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# Can Products be Designed to Promote Subjective Wellbeing?

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## Abstract

This thesis sets out the synthesis of a body of research in response to the question, 'can products be designed to promote subjective wellbeing'? To achieve this, three different forms of research are undertaken and cross-compared. The exploration of existing literature, primary research into users' interaction with chairs they own and finally, primary research into users' initial perception of chairs. These are the building blocks of this research and explore concepts of nature, art and psychology from a design perspective while adding context through existing meta design concepts. This research culminates by identifying a list of five design factors that are indicated to affect the subjective wellbeing of users. This contributes to the body of knowledge related to the factors that can be used to affect subjective wellbeing and sets the stage for further work on this topic.

## Declaration

This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

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### STATEMENT 1

This thesis is the result of my own investigations, except where otherwise stated. Where correction services have been used the extent and nature of the correction is clearly marked in a footnote(s). Other sources are acknowledged by footnotes giving explicit references. A bibliography is appended.

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### STATEMENT 2

I hereby give consent for my thesis, if accepted, to be available for deposit in the University's digital repository.

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# Section 1: Contextualization

## Introduction

This thesis probes the question whether designed products can influence a user's subjective wellbeing. At the time of writing, and as the world recovers from the impact of covid-19 lockdowns, it has become clear that the boundaries between personal and professional spaces have become blurred. Therefore, research into how everyday designed objects can help bolster a user against the stresses and pressures inherent to this scenario has become all the more important. (Wepfer, et al. 2018, p. 737) In addition to these immediate issues, the past several years alone has seen a significant rise in the amount people who have been found to have mental health issues (McManus, et al. 2014, p.8). This rise in diagnosis coincides with increased awareness of mental health issues and illustrates just how important it is to find new approaches to helping support people with these problems. With the ubiquitous reach of designed products, the findings of this research and others like it will help to generate design tools to help improve people's quality of life and the general wellbeing of the population. The primary aim and motivation for undertaking this research to take steps towards confirming whether products can be designed to promote subjective wellbeing. In the first of the three sections that compose this thesis the question "can products be designed to promote subjective wellbeing?" is investigated through the compiling and analysis of existing bodies of knowledge. This knowledge is drawn from both the fields of design and psychology, and considers multiple viewpoints and cultural underpinnings.

*"The act of creating something of beauty is a way of bringing good into the world. Infused with optimism, it says simply: Life is worthwhile". (Moore, 2016, p.12)*

As identified by Moore, it is understood in the literature that people are attracted to well-made objects and take pride in the spaces they build around them. There are even some that would claim that certain well-made objects can have a 'spark', some subtle intangible attraction that causes them to appeal to us on an unconscious level. These objects can differ from person to person in reflection and rhythm with that person's subjective biases. It is often a designer's goal to design and create products that can affect people in this way. Designers have their own

perspectives and ideas about how to achieve this, a good example being Dieter Ram's "10 Principles of Good Design" (Rams, 2020) or alternatively Don Norman's book "The Design of Everyday Things" (Norman, 1988). In many cases the concepts and ideas illustrated can be contradictory. There is no 'be-all-and-end-all' or 'correct' approach to design. These approaches, by themselves, don't reveal any universal truths or magic rules. They are often as subjective, flawed and human as their creators; which many would argue is the point.

There are several movements within the design field that aim to take this 'spark' and elevate it into an interaction that can promote a person's wellbeing. In modern design, these often point back to the "First International Conference on Design and Emotion" (Overbeeke and Hekkert, 1999) or "Kansei engineering: a new ergonomic consumer-oriented technology for product development" (Nagamachi, 1995). There are, however deeper, older roots to these approaches much of which is grounded in scientific papers throughout the latter part of the 20<sup>th</sup> century. Some of the most relevant of these are the 'View Through a Window May Influence Recovery from Surgery' (Ulrich, 1984) and 'Psychological Benefits of a Wilderness' (Kaplan and Talbot, 1983). There is even anecdotal evidence of similar design considerations throughout the histories of several cultures.

*"A workable understanding of how our psychosomatic organism ticks, information on sensory clues which wind its gorgeous clockwork or switch it this way or that, undoubtedly will someday belong in the designer's mental tool chest". (Neutra, 1954, p.191)*

There are many examples of emotional interactions between users and designed products. Unfortunately, many are marred by negative applications or as Chris Nodder puts it "Evil" intentions (Nodder, 2013, p.13). Many of these 'Evil' intentions are seen in aggressive marketing practices, gambling, and other forms of influencing interactions. If it is possible to create negative / addictive emotional connections between people and products, should it not be possible to do the opposite, to create positive products that can help to improve someone's life? This research will not be able to give a definitive answer to that question, but it hopes to correlate some of the leading research in this field and compare those findings with



independent research with a wide variety of participants. Hopefully in the future methods for aiding someone's subjective wellbeing will have a prominent place in any designer's "mental tool chest".

### Aims

The aim of this research is, through a review of existing bodies of work along with firsthand research, to develop and define a design methodology or specification that can be applied during the design process to aid in the creation of products that improve subjective wellbeing. To address the question, 'can products promote subjective wellbeing'?

### Objectives

The objectives of this research are:

- To build an understanding of the existing bodies of literature surrounding Design and Emotion and to develop a design methodology or specification, that supports subjective wellbeing, through the analysis of common and key themes within the text.
- To conduct primary research about participants' existing interactions with chairs within their home environment and to develop an outcome that guides the design of products that supports subjective wellbeing, through the analysis of common and key themes.
- To collect primary research about participants' comparative views and bias towards existing chair designs and to develop an outcome that guides the design of products that support subjective wellbeing, through the analysis of common and key features.
- To compare outcomes from the previous three sections correlating any overlap or perceived key aspects. Culminating in a single final outcome, that lists design aspects and considerations that support subjective wellbeing.

## Thesis Structure

The structure of this thesis is broadly split into three sections: Contextualization, Research Method and Discussion. The first section, Contextualization, explores secondary research surrounding affective interactions and focuses on analysing existing systems and frameworks for designing products that promote subjective wellbeing. The second section, Research Method, conducts primary inductive research where participant interactions with chairs are recorded and analysed through the use of grounded approaches. The final section, Discussion, condenses and compares the findings of the previous two sections and their resulting outcomes in order to develop a more rigorous understanding of if and how designed products can affect subjective wellbeing. Four outcomes are generated throughout the body of research. The first three comprising of primary and secondary research components which culminate in the fourth and final outcome which presents the findings of this thesis. This structure is shown in figure 1.

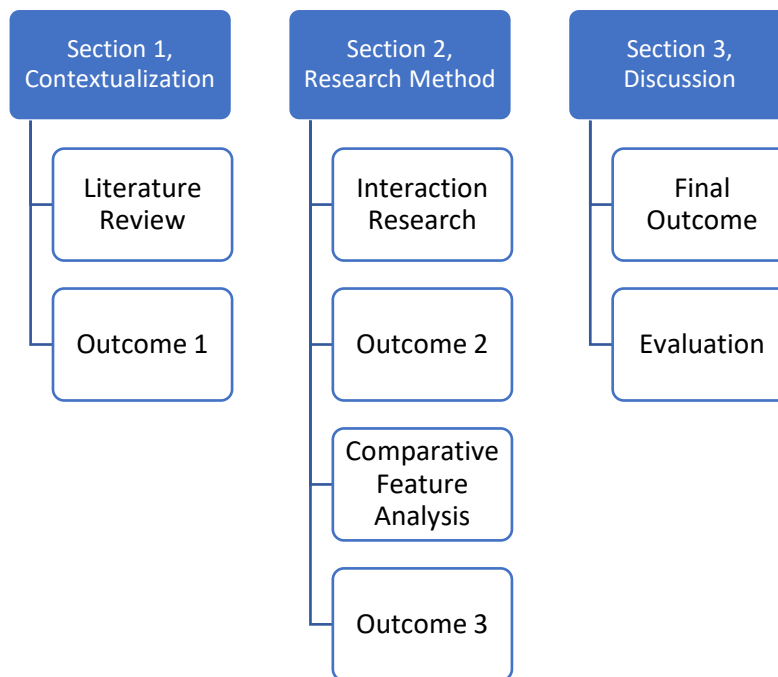


Figure 1: Diagram of Thesis Structure

## Methodologies

*“There is no escape from philosophy. The question is only whether a philosophy is conscious or not, whether it is good or bad, muddled, or clear. Anyone who rejects philosophy is himself unconsciously practicing a philosophy”.* (Valentine, 1992, p. vi)

Philosophical stances are unique to each of us and are derived from some of the same factors that can dictate affective responses in product design. These stances guide both our decisions and biases in life and effect our analysis and judgement surrounding research. Brent Slife and Richard Williams illustrate quite well the importance of acknowledging philosophical stances in their book, “What’s Behind the Research?”.

*“The desire to be open-minded may lead people to think that they have avoided biases, when all that they have really avoided are the biases that they are aware of – the nonhidden ideas. The irony is that the ideas that end up guiding educational and therapeutic interventions are the ones that these teachers and therapists know the least. Ideas guide all interventions; behavioural science professionals have no choice about this. There is a choice, however, about whether these ideas remain unknown”.* (Slife and Williams, 1995, p.9)

Slife and Williams express a need to define one’s philosophical stance, to contextualise your research among others. Defining a general philosophical approach is something that has become normalised within the research community; however, much of the terminology is yet to homogenise. Egon Guba refers to this concept as a *“Basic set of beliefs that guides action”* (Guba, 1990, p.17), which is later mirrored by the term *Worldview* (Creswell and Creswell, 2018, p.5). Other definitions of this concept include *Paradigms* (Lincoln, Lynham and Guba, 2011; Mertens, 2010), *Epistemologies and Ontologies* (Crotty, 1998) and *Broadly Conceived Research Methodologies* (Neuman, 2009). Due to the succinct nature of the term *Paradigms*, this research will adopt the term when referring to the philosophical and cultural stance underpinning this research.

Post-Positivism, Constructivism, Transformative and Pragmatic Paradigms (Creswell and Creswell, 2018) are examples of different but equally valid approaches to research. Each of

these Paradigms has their own strengths and weaknesses and are often favoured by different types of academics and researchers. Given the subjective nature of wellbeing the researcher's ontological position is that reality is constantly renegotiated, debated, and interpreted. Therefore, the epistemological position is that the best methods for research are the ones that solve problems, giving the research paradigm of pragmatism (Lee and Lings, 2008; Saunders, Lewis and Thornhill, 2009; Creswell and Creswell, 2018; Frey, 2018; Maarouf, 2019; Kelly and Cordeiro, 2020).

The pragmatic paradigm, adopted by in this thesis, allows and accounts for the subjective nature of affective influence and serves to ensure that the researcher remains aware that there is likely to be more than one 'reality' in this research (Frey, 2018). At the same time, a consensus may be reached on certain factors which the participants believe influence well-being. Some of the earliest uses of Pragmatic Paradigms can be found in the works of C. S. Peirce, William James, George Herbert Mead and John Dewey, and several others (Cherryholmes, 1992). A Pragmatic Paradigm focuses on approaching a question from all angles to gain a true understanding of the problem. And as such allows for this research to make use of mixed method approaches such as grounded theory supporting a broad holistic approach to research (Rossman and Wilson, 1985, p. 6). A common sentiment surrounding this approach is the Pragmatist's rejection to quantifying reality in research. This is noted by Cleo Cherryholmes in their 1992 paper "Notes on Pragmatism and Scientific Realism" (Cherryholmes, 1992) and also by Richard Rorty in their paper "Pragmatism as anti-representationalism" where they wrote that they, "would simply like to change the subject" (Rorty, 1990, p. xiv). Echoes of this way of thinking are found in Gaver and Desmet's introductions to Emotional Design, where they argue that people are subjective and unique and by focusing purely on quantifying their environment can invite ignorance of their individuality.

In order for a Pragmatic Paradigm to incorporate qualitative and quantitative approaches to research it can lean on other Paradigms like Constructivism and Post-Positivism. Constructivism or Social Constructivism is often seen as a Paradigm favouring qualitative research. This Paradigm has been repeatedly defined in the papers of Karl Mannheim, Peter Berger and Thomas (Berger and Luckmann, 1967) and Yvonna Lincoln and Egon Guba (Lincoln and Guba,

1985). Constructivists, “seek understanding of the world in which they live and work. Individuals develop subjective meanings of their experiences – meanings directed towards certain objects or things” (Creswell and Creswell, 2018, p.8). This description of a Constructivist approach illustrates one of its core tenets. A Constructivist understands that subjective response is often paired with differences in opinion, because of this they look at their research as a more complex matrix rather than assigning narrow meanings or ideas into finite categories. This component of a Constructivist viewpoint could be compared with Mark Hollins’ “Robust orthogonal dimensions” (Hollins. et al, 1993, p. 697), discussed in the literature review section of this thesis. Due to the qualitative nature of Constructivist research, Constructivists make use of open-ended questions and other research methods that allow participants to share their personal and cultural views. The utilisation of these aspects within this research’s Pragmatic Paradigm allows for greater consideration of the subjective when collecting and analysis data.

Post-Positivism is a Paradigm that favours quantitative research methods and is seen as a developed form of the Scientific method or Positivist approach used by scientists such as Charles Darwin and many other key historical figures. The emergence of Post-Positivism is often credited to 19<sup>th</sup> century writers, such as Comte, Mill, Durkheim, Newton, and Locke (Smith, 1983). By their definition, a Post-Positivists Paradigm still subscribes to the linear quantitative forms of research favoured in Positivist circles, however they choose to challenge the traditional concept of absolute truth especially when studying the behaviour and actions of humans (Phillips and Burbules, 2000). A Post-Positivist approach attempts to find empirical evidence to support, summarize or develop a hypothesis while ensuring scientific validity through examinations of methods and biases. These aspects are adopted by this research’s Pragmatic Paradigm in order to contextualise and compile collected data through empirical scientific methods.

The Pragmatic Paradigm adopted by this research is ultimately an amalgamation of these three unique approaches, rooted in Pragmatic philosophy while making use of both Constructivist and Post-Positivist methods. An inductive mixed method approach is taken towards this research, allowing for both qualitative and quantitative data to be collected while also remaining aware of not only the researcher’s culture and bias but also those of the participants.

Beyond the philosophical stance defined above, specific methodological choices have been made to ensure the validity of this thesis' findings. Three research components have been chosen to enable cross-comparison and strengthen their specific findings. Each of these sections reflect several of the tenets described in the Pragmatic, Constructivist and Post-Positivist paradigms described above.

The first research component, the Literature Review, considers a variety of relevant studies and concepts surrounding the concept of affect and the interplay between environment and subjective wellbeing. A modified version of the KJ method of analysis, defined on page 46, was used to codify, and correlate common themes and sentiments to create a short list of factors that the literature indicates could affect the subjective response of an individual.

The second research component, Interaction Analysis, covers the collection of primary research about participant's interactions with their own chairs. This section makes use of a digital questionnaire, hosted by the company SurveyMonkey, and distributed to staff at the University of Wales Trinity Saint David and on online forums such as r/samplesize and r/productdesign. This research is based in grounded theory where both qualitative and quantitative data was collected, codified, and compared using the same KJ method used to analyse the findings of the Literature Review. This is defined on page 56. The questions selected for use in the questionnaire were mostly quantitative with a small number of quantitative questions being used to define participant demographic. (Appendix 1)

The third research component, Comparative Feature Analysis, makes use of another questionnaire to capture participant data on preconceived ideas, bias, and reactions to images of designed chairs. This section makes use of another digital questionnaire targeting the same participant demographic of academic staff and tech-literate English-speaking forum members. This questionnaire differentiates itself in composition from the first by deriving quantitative results from a series of multiple-choice questions and only using qualitative questions to supplement these findings. By using bipolar adjective pairings on a differential scale, and by normalising by demographic, the results of this research are contextualised by the findings of

the Interaction analysis and Literature review and output as list of features that affect the subjective. (Appendix 2)

Due to the subjective nature of the interactions researched here it was important to collect both qualitative and quantitative data on participants. The qualitative data collected by the Literature Review and the Interaction Analysis sections allows for a breadth of concepts, voices and bias to be collected and reviewed. While the quantitative data collected through the Comparative Feature Analysis contextualises these sentiments with empirical findings. It is through this grounded, mixed method approach (Glaser, 1998) that validity can be ascribed to the findings of this thesis despite the short comings of individual research components.

In the final section of this thesis the findings of each of the research components are analysed through a Convergent Design process (Creswell and Creswell, 2018, p.218). And creates a list of factors that, this thesis indicates, can affect the subjective interaction between users and designed products.

# Literature Review

## Introduction

This literature review is the first of the three research sections that make up this thesis. This section attempts to correlate themes and concepts from key research surrounding Emotion and Design, to analyse these findings, and to create a specification or methodology that can be referenced later in this thesis.

This Literature Review is split into four sections that help to state and contextualise many of the key concepts found in Design and Emotion. These four sections are broken down further into individual topics and key texts that are encompassed by the overarching section.

- Affect and Subjective Wellbeing.
  - Affect
  - Wellbeing
- Design and Emotion
  - Conference on Design and Emotion
  - Emotional Design
  - Case Study 1: Positive Design, An Introduction to Design for Subjective Wellbeing
  - Biophilic Design
  - Frustrating by Design
- Kansei Engineering
  - Translating the word ‘Kansei’
  - Case Study 2: Kansei Engineering: A new ergonomic consumer-oriented technology for product development
- Psychology and Wellness
  - The Psychology of Space
  - Wellness Through Space

In the section “Affect and Subjective Wellbeing” these two terms are clearly defined and their relevance and impact to this research is discussed.



The section “Design and Emotion” covers many of the key proponents of western Design and Emotion thinking, investigates similar attempts to create a methodology for designing products that aid subjective wellbeing, and explores several discussions on if and how products can affect users.

The third section “Kansei Engineering” investigates an eastern approach to Design and Emotion thinking and attempts to translate some of the more complicated concepts for comparison with western design thinking.

In the last section “Psychology and Wellness” this research explores examples of non-design-based frameworks and rules for promoting subjective wellbeing and how environmental and psychological factors can affect subjective wellbeing.

The outcome of this Literature review is a list of questions that reflect many of the important considerations for improving subjective wellbeing displayed in the literature. The literature is analysed by using a modified version of the KJ method, developed by Japanese ethnographer Jiro Kawakita and widely used as a technique for generating and prioritising ideas in studies across many fields (Scupin, 1997). This technique, which is also commonly referred to as affinity diagramming, breaks these texts down into their key components, codifies them, groups them semantically and finally charts them displaying common and outlying themes.

## Affect and Subjective Wellbeing

### *Affect*

n. any experience of feeling or emotion, ranging from suffering to elation, from the simplest to the most complex sensations of feeling, and from the most normal to the most pathological emotional reactions. Often described in terms of positive affect or negative affect, both mood and emotion are considered affective states. Along with cognition and conation, affect is one of the three traditionally identified components of the mind. (APA, 2020)

To be affected by something is to be influenced by it. In the past “affect” has been used to simply refer to feeling –to be affected is to be made to feel something. The modern field of Psychology refers to “affect” as a “special kind of influence—something’s ability to influence your mind in a way that is linked to your body” (Barrett and Bliss-Moreau, 2009, p.167). More specifically “affect” is used as part of a framework that describes the ways in which people comprehend stimuli. The cognitive scientist and leading design theorist Don Norman described the distinctions between affect and emotion.

Affect is the general term for the judgmental system, whether conscious or subconscious. Emotion is the conscious experience of affect, complete with attribution of its cause and identification of its object. The queasy feeling you might experience, without knowing why, is affect. Anger at Harry, the used-car salesman, who overcharged you for an unsatisfactory vehicle, is emotion (Norman, 2004, p.11)

Some of the first references to this definition of affect can be found in the culmination of Silvan S. Tomkins life’s work “Affect Imagery Consciousness”. A series which he spent the latter part of his life working on, from 1950s up until his death in 1991. While introducing his first volume he writes.

*“For decades now ‘behaviour’ and unconscious hydraulic-like forces have dominated the study of human being. The emergence of ego psychology, the theory of cognition and a renewed interest in neurophysiology are signs that the excesses of Psychoanalytic theory and Behaviourism alike are in process of radical modification”.*  
(Tomkins, 1962, p.3)

Tomkins proposes that the leading Psychologists’ pursuits within the fields of Behaviourism and Psychoanalysis focused on overarching sterile approaches, seeking meaning in behavioural patterns, and often overlooking the degrees of consciousness as a form of response. In the later volumes of his work Tomkins attempts to further broaden the focus of Psychologists around the world, from ideas of habit and behavioural patterns to bespoke concepts of interplay between the conscious and unconscious and motivational and non-motivational systems, in other words, ‘Affect’ (Tomkins, 2008).

One of Tomkins' key approaches to affect focuses on how affect can be conveyed through a person's face. His form of affect operates on several degrees of intensity and often reflects complimentary word pairings. *i.e. Enjoyment-Joy, etc.* This analysis through word grouping is something that has persisted through to contemporary studies surrounding affect. Examples can be found in much of the design research conducted from the early 1990s to present day. One of the fields that heavily supports this type of research is Psychophysiology where often participants' responses to physical interactions and stimuli are attempted to be measured. Hollins, Faldowski, Rao, and Young (1993) and later Hollins, Bensmaia, Karlof, and Young (2000) focused on tangible affective interaction. Through these approaches they found "robust orthogonal dimensions" of touch perception (Hollins. et al, 1993, p. 697). In essence, showing strong perceived correlations between haptic responses, e.g., roughness-smoothness. In a more recent study, Tiest (et al) investigated over 120 stimuli and found that the perceptions of roughness and softness might depend on more than one physical parameter of the stimuli in some combined way, further supporting this concept (Tiest, et al. 2006, p. 1-20). This idea of multiple stimuli or orthogonal dimensions as Hollins describes mirrors perfectly the complimentary word pairs found in Tomkins' work.

