soft Sand - slight subtle grain</p> <p>Patterned Pebbles - uniformly bumpy.</p> <p>River Rocks - extra bumpy</p>
Limitations:	<p>-Textures are not always that interactive</p> <p>-The calming effect is only potentially effective for low levels of anxiety, not anger, panic, etc.</p>
Marketing:	Marketed for individuals with anxiety, BFRB (Body-Focused Repetitive Behaviours), ADHD, Autism, and other Neurodivergence

Table B3: Compression/pressure garment – ADHD product analysis. Table by Author.

Table B5: Timers

Product Details:	<p>Category: Timers</p> <p>Visual Timers: Time Timer, Sand timers</p> <p>Time blocking: Pomodoro</p>
Function/Purpose:	<p>Time Timer: This enables the passing of time to be visualised, with a patented red disk that gradually disappears as time elapses and assists temporal challenges.</p> <p>Pomodoro technique: encourages focus periods followed by breaks, usually 25:5- assists in regulating hyperfocus or hypofocus through time-blocking</p>
Expression: (level of person-centredness, user-involvement and context considered in design)	Time Timer: Person-centred. ‘Time timer’ was patented and created by Jan Rogers after witnessing how her child needed a visual timepiece to support her in understanding the passage of time. “Once Jan met this need, she found that transitions in daily routines became much more manageable for her daughter.” (Rogers, 2022)

Aesthetic:	Time Timer: Minimal dual colour block aesthetic Special Edition Tie Dye Pomodoro: Tomato kitchen timer, but can use any kitchen timer
Self-regulation type:	proactive self-care
Strengths/ Design opportunities:	<p>Time Timer:</p> <ul style="list-style-type: none"> -A neuroaffirming and person-centred approach, as Jan recognised her daughter’s genuine experience even though it was different to the standard perception of time and designed something to meet her daughter’s experiential need. Jan recognised that in her daughter’s experience with regular timers were “just a series of numbers that meant nothing” or “a bell in space”, resulting in the novel Time Timer. -Connecting time and space is a valuable concept that could be incorporated into clothing. <p>The concept of visualising time is not new. The sundial, one of the oldest time-tracking devices, was based on visualising Earth’s literal movement in space around the sun, so time reflects movement through space.</p> <p>Industrialisation is speculated to have resulted in the standardisation and acceleration of time (Geczy & Karaminas, 2018).</p> <p>The time-timer demonstrates that by letting go of standardised models and perspectives, we may be able to come up with ideas that universally (literally and methodologically) and experientially make sense. Additionally, creating tangible connections between movements in space and movements of time may be a design potential.</p>
Limitations:	<p>Visual Timers: The user needs to remember to look at the timer.</p> <p>Time Timer: Large, about 8cmx8cmx4cm</p> <p>Pomodoro: Requires the user to remember to keep resetting the timer and be self-disciplined.</p>
Marketing:	Marketed for Autism and ADHD across many sites.

Table B5: Timers – ADHD product analysis. Table by Author.

Table B6: Swinging chairs

Product Details:	<p>Category: Hanging/Swinging</p> <ul style="list-style-type: none"> -Compression swing - a double layer of Lycra creates a cocoon-like experience (Sensory Corner, n.d.). (compression swing is same as a body sock except you are in a Lycra hammock instead of in a long tubular piece of Lycra). --Swinging chair (Fun & Function, n.d.-a)
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Function/Purpose:	Provides proprioceptive and vestibular input for the over-stimulated nervous system and helps with developing body awareness and motor planning skills -sensory modulation relaxation/de-stress
Expression: (level of person-centredness, user-involvement and context considered in design)	Based on sensory-integration theory/therapy as opposed to user-guidance
Aesthetic:	Neutral or Bold singular colour- looks like suspended body-sock* Hammock/cocoon aesthetic -OT aesthetic
Self-regulation type:	Reactive self-soothing or pre-emptive self-soothing, depending on sensory needs
Strengths/ Design opportunities:	Pressure is described as gentle yet effective and calming. Motion is significant for the calming effect.
Limitations:	For home use, not easily transportable
Marketing:	Marketed for Autism, ADHD, and kids with low muscle tone, mostly targets kids. funandfunction.com

Table B6: Swinging chairs – ADHD product analysis. Table by Author.

Table B7: Future ADHD planner

Product Details:	Category: Journals/Planners <i>-Future ADHD planner (Future ADHD, n.d.).</i>
Function/Purpose:	Aids with organisation, planning, external memory, self-care, goal-direction, habit-tracking scaffold, support and guidance through mental clarity and self-care
Expression: (level of person-centredness, user-involvement and context considered in design)	Designed by an ADHDer for ADHDers, based on a planner that ‘evolves’ with the user, i.e. journal/planner is modular ‘build-as-you-go format.’ Person-centred. Includes explanations behind the design of each section and why it is helpful for ADHD based on lived experience and research related to ADHD brains.

Aesthetic:	Various minimalist options
Self-regulation type:	Proactive self-care also includes self-soothing colouring/drawing exercises for pre-emptive and reactive self-care
Strengths/ Design opportunities:	<ul style="list-style-type: none"> -FutureADHD Planner is a highly reviewed planner for ADHDers. -Understanding the existing environmental barriers preventing ADHDers from using a good planner may offer insights into clothing potential. -Modularity is an ADHD-friendly opportunity -Focuses on self-tracking with self-love and reducing shame-neuroaffirming
Limitations:	Must print it yourself or use it digitally
Marketing:	<p>Marketed for Adults with ADHD</p> <p>“No matter what your story is, Future ADHD offers you a safe place where your brain makes sense - a way to re-frame your struggles, unshame your past, and learn to work with your ADHD brain.” (Koelma, 2024)</p>

Table B7: Future ADHD planner – ADHD product analysis. Table by Author.

Table B8: Busy blankets

Product Details:	<p><i>Busy Blankets/Fidget Blankets</i></p> <p>Various adaptations include:</p> <ul style="list-style-type: none"> <i>Weighted Lap Pad</i> <i>Fidget Pillows</i> <i>Fidget Aprons</i> <i>Fidget Muffs</i> <i>Sensory Cuff</i> <i>Fidget Books and Busy Boards</i>
Function/Purpose:	<p>Self-soothe with familiar items and visual, tactile, and sensory stimulation.</p> <p>“helps reduce behavioural and psychological symptoms of dementia, such as anxiety, irritability, insomnia, and agitation. They can have similar benefits for anyone who struggles with these symptoms...” (Jayne, n.d.)</p>
Expression: (level of person-centredness, user-involvement and context considered in design)	Differs depending on if it is customised or not.

Table B8: Busy blankets – ADHD product analysis. Table by Author.

Aesthetic:	<p>Quilted and hand-made crafty aesthetic</p> <p>Fidget quilts often include buttons, ribbons, sequins, beads, pockets, and different fabric textures to provide various sensations. Some also add scented items for relaxation using aromatherapy.</p>
Self-regulation type:	For ADHD, these provide sensory stimulation, which is reactive/proactive depending on sensory profile (see appendix 3)
Strengths/ Design opportunities:	<ul style="list-style-type: none"> - silent -personalised -can be made wearable -comforting -can be sustainable and meaningful by using customising with one's own objects
Limitations:	<ul style="list-style-type: none"> -not subtle. -only helpful for ADHD if and when you need sensory stimulation -need to be seated -context not considered for ADHD
Marketing:	<p>Marketed for autism, ADHD, Alzheimer's, and anyone else who benefits from stimming —sensory stimulation.</p> <p>Often sold by independent crafters</p> <p>The familiar objects on sensory quilts help users self-soothe and serve as a source of visual, tactile, and sensory stimulation.</p> <p>They often come in soothing pastels or cheerful bright colours and patterns and may be themed around a particular interest, hobby, animal, etc.</p>

Table B8: Busy blankets – ADHD product analysis. Table by Author.

Table B9: Dubbii and SensaHealth app

Product Details:	<p>Category: Apps</p> <p>SensaHealth app - daily schedule maker, weekly assessments, mood journal, daily mindfulness tasks and self-paced lessons on cognitive behavioural therapy exercises (SensaHealth, n.d.)</p> <p>Dubbii - videos for completing house chores and study (Dubbii, n.d.).</p> <p>Various interval timers for ADHD.</p>
Function/Purpose:	<p><i>My Sensa</i> : Organisation/planning, mood tracking</p> <p><i>Dubbii</i> -body-doubling (a productivity strategy commonly used by ADHDers, that involves working in the presence of another person)</p> <p>Interval timers: Temporal regulation</p>

<p>Expression: (level of person-centredness, user-involvement and context considered in design)</p>	<p>My Sensa- no evidence of user involvement in design development. 'Personalised' action plan based on 10 categories of 'struggles'; ADHD is one of those categories</p> <p>Dubbii: Designed by social media influencers 'ADHD love', who take a Person-centred approach to ADHD (prioritising lived experience over pathology).</p>
<p>Expression: (cont.)</p>	<p>They are a couple, one with ADHD and the other autistic (a recent development, previously identified as neurotypical), who document their lived experience on social media. They have published 2 books on how neurotypical and ADHD persons in a relationship can support each other and practice self-love in neuroaffirming ways.</p> <p>The app is described as the result of asking 30,000 people what they struggled with the most (presumably their social media followers who identify with ADHD), with the answer being housework. Have now expanded to study sessions and preparing your workspace. Focusses on tracking progress without shame.</p>
<p>Aesthetic:</p>	<p>My Sensa: Minimalist with friendly character animations</p> <p>Dubbii: Minimalist, colour-coded, main focus is on videos</p>
<p>Self-regulation type:</p>	<p>My Sensa: Mood journal= proactive self-care Mindfulness exercises= proactive self-care and self-soothing CBT approach is controversial for neurodivergent and marginalised communities when not adapted for neurodivergent lived experiences as it can lead to self-gaslighting if differences aren't understood; how CBT is implemented in the app is not explained without purchase</p> <p>Dubbii: Proactive self-care</p>
<p>Strengths/ Design opportunities:</p>	<p>My Sensa: There is good sentiment about self-tracking and mindfulness</p> <p>Dubbii: Body-doubling is an effective strategy based on lived experiences Videos for this by an ADHDer and ally normalise real challenges that can be stigmatised. Reducing shame is shown to be the most effective way to tackle procrastination, according to a leading expert on procrastination (Pychyl, 2023)</p>
<p>Limitations:</p>	<p>My Sensa: There is no explanation for why they believe CBT is helpful or how it is applied. Promotes self-improvement without mentioning subjective goals, not neuroaffirming</p> <p>Dubbii: House chores are quite general; would be better if the tasks could be individualised</p>

Marketing:	<p>Marketed for ADHD</p> <p>My Sensa: uses targeted Instagram advertising with headlines such as: “How to manage ADHD without medication” “...by behaviour psychologists, science-based techniques according to your chronotype” . This can be considered what Caulfield (2011) calls scienceploitation</p> <p>Dubbii: Engages with community</p>
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Table B9: Dubbii and My Sensa Health App – ADHD product analysis. Table by Author.

Table B10: Sensory/fidget items (non-toys)

Product Details:	<p>Sensory/fidget items (non-toys from <i>Fun And Function</i> website)</p> <p><i>1-weighted sensory knot</i> <i>-sensory vibrating neck pillow</i></p> <p><i>2-foot fidget footrest</i> <i>-denim marble maze</i></p> <p><i>3-chewellery</i> (chewable jewellery)</p>
Function/Purpose:	<p>1-provides calming sensory input</p> <p>2-provides stimulation for under-stimulation -assists fine motor skills and provides stimulation</p> <p>3-oral sensory input and sensory regulation</p>
Expression: (level of person-centredness, user-involvement and context considered in design)	Unclear
Aesthetic:	<p>Weighted sensory knot- Modern cosy aesthetic</p> <p>Neck pillows: plushie animals or cosy aesthetic</p> <p>Foot fidget footrest- OT aesthetic</p> <p>Denim marble maze- Discreet</p> <p>Chewellery- looks like a big piece of silicon- a range of colours</p>
Self-regulation type:	For ADHD, these provide sensory stimulation, which is reactive/proactive*

Strengths/ Design opportunities:	<ul style="list-style-type: none"> - Weighted sensory knot- You can weave your hands in and out of the knot so it is like a larger body fidget, not just your fingers. <p>Animal neck pillows</p> <ul style="list-style-type: none"> - like a companion during independent work. -highlights the opportunity for individualised options through animals/ characters/motifs that are meaningful to the individual. <p>Vibrations on the neck while working may potentially help interoception by increasing awareness of discomfort and the need for breaks...</p> <ul style="list-style-type: none"> -The use of feet for fidgeting instead of hands is an interesting concept that is more discreet -Chewing is a unique sensory need that could be incorporated more subtly into clothing as per individual needs
Limitations:	Products on the <i>Fun And Function</i> website lump together products for autism and ADHD, as well as adults and children.
Marketing:	See above. Chewellery mostly targets autism but occasionally mentions ADHD, too

Table B10: Sensory/fidget items (non-toys) – ADHD product analysis. Table by Author.