### *Wellbeing*

*n.* a state of happiness and contentment, with low levels of distress, overall good physical and mental health and outlook, or good quality of life. (APA, 2022)

'Wellbeing' by this definition is a state of contentment that people strive to achieve within their life, however this is not the only way of looking at a person's wellbeing. Subjective wellbeing is a term that shows up in much of the research surrounding Design and Emotion. This term differs from the dictionary definition of wellbeing through an emphasis on individuality and subjective response (Dodge, et al, 2012). The scientific study of wellbeing can be dated back to the mid-20<sup>th</sup> century where there was much debate over the nature of wellbeing and many attempts to clearly define the term. One of the most prevalent definitions of the period was posed by the social scientist Norman Bradburn.

*“An individual will be high in psychological well-being in the degree to which he has an excess of positive over negative affect and will be low in well-being in the degree to which negative affect predominates over positive”.* (Bradburn, 1969, p. 9)

This definition of wellbeing, or subjective wellbeing, considers a person in terms of affect. Bradburn poses that wellness can be found when a person’s positive affective responses are more frequent or prevalent than their negative affective responses. As was described in the last section, “affect is the general term for the judgment system” (Norman, 2004, p.11) and is predominantly unique to each individual person. By this definition wellbeing is a completely subjective state that can be reached through different means for different people. In the paper “The Challenge of Defining Wellbeing” (2012) Dodge et al. propose a simplified definition that has been widely adopted in recent years. Their definition is illustrated in figure 2.

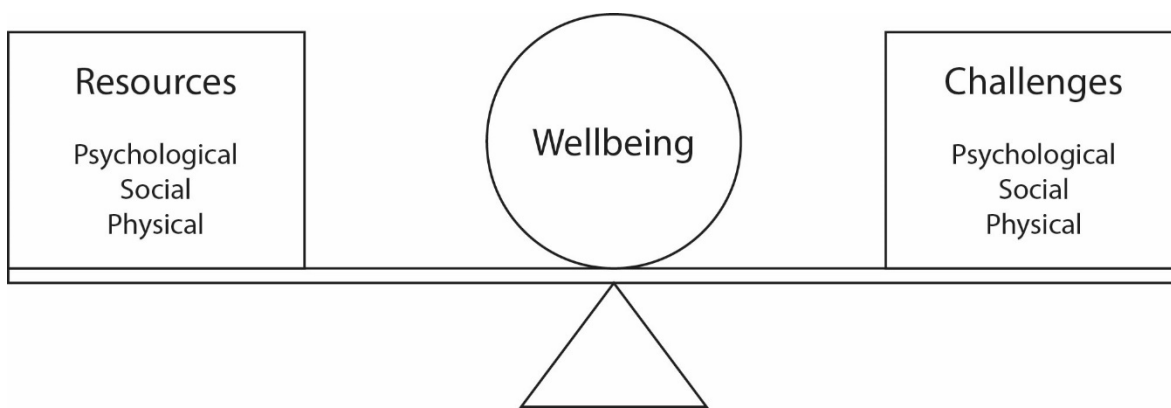


Figure 2: Definition of Wellbeing, Dodge, et al. 2012, p.230

This figure illustrates the drive of an individual to balance both the resources and challenges that surround them in order to reach an equilibrium that could be referred to as wellbeing.

In essence, stable wellbeing is when individuals have the psychological, social and physical resources they need to meet a particular psychological, social and/or physical

challenge. When individuals have more challenges than resources, the see-saw dips, along with their wellbeing, and vice-versa. (Dodge, et al. 2012, p.230)

This precarious vision of wellbeing shows on a basic level how objects and experiences can begin to play into the promotion of subjective wellbeing through the introduction of challenges and resources.

## Design and Emotion

### *Conference on Design and Emotion*

Some of the first recorded discussions of design and emotion were held at the First International Conference on Design and Emotion held in Delft from November 3<sup>rd</sup> to 5<sup>th</sup>, 1999. The editorial notes left by Overbeeke and Hekkert on the proceedings of this event, give good reflective insight into some early theoretical integrations of affect and wellbeing into design thinking.

So-called high-tech products, such as computers, require an enormous cognitive effort on the part of the user. In order to support this user in operating these machines, they try to make them intelligent, for instance by anticipating user responses or needs. User behaviour is however highly emotion driven, leading to a quest for emotional or affective intelligence. (*Overbeeke and Hekkert, 1999, p.5*)

This conference brought together over forty design thinkers and gave them a platform to debate and propose their concepts and ideas about Design and Emotion. Many of these ideas touched on concepts of complicated and personal interactions with objects and environments. Desmet's contribution "To Love and Not to Love: Why do products elicit mixed emotions?" is a good example of how subjective affective response can drive interactions with designed products.

In some cases, products elicit combinations of different emotions within subjects as well. The emotional response of an individual to the Ford Ka for example, could be mixed. Although on the one hand she doesn't like the design and therefore feels aversive, on the other hand she is inspired by the fact that the design has a distinct innovative quality. In this situation she experiences a mixture of both positive emotions, related to

the innovative aspects, and negative emotions, related to the aesthetic aspects of the design. (Desmet, 1999, p.67-68)

In the example given by Desmet, the mixed emotions could be viewed as forms of positive and negative affect, which in turn hints at an understanding of the effect that these affective responses have on subjective wellbeing. This understanding is drawn from a hypothetical analysis of existing products, however other participants of the conference posed specific aspects that might cause specific affective responses in specific users. Cupchik, Leonard and Irvine-Kopetski proposed the impact of social values in their paper “Advertisements: Multileveled in Word and Image and in the Mind of the Beholder” (Cupchik et al., 1998) which Cupchik later reiterated.

At the most superficial level, an object can be seen by the user to resonate with and be symbolic of the self. Thus, perceiving oneself as rich and powerful might lead to conspicuous consumption, such as owning a luxurious car or wearing designer apparel. At a more profound psychodynamic level, having and utilizing an object can compensate for an unconsciously felt inadequacy. This felt inadequacy may be a product of an individual’s life history or induced as a result of social values and norms, for example, about appropriate masculine or feminine styles (Cupchik, 1999, p76).

Cupchik implies the importance of mirrored perception between products and users. If a person can see a reflection of their morals, goals, or beliefs in a product it is more likely to create a strong affective response. This concept can be seen both positively and negatively. If a user can see a reflection of an admired or desired lifestyle in a product, they can find themselves drawn to it. However, as Cupchik points out this interaction may come attached with negative affect from social beliefs about themselves or others. This multi-layered interaction between product and user illustrates the difficulty in creating products to affect subjective wellbeing. With each user of a product having different social beliefs and biases a product that creates positive affect in one person could feasibly cause strong negative affective responses in another. Gaver warns against the ignorance of this multileveled subjective interaction between user and product in his addition to the conference “Irrational aspects of technology: Anecdotal evidence”.

There is no such thing as a neutral interface. Any design will elicit emotions from users, or convey emotions from the designer, whether or not the designer intends this or is even conscious of it. Interfaces can be designed for neutrality, but the effect is not neutral in the sense that it allows emotions to be neglected; instead, it is a choice with its own implications. Ignoring emotional connotations of design can have unpredicted effects. (Gaver, 1999, p.51)

Gaver not only warns against a lack of consideration of an end user's emotions but also the emotions of the designers. When designers create, they impart themselves into their work. Their biases become the work's biases. Their preferences become the work's aesthetics. Gaver illustrates that as a designer it is not only important to create pieces that are functional and beautiful but also genuine. An Ethnographic consideration to both user and designer. This consideration of the user, product, and designer is a thread that has been integrated into some more modern Design and Emotion research. Karana and Hekkert are a good example as they attempt to meld this idea of subjective interaction, with a product's materiality (Karana and Hekkert, 2010) in their journal article "User-Material-Product Interrelationships in Attributing Meanings". They focus on the relative context of materials, participants, and the interrelationships this yields. With them posing that "the contention that meanings of materials in a particular context are shaped by interactions of materials with aspects of products and users" (Karana and Hekkert, 2010 p.49). Karana and Hekkert also note that not only does a product's context shape its user interactions but also the shape and form of the product itself, writing that "the type of product and the way a material is shaped in a product have a big impact on what a material expresses" (Karana and Hekkert, 2010 p.49). These statements are clear reflections of the 'emotional connotation' posed by Gaver in this "First Conference on Design and Emotion"

### *Emotional Design*

We think that these developments are more than a fashionable uprising. They mark the beginning of an era in product design in which the way we emotionally relate to products becomes of increasing interest and importance. Not only because pleasing products sell better, but also because of the widespread belief that we should put an

end to technology driven product design that is not going to contribute to a human and sustainable world. (*Overbeeke and Hekkert, 1999, p.5*)

This first international conference on design and emotion paired with advances in the fields of neurology and psychology set the stage for a profound shift in meta-design thinking throughout the early 2000s. In the years following the conference more designers and scientists chose to investigate affect and emotion as parts of their designs and research. Even Don Norman wrote a sequel to his prolific book “*The Design of Everyday Things*” (Norman, 1988) which was, and is still a staple within design education.

In writing *The Design of Everyday Things*, I didn’t take emotions into account. I addressed utility and usability, function, and form, all in a logical, dispassionate way – even though I am infuriated by poorly designed objects. But now I’ve changed. Why? In part because of new scientific advances in our understanding of the brain and of how emotion and cognition are thoroughly intertwined. We scientists now understand how important emotion is to everyday life, how valuable. Sure, utility and usability are important, but without fun or pleasure, joy and excitement, and yes, anxiety and anger, fear and rage, our lives would be incomplete. (Norman, 2004, p.8)

Norman makes clear in this statement that affect and its applications in design are not always positive and that without both positive and negative affect our lives would be incomplete. These thoughts on the value of emotions and the intertwined nature of positive and negative affect do not only reflect the thoughts of many of the researchers at the first conference on design and emotion but also builds upon some of the more basic concepts of affect. Norman’s grouping of emotions into complementary sets is reflective of Tomkins’ (1962, 2008) work on early affect and Hollins et al.’s (1993) refinement of the concept and attempts to marry these two systems of thought under the scope of design thinking. In his book, Norman expands further from these merged concepts and proposes additional systems for creating affective products with his “*Three Levels of Design: Visceral, Behavioural and Reflective*”.

Human response to the everyday things of the world are complex, determined by a wide variety of factors. Some of these are outside the person, controlled by designer and manufacturer, or



by advertising and such things as brand image. And some come from within, from your own, private experiences. Each is as important as the others, but each requires a different approach by the designer (Norman, 2004, p.63)

**The Visceral level** of design, as Norman describes, is dominated by physical features – specifically the look, feel, and sound of a product. Visceral interactions with a product are immediate and often quite strongly felt. This encompasses what is colloquially now known as a WOW factor, that instant sense of awe at a sudden break in a tree line revealing a breathtaking view or the overwhelming appeal to the lights of a carnival. It doesn't just include these positive affective scenarios but also the negative visceral response of being shown something grotesque or disgusting. (Norman, 2004, p.65-69)

**The Behavioural level** is focused on the performance and usability of a product. Behavioural design involves determining the needs of the user beyond just the physical and ergonomic needs by considering their unarticulated need. This can be in the form of pleasurable or high-quality experiences that build on top of the more physical requirements of a product. (Norman, 2004, p.69-83)

**The Reflective level** covers the culture, message, and the meaning of a product. This component reiterates much of the psychological and design-based research covered thus far. Norman is intentionally vague about detailing influencing factors that effect the degree and type of affective response someone has to a product. Instead, he describes these factors as “the meaning of the things, the personal remembrances something evokes (Norman, 2004, p.84). He goes on to describe products that reflect or fit in with a person's self-image, and products that appeal out of a sense of uniqueness rather than aesthetics or function. (Norman, 2004, p.83-89)

These three levels of design are important to consider as part of this research, as even though many of the ideas around affect are naive and not as developed as in some of the other texts in this section, this is a framework or methodology specifically tailored to creating products and as such incorporates many additional factors outside of pure psychological affect that will have a large impact on the effectiveness of a final product in attempting to promote subjective wellbeing.

Another text that provides us with a framework specifically tailored to the creation of products is posed in the paper 'Positive Design: An introduction to Design for Subjective Well-Being' (Desmet and Pohlmeier, 2013)

### Case Study 1: Positive Design, An Introduction to Design for Subjective Well-Being

Pieter Desmet and Anna Pohlmeier are two of the most well-regarded names in the field of emotional design. Both have published several papers on the subject over the last twenty-five years, many of which have been conducted as part of the Faculty of Industrial Design Engineering at the Delft University of Technology in the Netherlands where they both hold positions. This university is currently at the heart of continuing research in this area and is integral to a majority of papers published in this field. It would not be too far of a stretch to call Delft University the current heart of western Design and Emotion thinking. Desmet and Pohlmeier (2013) describe in this paper the goal of 'Design for Subjective Well-Being' and of Design and Emotion research as 'Positive Design'.

Positive design initiatives deliberately intend to increase people's subjective well-being and, hence, increase an enduring appreciation of their lives. It is important to note that this target is the explicit central objective at the outset of a positive design process, not simply a fortunate side effect of a design: In positive design, the design's *raison-d être* is determined by its effect on subjective well-being. (Desmet and Pohlmeier, 2013, p.7)

In their paper, they also discuss the nature of emotional design, or as they write "the question of how design can contribute to the happiness of individuals – to their subjective well-being" (Desmet and Pohlmeier, 2013, p.5). This is expanded upon throughout their research, building on concepts developed since the first international conference on Design and Emotion, to create a multi-component framework for the implementation of positive design (design that promotes subjective well-being). This framework consists of three distinct components: Pleasure, Personal Significance and Virtue. Shown in figure 3. These three components reflect some of the points discussed in both the First International Conference on Design and Emotion (1999) and Norman's Emotional Design (2004).

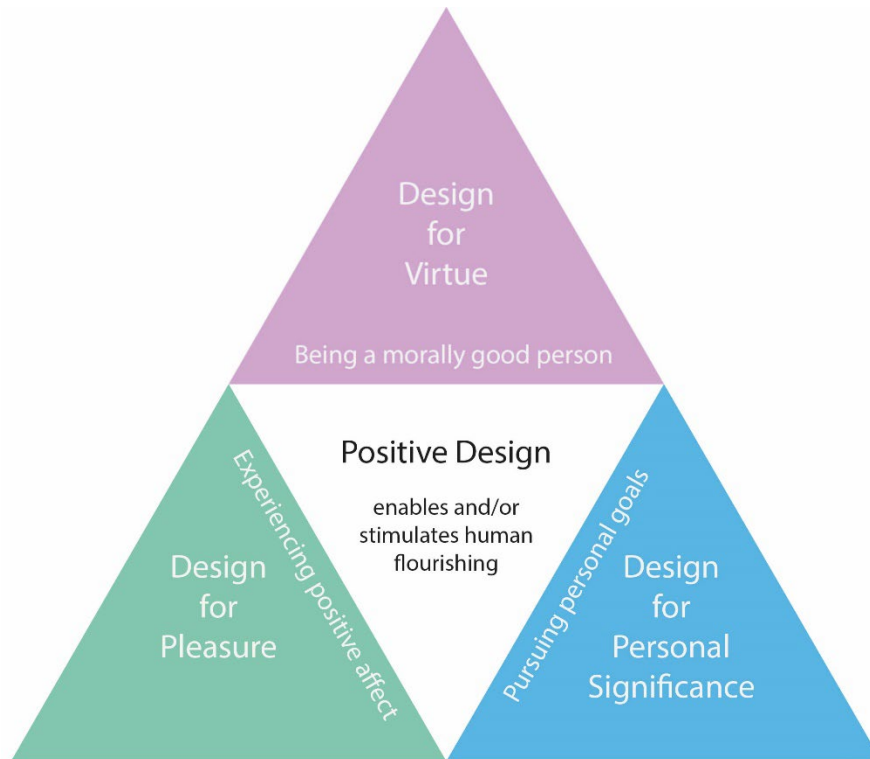


Figure 3: Positive Design Framework. Desmet and Pohlmeier, 2013, p.7

**Pleasure** encompasses a general positive affective response generated by a product. A product should make the user feel good, entertained, or happy and not make them mad or upset.

**Personal Significance** covers the long-term goals or needs of the user. A product should appeal to a user's subjective tastes and aesthetics. They should help to create an image of the type of person the user wants to be or contribute to the types experiences they want to have. An example of this might be, what types of clothes they want to be seen wearing and what kinds of experiences they might like while wearing them.

**Virtue** considers a product's morality. This is often how a product appeals to a user on a cultural and social level. A user who has grown up being taught to protect the environment would find an eco-friendly product more appealing, or a user who holds certain beliefs may not like products that make use of leather or other animal products.

This framework is loosely derived from classifications indicated in work done by the philosophers and psychologists Parfit (Parfit, 1984) and Ryan and Deci (Ryan and Deci, 2001) and is structured to follow positive psychology as defined by Seligman (Seligman, 2002). The framework introduced here also seems to reflect the “Framework of Product Experience” published by Desmet and Hekkert in 2007 (Desmet and Hekkert, 2007, p.60).

In supporting this framework Desmet and Pohlmeier defined certain subjective terms such as subjective well-being and happiness. In explaining subjective well-being, they turn to the definition posed by Ed Diener and Robert Biswas-Diener in their 2008 study “Happiness: Unlocking the mysteries of psychological wealth”, who puts subjective wellbeing in terms of what they call true wealth.

Here are some essential components of true wealth:

- Life satisfaction and happiness
- Spirituality and meaning in life
- Positive attitudes and emotions
- Loving social relationships
- Engaging in activities and work
- Values and life goals to achieve them
- Material sufficient to meet our needs

Ultimately, the quality of your life will suffer if you do not develop each aspect of your true wealth. (Diener and Biswas-Diener, 2011)

These criteria for subjective wellbeing imply that the process happens over a large period of time and refers to many intangible subjective aspects of life. Even when Diener and Biswas-Diener refer to the attainment of these they use the term “develop” suggesting that subjective wellbeing is not something simply attained overnight through the acquisition of a new object but something that accumulates over time. Desmet and Pohlmeier regard this writing:

This process-orientation is perhaps best exemplified by the developmental characteristic of flourishing: Continual development and self-actualization become goals for their own sake instead of only means to reach perfection. While some design projects only aim for user satisfaction during interaction with the designed object, or for the immediate

benefits that may be garnered as a result of product use (e.g., task facilitation products) (Desmet and Pohlmeier, 2013, p.13)

This concept that time plays a large role in how people interact and are affected by products is reminiscent of Norman's Reflective Level of design (2004), and Desmet's (1999) and Cupchik's (1999) statements on socially derived bias. All of these concepts reference a person's beliefs and morals that have been derived through a lifetime of experiences.

Another term Desmet and Pohlmeier attempt to define is happiness. To do this they lean on a definition given by Ruut Veenhoven in his 1984 paper "Better World Happier People?". He defines the phenomenon of happiness as "the degree to which an individual judges the overall quality of his/her own life-as-a-whole favorably". (Veenhoven, 1984, p.3) This definition of happiness can be broken down through some of the concepts discussed earlier in this Literature Review. The use of the word judge is important here as it illustrates the intertwined nature of happiness and affective response as seen in Norman's description of affect as a "judgemental system" (Norman, 2004, p.11). The statement "the overall quality of his/her life" implies a holistic approach to affective response that individual concepts can contribute to but cannot be quantified through a single interaction. And finally, "favorably" considers that a holistic, positive affective impulse is required to reach a state of happiness or enhanced subjective wellbeing.

Ideas of how the concept of happiness interacts with affect can be seen as far back as the works of Tomkins. He states that, to understand terms such as happiness it is often necessary to view them as more than an individual term and instead form associated pairings (Tomkins, 2008). This analysis through word grouping is something that has persisted through to contemporary studies surrounding affect, and design and emotion. Examples of this can be found supporting methods of analysis in much of contemporary design research. One of the fields that heavily supports this type of research is Psychophysiology, where often participants' responses to physical interactions and stimuli are attempted to be measured. Hollins, Faldowski, Rao, and Young (1993) and later Hollins, Bensmaia, Karlof, and Young (2000) focused on tangible affective interaction. Through these approaches found "robust orthogonal

dimensions” of touch perception (Hollins. et al, 1993, p. 697). In essence showing strong perceived correlations between haptic responses, e.g. roughness-smoothness. In a more recent study, Tiest (et al) investigated over 120 stimuli and found that the perceptions of roughness and softness might depend on more than one physical parameter of the stimuli in some combined way, further supporting this concept (Tiest, et al. 2006, p. 1-20). These associated pairings even show up in discussions of subjective wellbeing. Eid and Diener write that “Subjective Wellbeing refers to one’s multi-dimensional evaluation of their lives, including cognitive judgments of life satisfaction as well as affective evaluations of moods and emotions.” (Eid, Diener, 2004, p.245). Lyubomirsky builds upon this as a “multi-componential phenomenon”, when discussing his model of subjective wellbeing saying that “the experience of joy, contentment or positive well-being, combined with a sense that one’s life is good, meaningful and worthwhile” (Lyubomirsky, 2007, p.32).

### Biophilic Design

Biophilia or Biophilic Design is a modern approach to design in which designers focus on creating spaces to promote subjective well-being through mirroring natural environments. Most commonly this is seen in architecture and landscaping however, there are a few design studios that are beginning to adopt Biophilia as a design approach such as Orangebox (Orangebox Insight, 2017) and Herman Miller (Herman Miller, 2013). One of the first uses of the term Biophilia is found in the 1964 book “The heart of man, its genius for good and evil” written by Erich Fromm. In his book, Fromm refers to Biophilia as “the love of life” (Fromm, 1964, p.13). It was Edward Wilson with his 1984 book “Biophilia” that shifted the focus away from Fromm’s philosophical concept and towards a more practical application. Wilson discusses his ideas of Biophilia while reminiscing about a great costal forest he had once seen near a small South American village called Arawak:

The emotions I felt were to grow more poignant at each remembrance, and in the end, they changed into rational conjectures about matters that had only a distant bearing on the original event. The object of the reflection can be summarized by a single word, biophilia, which I will be so bold as to define as the innate tendency to focus on life and life-like processes. (Wilson, 1984, p.1)

This passage is interesting as it implies that this emotional, affective experience interaction was still affecting Wilson long after the event and became such a prominent memory that he would often reference the interaction even when discussing tangential topics. Not only does Wilson describe this as a reflective and remembered experience which is echoed in Norman's Reflective Level of Design (2004) and Desmet and Pohlmeier's Positive Design Framework (2013) as "personal remembrances" and "Design for Personal Significance" respectively, but also implies that this Biophilic interaction is something that is inherently understood and not a subjective reaction influenced by social bias as introduced in this Literature review by Desmet (1999) and Cupchik (1999). This is an important thread in this research as it illustrates an appreciation of common and uniform affective responses to specific interactions.

One of the most compelling pieces of research in the field of Biophilic design was undertaken by Roger Ulrich et al. in their 1984 paper "View Through a Window May Influence Recovery from Surgery" (Ulrich, et al., 1984). In this study they adopt an inductive approach, expanding on an anecdotal acceptance of the positive effects of natural spaces, in an attempt to quantify an increase in the physical wellbeing of patients in a hospital ward. To do this they investigate the interactions between the views patients recovering from surgery could see from their wards and their recovery rates. Ulrich et al. detail these assumptions, writing:

Investigations of aesthetic and affective responses to outdoor visual environments have shown a strong tendency for American and European groups to prefer natural scenes more than urban views that lack natural elements. Views of vegetation, and especially water appear to sustain interest and attention more effectively than urban views of equivalent information rate. Because most natural views apparently elicit positive feelings, reduce fear in stressed subjects, hold interest, and may block or reduce stressful thoughts, they might also foster restoration from anxiety and stress. (Ulrich, 1984, p. 420)

Ulrich et al. pose that, reduced fear and stress, reduced stressful thoughts, ability to hold interest, and creation of a restorative environment are components for improved wellbeing that are anecdotally attached to the experience of natural views. Despite this paper attempting to quantify improvements to physical wellbeing many of the aspects they attempt to test are

inherently subjective like stress and interest, this holistic approach can be seen echoes in a lot of Design and Emotion and psychological research, notably in Dodge et al.'s "Definition of Wellbeing" (Dodge, et al. 2012, p.230) where both psychological resources and challenges are intertwined with their physical counterparts.

To validate these claims Ulrich et al. compared the recovery rates of participants recovering from the same gall bladder surgery in two separate wings of the same hospital. The only difference was that one wing had views of trees visible from their ward whereas the other had views of a brick wall (Ulrich, et al., 1984, p.420). Ulrich et al. ultimately found that "patients with the tree view had shorter postoperative hospital stays, had fewer negative evaluative comments from nurses, took fewer moderate and strong analgesic doses and had slightly lower scores for minor postsurgical complication" (Ulrich, 1984, p. 421). These findings were some of the first scientific validations of the general anecdotal belief surrounding natural environments and their ability to promote positive affect and as such underpin much of Biophilic Design today. This underpinning has become even more prevalent in Biophilic research since the beginning of the Covid-19 pandemic in 2020 with papers such as McGee and Park's "Colour, Light, and Materiality: Biophilic Interior Design Presence in Research and Practice" (McGee and Park, 2022) and "The impact of natural environments and biophilic design as supportive and nurturing spaces on a residential college campus" (DeLauer, et al, 2022) highlight the importance of the concepts supported by Ulrich et al within this isolated period of history.

## Frustrating by Design

Products can be frustrating. It is understood that complex or confusing products can cause negatively affective interactions. These frustrations can be alleviated in well-designed products but in others, they can become a permanent thorn resisting the promotion of subjective wellbeing through the imbalance of positive and negative affect. Norman touches on this sentiment in his "Behavioural Level of Design" (2004) and has large sections dedicated to this in his book "The Design of Everyday Things" (1988). Alan Cooper discusses a similar concept of frustration in his book "The Inmates are Running the Asylum" where he details the



contradictions introduced by outside influence during the design process and their effect on, in this case, a digital product's quality and function (Cooper, 1999).

“Unfortunately, most executives have an almost irresistible desire to reduce the time and money invested in programming. They see, incorrectly, the obsolete advantage in reducing costs. What they don't see is that reduction in investment in programming has strong negative effects on a product's long-term quality, desirability, and therefore profitability”. (Cooper, 1999, p.xxiii)

These problems, as Cooper states, are often a result of industrialised product manufacturing and development. Cheap and quickly made products are notorious for this, they not only lead to the creation of lower quality products but also products that are more frustrating and difficult to interact with. Rosalind Picard argues that this concept can be even more pronounced in computer programming due to the complexity of many interfaces and the speed with which they are updated and changed (Picard, 1997). These issues however are often unintentional. While these examples describe how frustration is born from the misunderstanding and subsequent misuse of design and emotion principles, some designed products intentionally make use of frustration as a tool when designing products. The behavioural psychologist, Chirs Nodder describes products designed in this manner as “Evil” (Nodder, 2013). In Nodder's book “Evil by Design” he illustrates some of his principles of design and emotion in the form of deadly sins. To educate the reader as to how companies design products to manipulate and develop unhelpful habits, he lists the seven deadly sins as components of affective design.

**Pride** covers a product's image and how it is perceived by a user. He makes emphasis that a product's perceived image doesn't necessarily need to be supported by functionality and that an image can often make up for aspects of a product. An example he gives for this 'cognitive dissonance' is within the image of cigarettes, despite now knowing the long-term effects of cigarettes the attempts to change the image of cigarettes are slow and many people still perceive cigarettes as being cool and trendy. (Nodder, 2013, p.1-39)

**Sloth** covers a behavioural system of preferred interaction with products and spaces. Nodder poses that people will often follow a “Path of least resistance” when interacting with a product and that barriers to this path can promote frustration. He explains how designers can misuse by obfuscating methods of navigation or control all while offering paid alternatives that give a user access to this path of least resistance. Digital cookies are a good example of this in 2022 as it is not uncommon to find that when you access a website for the first time you are prompted with a button to ‘ACCEPT COOKIES’ and to decline those you must navigate through unclear menus just to get access to the page. (Nodder, 2013, p.39-67)

**Gluttony** covers some of the ways in which companies reward users for increased interaction or use of their products. He describes this as a sense that “I’ve earned it; I deserve it” and references the impact of discount and loyalty schemes on a company’s sales even if the consumer doesn’t save any money in the long run. The importance is in the sense that the user is being rewarded for their interactions even if the rewards are trivial or non-substantial, and the fear and guilt of losing these benefits if the user was to stop these interactions. Another aspect of gluttony is investment. If a person invests time and energy into learning how to use or interact with a product, they are less likely to discard it if they encounter issues down the line. Companies will often use inflated scarcity and loss aversion to get users to invest time, energy, and even money into a product. This investment in turn means they are less likely to stop using the product as after all they’ve put so much effort into it already. (Nodder, 2013, p.67-103)

**Anger** is discussed as a form of negative affective response and Nodder considers how to manage these interactions with a product. He starts off by noting that, if possible, you should avoid these kinds of responses but if they are unavoidable, it may be possible to balance them through positive affective response, the example he gives for this is humour. He also poses by changing and updating products anger can be lessened by implementing negative aspects slowly over time stating that “If individual changes are sufficiently inoffensive, people won’t become irate enough to revolt” (Nodder, 2013, p.107). This can be seen in use with subscription companies like Netflix and Disney slowly increasing their fees over time instead of all at once. This could also feasibly be applied inversely with the degradation of

physical products; a user is less likely to become frustrated with a product if it slowly wears out rather than breaking all at once. (Nodder, 2013, p. 103-137)

**Envy** again touches on how a product is seen but instead of focusing on a product's general image 'Envy' covers ownership of a product and the status that implies. Senses of importance and ownership are key to this concept and can be used to heighten interaction with a product. This kind of influence can be seen in crowdfunded products where you are often made to believe that you are not just buying a product, you're becoming part of an elite community that made the product happen. (Nodder, 2013, p.137-169)

**Lust** is another section influencing the perception of a product. Instead of focusing on the looks or status attached to a product 'Lust' focuses on eliciting an emotional investment or desire from a user. Companies can use these emotional investments to convince users to use or buy their new products or experiences and will often create communities or give products away to foster these kinds of biases. (Nodder, 2013, p.169-203)

**Greed** covers many addictive influences and focuses on "gamifying" product interaction and creating systems to keep users returning through the application of the other sins. An example being giving gifts or rewards for interacting with a product and making those interactions personal rather than arbitrary. (Nodder, 2013, p.203-249)

Nodder isn't the only person to dissect products that support addictive behaviour Nir Eyal describes these as "Habit Forming Products" (Eyal, 2014). Eyal's book "Hooked: How to Build Habit-Forming Products" (Eyal, 2014) mirrors many of the concepts described by Nodder but argues that these habit-forming products aren't necessarily bad and that his "Hook model" can be used to improve a product's profitability through subtly encouraged user behaviour.

Companies that form strong user habits enjoy several benefits to their bottom line. These companies attach their product to *internal triggers*. As a result, users show up without any external prompting. Instead of relying on expensive marketing, habit forming companies link their services to the user's daily routines and emotions. (Eyal, 2014, p.3)

As may be evident many of these concepts can be problematic when applied to products and can cultivate negative affective interactions, and possibly some of the negative addictions that we see today. However, as evident in the texts, subjective wellbeing can be found in a balance between positive and negative affect, and because of this, it is important to consider these frustrating and negative aspects as a ballast to the more conventional positive frameworks explored in this Literature Review.

## Kansei Engineering

### *Translating the word 'Kansei'*

The appearance of the term Kansei in Japanese literature began at least as far back as the 17<sup>th</sup> century (Shirane, 2008, p.197). Lévy introduces “Nanshoku masukagami (lucid mirror of nanshoku)” (Lévy, 2013), which they presume was written by Yoshida in 1687 (Yoshida, 1687/1950), as one of the first Japanese works in which the term kansei appeared in print. The first academic use of the term however is found in the Meiji era, a Japanese period from 1868 to 1912 (Frédéric, 2002, p.624), in either Teiyu Amano’s translation of the text “Critique of Pure Reason” by Immanuel Kant (Kant, 1781) or from Amane Nishi’s translation of the text “Mental Philosophy: Including the intellect, sensibilities and will” (Haven, 1881). With the term Kansei being used to substitute the terms “Sinnlichkeit” meaning “sensuality” in English (Cambridge Dictionary, 2022) and “sensibility” (Miura, 2011, p. 341-342). Mitsuhiro Toho attempts to provide a more accurate translation of the modern term used in design practice in his unpublished paper presented at Kansei w praktyce Conference (Kansei in practice Conference), Warsaw in 2006.

“The Japanese origin word Kansei is widely accepted in the world as a technical term in the fields of engineering, industrial design and several others. The reason for this is clear. It is difficult to find any appropriate term by which Kansei could be replaced in other languages.” (Toho, 2006, p.1)

It is clear to see the difficulty in finding an appropriate translation for the term when analysing the two Sino-Japanese characters that make up the work kansei, kan 感 and sei 性. The Nelson’s Japanese Character Dictionary describes these characters as:

Kan 感: feeling, sensation, sentiment, sense, emotion; impression, intuition, perception, sensibility, influence, touch

Sei 性: sex, gender, nature, attribute

(Haig, 1997)

Many of these attributes are also found in western Design and Emotion thinking. We could translate the term to reflect Gaver's (Gaver, 1999) concept of the perception of attributes. Or alternatively, we could see this term as akin to Desmet's (Desmet, 1999) description of cultural subjectivity, unique to each person. Or even as any number of alternative parallels of which hardly any would fully represent Kansei. Mitsuo Nagamachi, who is widely regarded as the founder of Kansei Engineering (Affective Engineering), a design practice that implements aspects of Kansei, attempts to translate Kansei through this example.

*"Imagine a scenario where you are searching for a restaurant during lunchtime. You are very hungry and find a restaurant you are not familiar with. When you enter, you first meet a waitress. She welcomes you and guides you to a table. You order a dish, and while you wait you look around the room. Then, you smell the aroma and are pleasantly surprised at the sight of the exquisite cuisine the server places on your table. The taste is beyond your expectations. Your impression of the restaurant escalates and makes you feel splendid.*

*When you first entered the restaurant and met the waitress, you felt some abstract feeling. When you looked around the interior, you had a good sense about the place. You felt pleased with the restaurant. Then, the cuisine was great. These feelings are all Kansei. Kansei is a Japanese word that expresses the feelings gathered through sight, hearing, smell, and taste. In our scenario, finally you think of this restaurant as splendid and someday you want to take your family there. This is also Kansei"*

(Nagamachi, 2011, p.1)

Kansei is a term that umbrellas many of the concepts that we refer to as design and emotion but can offer a very different cultural perspective. Due to this, it may be unfair to refer to

Kansei Engineering (Affective engineering) as a subsection of Emotional Design, which is why this Literature Review regards it as a separate approach to promoting subjective wellbeing. Kansei Engineering (Affective Engineering) then, as an application of these aspects, is an important consideration in any discussion on design to promote subjective wellbeing due to its own set of philosophical biases and views.

*Case Study 2: Kansei Engineering: A new ergonomic consumer-oriented technology for product development*

The first reference to the term Kansei Engineering was in a lecture given by the president of Mazda Motor Company Kenichi Yamamoto in 1986 (Lévy, 2013) titled “‘Kansei’ Engineering: The Art of Automotive Development at Mazda” (Yamamoto, 1986). However, mainstream adoption of the term came later with Mitsuo Nagamachi’s paper “Kansei Engineering: A new ergonomic consumer-oriented technology for product development” (Nagamachi, 1995). In this paper, he defines Kansei Engineering as “translating technology of a consumer’s feeling and image for a product into design elements” (Nagamachi, 1995, p.3). Nagamachi breaks his method of Kansei engineering into three processes: Type 1 “A Category Classification”, Type 2 “Kansei Engineering Computer System”, and Type 3 “Kansei Engineering Modeling”.

**Type 1 ‘Category Classification’**

This describes a method of design analysis in which a designer designates an intended affective interaction between the product and the user and then catalogues the steps and design components required to achieve the desired interaction. Nagamachi describes this as “Category Classification from zero- to nth-category” (Nagamachi, 1995, p.4), meaning categorising design components from an initial concept into as many subcategories as is needed to describe an acceptable design solution. The paper gives Mazda Motor Company’s implementation of this during the development cycle of the Mazda MX-5 as a good example of this process.

In the example shown in figure 4, they defined their intended affective interaction as “Human-Machine Unity (Jinba-Ittai in Japanese)” (Nagamachi, 1995, p.4) and categorised four components that they saw as necessary for creating this interaction: Tight Feeling, Direct Feeling, Speedy Feeling, and Communication.

Kansei				Sensation	Automotive Engineering	Physical traits
Zero	1st	2nd .....	nth			
HMU	Tight Feeling	┌.....	└.....	Vision	Body size	Size
	Direct Feeling	┌.....	└.....	Hearing	Engine Chassis	Width Height Seat
	Speedy Feeling	┌.....	└.....	Smell	Steering yaw	Steering Design
	Communication	┌.....	└.....	Skin	Noise Control	Frequency
		┌.....	└.....	Organic sense	Vibration Exterior Interior	Frequency Design Design

Figure 4: “The translation of Kansei into physical traits in the case of ‘Miyata’”, Nagamachi, 1995, p.5

These sections were then subcategorised again used to develop parallel categories concerning specific aspects like the product’s physical traits, as shown in figure 5.

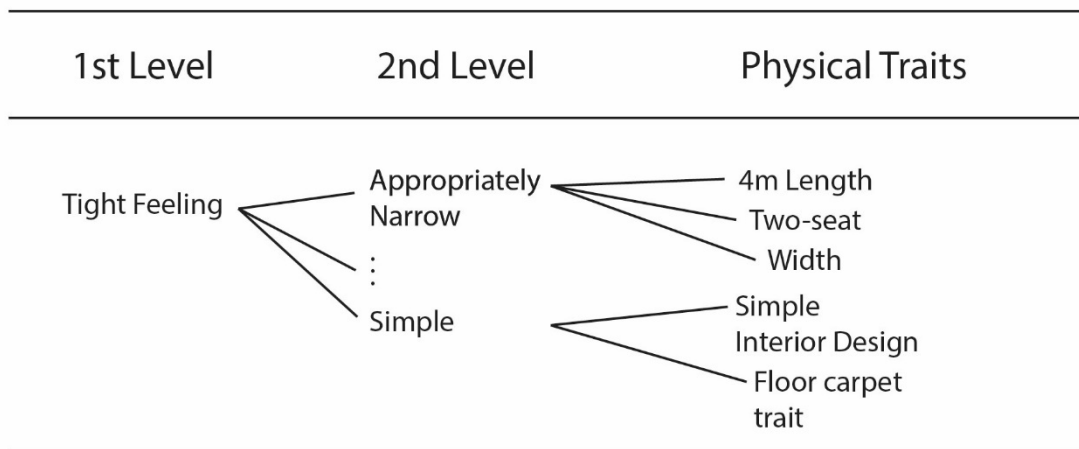


Figure 5: “An example of refining the physical traits from Kansei subconcepts”, Nagamachi, 1995, p.5

Nagamachi claims that this method was so successful that at the time Mazda and its subcontractors were using Kansei Engineering Type 1 as a fundamental part of their automotive design process. (Nagamachi, 1995, p.5)

## Type 2 'Kansei Engineering Computer System'

Nagamachi describes this method as “a computerized system with the Expert System to transfer the consumer’s feeling and image to the design details” (Nagamachi, 1995, p.5). In layman’s, this method has the designer construct a computerized system that supports design thinking through the translation of a subjective term into images that support a matching subjective response. Nagamachi poses that this system should be broken down into four sections: Kansei Database, Image Database, Knowledgebase, Design and Colour Database, and Kansei Engineering System Procedure. As shown in figure 6.

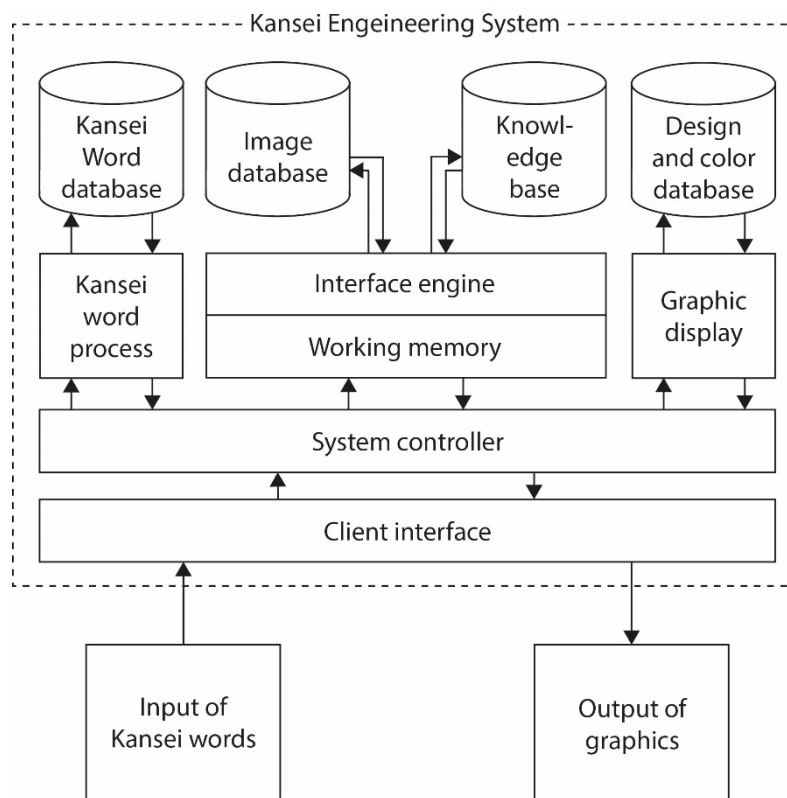


Figure 6: "A System Structure of Kansei Engineering System", Nagamachi, 1995, p.6

Each of these broken-down sections houses a different wealth of knowledge that is important to the analysis and promotion of affective response. The Kansei word process is used to categorise and compare the term input into the system with smaller groups of related terms held in the Kansei Word database, which it then passed on to the rest of the system. The next component of this system is where the main analysis is done, the categorised term is passed to an analysed database of images and a database of methods



and factors that support that affective response. Images and features that agree with the term are then passed to a final processing component that selects final images that support not only the features selected earlier but are also supported by colour correlated to the categorised term. These are then output to help guide the design process of products that support the input term.

### **Type 3 ‘Kansei Engineering Modelling’**

This final method involves using mathematical model in lieu of a structured rule base within the design process. This mathematical model approach could be considered in the terms of a modern-day artificial intelligence that could be used to validate design choices instead of having to abide by steadfast rules.