Table B11: Loop earplugs

Product Details:	<i>Loop</i> earplugs
Function/Purpose:	Provides up to 24 decibels (SNR) and 14 dB (NRR) of noise reduction and noise-filtering for focus, noise-sensitivity, ear health, noise relief, happier socialising
Expression: (level of person-centredness, user-involvement and context considered in design)	Person-centred. The design process values user feedback and user experience. User involvement beyond this is unclear, but a large variety of contexts and contextual needs are considered.
Aesthetic:	Minimalist and stylish aesthetic
Self-regulation type:	Reactive self-soothing and pre-emptive self-care
Strengths/ Design opportunities:	<ul style="list-style-type: none"> - Updated designs respond accordingly to user feedback -Good performance in line with marketing, according to reviews -Aesthetically appealing. Considers multiple contexts and variation of users and their varying backgrounds
Limitations:	<ul style="list-style-type: none"> -Can be easy to lose -The connector chord piece is an additional cost that may not feel worth the plain design. -stylish accessory pieces to hold the loops are a gap
Marketing:	<ul style="list-style-type: none"> -The 'experience' and 'engage' Loops are marketed for ADHD -Engages with Community -Marketed for everyone but embraces Autism and ADHD needs in response to their customer base; many neurodivergent persons have praised and embraced loops online.

Table B11: Loop ear plugs – ADHD product analysis. Table by Author.

Related wellbeing products (not specifically designed for adults with ADHD)

Product category	Product	Function/purpose	Strengths/ Opportunities	Limitations	Self-care/ Wellbeing aspect targeted?
jewellery for anxiety	-fidget rings -sensory rings -breathing tube -pressure point jewellery	based on various techniques -fidget motions -tactility -controlled inhaling and smoking cessation -acupuncture	User-friendly designs due to the incorporation of techniques into things people already wear and making them look elegant instead of functional	rings are a very small, concentrated location to channel energy/emotions into. A larger but still discreet version could be more effective, i.e. clothes	self-soothing
e-textiles for emotion regulation	-vibrotactile stimulation -huggable cushion or toy with a breathing actuator -haptic metaphors in clothing -communicating emotions on e-clothes	-sensory input that guides mindfulness -altering body perceptions/novel sensory substitution strategy coregulating breath -posture correction/self-awareness -signals emotions to others-may have a responsive output	Mindfulness (including awareness of breath) made tactile or sensory is valuable as mindfulness is often argued to be effective but also challenging for ADHDers haptic metaphors can be a discreet way of communicating meaningful motifs/emotions/memories to the wearer for subjective goals	washability, cost, technological ethical considerations around breathing actuation and making emotional data visible to others	Emotional connections, playfulness
Montessori Touch Fabrics	Sensorial activity has multiple squares with different textures that can be laid out (Global Montessori Network, n.d.)	'helps children with tactile and visual discrimination, social-emotional development, visual, and academic progression.'	the idea of multiple tactile options laid out could be useful in user-preference stages and for considering the need for novelty	for teaching context	sensory integration (tactile discrimination is vital for learning spatial awareness/proprioception)
soft toy for anxiety and grief	weighted, scented, soft, warming and cooling	for anxiety, grief, sensory comfort, hugging	multi-use, popular, reportedly used widely during pandemic lockdowns for anxiety	home use	self-soothing emotional connection

Table B12: Non-ADHD product analysis. Table by Author,designed for ADHD specifically. Table by Author.

Appendix C

Appendix C: Design precedents related to ADHD experiences but not designed specifically for ADHD

Design outcome	Related ADHD domain that assistance is provided for	Function/purpose	Aesthetic/ form	Expression, personalisation	Is context considered?	Limitations	Strengths
breathing scarf – (Cochrane et al., 2022)	supporting personalised self-regulation strategies for emotional lived experience	support the individual's emotional life through ATB (attention to breath) and IA (interoceptive awareness) LEDs turn different colours in response to emotional arousal levels. Light fades in and out to match the user's breath as a 30-second guided ATB exercise.	considered through the HCI lens of wearability... fibre optics, etc. Colours of lights are considered as per personal preference. Visual data: sketches, textures, and models classified according to emotions and recreated as collages to represent emotions visually. Collages related to four categories: shape, texture, colour, and material, led to a visual database that informed the final prototype.	considers the social consequence of publicly displaying personal bio-data (even by way of lights)	yes. 'learned early on not suitable for outside use' - only for ER inside the home due to feeling nervous testing prototype in social situations	not specifically for ADHD so self-regulation strategies, evaluations and Design considerations may need to be reconsidered for ADHD. HCI context means design considerations focus on emotional self-regulation in technologies. However, this was also in combination with jewellery design, so some cross over with fashion, particularly regarding individualised design consultation.	exemplifies how design considerations for self-regulation can be embodied in the design. A relatively holistic approach to emotion-regulation by using a first-person reflective and mindful design process the focus was on design considerations for individualised emotional self-regulation to guide a design process, as opposed to focusing on a design outcome for a broad understanding of self/emotion-regulation. Uses existing related research and first-person research at appropriate points. -individualised for autonomy over individual health and wellbeing

Design outcome	Related ADHD domain that assistance is provided for	Function/purpose	Aesthetic/ form	Expression, personalisation	Is context considered?	Limitations	Strengths
Soma mat and breathing light (Stáhl, Balaam, et al., 2022)	relaxation and increased body awareness- space for soma to become in	turning attention inwards ...the light dims in and out, mirroring the user's chest's breathing movements using a sensor. The mat's integrated heat pads heat up underneath different body parts to heighten awareness with synchronised audio instructions (body scan guidance)	yes. Design is guided by Someaesthetic appreciation design which considers how aesthetic features impact somatic experiences. The light is made with fabric and string curtains to intentionally create an enclosure as a space to 'turn inwards and wind down' and 'become in'.	not a wearable and guided by subtlety so expression relates to inner experience as opposed to outer experience in society... considers expression in terms of 'becoming' which takes place as self-knowledge	yes focus is on designing an open space for users to 'become in'. Considers designing 'the act' the user will undergo when using design as well as the design's function.	not related to fashion or a wearable product but has transferable design elements	Design thinking shifts from problem-solving to providing open spaces to become in (/evolve somatic awareness repeatedly). considers bounded openness and ethics of 'becoming' ... designers should shift their perspective to be 'sensitive to the in-between the part of the space by which becoming lies'
jigsaw puzzle- (Jeon, 2015)	creating an ideal form of comfort through unconsciously drawing on experiences, feeling and thinking, and intuitive body movement.	movement-based interaction that responds to emotions. Adaptable and transformable to accommodate the wearer's needs in a moment-to-moment environment designed to open experiences	"less matter but more experience" designed to be very abstract so the wearer can involve their basic perceptual capabilities to manipulate the piece.	the form is ongoing and changeable"...requiring the wearer's bodily interaction to complete it' but expressive needs of wearer are not considered	no- doesn't seem appropriate for public use	context not considered nor wearability	embodied approach aligns with soma becoming- the wearer's soma completes the design not centred on the functional use of comfort but on the narrative use of the garment for comfort-how one interacts with the garment pieces to embody comfort

**Related ADHD domain
that assistance is
provided for**

Design outcome	Function/purpose	Aesthetic/ form	Expression, personalisation	Is context considered?	Limitations	Strengths
Diguse-Garment- (Jeon, 2015) engineered felted wool embedded with LED lights. Protect the wearer as a therapeutic aid that can change wearer's mood	movement-based interaction that responds to emotions. 'The illuminated garment is designed to morph and change colour to help wearer feel simultaneously protected, playful and confident.'	made to be highly experiential and interactive to increase sensorial, emotional and functional experience.	protective qualities and feelings of playfulness' not considered in context or justified based on feedback/ experiences.	based on a fictional scenario of 'using a garment to disguise the body like a ghost'	Not guided by user preferences. Guided by user experiences, however, experiences are interpreted by the designer, and the user- experience of design is not shown to be considered in context. Transforming emotions is assumed to be provide a sense of psychological, physical and emotional wellbeing without any explanation or provided evidence.	responds to wearers' experiences of feeling insecure and fearful and the need for protection is identified and designed for. considers the process of transforming fear into positive emotions but doesn't look into this further.
touch me, play with me, feel me garment- (Jeon, 2015) 3D felted wool structure with different inside and outside textures to elicit various sensorial experiences	protective functions via enclosed personal space and habitable shelter in secure or insecure spaces	crafting techniques such as sewing, folding and engineered felted to project a sophisticated aesthetic while maintaining a soft texture to enhance personal facility by encouraging the wearer to move over and interact with the textile surface p139	designed to be open to diverse experiences so textile can be configured in many ways through bodily interactions- allowing wearer to express individuality wearer becomes involved in the creative process through craft techniques. This stimulates an interpersonal dialogue between the wearer and the garment that can lead to attachment to the garment.p140	context of different emotions such as insecurity in relation to bodily responses and what they evoke (relief and security) considered	social/cultural context not exactly considered or tested body-focussed- addresses emotions through movement (focuses on user's act of doing rather than thinking') but both are valuable to understand user's holistic needs self-therapy is referring to self-soothing	considers dynamic expressiveness of bodily behaviour and satisfaction and comfort experienced by wearer. In the emotional context of comfort wearer's used an interactive wrapping process for the purpose if protecting, hiding and disguising themselves in insecure situations

Design outcome	Related ADHD domain that assistance is provided for	Function/purpose	Aesthetic/ form	Expression, personalisation	Is context considered?	Limitations	Strengths
<p>Soma Corset- (Karpashevich, et al., 2022) becoming aware and altering somatic experiences- ongoing design project</p>	<p>increasing breathing awareness</p>	<p>learning breathing exercises, and deliver deep touch pressure DTP</p>	<p>not considered</p>	<p>not considered</p>	<p>no- only considers context conceptually through theory of touch as a way of being in the world. Focuses on the designer's first-person felt experience of the prototype and meaning-making of experience.</p>	<p>focussed on HCI wearable technology, digital touch interactions. ongoing design project...Aesthetic and expression not yet considered, wearability/ functionality of back closure also not considered</p>	<p>designer's meaning-making context raises valuable ethical considerations regarding embodiment and entanglement with garments that are interactive or responsive to our bodies. (E.g. considers body-perceptions under the skin...) Configurable DTP, strategic placement over torso muscles, guidance through pressure actuation. breathing exploration helped develop somatic awareness</p>

Design outcome	Related ADHD domain that assistance is provided for	Function/purpose	Aesthetic/ form	Expression, personalisation	Is context considered?	Limitations	Strengths
The AR fidget system: AR glasses and fidgeting actions AR-Fidget Experiences that support ER – (Ji & Isbister, 2022)	“scaffolding emotion regulation” 3 visual auditory metaphors: lotus for regulating anxiety, bubble for regulating boredom, and fire for regulating anger, with suggested target fidget actions: swiping, tapping and clicking this is based on relationships between fidget behaviours and mood states Not specifically for ADHD	transitioning from undesired to desired emotional states, specifically anxiety, boredom and anger AR glasses for unobtrusive and in moment feedback “The AR interface serves two main purposes: 1) providing the user with guidance about which fidget gestures (swipe and tap) to use in order to help in moving to the desired affective state. 2) providing visualisation guidance and accompanying sound that augments the transition from the undesired to the desired state.” p. 2	final product not made. Considers some aesthetic elements regarding the interface but not the wearability. E.g. ‘design visualisations in a minimalised way so users can sense and respond to social and environmental cues’ and ‘poorly designed AR interface would potentially cause distraction’ p2	predetermined metaphors	/ only in relation to function states head-mounted displays (glasses) can incorporate discreet sensory feedback’ - considers the visibility of HCI feedback but not of the glasses or fidget actions required to interact with the glasses. (in comparison to VR headsets)	uses subjective language when discussing ‘appropriate’ self-regulation behaviour and affective goals which are not user-led. their research suggests that certain affective states relate to fidgeting actions, but they have jumped to assuming these actions result in a desired state without providing research or evidence for this. they also don’t define what a desired state is and why this is helpful.	“another design goal is to create visual metaphors of affective state trajectories” -use of visual metaphors and visual narrative association to support regulation (although they did not identify this) concepts inspired by mindfulness and natural ‘fidgeting behaviour’ there is potential to customise from a range of metaphors or help wearers identify their own affective metaphors

Table C1: Analysis of design precedents related to ADHD, but not designed for ADHD specifically. Table by Author.