These three processes or ‘types’ of Kansei Engineering are key to illustrating how design and emotion thinking can be applied to design practice. They do however avoid discussing the specifics of how a lot of the underpinning data is derived and constructed. Nagamachi mentions that the data they use is drawn from Chikio Hayashi’s “Quantitative Theory Type 1” (1976, quoted in Tanaka, 1979). Hayashi’s methods of quantification as described by Tanaka are a series of mathematical, logical equations, and systems for analysing and quantifying qualitative data sets. Nagamachi notes in the second half of his paper, the importance of hybridised uses of these processes which can leading to more detailed multifaceted systems to support Kansei design. Nagamachi’s more recent publications including his 2010 book “Kansei/ Affective Engineering” (Nagamachi, 2010) often consider a more hybrid approach to these concepts and have evolved to include many new technologies and approaches.

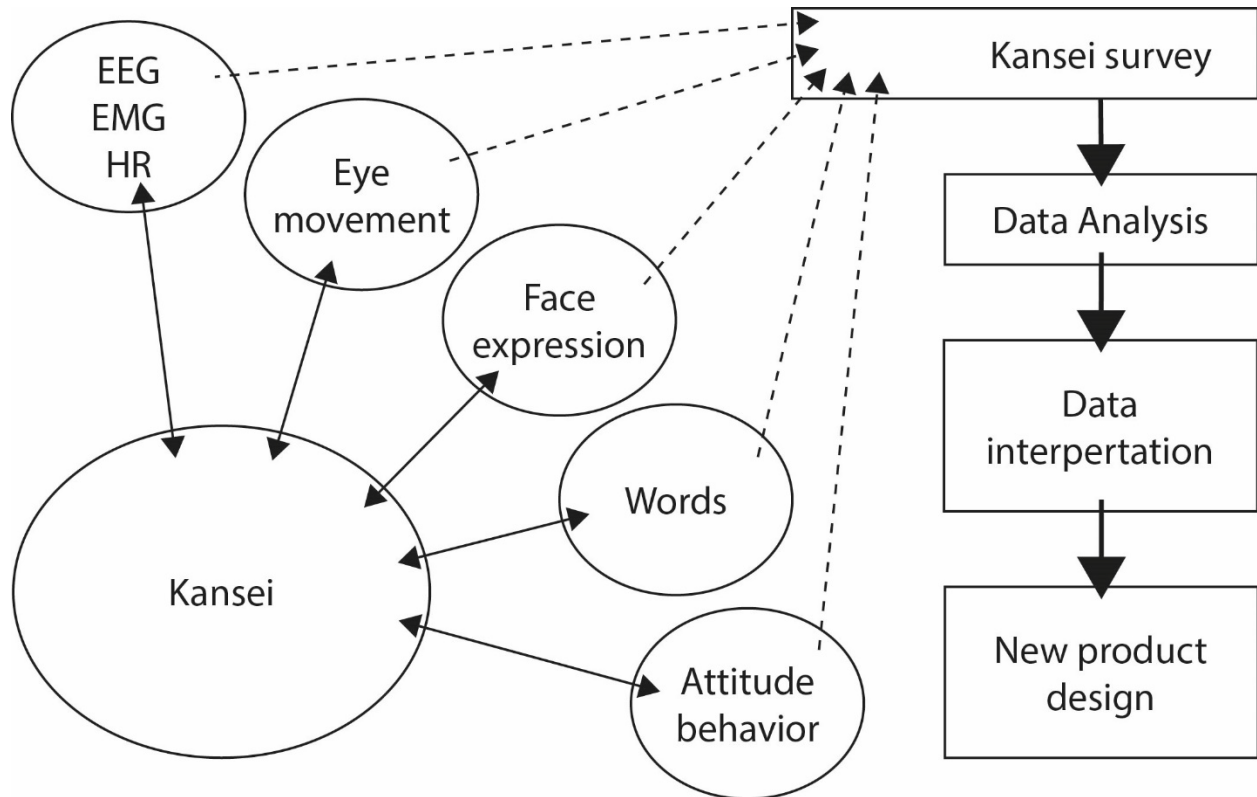


Figure 7: "Choices of route to reach Kansei", Nagamachi, 2010, p.4

Figure 7 shows a broader view of what kinds of data can be applied through a hybrid kansei engineering approach and how new methods of data collection and analysis can also support these methods. Many new methods of affective data collection have become more readily adopted since this book, like those found in Jenkins et al's "Comparing Thermographic, EEG, and Subjective Measures of Affective Experience During Simulated Product Interactions" (Jenkins, et al., 2009) and could easily be plugged into this framework set out by Nagamachi.

Nagamachi's 'Types' were originally designed to process and analyse 'Kansei Words'. This in other fields could be referred to as a subjective word analysis which is often applied to the data collected from affective self-reports (ASR). Lokman and Kamaruddin's paper "Kansei Affinity Cluster for Affective Product Design" (2010) is interesting as it attempts to illustrate some of the disadvantages of word analysis and offers solutions to aid in the processing of these 'Words'.

*"Previous studies involving the assessment of emotion have seen different ways used to represent verbal description of the subjective emotion. Most of them set their basis on several keywords that somehow fit to describe the study domain. However, these*

*have led to many cases of poor semantic dimension, since a good reference for affinity of words does not exist". (Lokman and Kamaruddin, 2010, p.1)*

Their research aimed to develop a system to support these methods of assessing emotion to develop more scientific methods of assessing users' subjective emotional experience with product design (Lokman and Kamaruddin, 2010, p.1). To do this they take an inductive approach, assuming that these poor semantic dimensions could be enhanced through an increase and refinement of word groupings. At the core of their methods is the KJ method which they use as the foundation of their supporting system. This method, also known as an affinity diagram, is a unique brainstorming method named after its Japanese creator that allows for the grouping and refinement of words, phrases, and terms into weighted categories. Lokman and Kamaruddin adapted the structure of this method to better suit pure analysis over idea creation, resulting in a four-stage research method.

- Initial Study, initial key words are selected.
- Exploratory Study, synonyms and antonyms are collected to create a pool of key words.
- KJ Method, key words are sorted into named groups based on subjective emotional biases.
- Confirmatory Study, results are confirmed and rendered as diagrams.

In total Lokman and Kamaruddin correlated 820 key words into 43 individual clusters.

Lokman and Kamaruddin conclude that this resulting system of clusters can be used as a good point of reference when conducting affective, word-based research. They do however note that these 43 clusters were derived from only three experts, whom all seem to be highly linked academic individuals, according to recent studies on UK universities performed by the Higher Education Policy Institute the average person in this position is also much more likely to be male (HEPI, 2020). This lack of breadth may have imparted some of the researcher's bias to the research outcome and as such, it may be useful to implement this system in conjunction with others to increase the validity of research findings and methods.

## Psychology and Wellness

### *The Psychology of Space*

Outside of the field of design, there is a great deal of research on subjective wellness and affective response some of which focus on how passive interactions between objects and environments can affect a person's wellbeing. An interesting paper by Wepfer et al. (2018) titled "Well-Being: Does Work-to-Life Integration Impair Well-Being through lack of Recovery" illustrates the importance of space and environment to a person's subjective wellbeing and concludes that:

"Work-to-life boundary enactment has (positive) implications for employees' well-being. Based on this knowledge, practitioners and policy makers can adjust organizational policy and culture and help employees manage their work-nonwork boundaries in a way that does not impair their well-being" (Wepfer, et al. 2018, p. 737)

Wepfer's (et al) research into work-life boundaries and their implications on wellbeing clearly supports a positive correlation between environmental context, in this specific example having a defined home setting, and the participants' subjective well-being. This concept is even far more relevant at the time of writing due to the current international landscape. With people spending more time at home, blending their work and home environments.

Another interesting study on the topic of a user's interaction with their environment and its effect on wellbeing is Harvey, et al's "Applying the Science of Habit Formation to Evidence-Based Psychological Treatments for Mental Illness" (Harvey, et al., 2020) where they discuss how methods of forming habits can be used in the treatment of mental health issues. As part of this Harvey, et al. establish six rules for establishing habits.

- Habits are independent of goals.
- Habits are cued by specific contexts.
- Habits are learned via repetition.
- Habits are automatic.
- Reinforcers promote habits.
- Habits take time to develop.

(Harvey, et al., 2020)

### *Wellness Through Space*

Building on the findings of his 1983 paper “Psychological Benefits of a Wilderness Experience” (Kaplan and Talbot, 1983), Stephen Kaplan attempts to introduce a framework “that places both directed attention and stress in the larger context of human-environment relationships” (Kaplan, 1995, p.169). Kaplan’s paper, titled “The Restorative Benefits of Nature: Toward an Integrated Framework” poses four requirements of a restorative environment (1995):

**Being away.** People often prefer to take holidays or relax in natural settings. Mountains, seaside, lakes, streams, forests, and meadows are all ideal places to “get away”. For many people who live in cities however, the opportunity to get away to these places is often rare. The sense of being away does not require distance. Natural environments that are easily accessible offer an extremely important resource for resting a person’s directed attention.

**Fascination.** Nature is filled with fascinating and beautiful objects, along with many thought provoking processes. Many of the things in nature that we find fascinating qualify as “soft” fascinations: clouds, sunsets, snow patterns, the motion of leaves in the breeze – these objects and processes can easily hold our attention, but in an undramatic, unintrusive fashion.

**Extent.** When out in natural environments it is easy to see the extent that they go on for. But extent does not have to mean large areas of land. Even a relatively small area can provide a sense of extent. Paths and trails can be designed so that even small areas can seem much larger. Another method is miniaturization, this can give the feeling of being in a whole different world, though the area is often not extensive. Japanese gardens often combine these devices in order to give the sense of scope as well as connectedness. Extent is also compatible on a conceptual level. i.e. historical artifacts promote a sense of extent through past years and environments.

**Compatibility.** Natural environments are extremely compatible with almost everybody. It is as if we have a special relationship, or human inclination, toward natural settings. For many people, functioning in a natural setting seems to require less effort than functioning in more a structured one, even if they have much greater familiarity with the latter. (Kaplan, 1995, p.174)

Perceptual fatigue, or “Directed attention fatigue” as Kaplan refers to it underpins this framework model. These categories are constructed to create places, objects, or processes that reduce directed attention fatigue and help to create restorative environments. This framework Kaplan sets out in his paper matches much of the design and non-design thinking surrounding the topics of affect and subjective well-being, and even in some areas bleeds into conventional design thinking and practice. The section ‘Being away’ suggests the importance of separated areas of being. This idea is embodied in Wepfer’s research and is even something that many people can anecdotally relate to. Kaplan’s ‘fascination’, and particularly ‘soft fascination’ requires an unobtrusive nature. When viewed through a designer’s eyes this unobtrusive nature is clearly reminiscent of Dieter Rams’ 5<sup>th</sup> principle for good design “Good design is unobtrusive” (Rams, 2020). The examples of ‘Extent’ Kaplan gives reflects eastern design thinking, which historically is far more advanced in the field of affect than our conventional western design thinking. This is expanded upon further in the following section “Kansei Engineering”. The general themes of “Compatibility” are not only mirrored in Desmet’s (1999), Desmet and Pohlmeier’s (2013) and Gaver’s (1999) papers on Emotional Design but the further theme of an inherent inclination towards natural environments can also be found in the evolutionary concept, the “Savannah Hypothesis”. This highly criticized hypothesis attempted to explain the evolutionary shift in bipedal forms away from forested habitats and toward wide-open savannahs. Criticisms aside, there are some very interesting concepts raised through this hypothesis one of which is reflected clearly in Edward O. Wilson’s book “The Biophilia Hypothesis”, first published in 1993. In this book Wilson expands on his definition of Biophilia as the “innate tendencies to focus on life and life-like processes” (Wilson, 1984, p.1) redefining his Biophilia Hypothesis as proclaiming:

“a human dependency on nature that extends far beyond the simple issues of material and physical sustenance to encompass as well the human craving for aesthetic, intellectual, cognitive, and even spiritual meaning and satisfaction.” (Wilson, 1993, p.20)

Wilson’s Biophilia Hypothesis describes our innate attraction to natural objects not only as something common across all humans but also as something that is inherited and carried from

generation to generation – much like the notions of inherited preferences seen in the Savannah Hypothesis.

## Outcome 1

This first outcome summarises many of the key and common concepts mentioned in the literature in the form of three questions that a designer might consider when designing a product to affect subjective wellbeing. These three questions are not definitive design specifications or a framework by which to design. Instead, they attempt to illustrate some of the many designed aspects and considerations that the literature indicated can influence affective response. This approach is taken to better accommodate the subjectivity inherent in designing products that affect the subjective.

This outcome is constructed through the use of the KJ Method of analysis found in the literature (Lokman and Kamaruddin, 2010, p.40).

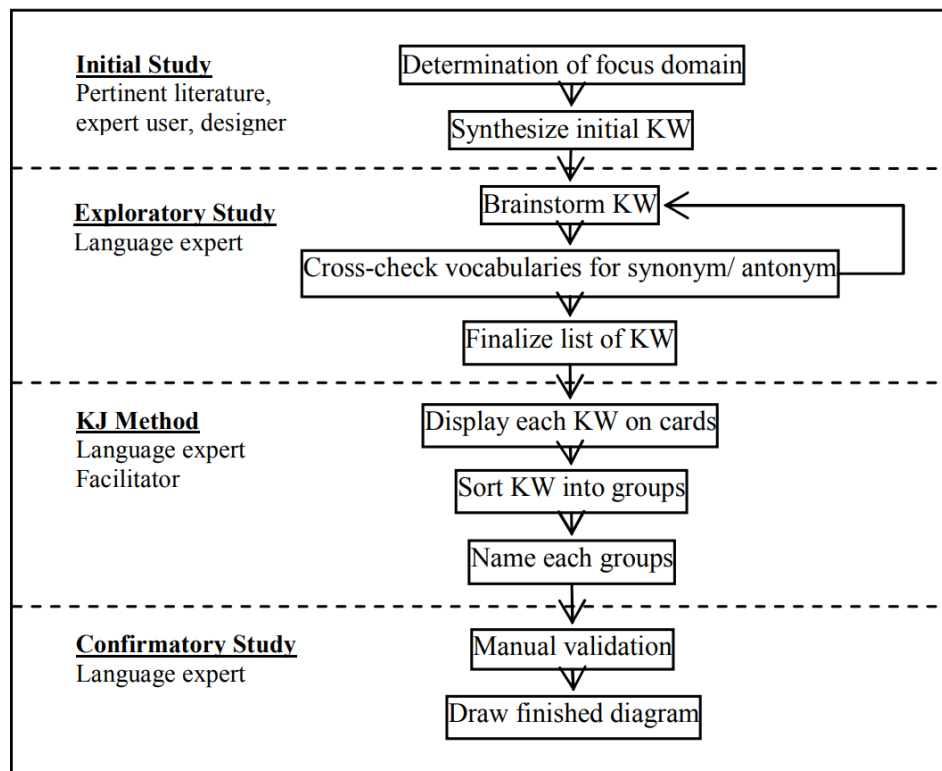


Figure 8: "The Research Methodology", Lokman and Kamaruddin, 2010, p.40)

In their paper, Lokman and Kamaruddin use this method, shown in figure 8, as part of their analysis in order to refine open-ended subjective responses through a method of codification and semantic grouping. The type of KJ Method used in this thesis varies slightly from Lokman and Kamaruddin's implementation. Conventionally a weight is applied to the semantic groups generated through the process, which is used to indicate their importance or frequency within the responses. However, for use in the generation of this outcome a hierarchical analysis was not used. The reason for this is found in the literature where several writers echoed Gaver in his statement that "Ignoring emotional connotations of design can have unpredicted effects" (Gaver, 1999, p.51). Gaver implies that emotional connotations should be considered evenly in order to avoid unpredicted results and to diminish some considerations in aid of others that might lead to the same conclusion.

### **Who are they, and who are you?**

A theme that commonly appeared in many of the frameworks and systems described in the literature is a necessary awareness of who both the designer and the users are. The morals, beliefs, and culture of any individual involved in the design process are indicated to have a large, profound effect on the final product. In Gaver's words, "ignoring emotional connotations of design can have unpredicted effects" (1999, p.51). Acceptance of emotional connotation imparted by people associated with the process is a key concept seen in ethnographic approaches to research in a myriad of fields beyond just those discussed in this section and is regarded as a "very effective method for making sense of the complexities of people and cultures" (Milton and Rodgers, 2013, p.21). The concept of wellbeing as described by Dodge et al, (2012) along with many statements made by writers such as Desmet (1999), Pohlmeier (2013), and Nagamachi (1995) also support the idea that subjective meaning can have large effect on not only a person's subjective wellbeing but also the interactions they have with products. It is possible to see how this concept could be implemented when considering how users with strong opinions might interact with specific products. A person who has strong beliefs about the climate crisis would have trouble enjoying even the most environmentally



conscious product if it came from a company renowned for polluting. This represents a scenario where the user's morals and beliefs have been considered in the design process but not the designer's or the company they represent. By considering the social and moral aspects of both the designer and the user, the literature indicates that products can be designed to positively affect end users.

### **How are they rewarded?**

Dodge et al, (2012) describe wellbeing as a balance weighing the challenges someone faces against the resources available to them to overcome the challenge. If this concept of balancing the correct number of resources to overcome challenges promotes wellbeing, then Harvey et al, (2020) and Nodder's (2013) assertions around habitual reinforcement may actively build upon this interaction. Nodder and Harvey et al, among others, discuss the importance of forming systems of habits through rewarding experiences. It is indicated through the literature that rewarding experiences can be used to enhance not only the retention and more regular use of a product but can also affect a user's subjective responses to interactions. The reward offered through interaction do not specifically have to be tangible in the sense of feedback or increased functionality. They could instead be psychological as sensations of comfort or reassurance. Examples of a rewarding experience might be a chair that when sat in confers a sensation of envelopment and comfort, or a device like a phone, that creates a satisfying auditory response when it is interacted with.

### **How does your product fit in?**

The topic of integration and environmental awareness is touched upon in several of the papers and books discussed in this literature review. Nagamachi (2011) describes the navigation through and experience of a designed environment in his attempt to explain the term Kansei. Throughout this description, he stops and iterates "these feelings are Kansei" or "this is also Kansei". The intention of this is to illustrate how intertwined Kansei is with the environment surrounding interactions. Nagamachi and Kansei Engineering are just one form of this concept, Kaplan (1995) when laying out his requirements for a restorative environment never focuses on specific features and instead takes a holistic approach to understanding an

environment. It seems that to Kaplan the restorative environments he described were not amalgams of individual components, but instead a single monolithic system that embodied and weighed different aspects. It is clear from the literature that an affective interaction can be largely influenced by the environment in which the interaction takes place, and that a consideration of the existing environment a product is going to enter is important to any product designed to affect subjective wellbeing.

## Section 2: Research Method

### Introduction

The focus in this section shifts away from design as a whole and instead focuses on a specific subset of designed products, chairs. Holistic design can be a difficult concept to explain or visualise to participants without specific design knowledge which would either create a narrow, biased group of participants or would lead to a large increase in erroneous and miss representative findings. Chairs are a ubiquitous form of design that is commonly used in almost any designed environment, which lends them for use when interacting with laypeople as they are something that any participant would be able to understand and visualise.

The research undertaken in this section takes an inductive, grounded approach to finding out if design can affect people's subjective wellbeing. This section is broken down into two sections of research. Interaction analysis, where participants' interactions with existing chairs are queried, and Comparative analysis, where features common in chair design are compared against each other. Both of these research components take the form of mixed method questionnaires due to the type of data available through the use of questionnaires and the constraints on this research at the time due to restrictions on in person interactions brought about by Covid-19. Each of these two questionnaires will be analysed individually and the results used to inform individual outcomes which can then be used in conjunction with the outcome of the literature review to approach a more robust method of designing products/ chairs that affect subjective wellbeing.

## Ethical Considerations

Due to the nature of this research, there are several ethical concerns that must be adhered to. To prevent the collection of identifiable information all data is collected and stored anonymously, in accordance with the General Data Protection Act (GDPA, 2016) and the Data Protection Act (DPA, 2018). All participants must be over 18 years old and are informed of the scope of this research and the role they play within it. Consent must be given by participants, and they have the option to remove themselves from the study up until the submission of this thesis.

## Questionnaire 1- Interaction Analysis

### Introduction

This section is the first of the two primary research components in this thesis and attempts to collect and analyse participant data about their existing interactions with chairs in their home environment. A mixed method grounded approach is taken towards this research with a questionnaire being used as the main form of data capture. This approach and resulting outcome allow for the cross-validation of other findings in this thesis and the development of a robust methodological approach to designing products that support positive wellbeing. This section also provides: an explanation of the methodologies underpinning this primary research, the justifications for the adopted research methods, and finally discusses the development and analysis of the research undertaken.

### Research Methods

The research method at the heart of this primary research is based on grounded theory described by Glaser and Strauss (1967), Glaser (1992) and Glaser (1998). Unlike some traditional research paradigms, grounded theory does not attempt to verify existing theory through the testing of hypothesis. It is an inductive methodology for generating theory with constant comparison at its heart. Before any hypotheses are defined, data is collected, coded, and arranged into theoretical concepts. Working hypothesis are defined by an analysis of the data to provide a basis for the next stage of data collection. This method of creating a working hypothesis lends this method toward the development of a methodological approach, which is key to this research (Charmaz, 2006; Corbin & Strauss, 2007, 2015).