Appendix D

Table D1: Analysis of design systems

Process and description: SYSTEMS (seeing wholes- defined by the interaction of its parts)	Main finding:	Enabled/supported my understanding of:	Transferable elements and Limitations	Influential Principles for this thesis:
<p>Soma Design – Designing with the Body (Höök et al., 2018)</p> <p>broad description of key elements and values of a soma design process: Develops the concept of aesthetic to somaesthetic, which involves valuing lived experiences and aesthetic desires. Recommends probing somaesthetic appreciation skills in user studies</p> <p>Relevant characteristic elements of Soma Design:</p> <ol style="list-style-type: none"> lived experiences- the designer's and end user's lived body is a resource in the design process slowing down of design -for understanding Bodily attention- to internal experiences that aren't always readily available to us through slowing down testing and retesting against desired aesthetic- to feel the interaction[/design] as it is created[/developed] 	<p>Rethinking user-centredness and design thinking... takes a more human-centred embodied approach to design thinking, importance of first-person designer and end-user bodily experiences</p> <p>soma design generally, - a basis for comparing other soma studies.</p>	<ol style="list-style-type: none"> lived experiences- the designer's and end user's lived body is a resource in the design process slowing down of design -for understanding Bodily attention- to internal experiences that aren't always readily available to us through slowing down repeat evaluative soma exercises to track experience <p>1)Slowstorming: process grounded in a qualitatively different somatic reality than regular brainstorming; it is more critical, reflective and honest</p> <p>Soma probing methods</p>	<p>a slow qualitative process is valuable and required</p>	
<p>Soma-wearable design- (Integrating somaesthetics and fashion design for somatic wellbeing) (Ståhl & Jung, 2018)</p> <p>Fashion design perspective of Soma: self-perceptions and clothing performance are considered a related concept to body consciousness and somaesthetic wellbeing as key link.</p> <p>A culturally informed soma-design process emphasises the sociocultural importance of fashion and somatic wellbeing and considers one's own environment.</p> <p>Body and mind sensemaking is a critical skill for self-care and reflection</p>	<p>It enabled me to understand soma design adapted to a fashion design process instead of an HCI process.</p> <p>And somatic wellbeing as a situated body-based experience of wellbeing... validates embodied wellbeing</p>	<p>See style-fashion-dress below</p> <p>Limitations: focuses mostly on the body-awareness</p> <p>Limitations: based on the assumption that enclothed cognition influences self-perceptions, which becomes self-presentation in public contexts, which in turn influences performance</p>	<p>from somatic being to somatic wellbeing</p> <p>style-fashion-dress= a complex system that influences lifestyle and shapes wellbeing</p>	

Process and description: SYSTEMS (seeing wholes- defined by the interaction of its parts)	Main finding:	Enabled/supported my understanding of:	Transferable elements and Limitations	Influential Principles for this thesis:
Style-fashion-dress (Stahl & Jung, 2018)	style-fashion-dress= a complex system that influences lifestyle and shapes wellbeing... recommended neutral and ordinary wearable forms - recognises that public presentation of the body could prevent one from deeper self-reflection and self-expression (subject formation)	This supports my analysis of some approaches as not inherently addressing expressive needs when approached from an HCI lens; however, fashion enables this	Expressive needs, as well as self-reflective needs for wellbeing based on neutral public presentation of the body	situated system impacting wellbeing
Designing for one -(Cochrane et al., 2022) (breathing scarf)	The prototype results from a unique design process that focuses on the lived experience of emotion regulation. Rather than designing a prototype for an experience, they designed a design process for understanding the experience, and the prototype followed. -it promotes and argues for a human-centred design approach and explores methods for understanding ER. However, it is not holistic.	Enabled my understanding of evaluating inclusive user-centred designs for emotions because it provided a thorough process for designing for emotional self-regulation that wasn't conceptual or body-based, though still some-based	Designs for emotions raise valuable design considerations, such as how emotion regulation is impacted by personality and cultural differences; interoceptive awareness, and self-awareness. These are key considerations for possible predictors of user-centeredness's efficacy. Limitation: it is a first-person design process (based on the researcher's experience), which means transferability as a user-centred design process is questionable and still needs to be developed.	Supporting personalised self-regulation strategies feeling a sense of ownership over the prototype through customisability and involvement in the design process can enhance the feeling of connectivity to the design, thus improving product use. Collecting first-person data can provide a nuanced understanding of the lived experience of emotional life to inform designs for self-regulation better.
Humanising ergonomics and evaluation tools (Francés-Morcillo et al., 2020)	Wearable Design Requirements wheel with three ergonomic categories (physical, emotional and cognitive), 10 main design requirements, and 22 design sub-design requirements... Helps cluster design requirements in the design process based on human technical factors	This enabled me to expand FEA needs to specific human factors and the need to humanise/re-centre humans in design. Enabled me to review compiled methods and evaluation stages- influential for method selection	R1)comfort R2)safety R3)durability R4)usability R5)reliability R6)aesthetic R7)engagement R8)privacy R9)functionality R10)satisfaction Limitation: May need to be adapted for neuroaffirming designing.	human-centredness, universal design, personal meaning-making with embodied wearables, human factors for interactive designs, etc.

Process and description:
SYSTEMS
 (seeing wholes- defined by the interaction of its parts)

Main finding:	Enabled/supported my understanding of:	Transferable elements and Limitations	Influential Principles for this thesis:
<p>Embodied Experience of Space (Jeon, 2015) <i>(Form empowered by touch and movement)</i></p>	<p>The relationship between body, emotions and space influences how we use our bodies in space, particularly for protective purposes, resulting in emotionally expressive <i>body styles</i>. This impacts body-garment needs.</p> <p>Garments as a protective environment Movement within garments as a kinaesthetic element of bodily interaction, supported my understanding of how individuals could form new relationships with garments through new and safe experiences with the body. Emotions understood through movement and space provide an accessible and systematic approach to designing for emotional experiences.</p>	<p>Limitation: Considers emotions in relation to the body but not in relation to the <i>body in culture</i>. Protective/inside zones of clothing Involving the wearer in the creative process/ craft-based interaction stimulates interpersonal dialogue and can enhance wearers' attachment to garments.</p>	<p>Conscious and unconscious experiential bodily knowing process Kinetic variation principles: Emotional cues like openness and closedness Analyse the personal space/ inside clothing zone alongside social and public space use. Emotions as dynamic in accordance with one's protective/self-expression needs (an interactive process)</p>

**Process and description:
SYSTEMS**
(seeing wholes- defined by
the interaction of its parts)

Main finding:	Enabled/supported my understanding of:	Transferable elements and Limitations	Influential Principles for this thesis:
<p>3 case studies:</p> <p>Personalised Participatory design (PD) adapted for Neurodivergent (ND) persons</p>	<p>Supported my understanding of validity when working with ND individuals. Validity comes from a genuine understanding of participants' needs as opposed to preselected methods.</p>	<p>Flexibility and reinterpretation of PD/CD (codesign) methods for ADHD needs</p>	<p>repertoire of methods from codesign and various perspectives.</p>
<p>1 - OTB blending methods (Frauenberger et al., 2017)</p> <p>2 - PD of AAC (Kudryashov, 2021)</p> <p>3 - D4D framework (Benton et al., 2014)</p>	<p>Their broad scope of inclusive and social acceptance contexts for autistic adults exemplifies the complexity of environmental factors when stigma is involved, impacting user needs.</p>	<p>Issue: A system for inclusively redesigning products...difficult to apply to designing for ADHD wellbeing.</p> <p>Reinterpreted user-centredness for neuroaffirming approach</p>	<p>Greater agency to allow situation-specific adaptations.</p> <p>There is a need to navigate dynamic issues of visibility, stigma, and perceptions.</p> <p>PD is not inherently liberatory but has the potential to place disabled perspectives and priorities at the centre of design processes</p>
<p>3 - adaptable methods and providing support are key components of ND-adapted design processes. Designers must adapt processes to their specific contexts and constraints.</p> <p>Universal benefits to design processes that are appropriate for neurodivergent communities</p> <p>ND perspective in 2014 was not well developed; outdated and pathologising language lived experiences aren't highly valued as guidance (is for children, though)</p>	<p>Supported my understanding of how to adapt a framework for ADHD (though for children) and the framework components for assisting in addressing unique and complex situations</p>	<p>Framework components:</p> <ul style="list-style-type: none"> -Individualisation -consideration of environmental implications and -providing appropriate support assist in addressing unique and complex situations 	<p>-ND perspective</p> <p>Codesign/ Cocreation</p>
<p>Demonstrates the development of PD for neurodivergent communities:</p>			

These 3 case studies demonstrate the development of PD for neurodivergent communities:

Observing strengths alongside challenges (not user-defined) ?

Drawing on lived experiences to determine design priorities and barriers (focussed on structured lived-experience-informed problem-solving) ?

Consider the diversity of needs and enable safe and inspiring participant engagement based on their needs and abilities. (individualised co-creation)

Table D1: Analysis of design systems. Table by Author.

**Process and description:
TECHNIQUES/METHODS**
(the practical skill or approach to execute the process)

Main finding:

Enabled/supported my understanding of:

Transferability

<p>Body maps (Cochrane, et al., 2022)</p> <p>-For generating ideas, articulating experience, visually representing experience, remembering and extracting experiences</p>	<p>Visual representation of their embodied experience is typically achieved through drawings, scribbles, and symbols based on the participant's intuition-reflection of their personal experience.</p> <p>maps out what occurs in their self-awareness</p> <p>Five identified uses of body maps as a generative tool:</p> <ol style="list-style-type: none"> 1) sampling bodily experience, 2) heightening bodily self-awareness, 3) understanding changing bodily experience over time, 4) identifying patterns of bodily experience 5) transferring somatic experiential qualities into physical designs <p>can be used before or after design activities to capture changed somatic awareness</p>	<p>Structuring some methods with design activities</p> <p>Ethical consideration that body maps can bring up unexpected emotions and participants must be allowed to keep their responses private</p>	<p>Body maps could be used to explore ADHD experiences to understand how one's experience is embodied.</p> <p>Soma-based methods, such as body maps, offer a holistic approach to understanding experiences. This is suitable for fashion designers.</p>
<p>Dimensions of emotionally durable qualities (Huang, Kettley, & Yao, 2023)</p>	<p>the emotional connection between user and material required for "resilient user-product relationship- for sustainable fashion design"</p> <p>stage 1) to understand physical, emotional and psychological needs stage 2) helps form and iterate the designs...</p> <p>proposes that designers should explore emotional durability individually to tackle the limitations of traditional fashion design processes, which lack understanding of users' lived experience</p>	<p>non-linear design process based on ongoing bodily experiences</p> <p>emotional connections are designed for the purpose of sustainability as opposed to for wellbeing... Sustainability can be a secondary benefit of designing for emotional wellbeing</p> <p>Fashion is framed as an environment. Exploration of dress is encouraged to understand emotional connections/ affects</p>	<p>materials are considered experiential and performative, embodying meaning and sensory properties</p>

**Process and description:
TECHNIQUES/METHODS**

(the practical skill or approach to execute the process)

Main finding:	Enabled/supported my understanding of:	Transferability
<p>First-person ideation methods for soma design: (Höök et al., 2018)</p> <p>Slow storming, A-labs, Embodied sketching</p> <p>1) Slowstorming: process grounded in a qualitatively different somatic reality than regular brainstorming; it is 'more critical, reflective and honest' (Höök, Friedman, & Stolterman, 2018)</p> <p>2) A-labs: an interactive embodied experiment performed together (researcher and/or participants with others). This method is open and explorative, focuses on aesthetic and felt/haptic experiences, and encourages participants to rely on their senses. A-labs are helpful for making choices about materials or feeling interactions with designs.</p> <p>3) Embodied sketching: Understanding and designing for bodily experiences early in the design process through physical ideation activities that leverage participants' lived experiences and the social and spatial setting as design resources to generate and test new ideas. Sometimes, it involves playfulness to elicit creative engagement.</p> <p>Three examples of embodied sketching Segura et al. (2016) propose are:</p> <ul style="list-style-type: none"> -bodystorming -co-designing with users -sensitising designers. 	<p>First-person designer and end-user bodily experiences are important resources in the design process.</p> <p>Limitations: The authors state that A-labs may frustrate those participants who are goal-oriented problem solvers</p> <ul style="list-style-type: none"> -there is a need to provide orienting questions to probe users' somas alongside embodied sketching. 	<p>Method 1 qualities: critical and honest reflection and brainstorming.</p> <p>Method 2 qualities: exploring aesthetic and felt experience using senses and choosing preliminary materials for this</p> <p>Method 3 qualities: physical activities for understanding bodily experience.</p> <ul style="list-style-type: none"> -Early in the design process to sensitise designers. -Playfulness or novelty. -Sketch/ map out the experience of the developing design or interaction as it unfolds.
<p>Somaesthetic appreciation -The Whole Enactment- not explicitly problem-solving (Ståhl et al., 2022)</p> <p>Soma design theory: important attendance to the aesthetics of our experiences through our movement and our ways of being and thinking</p> <p><u>Design tactics</u> = Somaesthetic appreciation, first-person soma practices (mind & body practices)</p> <p>Key features: 1)subtlety, 2)making space, 3)intimate correspondence</p> <ul style="list-style-type: none"> -extend body awareness via body practices -1st person helps clarify design potential with soma prototypes <p>Open space to become in: means not trying to explicitly 'problem-solve' user acts but instead understanding that we design the 'whole enactment', not just the act.</p> <p>Bounded openness: Designers don't expect people to have the same/ similar experiences (ethics) Key features: 1)subtlety, 2)making space, 3) intimate correspondence</p>	<p>Supported an understanding that the User's mindset/attitudes are influential and cannot always be designed for; their openness to engagement is always in flux, and this unpredictability is a key consideration in a soma design process,</p>	<p>Design tactics.</p> <p>Soma design encompasses the whole body, aka the soma (flesh, mind emotions, subjective understandings and values)</p> <p>discusses ethics of transformative mattering: boundaries of the experience and mindset</p> <p>Designing "for how the user can become" instead of predetermining the ideal experience</p>

**Process and description:
TECHNIQUES/METHODS**

(the practical skill or approach to execute the process)

Main finding:

Enabled/supported my understanding of:

Transferability

<p>Direct lived experiences, not personas.</p>	<p>Learning directly from users about their experiences, not making generalisations about users and their experiences.</p>	<p>Adapted PD approach to enable lived experiences to be shared</p>
<p>For user agency and understanding inclusive needs (Kudryashov, 2021; Benton et al., 2014)</p>	<p>Modified pains/gains map, participatory design sessions</p> <p>taking an ND perspective enabled important elements of the design process that usually aren't acknowledged to be considered, such as: including users in decision-making, social stigma and loss of agency, ableist assumptions, identity language preferences</p>	<p>D4D—It is important to directly involve neurodivergent people in the design process (rather than proxies like parents, teachers, etc.) because neurodivergent needs are not generally well understood or identified.</p>
<p>Neurodiversity-informed interaction methods -for a supportive PD approach (Kudryashov, 2021)</p>	<p>-PD structure and interaction methods informed by existing guidelines for engagement (with autistic individuals) (Kudryashov, 2021) “- multiple modes of participation - shared the agendas ahead of time, - split activities into two shorter sessions to reduce the potential for fatigue and sensory overload, - provided examples and probes for each design activity - sharing accessibility information from the outset, - checking in about access needs at multiple points throughout the process - sharing the lead facilitator’s personal experiences and investments around the topic.” (Kudryashov, 2021, p8) -participant considered the domain expert -providing scaffolding and support -necessary to focus on a broad scope of interactions, inclusive and social contexts --they exemplify the complexity of environmental factors when stigma is involved impacts inclusiveness and thus user needs</p>	<p>Autistic interaction method adaptations are not entirely transferable. It is likely more challenging to find out design priorities from ADHDers (as opposed to autistic persons) due to potential challenges with prioritising and focusing on an aim. The researcher may need techniques for extracting/interpreting participants’ design priorities rather than simply asking. - validates the adaption of ND theory for PD for empathetic ND-informed methods</p>

Process and description: TECHNIQUES/METHODS

(the practical skill or approach to execute the process)

Main finding:	Enabled/supported my understanding of:	Transferability
<p>an ecosystem of multiple tools for neurodivergent PD (Kudryashov, 2021; Benton et al., 2014)</p> <ul style="list-style-type: none"> -specialise for different purposes -optional integration of tools/flexibility for user needs -allow more nuanced and dynamic negotiations of disclosure <p>D4D framework steps: adapted for ADHD (children):</p> <ol style="list-style-type: none"> 1) understand the culture of ADHD 2) understand the individual 3) structure the environment and provide supports <p>the comprising components: individualisation, consideration of environmental implications and providing appropriate support assist in addressing unique and complex situations</p>	<p>D4D's flexibility means it does not need to be precisely replicated, and designers are considered to need to adapt processes to specific design contexts and constraints.</p>	<p>Neurodiversity theory is used to guide PD processes and to recognise strengths alongside challenging differences within specific contexts.</p>
<p>Kinetic variation analysis principles- (Jeon, 2015)</p> <p>-for identifying emotional cues of expressive movement</p> <ul style="list-style-type: none"> 4 essential Kinetic variations for: designing a garment that is functional and enables expressive movement across a range of emotional situations 4 essential principles/considerations: Kinetic variation of... <ol style="list-style-type: none"> 1) self-awareness 2) scale 3) speed 4) transitional emotions <p>"the protective function of clothing extends beyond physical, climatic protection but extends to physical harm and psychological dangers for feelings of insecurity" (Jeon, 2015)</p>	<p>Analysing the varied nature of movement beyond simply emotional or regulatory representations</p>	<p>the 'inside zone' of clothing relates to privacy and security and can indicate how to accommodate emotional comfort in personal space (kinesphere)</p> <p>raises important themes about insecurity, protection, openness and closedness, retreating, etc, in relation to the body's position in garments.-These relate to themes in ADHD lived experiences</p>

Table D2: Analysis of design techniques and methods. Table by Author.

Appendix E

POLYVAGAL THEORY:

PVT develops a connected perspective between the body and mind and feelings of safety, providing a more holistic understanding of ADHD experiences. PVT centres around the nervous system and highlights how physiological states support behaviours like ‘fight-or-flight’ or social engagement through vagus nerve regulation and *introduces* “neuroception”, a way our body senses danger or safety to trigger or stop defence responses (Porges, 2009).

Historical view of the Autonomic Nervous System (ANS):

ANS through PVT lens:

Parasympathetic = rest/ digest/ heal	Ventral Vagal Activation = Safe state
Sympathetic = fight/ flight	Sympathetic Activation = Mobilised state
	Dorsal Vagal Activation = Survival state

Table E1: Polyvagal theory view of Autonomic Nervous System. Table by Author.

Appendix F

Qualities of an ADHD-informed process based on Context Review Findings

Method Qualities:	Process Qualities:	Ethical Considerations:
Greater customer input in fashion processes	Understand the wearer's authentic needs	An open-minded and inclusive design approach to rethink deficit perspectives
Holistic approach = Adapted inclusive design approach to consider adults' whole experience of ADHD	Critical neurodiversity-affirming perspective (value-neutral model in this case)	Alternative perspectives that support the sociocultural experience of ADHD
Bringing together medical understanding and lived experiences	Reframing relationships with clothing	Valuing lived experiences as essential guidance for understanding individuals' life worlds, goals and barriers
Directly consult wearers for a holistic perspective of user-needs and to rethink exclusionary practices and expectations	Consider the purpose of self-regulation- reactive, proactive, pre-emptive	Recentring marginalised lived experiences and considering the purpose and outcomes of using lived experiences in design processes
Consider the subjectiveness or individuals' goals and productivity	Enable experiences of somaesthetic reflection and provide the means to articulate them	Understanding ADHD affects and presents in each person uniquely
Seek to understand complexities through neurodiversity-affirming perspectives	Seek understanding before knowledge	Mitigate risks of neglecting or avoiding the negative lived experience of individuals
More user-defined for 'interventions'	A value-neutral approach to emotions to learn the experiential value of individuals' subjective emotions	Enhancing ADHDers' self-concept is a wellbeing priority
Emphasise wellbeing alongside neurodivergence	Recentring self-regulation needs for a whole-person approach	Be critical of unconscious and implicit biases that contribute to unsupportive environments for ADHDers (e.g. stigma)

Method Qualities:	Process Qualities:	Ethical Considerations:
Consider wellbeing care provisions for ADHDers' functional, aesthetic, expressive and safety needs	Distinguish between ADHD self-care and commercialised modern self-care	Not automatically designing for neuronormative standards
Soma Design guides participant method selection	Enables connecting with the mind-and-body. Extending body-awareness through body-mind practices. Sensitising, priming, probing.	Strengths-based approaches should not exclude understanding the full spectrum of emotions, values, cultures and subjective needs of lived experiences
Consider the amount of stigma surrounding one's specific ADHD symptom/experience	Consider the understanding of ADHD wellbeing applied in the design process	Consider the amount of stigma surrounding one's specific ADHD symptom/experience
Empathetic and context-sensitive	Integrate and adapt inclusive user-centred approaches across disciplines for a more qualitative, individualised design process	Understand the intricate bidirectional link between emotional and sensory experiences and how this is experienced
Adapt existing processes for your specific contexts and constraints	Adaptable and responsive to participant needs and researcher abilities/parameters	Understand the evolving perceptions of ADHD in society
Flexible, blended methods to enable safe and inspiring participant engagement	Iterative participatory sessions to learn participant/user needs	Awareness that neurological-based or behavioural-based perspectives of ADHD are not necessarily reflective of lived experiences
Co-construct knowledge with users	Curiosity. Discussion. Open/semi-structured questions and follow up questions.	Inductive

Table F1: Qualities of an ADHD-informed process based on Context Review Findings. Table by Author.

Appendix G

Selection criteria:

Eligibility criteria (based on non-negotiable delimitations):	Reason
<ul style="list-style-type: none"> Diagnosed for the first time during adulthood 	Due to the project scope
<ul style="list-style-type: none"> Formal diagnosis required 	Due to the mental health risks associated with inaccessible healthcare when undiagnosed, <i>I do not have the resources or expertise to provide support within this project</i>
<ul style="list-style-type: none"> Diagnosed over six months ago 	
<ul style="list-style-type: none"> Any coexisting conditions are <i>not</i> self-selected as potentially “likely” or “extremely likely” to impair participation abilities as a co-designer. (see survey question 1.4) 	
Low-risk considerations:	
<ul style="list-style-type: none"> Self-identifies their current management of ADHD as “good” or higher (see survey question 2.1) 	
<ul style="list-style-type: none"> Shows a positive self-perception of ADHD 	Reflecting on ADHD is not likely to be triggering or emotionally risky - due to ‘reframing life process’
<ul style="list-style-type: none"> Shows interest in ADHD education/research and self-understanding (see survey question 2.2 and 2.3) 	Due to the co-design process being reflection-based
<ul style="list-style-type: none"> Demonstrates openness and self-reflection when sharing experiences (in open-ended responses) 	To reduce the likelihood of discomfort in a reflection-based co-design process
<ul style="list-style-type: none"> Beliefs should somewhat align with the Soma Design approach 	To reduce the risk of discomfort in a Soma Design process
Co-designer suitability- maximising benefits and enabling low risks:	
<ul style="list-style-type: none"> <u>ADHDers</u> who feel knowledgeable in how ADHD affects their life based on understanding ADHD as a condition and expressing reflective self-awareness (this is necessary to identify if/how life experiences are ADHD-related and makes design translation easier) 	
<ul style="list-style-type: none"> Expresses translational design ideas/skills (demonstrate ability to relate what they wear to their ADHD experience and strengths)... a potential indicator of their capacity to be comfortable as a co-designer 	
<ul style="list-style-type: none"> Their interests, preferences, and needs align with my ability to meet their needs, availability, and preferences in a code process. Knowing their needs and preferences enables planning an individualised co-design process. 	
<ul style="list-style-type: none"> Able to travel easily for in-person co-design/located locally 	

Table G1: Participant selection criteria. Table by Author.

Appendix H

Research statement:

An opportunity for adults with ADHD to help develop ADHD-supportive designs

I'm an adult with ADHD and I have the opportunity for my Master's study to **give back to our adult ADHD community!** However, this won't be done alone...

Your input matters!

My project aims to understand various lived experiences of **adult-diagnosed** ADHD so that I can consider ways that designs can support our specific needs. Throughout the design process, I will seek feedback from a group of selected participants and explore ideas through workshops.

You may be wondering...What is the purpose of this?

The purpose of this project is to combine the recommended strategies and tools for managing ADHD with wearable designs (for example, clothing and accessories) for a more accessible management approach which is **guided by the genuine experiences of adults with ADHD.**

If you're interested in helping out, then please complete the survey which can be found here: <https://form.jotform.com/223365903645863>

The survey responses will help me to:

- 1) Understand your needs that are most valuable to focus on
- 2) Connect with those of you who might like to participate further.

Even if you can't commit further, your survey responses will still be a valued contribution!

So, thank you for your time and input!