With the focus of this research being subjective in nature it is evident that qualitative methods are important considerations to an inductive approach. These qualitative methods will be paired with quantitative methods to help to derive more robust conclusions and analysis of the data. This is considered a Mixed Method approach. Mixed Method approaches are well documented in the literature (Desmet. 1999, p.67-68. Sieber, 1973). They are well regarded for allowing the collection of much wider data sets than most contemporary alternatives and by using multiple comparative methods of analysis, avoid some of the shortcomings found in purely qualitative or quantitative studies, e.g. The validity of the data. The value of this method becomes evident when the increase in data variety is used to enhance the iterative process found within grounded theory. Originally referred to as “Multitrait-Multimethod Matrix” (Campbell. 1959) this method will also be used to increase the validity and the scope of findings through the cross-referencing of both qualitative and quantitative data (Jick, 1979. Tashakkori & Teddlie, 2010).

Another consideration when researching the subjective nature of personal wellbeing is an understanding of those involved with the research and the effects they have on findings. To aid this an ethnographic stance is taken, complimenting the Pragmatic Paradigm adopted at the beginning of this research. Which helps to ensure that the data collected and analysed throughout this research takes into consideration this writer’s cultural biases and preferences (Visocky O’Grady & Visocky O’Grady, 2017, p.49). Conversations involving subjective response are common within much of academic literature throughout a variety of fields. From Desmet (1999) to Wang et al (2009) the conversation encompasses both theoretical and quantifiable concepts that illustrate the importance of considering subjectivity and note its importance in fields that target interactions with people, like design. These sentiments are supported by the Ethnographic and Grounded approaches taken by this research and A method of data collection appropriate for this research must there for not only capture qualitative and quantitative data but also consider subjectivity.

There are several methods of data collection that support ethnographic approaches, both this section and the next of this research make use of questionnaires in order to quickly collect



qualitative and quantitative data collection, including personal data in keeping with an Ethnographic approach as part of a Survey Research Method (Fowler, 2008). This is a good method as it not only allows the collection of basic quantitative data but can also be adjusted to collect participants' subjective responses. This method of data collection is widely used within the fields of psychology and emotional design, sometimes being referred to as Affective Self Report, or ASR. ASR or Survey Research encompasses several processes where participants can give subjective responses. E.g., Questionnaires, Interviews, Participant Diaries, etc. Despite the many options within ASR approaches this research makes use of questionnaires in order to collect data due to the limiting time factors associated with this research being undertaken as part of an MRes degree which was intended to be completed over a one-year period and the effects of Covid-19 on contact-based methods reducing the viability of many other respected approaches such as interviews. With the myriad of factors effecting the completion of this research component the use of a questionnaire to collect the intended, subjective, qualitative, and quantitative data became a necessity.

The data collected in both this Interaction Analysis and the following Comparative Feature Analysis sections are guided by many of the key themes found in the literature. As was seen in the Literature Review section of this thesis many varied systems like Desmet's "Framework for Positive Design" (2013), Kaplan's "Requirements of a restorative environment" (1995) and Ed Diener and Robert Biswas-Diener's "Essential components of true wealth" (2008) were used to inform an outcome that supported design for subjective wellbeing. In this thesis, this is referred to as Outcome 1. Each of the primary research components of this thesis will generate their own outcome, informed by the widely accepted approach detailed in the Literature but independent in their approach to increasing the scope and validity of the design components indicated. The outcome of this Interaction Research component attempts to comprehend participant sentiment towards and around existing chairs in their home environment and correlate specific components, and aspects that were indicated as eliciting subjective responses.


## Questionnaire Design

Surveys and Questionnaires are extremely broad types of data collection. They can refer to the one or two questions that get thrust at you after every Zoom call asking, “How was the quality of your call?”, or even refer to the monolithic feedback surveys you are obliged to complete after graduating from university or while working for some large companies. Both of these forms hold benefits and shortcomings when applied in research. As mentioned, the purpose of the questionnaire utilised in this research is to collect qualitative and quantitative data, remotely, quickly (less intensely) and from a large group of participants. To achieve this, this questionnaire will need to be lengthy enough to collect an acceptable breadth of responses, but also quick and simple enough to answer that a larger volume of participants will be willing to complete it (Collins, 2010, p. 132). Short, closed-ended questions are often preferred when designing research questionnaires as the speed of completion tends to keep the participant involved long enough to complete all of the questions (Martin & Hanington, 2012, p.140). E.g., Likert Scales, multiple choice. However, if this research were to solely make use of these quantitative questions the resulting data would lack the subjective depth necessary to develop an outcome through a mixed method approach. As such a combination of quantitative Likert and multiple-choice questions, along with qualitative open-ended questions were used to capture the subjective nature inherent in this research and then contextualise them within quantitative bounds.



There are two main sections in the questionnaire used in this Interaction research section. The first of these captures data that can be used to contextualise the findings of the latter. This primarily focuses on personal information about participants in keeping with the ethnographic approach undertaken. An example is shown in figure 9. These questions were however, tempered by the necessity of data protection and internal academic systems. Because of this only a specific amount and types of personal data are collected about participants in order to retain a degree of ambiguity and all data collected is internally anonymized in keeping with the guidelines laid out in the GDPR (2016) and the DPA (2018).

2. What gender do you identify as?  

- Male
- Female
- Non-binary
- Gender fluid
- Other (Please specify)

3. Do you have any existing health conditions?  

- No
- Yes (Please specify)

4. What nationality are you?  

*Figure 9: Example of quantitative questions used in Interaction Analysis Questionnaire*

The second of the two sections collects data about participants' existing interactions with their own furniture. An example is shown in figure 10. Participants' feelings about their chair and their feelings about the space the chair occupies are a focal point of the questioning as both the object and environments are, to some effect, designed aspects that seamlessly meld into participants day to day interactions. By querying the sentiments and effects these designed aspects can have on participants, it is possible to identify many design considerations that participants are aware affect the subjective. In the questionnaire these questions take the form of open-ended questions with supplementary quantitative questions specifically confirming aspects of their preferred chair and the environments it is used in.

18. Describe how you feel about this room? (i.e. It is too bright or too dark. You find it relaxing because of nostalgic furniture. You find it stressful as a lot of people are always walking through.) Please be as descriptive as possible. ☺ ○

19. What do you do while using this chair (i.e. Working, Studying, Cooking, Watching TV) ☺ ○

20. How does this chair make you feel? (i.e. Grumpy, as it's hard and uncomfortable. Happy, because it looks nice. Nostalgic, as it reminds you of people or experiences) Please be as descriptive as possible. ☺ ○

*Figure 10: Example of Open-ended questions used in Interaction Questionnaire*

There is also a third section that prefaces the body of the questionnaire in which, as per university regulations and in keeping with the data protection act, participants are made aware of the intent of this research, the approaches undertaken to protect the participant and their information and has them agree to have their data used in this manner. This researcher's details were also given at the same time so participants had a fair opportunity to ask any questions they might have had or reach out if they wished to withdraw their results from the pool of data.

The data collected through this questionnaire, as mentioned earlier in this section, comprises both qualitative and quantitative results. The analysis of this data however focuses primarily on the qualitative responses due to the intent to identify subjective emotional interactions between the participants, their chosen chair, and the chair's immediate environment. The qualitative data collected as part of this questionnaire is processed through the same KJ Method previously used in this thesis to analyse the findings of the Literature Review. Shown in figure 11. This process, once again, allows for the codifying and following grouping of sentiment through the analysis of subjective responses to open-ended questions.



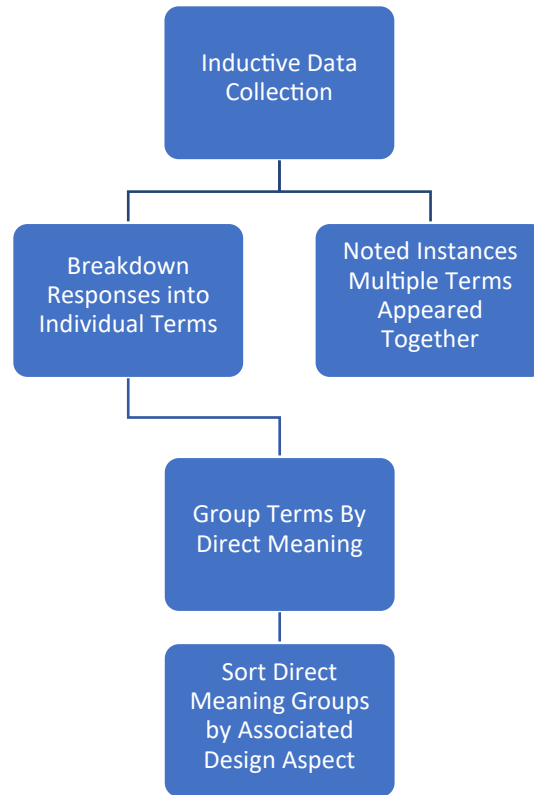


Figure 11: Breakdown of KJ Method used in Interaction Analysis

The KJ method of analysis used here begins with the codifying of subjective responses by shared meaning. This means for each subjective response to this questionnaire (Primarily questions 18 and 20 of the questionnaire), the written response is broken down into sections each of which is given an identifier based on its meaning. Many common or synonymous responses were given the same identifier. These coded sections of responses were then sorted into groups, each of which represents a different sentiment participants noted, i.e., soft, isolated etc. During this grouping process, it was also noted which sentiments appeared in tandem with each other and how often they did so. These groups, while presenting different aspects that affect response in participants, are difficult to consider in design terms. As the aim of this research is to explore if design can affect subjective wellbeing, these terms were further refined into groups whose aspects reflect those design aspects noted in the Literature Review. At this point, positive, neutral, and negative sentiments were condensed

into single aspects that reflect the potential to affect subjective response. This left six semantic groups of design aspects that participants indicated affect their interactions with chairs.

**Functionality** is a straightforward grouping as it refers to participants' comments on the functionality and aesthetics of their chairs. This was often mentioned in terms of comfort, ergonomics, usability, and looks. In essence this Functionality group encompasses most general design considerations.

**Temperature** is another self-explanatory grouping that recorded responses where participants' mentioned temperature, whether ambient or relative to their chair.

**Seclusion** covers any mentions of crowding, business, or solitude. This is an important section when considering the influence of Covid-19 on the participants. Many participants who were forced to work at home reported that shared space and privacy were large factors in how they responded to their environment and often their chairs specifically. With some noting the importance of being able to "curl up in it".

**Personal Meaning** regards the personal culture, preferences, and associations made by individual participants. Many participants noted aspects of nostalgia and experience while others often implied associated meaning through statements like "makes me feel like working" or "makes me feel content".

**Environmental Aspects** includes mentions of light, views, and other natural phenomenon such as wild animals and plants. Participants often wrote of the effects of lighting and plants in the immediate environment and commonly paired these aspects with sentiments like "relaxing".

**Complexity** encompasses not only reflections on the complexity of participants' chairs but also mentions of general clutter and tidiness.

## Pilot Questionnaire

When designing this questionnaire, it was difficult to get a balance between clarity and descriptiveness. This difficulty was compounded by the mixed method approach required for this research. In order to avoid inappropriate or inaccurate data it was important to test and rewrite questionnaires before a final version is released. These types of test questionnaires are recognised in the literature (Collins, 2010, p.135) and are often referred to as “Pilot Questionnaires”. In this case, the initial questionnaire drafted in this research was released to a select group of participants in order to collect information on the responses to the questionnaire. This helps to gauge the speed and completion of the questions, and can also give insight into the types of responses each question would elicit. The responses to a pilot questionnaire can also help when formulating an appropriate analysis (Creswell & Creswell, 2018, p.154), and were used heavily with this questionnaire to improve participant completion rates and user friendliness.

After several small scale, internal refinements, a pilot questionnaire was released to a targeted group of participants for feedback and evaluation. One of the participants for this pilot was Steve Munn, who works as a questionnaire designer for a government owned company. Their advice was indispensable in helping to evaluate the context and contents of this questionnaire. Taking their input and the findings from the pilot questionnaire guided the creation of the revised questionnaire used in this research.

## Questionnaire Dissemination

The questionnaire was disseminated to two groups. The first group consisted of university staff and were sent the questionnaire by email. The second group consisted of participants gathered from the r/productdesign<sup>1</sup> and r/SampleSize<sup>2</sup> subreddit forums. The questionnaire was hosted by the company SurveyMonkey and available for 3 months after release. These two approaches were chosen due to their relative ease of access during covid and compatibility with the language and terms used. In total 67 responses were recorded, 51 of which were adequately complete to be viable. Of these 51 responses: 32 were female, 16 were male and 3 identified as

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<sup>1</sup> A subreddit forum that helps to gather research participants. <https://www.reddit.com/r/SampleSize/>

<sup>2</sup> A subreddit forum that discusses matters around Product Design. <https://www.reddit.com/r/productdesign/>

either Non-Binary or Gender fluid. Whilst the participants were of varied age and gender, as shown in figures 12 and 13, it is clear from figure 14 that the vast majority of participants come from developed western nations.

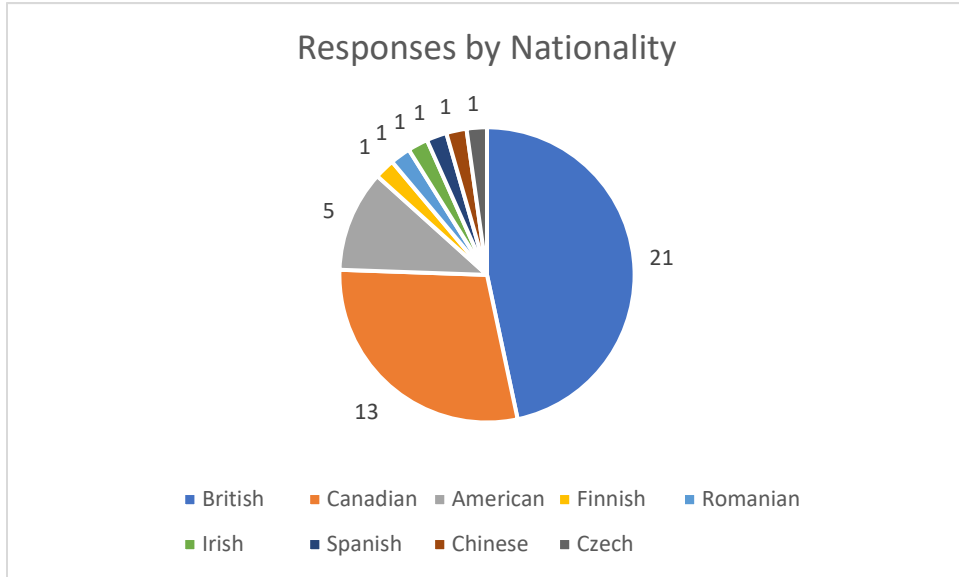


Figure 12: Number of Responses to Interaction Analysis by gender

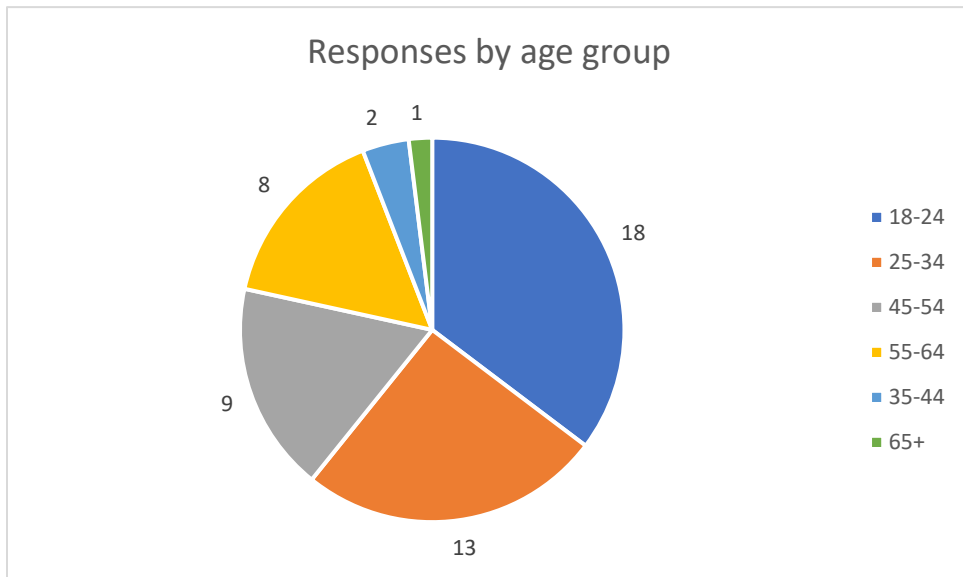


Figure 13: Number of responses to Interaction Analysis by age group

*Figure 14: Number of responses to Interaction Analysis by nationality*

This lack of diversity is a product of the limitations of time and scope applied to this thesis. As such the findings of this questionnaire are only representative of a WEIRD: Western, Educated, Industrial, Rich, Democratic (Henrich, et al. 2010) demographic.

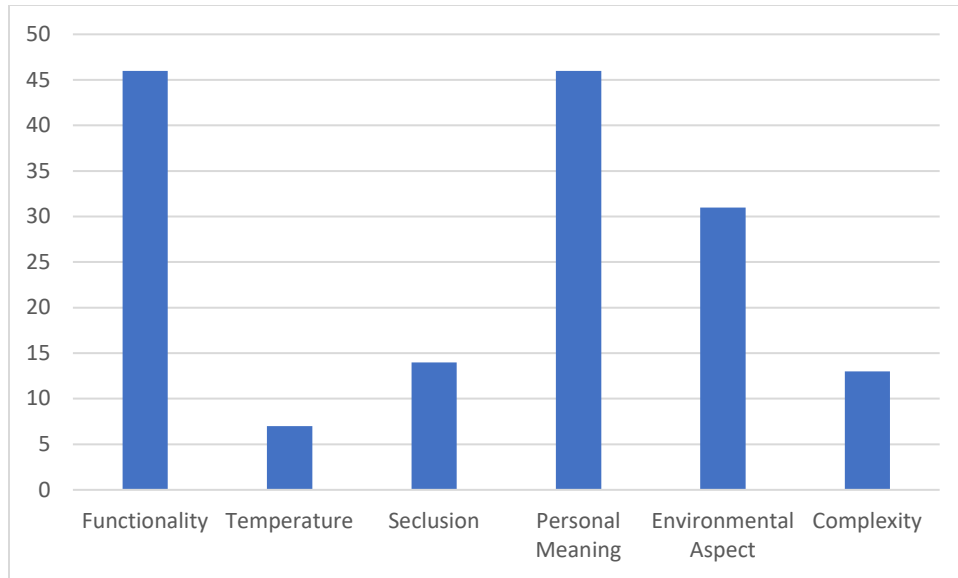
## Results

The final released questionnaire yielded 67 responses, 51 of which were viable for analysis due to some participants choosing to forgo answering key questions. Of the questions asked question 18 “Describe how you feel about this room?” and question 20 “How does this chair make you feel?” covered the majority of open-ended responses used in this analysis. There were other open-ended questions like “Are there any features of this chair that you think are good or bad?”, however it became clear when viewing the final data set that by mentioning “features” in the question the majority of responses were specifically about functional features instead of design features. This introduced bias wasn’t clear from the pilot results due to the small participant group and the resulting small number of responses. The reason for this stems from the difference in understanding between this researcher, as a designer, and many of the participants, without design backgrounds, who engaged with this questionnaire. From the 51 viable data sets, 157 individual terms were codified, grouped, and sorted by associated design aspects through the method previously described.

Sentiment Groups (Room) 1	Sentiment Groups (Room) 2	Sentiment Groups (Room) 3	Sentiment Groups (Chair) 1	Sentiment Groups (Chair) 2
Environmental Aspect			Functional	Seclusion
Environmental Aspect	Complexity		Functional	
Seclusion	Complexity		Functional	Personal Meaning
Functional			Personal Meaning	
Temperature	Environmental Aspect	Seclusion	Functional	Personal Meaning
Temperature	Environmental Aspect		Personal Meaning	
Personal Meaning			Functional	Personal Meaning
Personal Meaning			Functional	
Personal Meaning	Environmental Aspect		Functional	
Personal Meaning	Complexity		Functional	
Complexity			Functional	Personal Meaning
Functional	Personal Meaning		Functional	
Seclusion	Personal Meaning	Complexity	Functional	
Personal Meaning	Environmental Aspect		Functional	
Personal Meaning	Environmental Aspect		Personal Meaning	
Seclusion			Functional	
Functional			Functional	
Personal Meaning	Environmental Aspect		Functional	Personal Meaning
Environmental Aspect	Complexity		Personal Meaning	
Seclusion			Functional	
Functional	Seclusion		Personal Meaning	
Seclusion	Environmental Aspect		Functional	Personal Meaning
Functional			Functional	Personal Meaning
Temperature	Environmental Aspect	Seclusion	Functional	Personal Meaning
Environmental Aspect	Personal Meaning	Complexity	Functional	Environmental Aspect
Seclusion	Personal Meaning		Functional	Environmental Aspect
Temperature	Environmental Aspect		Functional	Personal Meaning
Seclusion	Environmental Aspect		Functional	Personal Meaning
Temperature	Environmental Aspect	Seclusion	Personal Meaning	
Environmental Aspect			Functional	
Temperature	Environmental Aspect		Functional	
Personal Meaning	Environmental Aspect		Personal Meaning	
Personal Meaning	Environmental Aspect		Functional	Personal Meaning
Environmental Aspect			Personal Meaning	Personal Meaning
Personal Meaning	Environmental Aspect		Functional	Personal Meaning
Functional	Seclusion		Functional	Personal Meaning
Environmental Aspect			Functional	Personal Meaning
Complexity			Functional	
Personal Meaning			Personal Meaning	
Complexity			Personal Meaning	
Functional	Personal Meaning		Functional	
Complexity			Environmental Aspect	Complexity
Environmental Aspect	Personal Meaning	Complexity	Functional	Personal Meaning
Personal Meaning	Environmental Aspect		Personal Meaning	
Functional			Functional	
Environmental Aspect	Seclusion	Personal Meaning	Functional	Personal Meaning
Complexity			Functional	
Environmental Aspect			Functional	
Environmental Aspect			Functional	
Temperature	Environmental Aspect		Functional	

Figure 15: Results showing semantic groupings and reference of multiple groups

Figure 15 shows the processed results of individual responses. Each row represents a different participant, with each column representing one of that participant’s indicated terms. The columns are broken into three sections. The first three represent the responses to the question “Describe how you feel about this room?”, columns four and five represent responses to the question “How does this chair make you feel?”, and the final two columns represent both questions and indicate which of the responses contained multiple terms.