If you have any questions, please get in touch with me. Sophya.research@gmail.com

Ngā mihi nui

Appendix I

Participant information sheet

Advancing perceptions of adult-diagnosed ADHD and designing supportive clothing tools


Participant information sheet

This two-page Participant Information Sheet will help you decide if you'd like to take part.

Researcher Introduction
Kia ora, my name is Soph Chambers I am a Master of Design student at Massey University Wellington.

Project Description and Invitation
The purpose of this project is to explore how wearable designs can support adults with (adult-diagnosed) ADHD. A codesign process has been selected to ensure that users are involved throughout the design process to ensure wearable design outcomes appropriately support the unique adult-experience of ADHD.

You are invited to take part in a prescreening survey. To participate in this research project, you must be over 18 years of age, residing in New-Zealand and have received a formal diagnosis of ADHD in adulthood.

You may express your interest using the following link to the prescreening survey  <https://form.io/form/223365993046863> or scanning the QR code to the survey. If you want to take part now but change your mind later, you can retract your expression of interest at any time during the recruitment process, you don't have to give a reason.

Project Procedures
As a group of 4-6 Codesigners I aim to collaborate with you as individuals as well as in group workshops to explore ideas, problems, and receive feedback from Workshops can be expected to last around 2-3 hours. Independent activities could range from comparing literary stories to photographing items or clothing with a written reflection, to evaluating breathing exercises and prototypes etc.

The nature of workshops and individual activities will be influenced by your responses in the prescreening. Details will be provided with updated information sheets and consent forms when the codesign process is confirmed. The codesign process may last up to 4 months during the design phase.

Participant Identification and Recruitment
Adults residing in New-Zealand who have received a formal diagnosis of ADHD in adulthood and are able to speak and read English (due to the nature of surveys), are eligible to register their Expression of Interest. This is based on ensuring an ethical low risk process for myself and for participants.

Selection Criteria: There will be at least one follow-up survey before final participants/codesigners are selected. Potential codesigners will be selected based on ensuring minimal vulnerability for participants in a codesign process that involves reflecting on ADHD experiences and based on participant's understanding of ADHD. ADHD experiences and ideas expressed in the survey.

Identification: Names are obtained through the prescreening survey, but this remains confidential. If selected to be a codesigner you will select or be allocated a pseudonym to be used in all aspects of this research project.

As my research project seeks to recognise your experiences of adult-diagnosed ADHD, including the strengths and struggles I ask that you only proceed if you feel confident that you are comfortable having these reflections. If at any time you feel overwhelmed and need support, please reach out to your social support network or the following numbers which are available for free nationwide, 24/7:

- Lifeline – 0800 LIFELINE (0800 543 354) or free text HELP 43577 confidential service to support emotional and mental well-being.
- Whakarongorau Aotearoa – free call or text 1737 -offertautoko (support) for anything having an impact on your wellbeing

Compensation:
Payments/compensation for time and travel, will be offered to the final codesigners. This will be confirmed in the updated information sheet once the codesign structure has been decided.

One \$50 Prezy card will also be offered to one randomly selected participant who completes the potential codesigner follow-up survey (even if you are not one of the final selected codesigners).

Data Management
All participant information will be carefully managed to ensure that privacy and confidentiality are maintained. The workshops will be recorded and transcribed. All identifying information will be changed i.e., replaced with pseudonyms, or removed in transcription. Recordings, transcriptions, and all other identifiable materials will be securely stored on my device and hard-drive, and these are safely locked away, only myself and my supervisors will have access to this. Upon completion of the project, all data will be stored and protected in a secure hard-drive for a total of 5 years.

Participant's Rights
If you decide to participate, you have the right to:

- decline to answer any particular question.
- withdraw from the study (ideally giving as much notice as possible)
- ask any questions about the study at any time during participation.
- provide information on the understanding that your name will not be used unless you give permission to the researcher.
- be given access to a summary of the project findings when it is concluded.
- ask for the recorder to be turned off or for comments to be excluded in transcriptions at any time during recorded sessions

Project Contacts
If you have any questions or concerns about participating in this project, please do not hesitate to contact me (Sophya Chambers) using the email provided below. If at any point throughout your participation in the project you have any questions, concerns or wish to provide feedback you may also contact my supervisors or myself using the details provided below.

Researcher: Sophya Chambers
Email: sophya_researcher@gmail.com
Supervisors: Sue Prescott
Email: S.P.Prescott@massey.ac.nz
Supervisors: Jason Mitchell
Email: J.K.Mitchell1@massey.ac.nz

LOW RISK
This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher named above is responsible for the ethical conduct of this research.

Figure I1: Participant information sheet

Appendix J

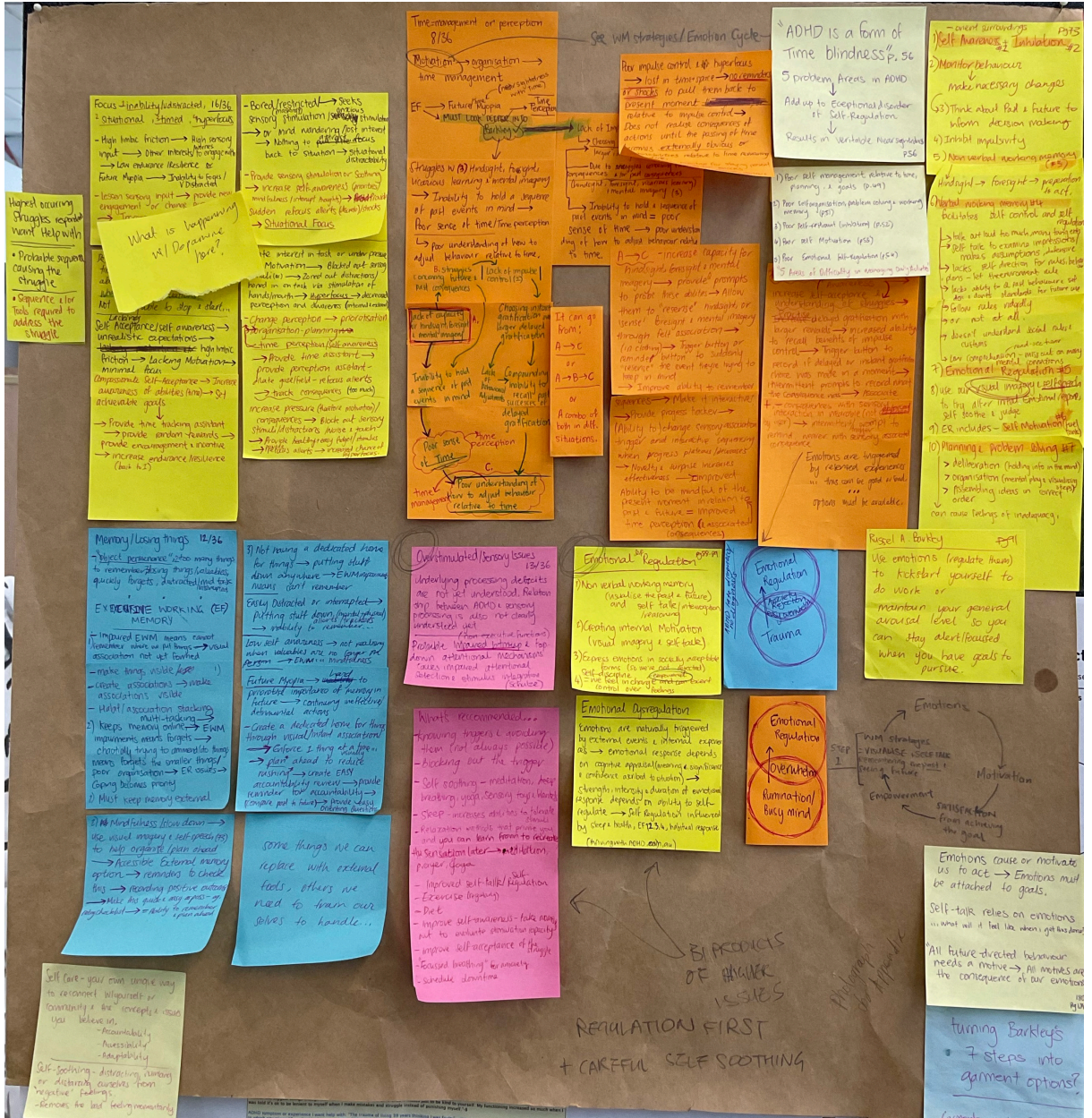


Figure J1: Photograph of post-it note frameworks/flowcharts (part of personal design translation process). Photographed material by Author.

Appendix K

Pre-screening survey

Welcome page:

PLEASE READ THIS INFORMATION before commencing the survey.

By submitting this survey you are agreeing that you have read and understand the terms set out in the information sheet. Thank you so much for your interest in my research! I expect this survey to take 20-30 minutes, but considering the nature of ADHD it may take some significantly longer. The questions in this survey seek to recognise your understanding and experiences of adult-diagnosed ADHD, including the strengths and struggles, please only proceed if you feel comfortable having these reflections. If at any time you feel overwhelmed and need support, please reach out to your social support network or any of the following numbers which are available for free nationwide, 24/7: Depression Helpline – 0800 111 757 or free text 4202, Lifeline – 0800 LIFELINE (0800 543 354) or free text HELP(4357) confidential service to support emotional and mental well-being, Anxiety Helpline 0800 269 4389 (0800 ANXIETY), Whakarongorau Aotearoa Free call or text 1737 -offer tautoko (support) for anything having an impact on your wellbeing

Survey navigation- PLEASE READ ALL SUBHEADINGS AND INFORMATION SECTIONS CAREFULLY

—Please be aware of the SCROLL BAR—all answers can be changed before submitting, there is a chance to review all responses at the end, or you can go back and forth through the questions —You must press next after filling in your answer — Please try answer all the questions applicable even if they are not marked as compulsory —At the bottom of the screen is a save icon,

should you need to continue the survey later—Please be aware of the SCROLL BAR
0 Question

NEXT

Eligibility

This section assesses your eligibility to participate. This is based on ensuring an ethical low risk process for myself and for participants. Your experiences are still valid and extremely important even if you don't meet the eligibility criteria.
6 Questions

NEXT

Have you been formally diagnosed with ADHD as an adult?*

A formal diagnosis is one made by a qualified specialist after undertaking an assessment(s) in accordance with the official diagnostic criteria. In New Zealand qualified professionals are: psychiatrists, neurologists, or clinical psychologists, and although rare- GPs who have undertaken specialised training.


YES

NO

As you **have not received a formal diagnosis** for ADHD in adulthood you are **not eligible** to participate in this study. This is for ethical purposes. You may exit the survey now.

I wish you the best of luck on your diagnosis journey and thank you kindly again for your interest in this study

THANK YOU

 **Accessibility Warning:** This widget may limit the accessibility of your form. Users with impairments may have trouble filling out your form.

How long ago were you formally diagnosed with ADHD?*

Type a description

- within the last 6 months
- within the last 2 years
- within the last 10 years
- over 10 years ago

Would you like to be a codesigner**?*

*Codesigners are a group of participants who collaborate with in multiple sessions to explore ideas, problems, and receive feedback from. This exploration includes multiple workshops as well as independent activities (these are yet to be determined). Workshops can be expected to last around 2-3 hours.

Independent activities could range from completing diary entries, to photographing items of clothing with a written reflection, to evaluating breathing exercises and prototypes etc.

YES

NO

Do you have any **coexisting conditions**- that you think will **impair your abilities to participate** as a codesigner? *

*coexisting conditions are conditions (NOT ADHD) which may include other neurodiverse conditions, mental health conditions such as anxiety, depression, brain injuries, sleep disorders, substance misuse, addictions... The purpose of this question is to ensure needs and risks are understood

- Extremely unlikely
- Unlikely
- Neutral
- Likely
- Extremely Likely
- OR I do not have any coexisting conditions

Optional additional comments:

share any additional comments for this section (such as accessibility or support needs to participate)

Tr B I U P L I I " - @ ☺

After realising you had ADHD, what did you try learning about?

scroll down and select all that apply

- Neurobiology of ADHD
- The cause of my struggles
- Management strategies
- ADHD medication
- ADHD diet/ supplementation
- ADHD products/ tools
- ADHD specialists
- ADHD communities and others' experiences
- ADHD overview books
- Other- please specify by typing here

I feel knowledgeable on the topic of ADHD, both from personal experience **and** from learning about the ADHD condition

Rate your agreement with the statement above:

- Strongly disagree
- Disagree
- Neither agree or disagree
- Agree
- Strongly agree

Understanding of ADHD

This section aims to clarify your overall understanding of ADHD.
3 Questions

PREVIOUS

NEXT

How well **do you feel** you currently manage your ADHD/ ADHD-related challenges?*

Type a description

- Poor- Feeling consistently out of control
- Fair- Managing some important aspects well but struggle with the rest
- Good- Practicing strategies across many areas of life
- Very Good- Consistently practicing strategies in most areas of life
- Excellent- Implementing effective strategies in all areas of life

Self-perception of ADHD diagnosis

This section aims to understand your ADHD related strengths and how you feel about your ADHD
2 Questions

PREVIOUS

NEXT

What **aspects of your ADHD** do you: consider **your strengths** and/or; **would miss** (If you had the option to live a neurotypical life)?

select all that apply.