*Figure 16: Results showing a count of how often each semantic group was mentioned*

When looking at the results shown in figure 16 it is important to note that all of these design aspects were regarded as impacting participants' interactions with their chairs so even a feature with a low value were impactful enough for participants to feel it was worth mentioning. Another important consideration to note is that these results only cover aspects that participants are aware affect their interactions. This means that these results do not represent factors that subconsciously affect participants. The results clearly show that functionality and personal meaning are the most common factor indicated. While Temperature and Complexity do not appear frequently within the data it may be that participants only considered writing about them if they were outside of what they normally experience.

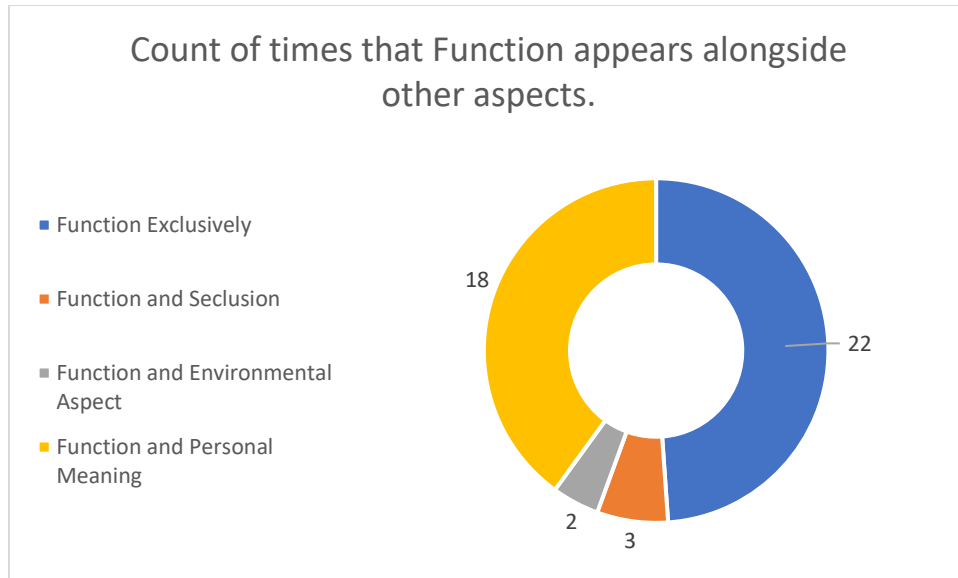


Figure 17: How often the semantic group Function was referenced alongside another group.

Beyond the design aspects that participants wrote about it is important to view the context they were written in. To do this during the KJ method of analysis pairs and triads of terms were also catalogued, so not only can we see the individual uses of terms but also how they were used in conjunction with one another. As shown in figure 17, Functionality and Personal Meaning were most commonly used in relation to each other, with 39% of responses that mentioned functionality also mentioning Personal Meaning. Another common pairing was between Personal Meaning and Environmental Aspects, however none of the participants mentioned Functionality, Personal Meaning, and Environmental Aspects in the same statement.



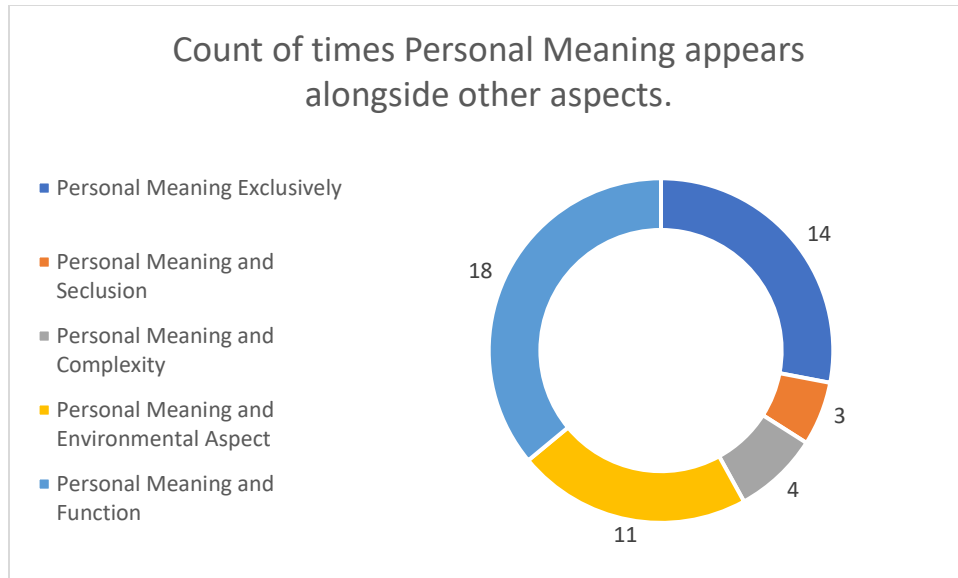


Figure 18: How often the semantic group Personal Meaning was referred to alongside another group

## Outcome 2

This second outcome summarises the data collected on participants' existing interactions with their chairs into four questions. These questions much like those in the first outcome attempt to illustrate aspects of design that can influence affective response without defining a specific method or design framework. Because the data collected for this outcome focuses specifically on existing interactions the results cannot represent any affective interactions relating to the initial impression or adoption of the chairs. This means that the data underpinning this outcome only regards interactions beyond early or initial use and focuses on factors that affect participants over a longer period. Another caveat to these findings is that they are determined by the participants and as such are affected by each participant's biases and assumptions. Also only representing design aspects that the participants are consciously aware of. As such many design aspects that subconscious affective interactions may be under presented.

### How well does the product function?

Functionality was one of the two most mentioned aspect of participants' chairs throughout this research with an equal number of semantic responses as Personal Meaning at 46. However, 22

of those responses exclusively mention functionality which is more than any other grouping. It is clear that the functionality of a chair, whether comfort, ergonomics or aesthetics is an important design aspect with many participants noting poor functionality as reasons they dislike or have other negative feelings towards the chair.

### **What type of space does the product help to create?**

In this research, temperature was grouped separately to functionality despite common aspects of a product's function including material choice and thus contact temperature. This was done because unlike comfort or ergonomics, temperature was not exclusively discussed in relation to participants' chairs. Instead, it was often mentioned in reference to the space or environment the chair is used in. Temperature was also the least mentioned group, only coming up 7 times. Despite how few times temperature was mentioned participants strongly indicated that it affected their interactions with their chair. This low number may indicate that participants have a higher tolerance for variations in temperature than they do about other aspects of their chairs. Environmental aspects, such as the quality of light and natural views were other commonly indicated groups being mentioned 31 times. Many participants mentioned the level or quality of light affecting how they interacted with their chairs. Often these statements would also mention how cluttered environments affect and interplay with the light. For example, "The room has a nice light from a skylight... it is kind of stressful having other people's stuff all over the place". The last of the semantic groups to be encompassed by this outcome question is complexity. As already discussed, complexity was often mentioned in reference to environmental aspects like light. Like temperature, participants that mentioned complexity mostly regarded the space their chair occupied instead of design complexity. They regularly referenced cluttered and busy environments all of which indicated a negative influence of these environments.

### **What is important to the user?**

It is clear from this research that personal associations and meanings play a large role in long term affective interactions with chairs. The semantic group, personal meaning was the joint most mentioned group and was often mentioned in conjunction with almost all of the other

groupings. Many participants made statements about the importance of nostalgia and other personal aspects surrounding their chair and its immediate environment of nostalgia. Some of these statements voiced how objects with significant meaning to the participant enhanced their enjoyment of the space and as such their interactions with their chair.

### **Does the product help to define spaces?**

The final group that was highlighted through the research is seclusion. There were several participant responses that directly spoke to the importance of creating boundaries and spaces for specific functions through their furniture. Many complained that due to the Covid-19 outbreak many were having to use their chairs for work or school, which they had never intended. Others discussed how their chairs helped to provide a safe, secure, or industrious space.

## Questionnaire 2 - Comparative Features Analysis

### Introduction

This research component attempts to understand participants' emotional responses to a variety of features common to chair design through the comparison of identifiable chairs and use this information in conjunction with the other outcomes to develop a more robust approach to designing products that support subjective wellbeing.

### Research Methods

An online questionnaire was chosen as the most appropriate method of data collection due to the prevailing restrictions at the time where face to face methods were inappropriate at the time due to the covid 19 pandemic. This method allows for the remote collection of larger data sets in a fairly small amount of time. There are issues with this type of data collection due to the potential for participants to misunderstand the questions. To address this concern, once again a pilot questionnaire was used to identify any misunderstandings that occurred and all participants were given the chance to voice any questions, or opinions they had about the questionnaire.

The questions in this questionnaire are inherently different to the previous one used in this research. Whereas the first questionnaire focused on subjective and qualitative responses, this second questionnaire primarily focuses on gathering quantitative data. Whilst the questionnaire focuses on quantitative data it does however include some qualitative questions that were used to validate, and support indicated trends within the data. Although the majority of the data collected by this questionnaire is empirical it was still important to note personal information such as age, gender identity, and cultural background within the framework of the University's research ethics policy. This information is used in the analysis of indicated trends within the data allowing for a more granular view of this questionnaire's results.

This questionnaire asked participants to select a single chair out of a group of images that represent common or well-regarded chair designs each of which have a diverse range of different design features. The design features attributed to these chairs are:

Plush	-----	Non-Plush				
Highbacked	-----	Low Backed				
Formal	-----	Informal				
Armrests	-----	No Armrests				
Simple	-----	Complex				
Light	-----	Heavy				
Colourful	-----	Subdued				
Wooden	-----	Metal	-----	Plastic	-----	Fabric

Figure 19: Illustration of opposing semantic groupings

The method of analysis chosen was based on a semantic differential scale. Specifically, with the exception of features regarding materiality (wooden, metal, plastic, fabric), all the features analysed in this section conform to the “Bipolar Adjective Pairs” described in Bradley and Lang’s paper “Measuring Emotion: The Self-Assessment Manikin and The Semantic Differential”. The semantic differential scale is typically used in psychological research to assess attitudes and beliefs. The method involves the creation of a series of rating scales in which the respondent is asked to give a judgment about something along an ordered dimension, usually of seven points. Ratings are “bipolar” in that they specify two opposite ends of a continuum (e.g., good-bad, happy-sad). The researcher sums the points across the items. In this study it was noted that the selection of chairs participants choose from share many of the same features which, with a small group of chairs, can lead to an imbalance in the amount of times certain features are represented. By creating a semantic differential scale that considers specific features (e.g. Plush – Non-plush) it is possible to normalise the collected data by weighting response, relative to that specific feature, by the relative ratio to mean average. This helps to mitigate the need for a large group of chairs for participants to choose from by allowing for a relatively small group of chairs to represent a group with an equal amount of each feature. The reason for constructing the questionnaire like this was to increase the completion rate by participants as a large group to choose from would not only increase the time required to complete the questionnaire by also the willingness of participants to complete it. The semantic pairs of features included in the questionnaire were influenced by the literature. The utilisation of grounded theory as an

inductive approach guided the selected features towards semantic pairs that loosely related to aspects noted in outcome 1. These were intentionally abstracted from the literature to allow for inductive findings outside of those that exclusively support aspects indicated by the literature. As such the considerations from outcome 1 were broken down into the “bipolar Adjective Pairs” shown in figure 19.

These features were used to select the chairs in the questionnaire through the judging of their physical differences. In an ideal situation, these chairs would have been selected at random to help mitigate selective bias. However, due to the constraints on time and study, this was not possible. It is difficult to be sure that a participant’s comparative selection has been made purely because of the features inherent to a specific chair, especially with limited scope for analysis through a specific small range of features. It is therefore possible that participants selected specific chairs because of aspects outside the scope of this analysis which would in turn cast a shadow on the findings of this research component. To address this consideration an open question was added to allow participants to justify their responses and specifically speak to aspects of some of the chairs. This additional data set can be used to refine and validate comparative findings and increase the accuracy and rigour of any conclusions drawn.

Figure 20 shows an example of the comparative questions used in the Comparative Feature Analysis questionnaire. The images have been removed for this print version due to copyright concerns. The participants of the original questionnaire were shown images of the relevant chairs.

8. Which of these chairs do you like the most?

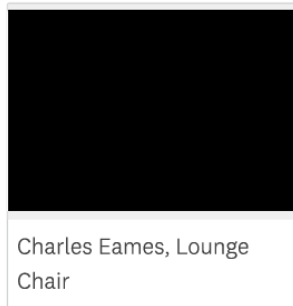
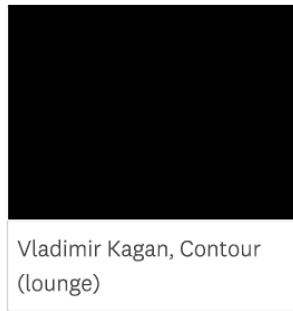
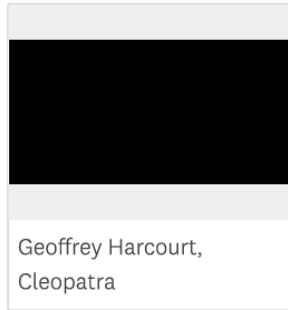


Figure 20: Example comparative question used in Comparative Feature Analysis questionnaire

## Pilot Questionnaire

There were some minor issues found through the pilot release of the questionnaire. The completion rate of the questionnaire was quite low and after collecting feedback it was noted that due to the digital formatting many participants were unaware of how much of the questionnaire remained so after a certain point about 5 minutes into the questionnaire the completion rate dropped off hugely. To address this a progress meter was added to indicate to the participant how far through the questionnaire they were. This increased the overall completion rate from 73% to 86%, allowing for the final questionnaire to achieve 66 largely complete data sets out of 76 responses. Another issue that was indicated was the responses to questions involving Likert scales. Due to the limitations of the software used to collect responses to the questionnaire, Likert responses were only recorded if they were moved from their starting position which represented a passive response. Because of this, assumptions had to be made as to some of the responses to these questions. If a participant answered the surrounding questions within the questionnaire, it is assumed that the intended response to the Likert scale was a passive one. If a participant did not complete the surrounding questions, then no assumptions were made, and the data set was discounted.

## Questionnaire Dissemination

As with the Interaction Analysis questionnaire, this questionnaire was released to two groups. The first consisting of university staff and the second participants found on online forums<sup>3</sup>. The questionnaire was hosted by the company SurveyMonkey and available for 3 months after release. In total 76 responses were recorded, 66 of which were adequately complete to be viable. Of these 66 responses: 40 were female, 19 were male and 3 identified as either Non-Binary or Gender fluid. Due to the same pools of participants the demographic diversity of the results is similar to that of the previous questionnaire as shown in figures 21 through 23.

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<sup>3</sup> The subreddits, r/productdesign (<https://www.reddit.com/r/productdesign/>) and r/SampleSize (<https://www.reddit.com/r/SampleSize/>). These forum pages discuss product design and collect academic participants respectively.



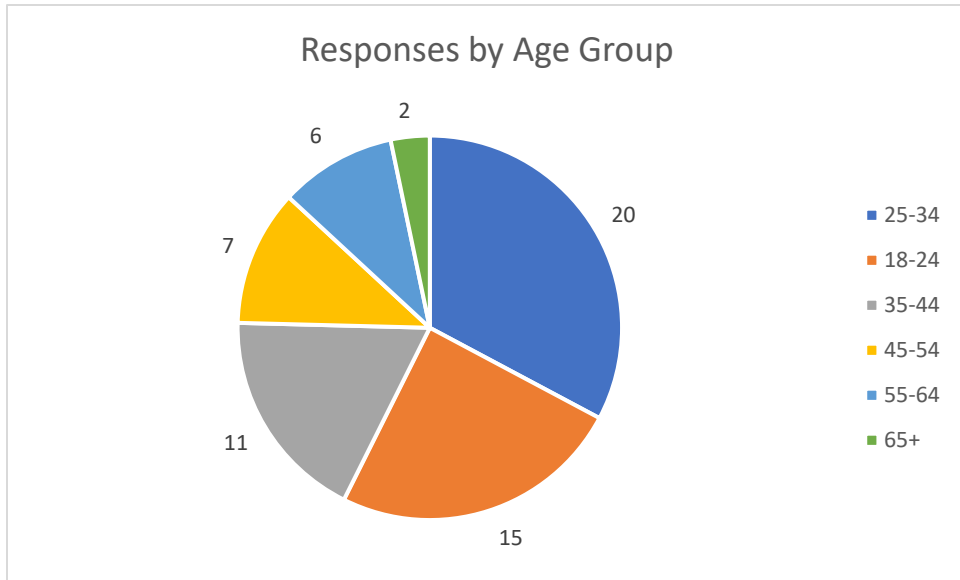


Figure 21: Number of responses to Comparative Feature Analysis by age group

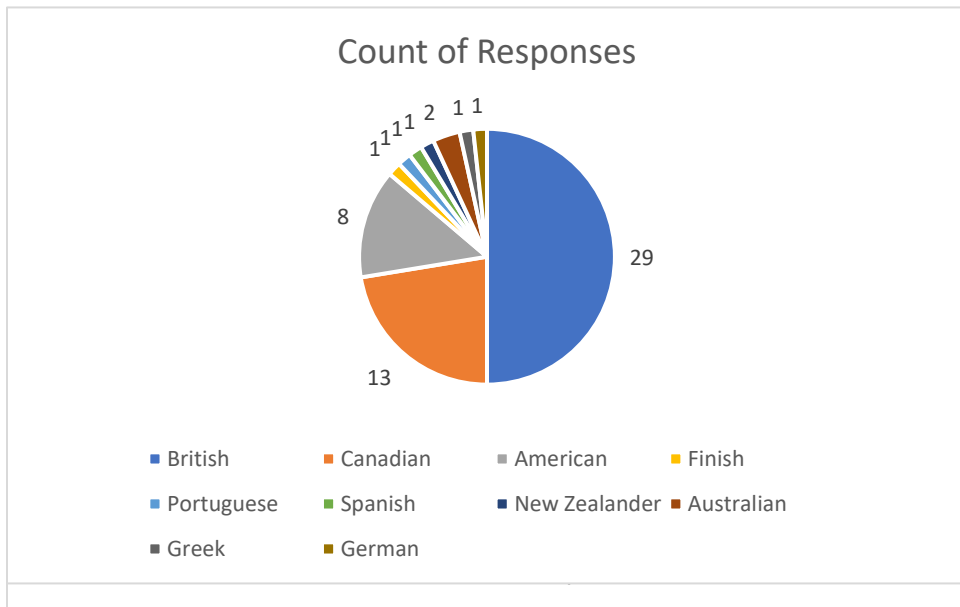


Figure 23: Number of responses to Comparative Feature Analysis by nationality

Figure 22: Number of responses to Comparative Feature Analysis by gender



i.e. **Weighting Factor** =  $((\sum x) \div n) \div a$

Where  $\sum x$  is the total number of times features within a group are represented, and  $n$  is the number of features within the group and  $a$  is the number of times the individual feature is represented in their group. This weighting factor attempts to make up for the limited and imbalanced frequencies that some features appear in and help to reduce the effect of participants' subjective bias. In addition to the data normalisation through the factor described above, it was important to also weight responses by other relevant factors. Age, gender, health, nationality, and occupation were all collected in order to derive data trends specific to aspects of the participant group. And as such the data underpinning these trends also had to be normalised, through the same means, to represent a more balanced and diverse group.

The findings of the first questionnaire and indications given in the Literature Review indicate that this data should see trends toward more traditionally “comfortable” design features like armrests and plush fabrics along with a preference towards more intricate designs (Kaplan, 1995).

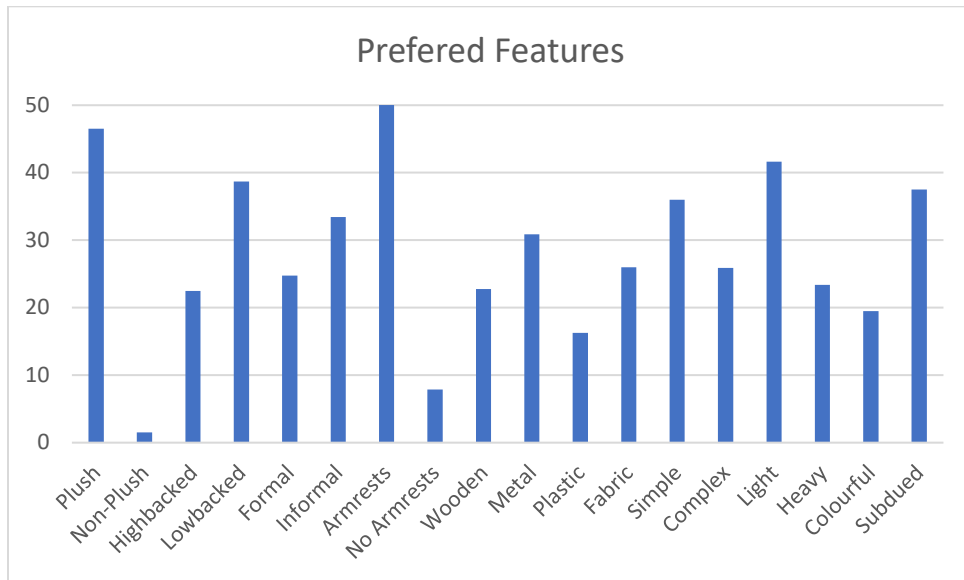


Figure 25: Results showing the preference of each feature

Although the assumption that seemingly comfortable features like plush fabrics and armrests along with subdued colours would be preferred can be seen in the data, more intricately

designed chairs seem to lose compared to simple designs. This is confirmed by participants' responses to chairs they disliked where it is clearly indicated that simple designs are much more preferred than complex. Participants who indicated that they disliked more complex chairs described that they might be uncomfortable, that parts might dig in or otherwise irritate them and that they were "too demanding" and would "want to be the most important thing (sic) in the room". This concept of an object being too demanding is reflective of Kaplan's "Directed Attention Fatigue" (Kaplan, 1995) and may indicate that intricacy or complexity in design has to be tempered in order to support subjective wellbeing or else it risks becoming tiresome to look at and "too demanding".

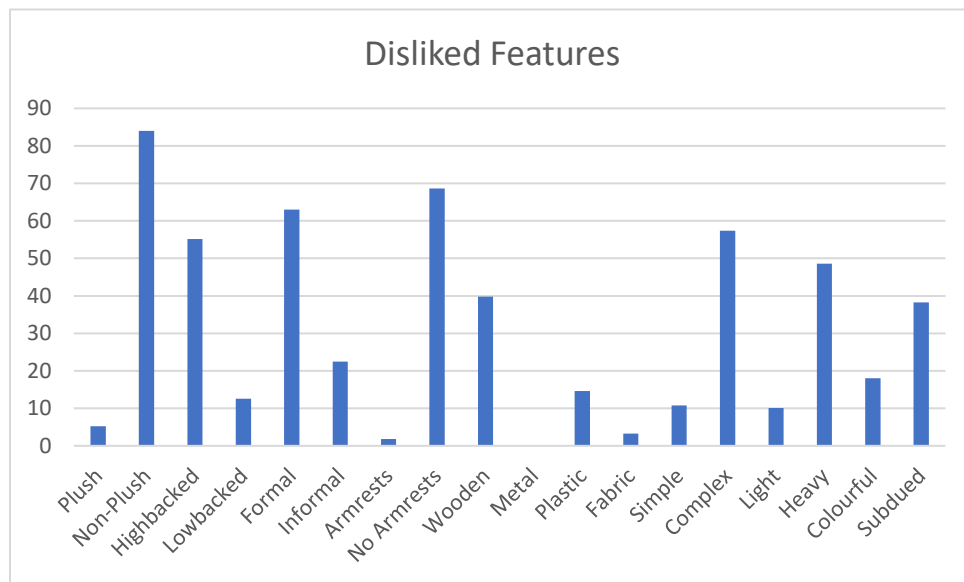


Figure 26: Results showing the dislike of each feature

There were several distinct trends that formed within the data. These can be seen clearly in large differences in responses to features within a group. The largest differences between features in a group indicate a distinct preference towards Plush over Non-Plush and Armrests over No Armrests. There are also smaller but still distinct indicated preferences towards low backed and Informal chairs. These indicated preferences all have the comfort of the user in common. As such it is reasonable to theorise that participants often equate or relate perceived comfort directly to the visual appeal of a chair. This correlation is clearly seen in the comparison

of comfortable looking features and generally preferred features where only the material features greatly diverged from one another.

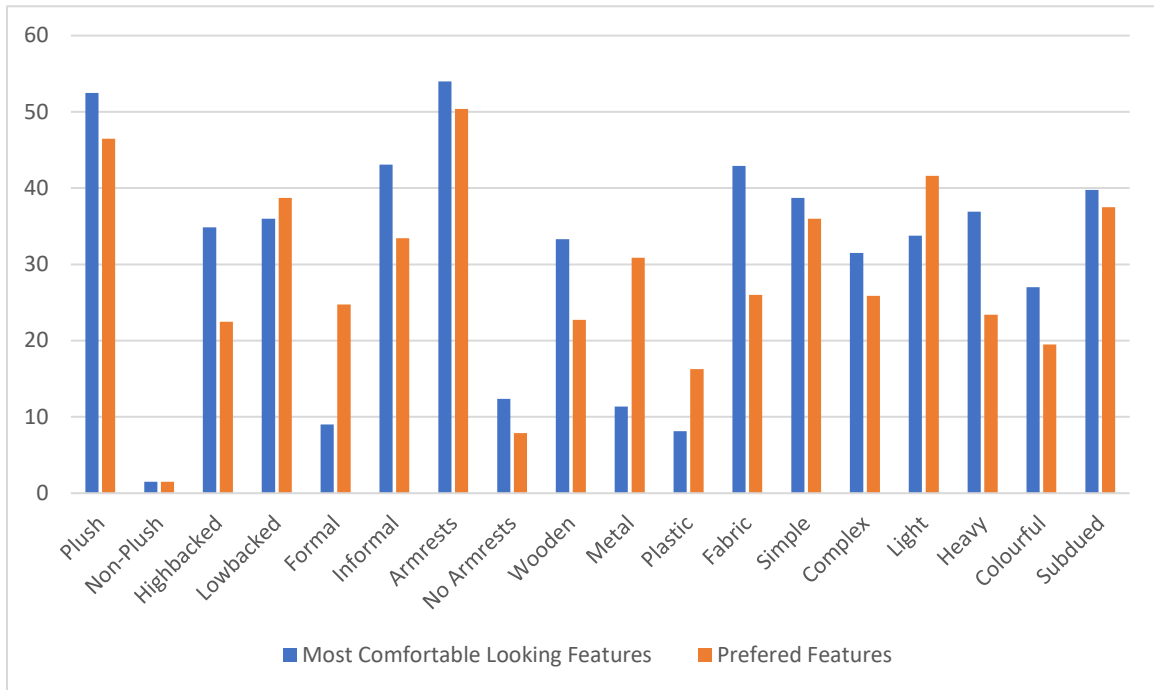


Figure 27: Comparison of comfortable features and preferred features

Another trend indicated by the data is a preference toward integration. The slight preferences for light, simple and subdued cannot be explained as a preference for comfort. Instead, the data correlates more clearly with the participants’ preference of features that can integrate into their existing environment. Perhaps due to Kaplan’s “Directed Attention Fatigue” (1995), Nodder’s “Sloth” (2013) or Havey et al’s reflections on habit (2020) there appears to be a component of passive or learned integration influencing the participant’s preferences.

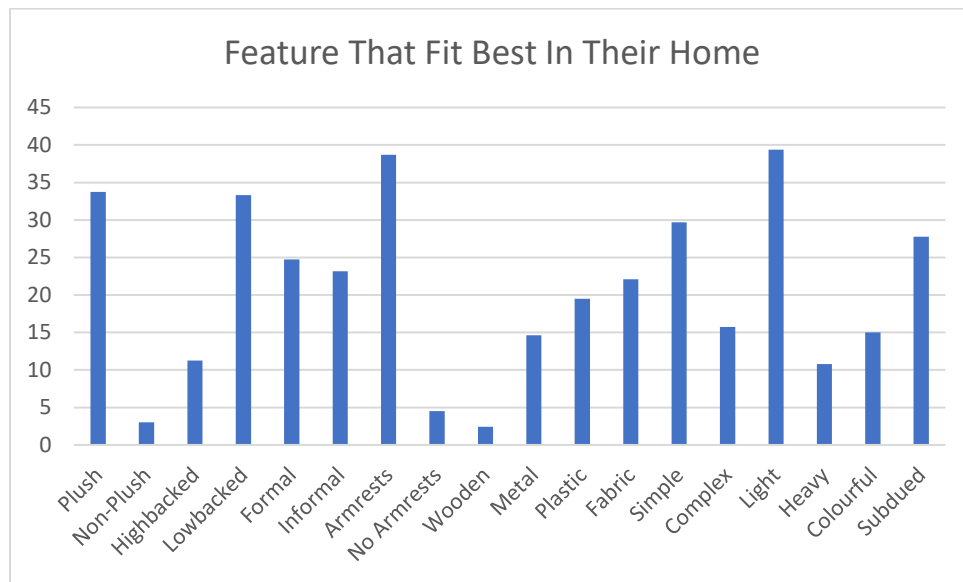


Figure 28: Results showing which feature fits best into participant's homes

By viewing the results through the lens of specific subgroups of participants it was clear to see how these factors effected participants' preferences. Refining the results by genders displays some of the clearest effects of specific subgroups on the data as a whole. There are entire features that were only selected by male participants and others that are almost exclusively selected by female participants. This clearly supports Cupchik (1999), Desmet (Desmet, 1999; Desmet and Pohlmeier, 2013), and Norman's (2004) assertion that culture and individuality are key to products that want to appeal and engage with a user.

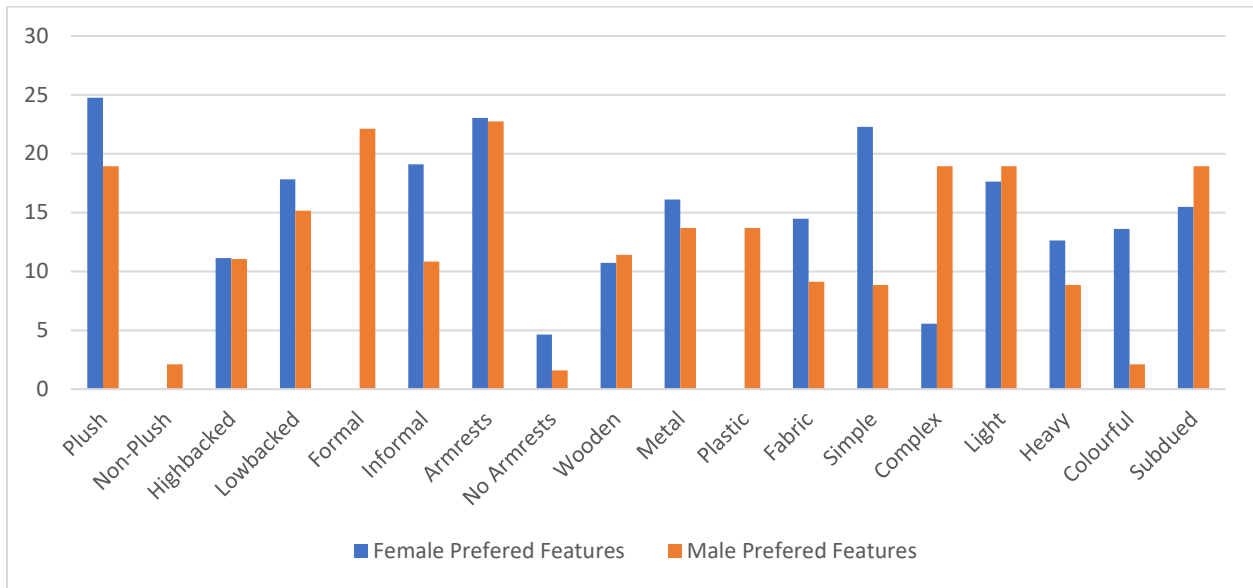


Figure 29: Results showing preferred features through comparison of male to female responses

There are some unexpected discrepancies within the preference and dislike data which conflict with anecdotal understanding, where disliked features are not inversely proportional to preferred ones. It could be assumed that these discrepancies are factors of the limited scope of this research. The error introduced through the small set of chairs used is most likely to blame for the contradictions between liked and disliked features. Although the contradiction could also be influenced by the sometimes-oxymoronic bias inherent in subjective response.

### Outcome 3

This third outcome is derived from the participant’s initial aesthetic interactions with chairs and notes three questions that the data indicates should be considered when designing a product that promotes subjective wellbeing. Because the data collected as part of the comparative feature analysis research is largely quantitative and representative of initial interactions and assumptions, the results and this outcome can only represent one component of affective interactions. As such this outcome should be referenced to in conjunction with outcome 1 and 2 in order to increase the validity of the findings.

### **What type of life do they lead?**

Gender, occupation, and age were all categories of data collected through this research. Although occupation and age didn't have as obvious an impact on the results as gender did, as is seen in figure 25, they clearly still showed bias toward certain features. It is this bias that is worth noting. This bias indicates that not only gender but occupation and age, defining factors in someone's life, have a role to play in how people perceive designed products. This concept reflects that of Cupchik's (1999) and Desmet and Pohlmeier's (2013) ideas of "social values and norms" and "personal significance" respectively. By integrating an understanding of the defining factors in a user's life it should be possible to design products that can begin to influence users on a subjective, subconscious level.

### **How does your product integrate with their existing environment?**

It is clear from the data that features commonly associated with being inobtrusive or aesthetically flexible were often preferred by participants from all backgrounds. Participants that selected chairs that used subdued colours, light weight construction and simple designs often reflected that they made their decision as those chairs would "fit with their home décor" or that they "don't stand out too much". This idea of integration could be explained in terms of Nodder's "Sloth" (2013) or Harvey's reflections on habit (2020) either or both indicating that ease of integration or comprehension can be factors that affect subjective interactions with designed products and spaces.

### **How well does the product appear to fulfil its role?**

Throughout the results of this research the term most used to contextualise responses was "comfort". This to a chair is akin to the functionality of other products. Participants often preferred chairs that made use of features that imply a more comfortable experience. Armrests and plush finishings are good examples of this where the aesthetics, brought about by these features, trigger experience-based reactions in the participants. These participants associate



those features with a more functional, comfortable interaction with the chair and as such assume a chair with those features would also be more functional. As with the integration of products into a space this implied nature can also be seen in Harvey's reflections on habit (2020) where learnt experience influences a participant's interactions with a designed product. This concept is also touched by Norman's "Behavioural level" where aspects beyond the physical, in this case the visual perception of an object, can enlist a subjective response.

## Section 3: Discussion

### Introduction

The question asked at the beginning of this thesis was "Can Products be Designed to Promote Subjective Wellbeing?". From design frameworks specifically designed to influence positive subjective reactions to psychological concepts about the spaces in which we live, the first section of this thesis attempted to answer this question through the investigation of existing bodies of knowledge from several different cultural and academic perspectives. The second section of this thesis took a different approach to finding an answer to this question. Guided by the outcome of the Literature review two questionnaires were formed. One that gathered information on how participants currently interact with their own chairs and a second that gathered data on how participants perceived and evaluated chairs. Each of these research components and the initial literature review resulted in their own outcome. In this final section, these three outcomes derived throughout this thesis are brought together and refined in order to develop a final outcome. This not only represents many concepts presented in existing bodies of literature but also attempts to validate them through inductive primary research exploring the subjective response of participants to designed products. The result of this progress should be a more robust outcome that indicated some of the ways in which design can be used as a tool to affect a user and in turn promote their subjective wellbeing.

## Outcomes

### Outcome 1

This outcome covers a curated section of existing knowledge around the question “Can Products be Designed to Promote Subjective Wellbeing?”. This ranges from design specific research and literature to more holistic psychological approaches. This outcome is key to this thesis as it forms a list of criteria through which this thesis can analyse and validate. It also informs the latter two research components and guides the lens and approaches each component takes.

- Who are they, and who are you?
- How are they rewarded?
- How does your product fit in?

### Outcome 2

This outcome looks at the existing experiences that participants have with their own chairs. This means that considerations of initial appeal or assumed functionality will not be covered. Instead, these results represent day to day interactions with users.

- How well does the product function?
- What type of space does the product help to create?
- What is important to the user?
- Does the product help to define spaces?

### Outcome 3

This outcome touches on what expectations users have of a product. The research used to generate this investigated how participants perceived chairs comparatively. The results are there for focused specifically on how chairs appear to users and how this can affect how they interact with them.

- What type of life do they lead?
- How does your product integrate with their existing environment?
- How well does the product appear to fulfil its role?

## Final Outcome

The final outcome derived in this thesis was constructed through the combination of the previous three research outcomes in a process similar to the “Convergent Design” process described by Creswell and Creswell (2018, p.218). Secondary research was undertaken to gain a better grasp on how design is understood to affect subjective wellbeing. Primary research was then undertaken. By using the aspects highlighted in the first outcome as a guide two questionnaires were devised, one that focused on experience based affective interactions and another that focused on initial aesthetic interactions. These two sections and culminating outcomes aimed to enhance and validate the findings of the initial outcome This final outcome embodies this intention. The list of aspects below is a culmination of the previous findings in this thesis and represents design considerations that appear to affect the subjective wellbeing of end users.

### **Awareness of Personal Significance (Culture, Social pressure, Beliefs)**

Subjectivity is a long recurring term in this thesis. In the literature writers such as Gaver (1999), Desmet (1999), Nagamachi (1995) along with several others, all centre their statements around this concept. As such this has become an important factor not only seen in the outcomes of each form of research but also in the methods behind the research. Humans are not straight forward linear beings but instead are full of contradiction and nuance. It is indicated that this nuance is a force that drives a lot of our interactions and biases toward or against products. This idea was explored heavily in the primary research component “Interaction Research” where subjective open-ended questions were asked about participants’ chairs and their environment. Through this exploration it became clear that although many aspects of affective interactions were shared across participants there was a large trend towards aspects that participants described as nostalgic or sentimental. These results could be explained through several of the different systems highlighted in the literature. From Harvey et al’s (2020) discussions on habits and reinforcement through interaction to Desmet and Pohlmeier’s “pursuing of personal goals” (2013) and subjective meaning. Whichever concept or hybrid we prescribe it is clear to see that

an awareness of both the user and designer can be essential in designing products that can promote subjective wellbeing. Therefore questions like “who are they, and who are you?” and “what is important to the user?” may help drive a designer toward the development of affective products.

### **Rewarding through ease of use and positive feedback**

A rewarding experience is an aspect of design that is commonly mentioned in the literature. Most of the time however it is not mentioned in regard to design. It is instead largely portrayed in the literature as a way of ingraining systems or types of interactions. Through the construction of these systems and actions that Dodge, et al (2012) and Harvey, et al (2020) describe its impact on subjective wellbeing. Eyal (2014) and Nodder (2013) describe how these systems of habitual interaction can be introduced into designs but also warn of the inherent risks, some as extreme as addiction and manipulation. This aspect was difficult to expand upon through the primary research conducted in this thesis because of the unconscious nature of this type of feedback and how rarely it is applied to chair design. It could be seen however that participants that found their chairs to be uncomfortable would use them more sparingly and would regularly change their chairs to make them feel “less stressed”. This poor impression implies that if a product promotes negative instead of positive feedback it may also be possible to affect interactions however in a negative way. The experience and function of a product is therefore paramount to avoiding negatively impacting user interactions and through the careful use of positive feedback it may be possible to promote subjective wellbeing. The questions “how are they rewarded” and “how does the product function?” from outcomes one and two respectively are important measures to consider when designing to affect subjective wellbeing.

## **Integration into users existing life and environment**

It is clear in both research components, interaction research and comparative feature analysis, that participants rarely consider products outside of their surroundings and that a products environment can have a large effect on how a product is interacted with. In the comparative feature analysis component, the Robin Day's H-W-H chair was the most picked chair when participants were asked which chair, they thought would fit best in their home. When asked why they made that choice the large majority of responses stated that it matched their existing furniture and environment. The results of the interaction research also indicate that the environment around a product can affect its interactions, where four of the six total semantic groupings, touched on the space in which the chairs were situated. In the literature Cupchik (1999) and, Kaplan (1995) both discuss the effects of environment and space on people and their interactions. It is clear from both the literature and the research done here that space and contextual environment are important aspects to consider when designing affective products. As such questions like "how does your product integrate with their existing environment?", "does the product help to define spaces?" and "how does your product fit in?" could be considered in the design process to help create products that support subjective wellbeing.

## **Aspects that reflect nature (Views, Openness, Nature)**

Nature and design aspects that reflect it are often rare in systems and frameworks that claim to support affective design. The few that do include it largely do not focus on the application of the concept and instead attempt to understand its effect. Ulrich et al (1984) and Kaplan (1995) are good examples of this where they unpack much of the aspects of nature. With Ulrich focusing on how natural views can affect healing and Kaplan posing explanations as to why. Although uncommon there are several writers such as Wilson (1993) that do attempt to integrate natural aspects into design thinking but is often ambiguous to its application. In the primary research section "Interaction Research" there are many participant responses that make note of specific natural aspects such as light quality, expansive natural views, and nearby plant life. This sentiment however does not appear in the second primary research component, "Comparative

Feature Analysis”. This is likely because of the focus on the collection of initial responses to different chairs instead of longer-term interactions. This may imply that natural affecting features are less likely to generate immediate affective responses and instead affect wellbeing over a longer period of time. This idea would be supported by Kaplan’s (1995) “compatibility” where he discussed human compatibility with natural environments and how they require less effort to interact with, which in turn would imply reduced challenges in Harvey et al’s (2020) model of wellbeing. It is clear that although the implementation of many natural features requires additional research, natural environments and design aspects can affect a person’s subjective wellbeing.