- Heightened emotional range
- Spontaneity
- Heightened sensory appreciation
- Divergent thinking
- Ability to hyperfocus
- Empathy
- Creative coping skills
- Heightened self-awareness
- The mindset developed as a result
- Non-conformity
- Special interests/ fascinations
- Other-please specify by typing her

Rate how you usually view your ADHD diagnosis (over the last 6 months)*
My ADHD diagnosis feels like a:



Hopeless identity

Reframing life opportunity

Support wanted and challenging environments

This section aims to, understand your ADHD-related struggles and experiences of stigma as well as identify support you want.

3 Questions

PREVIOUS

NEXT

Other-please specify by typing here

What symptoms/ADHD experiences do you want help with the most?
List UP TO 5 in any order.

ADHD symptom or experience I want help with

ADHD symptom or experience I want help with

ADHD symptom or experience I want help with

ADHD symptom or experience I want help with

ADHD symptom or experience I want help with

Can you think of any ways that wearables could help with the experiences/struggles that you mentioned in the previous two questions?
list or describe any ideas you have:

Tr B I U " -

In which situations (if applicable) has your ADHD felt like a burden?*

Select all that apply.

- learning environments (i.e work training, extra-curriculars etc.)
- when I forget to take my medication
- when experiencing sensory overload
- social situations
- when family and friends don't understand my struggles
- when my struggles are misunderstood as behavioural issues
- when I am unable to explain the impacts of my ADHD struggles to people
- when my forgetfulness lets others or myself down
- when I struggle to cope with strong emotions
- when I feel like the outsider
- when I believe others' criticisms of me are accurate
- when I can't stop self-deprecating thoughts
- when I require validation from others
- when I avoid situations because of my struggles
- when people are disappointed in my direction of attention or impulsiveness
- when I have difficulty perceiving time accurately
- when I am experiencing burnout or cognitive overload
- when I lose stuff

Evaluating efficacy and design potential

Type a subheader

8 Questions

PREVIOUS

NEXT

Describe a time when **something wearable supported your ADHD experience, and/OR enabled your ADHD strengths.**

Because wearables effect everyone differently, **the detail you can provide in your answer is valuable for our understanding.** Here are some examples of my own as prompts.

Example 1:

My workroom handbag is like my command centre... I make sure to always have it when I am in the fashion workroom. It contains all the essential items and spares so I can focus despite the busy environment and walk around freely without worrying if I've forgotten something important.

Example 2:

Sometimes at yoga I wear a soft fabric headband which I can pull over my eyes when the overhead lights are too bright...This helps me enjoy the benefits for my emotional regulation without having to worry about my sensitivities to lighting.

Tr B I U " -

What tools do you currently use to manage living with ADHD?*

Select all that apply. (The next question will ask you what strategies you currently use)

<input type="checkbox"/> reading positive affirmations	<input type="checkbox"/> journaling
<input type="checkbox"/> reading for focus/calm	<input type="checkbox"/> timers and alarms
<input type="checkbox"/> guided meditation	<input type="checkbox"/> dget items
<input type="checkbox"/> cold exposure	<input type="checkbox"/> massage/self-massage tools
<input type="checkbox"/> lists/ checklists	<input type="checkbox"/> Music or focus soundtracks
<input type="checkbox"/> calendar, diaries, planners	<input type="checkbox"/> pill container
<input type="checkbox"/> reminder apps	<input type="checkbox"/> mood/vision boards
<input type="checkbox"/> coloured stationery for colour coding/organising	<input type="checkbox"/> physical organisation, hooks, baskets, boxes, whiteboards, corkboards, fridge notes etc.
<input type="checkbox"/> visual cues/prompts (such as post-it notes, speci c placement of things)	<input type="checkbox"/> therapeutic items (like stress balls, weighted blanket, warming items)
<input type="checkbox"/> Other-please specify by typing her	

select any tools you have tried that were NOT effective *

Type a description

<input type="checkbox"/> reading positive affirmations	<input type="checkbox"/> journaling
<input type="checkbox"/> reading for focus/calm	<input type="checkbox"/> timers and alarms
<input type="checkbox"/> guided meditation	<input type="checkbox"/> dget items
<input type="checkbox"/> cold exposure	<input type="checkbox"/> massage/self-massage tools
<input type="checkbox"/> lists/ checklists	<input type="checkbox"/> music or focus soundtracks
<input type="checkbox"/> calendar, diaries, planners	<input type="checkbox"/> pill container
<input type="checkbox"/> reminder apps	<input type="checkbox"/> mood/vision boards
<input type="checkbox"/> coloured stationery for colour coding/organising	<input type="checkbox"/> physical organisation-hooks, baskets, boxes, whiteboards, corkboards, fridge notes etc.
<input type="checkbox"/> visual cues/prompts (such as post-it notes, speci c placement of things)	<input type="checkbox"/> therapeutic items (like stress balls, weighted blanket, warming items)
<input type="checkbox"/> Other-please specify by typing her	

What strategies do you currently use to manage living with ADHD?*

Select all that apply.

<input type="checkbox"/> task breakdown and prioritising tasks	<input type="checkbox"/> pomodoro techniques/ De-focus periods
<input type="checkbox"/> eye-movement strategies	<input type="checkbox"/> grounding techniques (mentally and/or physically with the earth)
<input type="checkbox"/> meditative practices	<input type="checkbox"/> breathing techniques/ practices
<input type="checkbox"/> hand warming techniques	<input type="checkbox"/> light exposure
<input type="checkbox"/> art therapy, keeping hands busy	<input type="checkbox"/> connecting with nature
<input type="checkbox"/> physical exercise	<input type="checkbox"/> mindfulness
<input type="checkbox"/> positive mindset	<input type="checkbox"/> body doubling
<input type="checkbox"/> organisation techniques	<input type="checkbox"/> following a routine
<input type="checkbox"/> knowing triggers and individual limits	<input type="checkbox"/> communicating needs and boundaries to others
<input type="checkbox"/> scheduling/planning ahead	<input type="checkbox"/> spiritual mindset (does not have to mean religious)
<input type="checkbox"/> self-motivation	<input type="checkbox"/> avoiding stressors or withdrawing
<input type="checkbox"/> noting feelings	<input type="checkbox"/> hiding or minimising distractions
<input type="checkbox"/> setting zones for separate activities (work, fun, sleep etc.)	<input type="checkbox"/> using strengths to counteract weaknesses
<input type="checkbox"/> shifting thinking or interrupting ruminations	<input type="checkbox"/> Other-please specify by typing her

select any strategies you have tried that were NOT effective *

Type a description

communicating needs and boundaries to others	<input type="checkbox"/>	<input type="text"/>
scheduling/planning ahead	<input type="checkbox"/>	<input type="text"/>
spiritual mindset (does not have to mean religious)	<input type="checkbox"/>	<input type="text"/>
self-motivation	<input type="checkbox"/>	<input type="text"/>
avoiding stressors or withdrawing	<input type="checkbox"/>	<input type="text"/>
noting feelings	<input type="checkbox"/>	<input type="text"/>
hiding or minimising distractions	<input type="checkbox"/>	<input type="text"/>
setting zones for separate activities (work fun sleep etc.)	<input type="checkbox"/>	<input type="text"/>
using strengths to counteract weaknesses	<input type="checkbox"/>	<input type="text"/>
shifting thinking or interrupting ruminations	<input type="checkbox"/>	<input type="text"/>
other	<input type="checkbox"/>	<input type="text"/>

task breakdown and prioritising tasks	<input type="checkbox"/>	<input type="text"/>
pomodoro techniques/ De-focus periods	<input type="checkbox"/>	<input type="text"/>
eye-movement strategies	<input type="checkbox"/>	<input type="text"/>
grounding techniques (mentally and/or physically with the earth)	<input type="checkbox"/>	<input type="text"/>
meditative practices	<input type="checkbox"/>	<input type="text"/>
breathing techniques/ practices	<input type="checkbox"/>	<input type="text"/>
hand warming techniques	<input type="checkbox"/>	<input type="text"/>
light exposure	<input type="checkbox"/>	<input type="text"/>
art therapy keeping hands busy	<input type="checkbox"/>	<input type="text"/>
connecting with nature	<input type="checkbox"/>	<input type="text"/>
Physical exercise	<input type="checkbox"/>	<input type="text"/>
mindfulness	<input type="checkbox"/>	<input type="text"/>
positive mindset	<input type="checkbox"/>	<input type="text"/>
body doubling	<input type="checkbox"/>	<input type="text"/>
organisation techniques	<input type="checkbox"/>	<input type="text"/>
following a routine	<input type="checkbox"/>	<input type="text"/>
knowing triggers and individual limits	<input type="checkbox"/>	<input type="text"/>

Please nominate your **3 most effective tools AND 3 most effective strategies** for managing your ADHD

*
in any order.

	most effective tools	most effective strategies	optional comments
1	<input type="text" value="Search"/>	<input type="text" value="Search"/>	<input type="text"/>
2	<input type="text" value="Search"/>	<input type="text" value="Search"/>	<input type="text"/>
3	<input type="text" value="Search"/>	<input type="text" value="Search"/>	<input type="text"/>

Optional additional comments:
share any additional comments for this section (such as effectiveness of tools and strategies you have tried)

Tr **B** **I** **U**

You are doing amazing! There are just a few short sections left.
Type a description

You're nearly done

Accessibility Warning: This widget may limit the accessibility of your form. Users with impairments may have trouble filling out your form.

Follow up contact
This section is to establish your preferences for follow up contact
5 Questions

[PREVIOUS](#) [NEXT](#)

Name *
Your personal details will not be shared with anybody else or used for any other purposes without your permission. If you are selected to be a codesigner, pseudonyms (fake names) will be discussed.

First Name Last Name

Email (to inform you of survey outcome and thank you) *
Your personal details will not be shared with anybody else or used for any other purposes without your permission.

example@example.com

Understanding your codesign needs
This section aims to understand your availability and preferences as a potential codesigner. Codesigners are a group of participants who explore ideas, problems, and receive feedback from _____. This is done through multiple workshops as well as independent activities. _____ The workshops and activities are yet to be determined, but workshops are expected to last around 2-3 hours. Independent activities could range from completing diary entries, to photographing items of clothing with a written reflection, to evaluating breathing exercises and prototypes etc.
6 Questions

[PREVIOUS](#) [NEXT](#)

Please select your **main preference** for the codesign format
The final codesign format (formatting workshops and independent activities) will be designed in consideration of the final codesigner group selected.

Mostly shorter, more frequent participation

Mostly longer, more intensive, but less frequent participation

No preference

Preferred mode for contact*
*provide number in next question

Preferred mode for contact

email

call*

text*

I do not wish to be involved further do not contact me

Phone Number
*required if your preferred mode for contact is call or text

Area code or prefix Phone Number

Your email will not be shared with anyone else. I will not email you without your permission.
Type a description

Are you happy for me to email you follow up questions about your survey answers?

Are you happy for me to email you a follow up survey?

According to your previous answer, please select your **preference for each category:**
(It's okay if your preferences change later) There will be an opportunity to further comment on your preferences at the end of this section.

Frequency	Codesign	Interaction	Workshop
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<small>Please</small>	<small>ACTIVITY LENGTH (not the workshop)</small>	<small>Please</small>	<small>I am comfortable engaging with other codesigner</small>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<small>Please</small>	<small>Please</small>	<small>Please</small>	<small>Please</small>

Accessibility Warning: This widget may limit the accessibility of your form. Users with impairments may have trouble filling out your form.

If you were selected to be a codesigner... Would you likely be willing and able to commit to sessions for up to 4 months?*

Yes No

Yes, but...please specify in 'other' box No, but...please specify in 'other' box

Other-please specify by typing here

Do you own the following?*

Type a description

personal computing device (computer, laptop, ipad etc)

a smart phone

a preferred camera device (can be your smart phone)

a drawing tablet device

Are you content uploading photos (from your phone or preferred camera device) to the web?*

Type a description

Optional additional comments:

feel free to make any other comments related to your availability and/or codesign preferences or share any concerns you have with committing to regular participation for up to 4 months

T **B** *I* U

Hooray! You've made it to the final question! Please rate how accessible this survey has been for you

Type a description

1=Exhausting, complicated and difficult 5=Painless, straightforward and manageable
3=challenging at times but manageable

Final Optional additional comments:

Share any additional comments or questions you have for this section or for the entire survey experience

T **B** *I* U

SUBMIT

[EDIT THANK YOU PAGE](#)

My design approach

This section aims to understand how you feel about my design approach.
Please read the description in the following question carefully
4 Questions

[PREVIOUS](#) [NEXT](#)

My design process will work with both the body and mind to achieve an in-depth understanding, this involves physical relaxation type exercises prior to sessions and incorporates movement activities (comparable with body-scan meditation and yoga poses). **How comfortable are you with this design approach? ***

Use the smiley slider to indicate your comfort level. Far left=not comfortable, centre=hesitant, far right=completely comfortable, or in-between



8- Do the qualities of the design approach described, align with your beliefs?*

(qualities described in previous question)

Not what I believe Mostly not what I believe Indifferent Sort of what I believe

type here

Figure K1: Pre-screening survey questions. Survey and images of survey by Author.

Appendix M

Participant consent form



Advancing perceptions of adult-diagnosed ADHD and designing supportive clothing tools
CODESIGN PARTICIPANT CONSENT FORM - INDIVIDUAL

I have read, or have had read to me in my first language, and I understand the Information Sheet. I have had the details of the study explained to me, any questions I had have been answered to my satisfaction, and I understand that I may ask further questions at any time. I have been given sufficient time to consider whether to participate in this study and I understand participation is voluntary and that I may withdraw from the study at any time.

1. I agree/do not agree to the workshop being sound recorded.
2. I agree/do not agree to the workshop being image recorded.
3. I wish/do not wish to have my recordings returned to me.
4. I wish/do not wish to have data placed in an official archive.
5. I understand that all the information I provide will be kept confidential to the extent permitted by law, and the names of all people in the study will be kept confidential by the researcher.
6. I acknowledge and agree to keep confidential any information discussed or otherwise disclosed during my involvement in the codesign process. For the avoidance of doubt, this includes anything discussed by me, a panel participant, or assistant about designs.
7. I agree to participate in this study under the conditions set out in the Information Sheet.

Declaration by Participant:

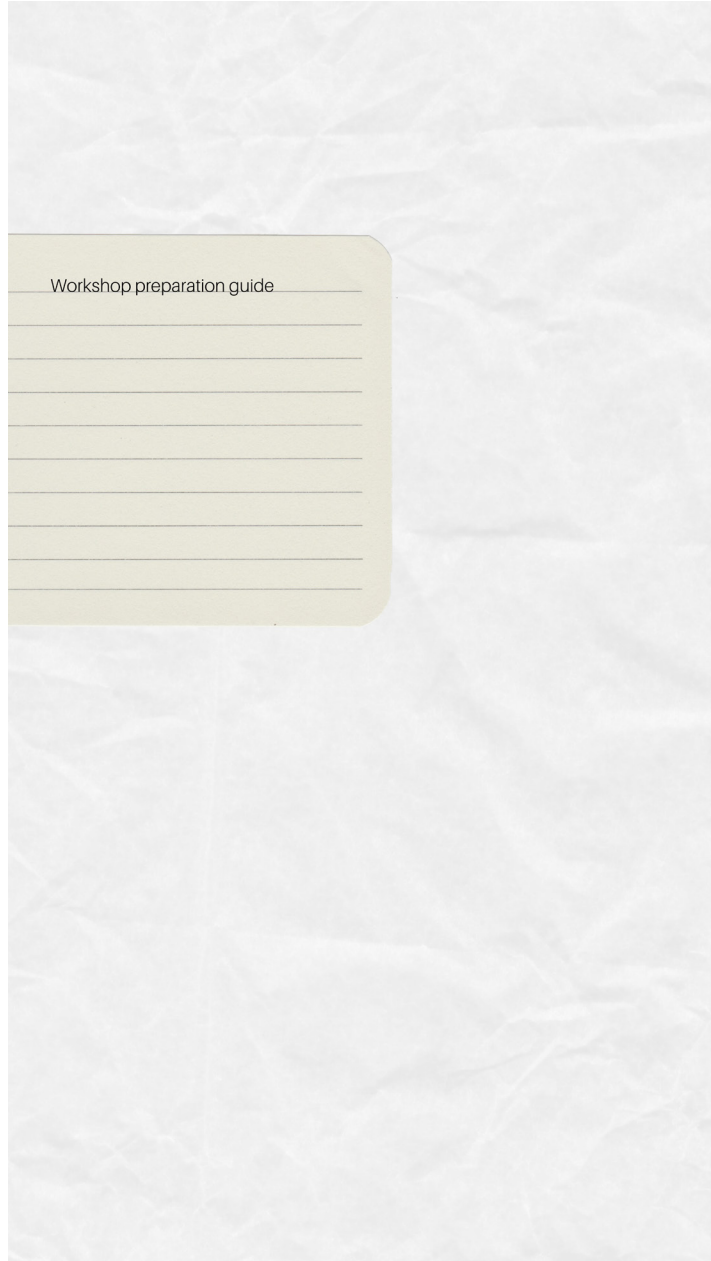
I _____ [print full name] _____ hereby consent to take part in this study.

Signature: _____ **Date:** _____

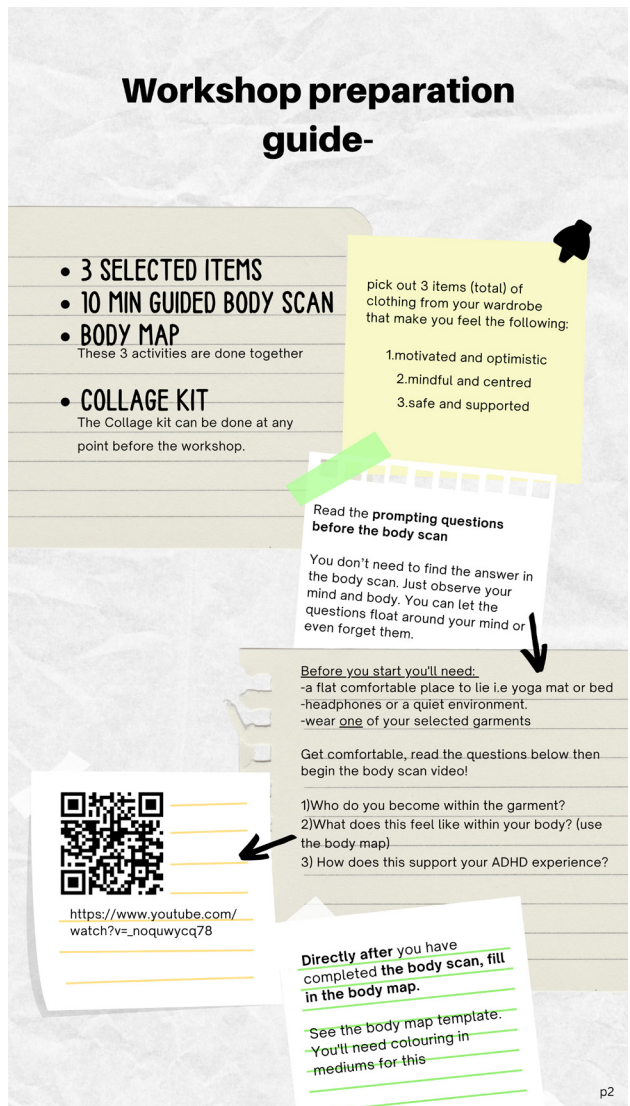
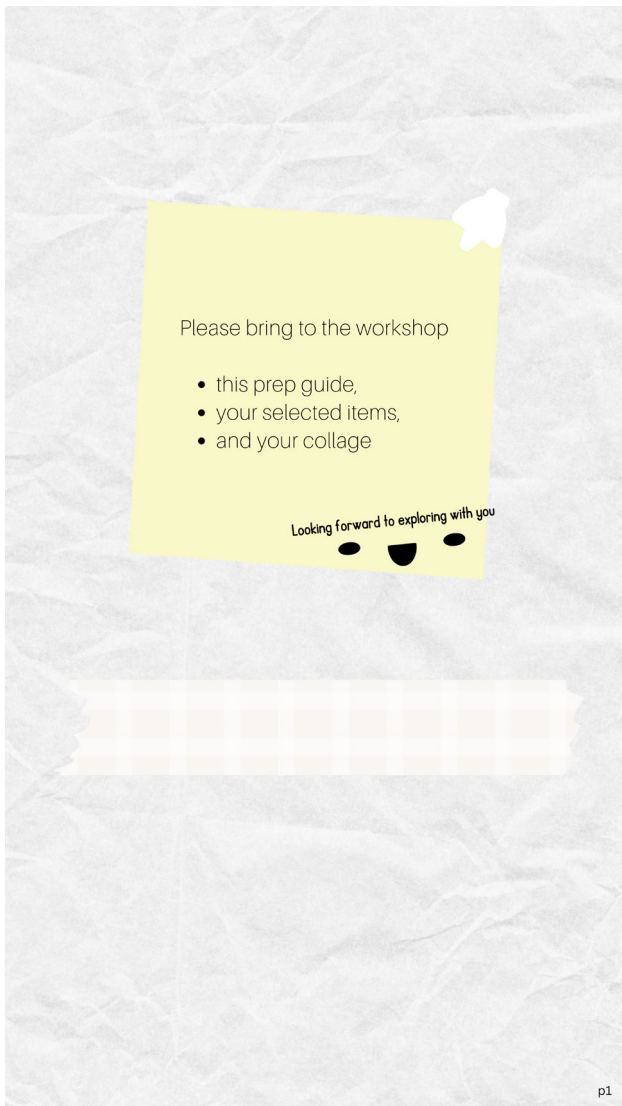
Figure M1: Participant consent form

Appendix N

Test co-design workshop #2 preparation kit booklet



Figures N1: Test co-design workshop #2 preparation kit booklet – cover page Booklet designed by Author.



Figures and N2 nd N3: Test co-design workshop #2 preparation kit booklet – pages 1 and 2. Booklet designed by Author.

Garment selection exercise

Pick one item of clothing from your wardrobe that makes you feel...
motivated & optimistic

↓

Pick one item of clothing from your wardrobe that makes you feel...
mindful & centred.

↓

Pick one item of clothing from your wardrobe that makes you feel...
safe & supported

Don't forget to bring these to the workshop :)

Next- prompting questions and body scan

p3

Body-scan

Questions prompts:






Who do you become within the garment...

What does this feel like within your body...

Does this support your ADHD experience...

You **don't need to find the answer** in the body scan. Just observe your mind and body. You can let the questions float around your mind or even forget them.

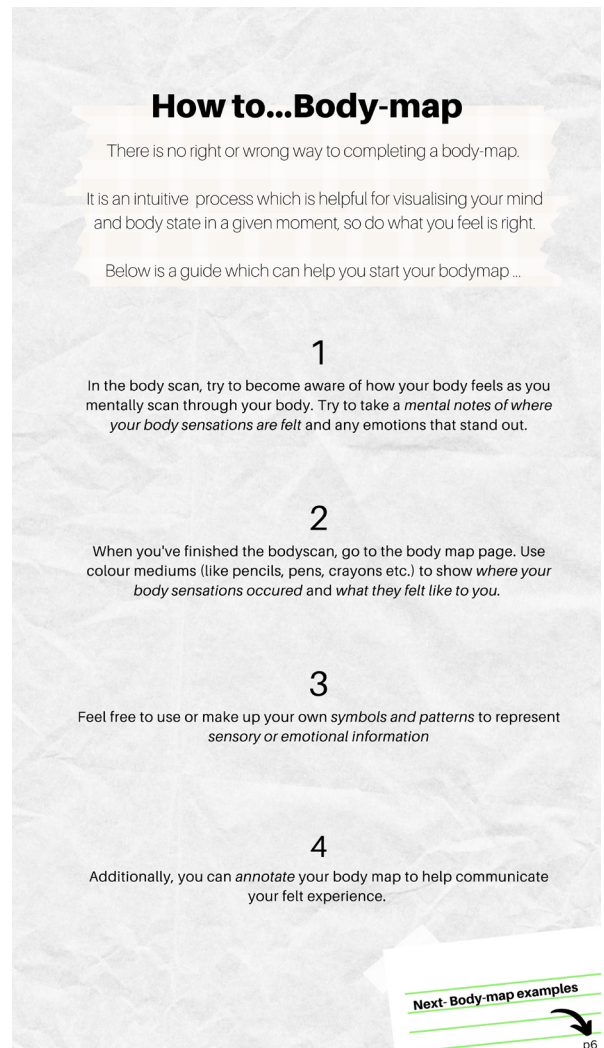
Before you start you'll need:

- comfy space to lie down 
- headphones or quiet space 
- one of your selected garments to wear 
- your body-map materials ready to do after 
- and the video opposite 

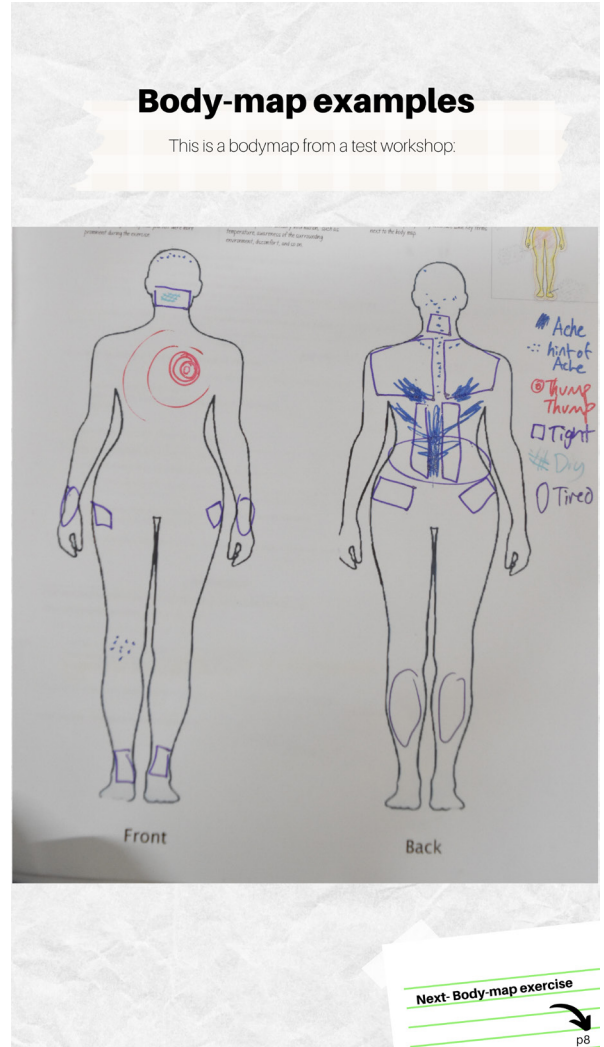
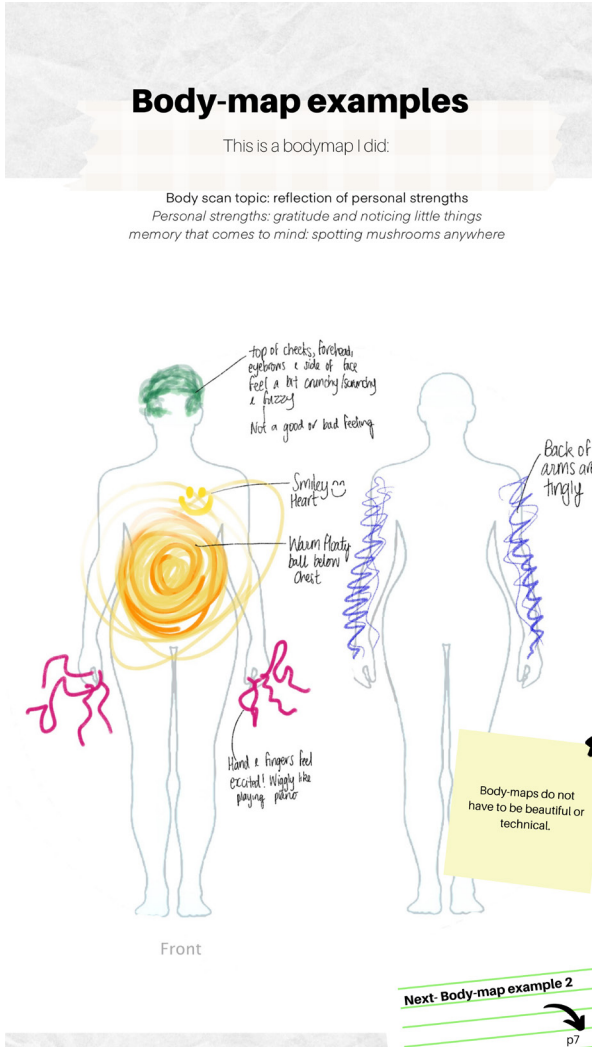
Next- Body-scan video

p4

Figures N4 nd N5: Test co-design workshop #2 preparation kit booklet – pages 3 and 4. Booklet designed by Author.



Figures N6 and N7: Test co-design workshop #2 preparation kit booklet – pages 5 and 6. Booklet designed by Author.



Figures N8 and N9: Test co-design workshop #2 preparation kit booklet – pages 7 and 8. Booklet designed by Author.

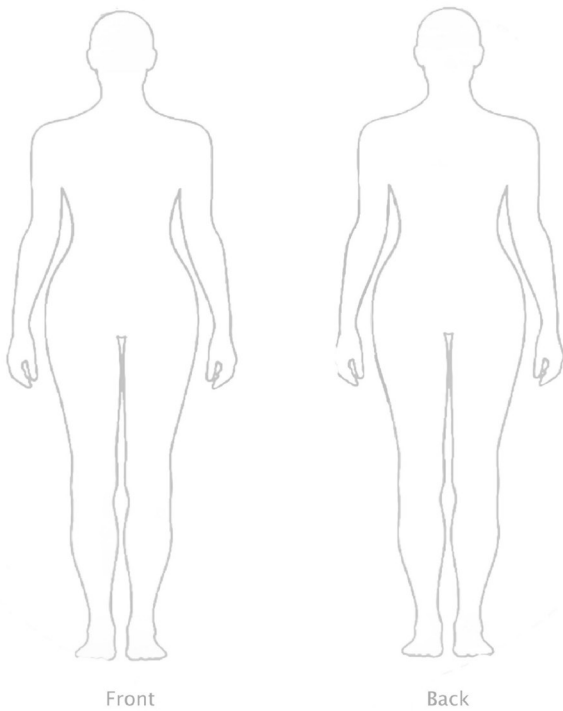
Body-map exercise

Show location of body sensations and how they felt to you

Tips: You can use...

- Different coloured stationery
- Symbols and patterns to represent sensory or emotional information
- Annotations
- The feelings list (at the back) can help

Who do you become within the garment...
What does this feel like within your body...



p9

Selected garment 1 questions

My selected garment is: **motivated & optimistic**

Why does it make you feel **motivated & optimistic**?

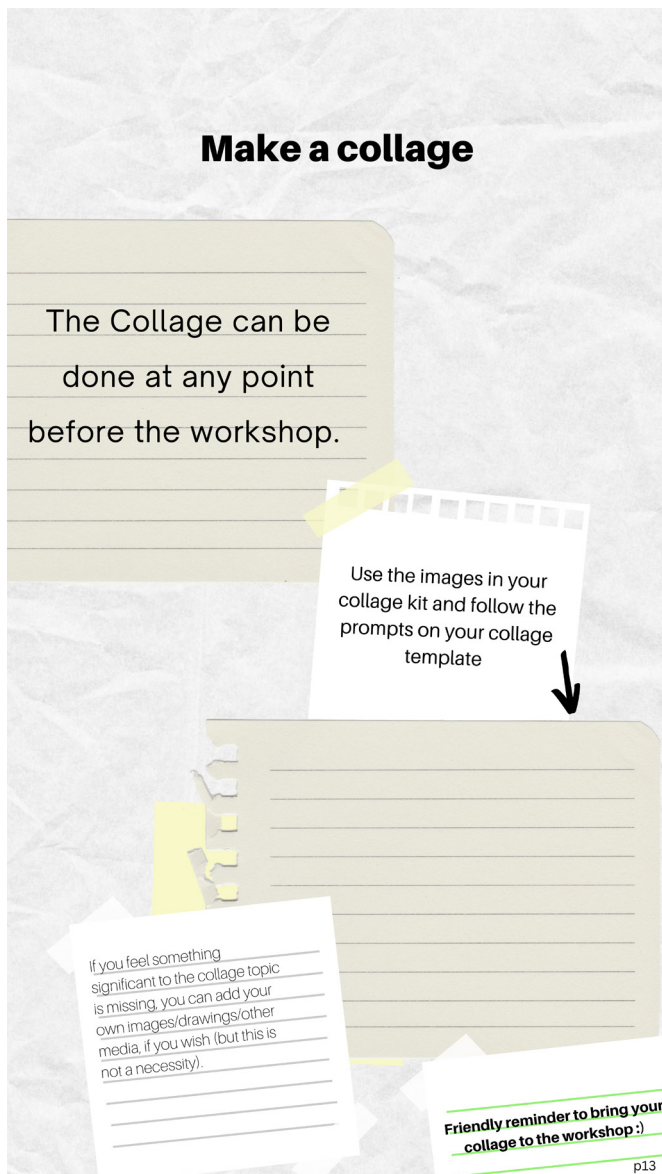
How is this motivation & optimism felt (or not felt) within your body?

How does this support your ADHD experience? (does it enable any of your strengths? support your self-care? alleviate challenges?)

Friendly reminder to bring these
to the workshop :)

p10

Figures N10 and N11: Test co-design workshop #2 preparation kit booklet – pages 9 and 10. Booklet designed by Author.



Figures N14 and N15: Test co-design workshop #2 preparation kit booklet – pages 13 and 14. Booklet designed by Author.

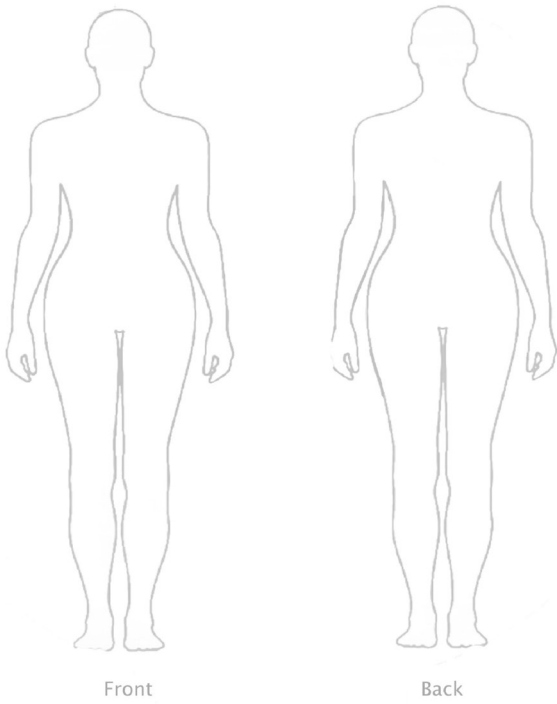
Spare

Body-map exercise

Show location of body sensations and how they felt to you
Do what feels right.

Tips: You can use...

- Different coloured stationery
- Symbols and patterns to represent sensory or emotional information
- Annotations



p15

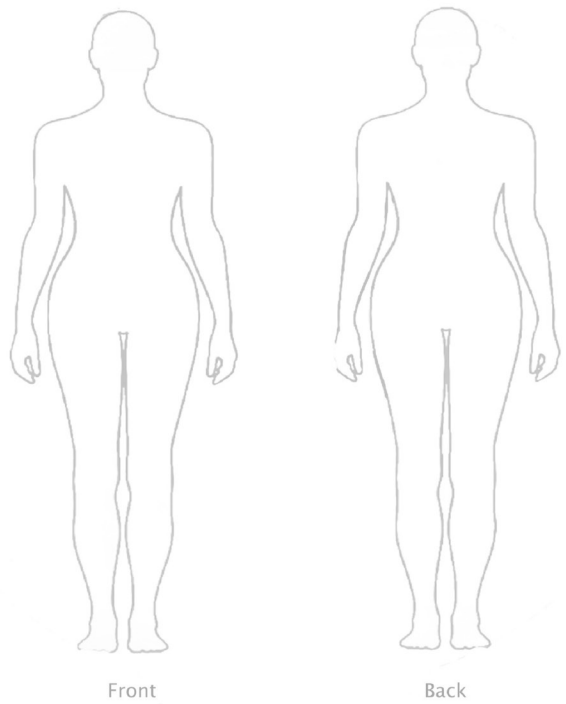
Spare

Body-map exercise

Show location of body sensations and how they felt to you
Do what feels right.

Tips: You can use...

- Different coloured stationery
- Symbols and patterns to represent sensory or emotional information
- Annotations



p17

Figures N16 and N17: Test co-design workshop #2 preparation kit booklet – pages 15-17 (same page- spare body map templates). Booklet designed by Author.