### **Defining boundaries through interaction**

Boundaries are a well-established psychological factor for aiding mental health (Wepfer, et al. 2018) and appear often throughout literature surrounding wellbeing. This concept however is sparsely mentioned in conjunction with designed spaces and especially design frameworks. Despite this, both primary research components in this thesis indicated that the definition of boundaries is an important aspect that affects participants’ interaction with chairs. There were two predominant forms of boundaries mentioned in both research components. The first was a physical separation often discussed in the form of enclosing and encompassing designs. The second was a subjective psychological boundary where participants indicated how associations surrounding their chairs made them feel like working or relaxing. Seclusion and boundaries therefor seem to have a noted impact on how participants interact with products and as such questions like “Does the product help to define spaces?” should be considered when designing affective products.

## Evaluation

From the outset, the aim of this research was to develop and define a design methodology or specification that could be applied during the design process to aid in the creation of products that improve subjective wellbeing. In effect setting out to address the question, 'can products promote subjective wellbeing'?

To achieve this, the researcher generated a list of objectives through which the success of this research could be evaluated.

These objectives were:

- To build an understanding of the existing body of literature surrounding Design and Emotion and to develop a design methodology or specification, that supports subjective wellbeing, through the analysis of common and key themes within the text.
- To conduct primary research about participants' existing interactions with chairs within their home environment and to develop an outcome that guides the design of products that supports subjective wellbeing, through the analysis of common and key themes.
- To collect primary research about participants' comparative views and bias towards existing chair designs and to develop an outcome that guides the design of products that support subjective wellbeing, through the analysis of common and key features.
- To compare outcomes from the previous three sections correlating any overlap or perceived key aspects. Culminating in a single final outcome, that lists design aspects and considerations that support subjective wellbeing.

The first of these objectives, to build an understanding of the existing literature, is represented by the Literature Review section of this thesis. Existing research and knowledge was collected and correlated with respect to Design and personal subjective wellbeing. This Literature Review, while not comprehensive in its depth, shows a broad spectrum of approaches, perspectives and understanding found in the literature regarding the subjective interactions between space (designed or not) and an individual's subjective responses. These findings were analysed and condensed into a set of three common concepts which could be viewed as a pseudo-specification for the development of a product that reflects the current understanding of how

designed products affect subjective wellbeing. This pseudo-specification responds to the second half of this first objective, to develop a design methodology or specification that supports subjective wellbeing, by successfully generating an approach to design that can be validated and refined in the later parts of this thesis.

The second of the objectives, to conduct primary research of participants' existing interactions with chairs, was addressed in the section Interaction Analysis. This section conducted primary research with a group of just over 50 participants drawn from a predominantly western demographic of mixed gender and age. Participants were invited to answer a questionnaire about their interactions with a chair they commonly use while at home. The questions used were chosen specifically to generate subjective responses, this approach was important to reduce the chance of misattributing key aspects. This however also causes the resulting data to be biased by the preconceptions and views of the participants. Despite this concern the outcome of this primary research by cross-validating these results with the others found in this research valid as long as special attention is paid to the specific demographics present in this research. The results of this section once again generated a pseudo-specification in place of an outcome that guides the design of products that support subjective wellbeing, as established in the objectives.

The third objective, to collect primary research about participants comparative views and bias was responded to through the research section Comparative Feature Analysis. In this section participants views, and bias are investigated through a second questionnaire, that quizzed participants on their subjective opinions and responses to existing chair designs. Because this research had to be conducted through a digital medium the data collected and results, only represent responses to visual aspects of each chair from a fixed angle. Physical aspects like texture, tactile feedback and environmental context are not represented in the findings. The preferred visual aspects identified through this research indicate some of the personal and cultural bias participants have towards designed chairs, and indicates some of the aspects that could make a chair more endearing. The outcome of this research component clearly meets the objective, of developing an outcome that guides the design of products that support subjective



wellbeing, if we consider endearment as a form of providing users with the resources described by Dodge, et al. (2012).

The fourth objective set out in this thesis, to compare outcomes from the previous three sections correlating any overlap or perceived key aspects, is achieved in the section Final Outcome. This section condenses the findings of the other three research components into a single, final outcome. This outcome while underpinned by research components with individual flaws represents a variety of idea, concepts and approaches to the ways in which design can influence subjective wellbeing. Which through a process of cross-comparison has eliminated many of the shortcomings faced in these earlier research components. As such this final outcome could be used as a reference when developing more specific sets of specifications for individual projects that wish to support subjective wellbeing.

This research took a grounded, inductive approach to answer this question allowing for an exploration of pre-existing and collected data sets. Beyond the overarching paradigms and methods, each section made use of their own methods for the capture, processing, and analysis of data as described in each section. The most used of these was the KJ method of analysing subjective responses through a process of codifying terms and sorting them into semantic groups. Also referred to as affinity diagramming, the KJ method is widely used as a method for processing subjective responses (Lokman and Kamaruddin, 2010). Through these methods and final comparison of results this thesis attempts to present a more rigorous understanding of how subjective wellbeing can be influenced by products, by correlating common themes within existing literature and exploring them through both interactive and perceptive methods. This process of convergent analysis (Creswell and Creswell, 2018) was essential as part of this mixed method research as it allowed for the findings of this thesis to be validated through the merger of qualitative and quantitative data and their comparison to existing well-regarded secondary findings. Though this convergent process of analysis helps to support the validity of the findings of this thesis it is also important to note the inherent issues of subjective or qualitative research components. As was described directly in each research section, the subjective nature inherent

to discussions of affect and emotion can introduce bias and contradiction to data sets. Both the mixed method and ethnographic approaches taken in this thesis aimed to reduce the impact of this. Another aspect considered to increase the validity of these findings was the collection of large diverse data sets to help reduce subjective bias. However, due to complications surrounding the Covid-19 pandemic and the availability of resources, the data sets were smaller and less diverse than intended with a total of 143 combined responses. The results of both the interaction analysis and comparative feature analysis sections of this thesis still indicate clear trends within their data which implies that they aren't badly affected by erroneous or extreme data. The final outcome of this thesis presents a list of factors which, through varied methodological approaches, are confirmed to effect affective interactions between users and products. This thesis does not attempt to advise how these aspects could be specifically applied to the design of a product, as several of the frameworks in the literature do, and instead indicates areas of thought, reflection and consideration that can affect user interaction.

## Conclusion

In Conclusion, this thesis successfully explores the question ‘can products be designed to promote subjective wellbeing?’ through the use of inductive mixed method approaches to the analysis of both primary and secondary research. Through this research, it was found that product interactions can promote subjective wellbeing, and through the consideration of this thesis’ findings it should be possible to design products that promote subjective wellbeing. This thesis’ culminating final outcome lists five design aspects and considerations that through the research have been shown to affect positive interactions between user and product.

- Awareness of Personal Significance (Culture, Social pressure, Beliefs)
- Rewarding through ease of use and positive feedback
- Integration into users existing life and environment
- Aspects that reflect nature (Views, Openness, Nature)
- Defining boundaries through interaction

To better understand these findings, future studies could use this outcome as a basis for the development and evaluation of frameworks specific to certain types of products and features.

## Future Work

This research set out to gauge whether design, as a medium, has the potential to affect a user’s subjective wellbeing. Although successful in its findings, the results of this paper only indicate that there can be subjective positive interactions between a user and designed products. This initial research provides a theoretical foundation on which to build further applied research. The aim of the next phase of the research is to generate and evaluate a comprehensive design toolkit to enhance design practice and deliver consistent real-world benefits to the wellbeing of individuals. Future work will be required to implement the toolkit from the point of initiation of the design process through to its completion. This will require the testing and validation of the findings of this research along with exploring how these factors can be implemented into a Design process.

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## Appendix 1 – Interaction Analysis Questionnaire

### Research into the affective (precognitive emotional) impact of chairs in the home environment

#### 1. Research introduction

Thank you for taking the time to complete this questionnaire. This research is part of my MRes in which I am attempting to draw links between people's wellbeing and the environment around them - specifically the chairs we use while at home. The results of this will be used to guide my design decisions while I design a chair that is better suited for a home environment. The main focus of my research is on the intangible affective (instinctive, emotional) responses surrounding product interactions; so when possible please try to be as descriptive as you can be.

This MRes will culminate in the publication of a thesis and body of practical work. All information collected will be anonymised and handled to conform with the General Data Protection Act (2018). If you are uncomfortable or unwilling to complete any of the questions, please do not feel any pressure to. You are free to withdraw from this research at any point without giving a reason - until the publishing of my thesis.

Researcher: Gareth Williams

If you have any questions please feel free to contact me at:  
gwilliams.productdesign@gmail.com

\* Consent Form.

- I understand that any information I have given to the Researcher will remain confidential.
- I understand that the information will be anonymised and used in an MRes research project and thesis.
- I confirm that I have read and understand the information given and have had the opportunity to ask questions.
- I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason.
- I agree to take part in the above study.

**Research into the affective (precognitive emotional) impact of chairs in the home environment**  
**2. Questionnaire**

General Information  
-----

1. How old are you?

- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65+

2. What gender do you identify as?

- Male
- Female
- Non-binary
- Gender fluid
- Other (Please specify)

3. Do you have any existing health conditions?

- No
- Yes (Please specify)

4. What nationality are you?

5. What is your current occupation?

6. Are you currently working?

- Working and currently undertaking duties I am paid for.
- Working but not undertaking duties I am paid for. (i.e. Furloughed or on self-employment income support scheme)
- Not working (Including students, OAPs as well as working age inactives)

7. Has the way you work been affected by the Coronavirus outbreak?

- No
- Yes (Please specify)

8. Do you have any special needs that affect your seating?

- No
- Yes (Please specify)

Home Context

-----

9. Do you usually work/study from home?

- I am working /studying at home due to Coronavirus
- I usually work /study from home
- I do not work /study from home
- N/A

10. Do you have a dedicated work/ study space at home?

Yes

No

11. How many people share your home environment? (Including yourself)

1

2

3

4

5

6+

Seating

-----

12. What type of chair do you use the most while at home?

13. Approximately how long, on a normal day, do you spend in this chair?

Thirty minutes

One hour

Two hours

Three hours

Four hours or more

14. On average how often do you get up and move around throughout the day?

Every fifteen minutes

Every thirty minutes

Every hour

Less than every two hours

15. Do you usually make changes to your seating to better suit you?

- No
- Yes (Please specify. i.e. Cushions for your back. Seat wedges)

16. How many people use this chair?

- 1
- 2
- 3
- 4
- 5
- 6+

17. Which room is this chair in?

18. Describe how you feel about this room? (i.e. It is too bright or too dark. You find it relaxing because of nostalgic furniture. You find it stressful as a lot of people are always walking through.) Please be as descriptive as possible.

19. What do you do while using this chair (i.e. Working, Studying, Cooking, Watching TV)

20. How does this chair make you feel? (i.e. Grumpy, as it's hard and uncomfortable. Happy, because it looks nice. Nostalgic, as it reminds you of people or experiences) Please be as descriptive as possible.



21. How do you find the temperature while you're using this chair?

Hot Average Cold



22. How happy are you with using this seat?

Happy Average Unhappy



23. Are there any features of this chair that you think are good or bad? (i.e. It has legs that are too long, so you have trouble getting comfortable. It has a tall back that supports your neck properly) Please be as descriptive as possible.

24. Any further information on how you interact with seats at home is more than welcome. (Or any other information you think would be interesting to this research)

Thank you again for taking the time to help me with my research. If you would like to keep up to date with my research as it continues I will be uploading some of my design outcomes to my website <https://gwilliamsdesign.online/>

Once again. All information collected will be anonymised and handled to conform with the General Data Protection Act (2018). If you are uncomfortable or unwilling to complete any of the questions, please do not feel any pressure to. You are free to withdraw from this research at any point without giving a reason - until the publishing of my thesis.

You can contact me at any point at [gwilliams.productdesign@gmail.com](mailto:gwilliams.productdesign@gmail.com) for more information on this research or to ask any questions you might have.

Thanks,  
Gareth Williams.

## Appendix 2 – Comparative Feature Analysis Questionnaire

### Reactions to Existing Chairs

#### Consent

Thank you for taking the time to complete this questionnaire. This research is part of my MRes in which I am attempting to draw links between people's wellbeing and the environment around them. The results of this will be used to devise a set of features and aspects that effect how a chair can affect the subjective.

This questionnaire is broken into two sections; Comparative Questions and Individual Questions. In the Comparative section you will be asked to compare several chair designs and judge them against each other. In the Individual section you will be asked to look at 3 different chair designs (One after another) and judge them purely on their own merits.

This MRes will culminate in the publication of a thesis. All information collected will be anonymised and handled to conform with the General Data Protection Act (2018). If you are uncomfortable or unwilling to complete any of the questions, please do not feel any pressure to. You are free to withdraw from this research at any point without giving a reason - until the publishing of my thesis.

Researcher: Gareth Williams

If you have any questions please feel free to contact me at:  
gwilliams.productdesign@gmail.com

#### \* 1. Consent Form.

- I understand that any information I have given to the Researcher will remain confidential.
- I understand that the information will be anonymised and used in an MRes research project and thesis.
- I confirm that I have read and understand the information given and have had the opportunity to ask questions.
- I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason.
- I agree to take part in the above study.

## Reactions to Existing Chairs

### General Information

These meta questions are to be used to contextualize the findings of this research and will allow for a more accurate representation of a diverse population.

2. How old are you?

- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65+

3. What gender do you identify as?

- Male
- Female
- Non-binary
- Gender fluid
- Other (Please specify)

4. Do you have any existing health conditions?

- No
- Yes (Please specify)

5. Do you have any special needs that affect your seating?

No

Yes (Please specify)

6. What is your nationality? (i.e. Welsh, French etc)

7. What is your current occupation?

## Reactions to Existing Chairs Comparative Questions

8. Which of these chairs do you like the most?



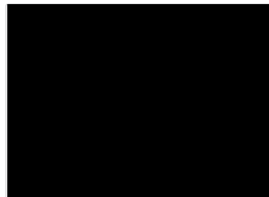
Arne Jacobsen, Egg



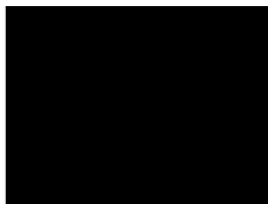
Geoffrey Harcourt,  
Cleopatra



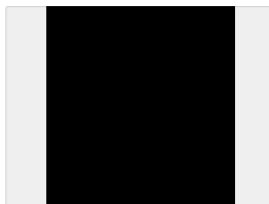
Jim Warren, Body Chair



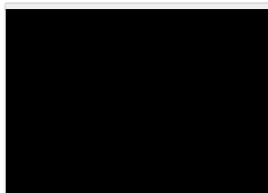
Robin Day, H-W-H



Vladimir Kagan, Contour  
(lounge)



C R Mackintosh, Hill  
House Chair

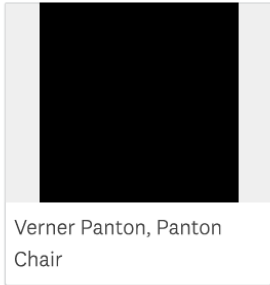


Charles Eames, Lounge  
Chair



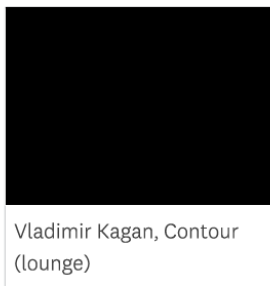
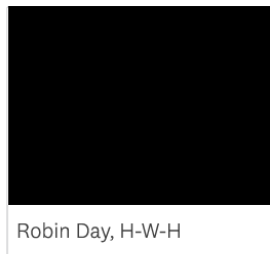
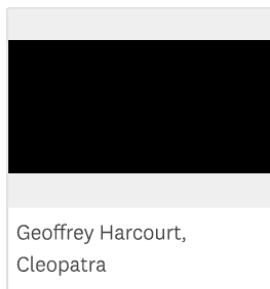
D Chadwick, B Strumpf,  
Aeron Chair

Images have been redacted for this print version due to copyright concerns. Participant who originally participated in the survey were shown images of the chairs described.



9. Why do you like this chair the most?

10. Which of these chairs do you like the least?





Charles Eames, Lounge Chair



D Chadwick. B Strumpf, Aeron Chair



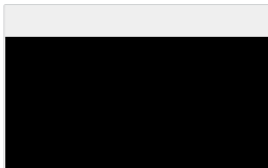
Verner Panton, Panton Chair

11. Why do you like this chair the least?

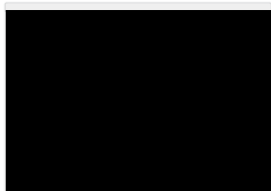
12. Which of these chairs do you think would be the most comfortable to sit in?



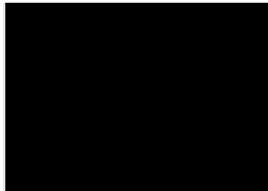
Arne Jacobsen, Egg



Geoffrey Harcourt, Cleopatra



Jim Warren, Body Chair



Robin Day, H-W-H



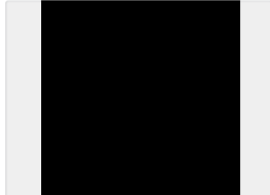
Vladimir Kagan, Contour  
(lounge)



C R Mackintosh, Hill  
House Chair



Charles Eames, Lounge  
Chair



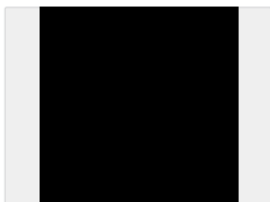
D Chadwick, B Strumpf,  
Aeron Chair



Verner Panton, Panton  
Chair

13. Why do you think this chair would be most comfortable?

14. Which of these chairs do you think would best fit into your home environment?

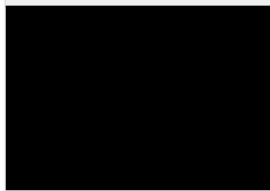


Arne Jacobsen, Egg

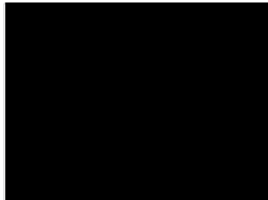


Geoffrey Harcourt,  
Cleopatra

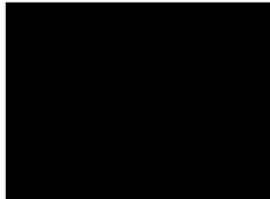




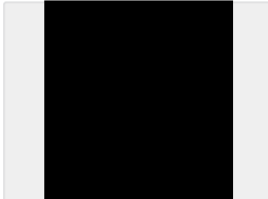
Jim Warren, Body Chair



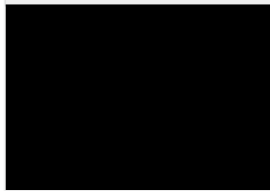
Robin Day, H-W-H



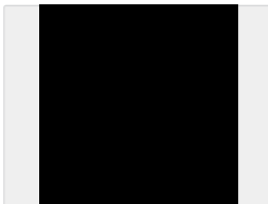
Vladimir Kagan, Contour (lounge)



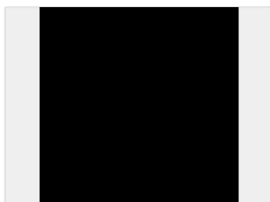
C R Mackintosh, Hill House Chair



Charles Eames, Lounge Chair



D Chadwick. B Strumpf, Aeron Chair



Verner Panton, Panton Chair

15. Why do you think this chair would fit in best in your home?

16. Where in your house would you put this chair?

Living Room (TV room, Conservatory etc.)

Bedroom

Kitchen

Office (Work space)

Other (please specify)





## Reactions to Existing Chairs

### Individual Questions, Body Chair

Jim Warren, Body Chair



23. How do you feel about how this chair looks?

Dislike Neutral Like

24. How comfortable do you think this chair would be to sit in?

Uncomfortable Neither Comfortable

25. How expensive do you think this chair would be? (Average = Cost of a similar chair from a shop like IKEA)


Cheap Average Expensive

26. Which feature/s of this chair do you like the most? (E.g. Armrests, A Highback, Ability to rotate.) Leave blank if unsure.

27. Which feature/s of this chair do you dislike the most? (E.g. Armrests, A Highback, Ability to rotate.) Leave blank if unsure.

28. How do you feel about this chair overall?

Dislike Neutral Like



## Reactions to Existing Chairs

### Individual Questions, Aeron Chair

Don Chadwick. Bill Strumpf, Aeron Chair



29. How do you feel about how this chair looks?

Dislike Neutral Like

30. How comfortable do you think this chair would be to sit in?

Uncomfortable Neither Comfortable








38. Which feature/s of this chair do you like the most? (E.g. Armrests, A Highback, Ability to rotate.) Leave blank if unsure.

39. Which feature/s of this chair do you dislike the most? (E.g. Armrests, A Highback, Ability to rotate.) Leave blank if unsure.

40. How do you feel about this chair overall?

Dislike Neutral Like



## Reactions to Existing Chairs

### All done

Thank you again for taking the time to help me with my research.

Once again. All information collected will be anonymised and handled to conform with the General Data Protection Act (2018). If you are uncomfortable or unwilling to complete any of the questions, please do not feel any pressure to. You are free to withdraw from this research at any point without giving a reason - until the publishing of my thesis.

You can contact me at any point at [gwilliams.productdesign@gmail.com](mailto:gwilliams.productdesign@gmail.com) for more information on this research or to ask any questions you might have.

Thanks,

Gareth Williams.

41. Any feedback on this questionnaire is welcome