WHAT YOU TOUCH, TOUCHES YOU: THE IMPACT OF HAPTICS ON CONSUMER BRAND IMPRESSIONS

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Abstract

Humans perceive the world around them through their senses. The sense of touch, a vital human sense, is linked to information and feelings about a product through physical and psychological interactions (Peck & Childers, 2003a). The product, the individual and the situation are the three drivers of a consumer's motivation to touch products (Krishna, 2010). Haptic information attained through our sense of touch is important for the evaluation of products that differ in terms of four primary material properties: texture, weight, hardness, and temperature (Peck & Childers, 2003b). However, prior touch research has primarily studied the individual differences in the need for touch, while scant attention has been paid to the product differences. This research is a preliminary investigation of the impact of the product-based salience of haptic information attained through touch on consumer brand impressions. This thesis embraces the theoretical perspective of embodied cognition, which posits that the mind should be understood in the context of its relationship to a physical body that interacts with the world to support this premise (Krishna & Schwarz, 2014; Wilson, 2002).

There is a focus here on brand personality (BP), which refers to "the set of human characteristics associated with a brand" (Aaker, 1997). Despite the plethora of research on brand personality, surprisingly little research has studied the antecedent factors contributing to the creation of brand personality (Labrecque & Milne, 2012). Addressing this knowledge gap, this thesis seeks to examine the impact of product-related haptic information corresponding to texture (smooth, rough) and weight (light weight, heavy weight) in evoking consumer brand personality impressions. In addition, this thesis examines three other consumer brand impressions: aesthetic appeal, perceived quality and willingness to buy. The spreading-activation theory of human semantic processing, which suggests that human memory structure is organised along the lines of semantic similarities sheds light on the predicted association between haptics and consumer brand impressions (Collins & Quillian, 1969). Accordingly, the first research question asks: To what extent are the haptic properties of texture and weight associated with consumer brand impressions?

However, product differences of touch alone cannot explain the proposed haptic effects, because the effects of touch are stronger for some people than for others (Peck & Childers,

2003a). Peck and Childers (2003a, p. 431) define this individual difference in the need for touch (NFT) as "a preference for the extraction and utilization of information obtained through the haptic system". NFT consists of two dimensions: the goal-oriented instrumental dimension and the hedonic-oriented autotelic dimension. This thesis posits that the haptic orientation of individuals has a moderating influence on the capacity of haptic stimuli to capture an individual's attention, thus evoking stronger brand impressions on a hedonic-oriented autotelic NFT consumer's memory. Accordingly, the second research question asks: To what extent do individual differences in the need for touch influence consumer brand impressions evoked by haptics?

This thesis proposes two novel haptic notions: *the multidimensionality of haptics and haptic cue congruity.* This thesis defines *the multidimensionality of haptics*: "*haptic perception as an integration of several haptic inputs rather than a single haptic sensory modality*". Perception and psychophysics literature, which argues that touch should be considered more of a multisensory rather than a single sensory modality rationalises this novel haptic perspective (Klatzky & Lederman, 2003). The multidimensionality of haptics further provides insight with regard to how haptic cues correspond with each other, which we refer to as *haptic cue congruity*: "*the degree of fit among haptic cues*". This research draws on schema congruity theory and sensory congruence (Krishna, Elder, & Caldara, 2010) to support the notion of haptic cue congruity (Meyers-Levy & Tybout, 1989). This thesis predicts haptic cue congruence among smooth (texture) and light weight (weight) and rough (texture) and heavy weight (weight) haptic conditions. Conversely, there will be haptic cue incongruence among smooth (texture) and heavy weight (weight) and rough (texture) and light weight (weight) haptic conditions. More specifically, this research examines the relationship between haptic cue congruity and an individual's autotelic NFT on consumer brand impressions. Accordingly, the third research question asks: What is the nature of the relationship between haptic cue congruity and an individual's autotelic need for touch on consumer brand impressions?

In addition, this thesis investigates the mediational role of brand personality on the interactive effect of haptics and an individual's autotelic NFT on willingness to buy. Accordingly, the fourth research question asks: To what extent does brand personality influence the interactive effect of haptics and an individual's autotelic need for touch on willingness to buy?

For instance, would roughness or weight of a photo frame impact brand personality such as competence thereby increasing autotelic NFT consumer's willingness to buy the frame?

Three experimental studies test the hypothesised effects of haptics and consumer brand impressions. The findings show that product-based haptic information relating to texture and weight evokes consumer brand impressions, and more specifically, brand personality. The effect of haptics on consumer brand impressions is moderated by an individual's NFT: hedonic-oriented autotelic NFT consumers are more influenced by haptics than instrumental-NFT consumers. The findings reveal that high autotelic NFT consumers are excited by products when haptics cues are in incongruence (smooth and heavy weight). In contrast, low autotelic NFT consumers perceive products as sophisticated when haptic cues are in congruence (smooth and light weight). As well, the research shows the mediational role of brand personality on the interactive effect of haptics and an individual's autotelic NFT on willingness to buy.

This thesis makes significant theoretical contributions to the evolving field of sensory marketing. Foremost, this research shows how haptic information corresponding to texture and weight evokes consumer impressions of brands. Second, this thesis contributes to touch literature by explaining how individual differences in the need for touch, especially for hedonic-oriented autotelic NFT consumers, influences haptic-evoked consumer brand impressions. Third, this thesis offers a novel theoretical perspective for the touch literature by conceptualising and empirically demonstrating the multidimensionality of haptics and haptic cue congruity. These two concepts help explain how the effects of haptic cue congruity differ in haptically evoking brand personality impressions across hedonic-oriented autotelic NFT consumers. Fourth, this research is the first to show how brand personality mediates the interactive effect of haptics and an individual's autotelic NFT on willingness to buy.

This thesis contributes to practice in several ways. Firms can develop strategies to evoke consumer brand impressions, particularly brand personality impressions, through understanding the product-based salience of haptic information. There are also useful insights for practitioners on market segmentation in terms of haptic responses to products and individual differences in processing haptic information.

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List of Abbreviations

ANOVA	Analysis of Variance
BP	Brand Personality
DV	Dependent Variable
HDR	Higher Degree Research
IV	Independent Variable
NFT	Need for Touch
SPSS	Statistical Package for the Social Sciences
SRQ	Sub Research Questions
MANCOVA	Multivariate Analysis of Covariance
MANOVA	Multivariate Analysis of Variance
RQ	Research Questions
UHREC	University Human Research Ethics Committee

Statement of Original Authorship

The work contained in this thesis has not been previously submitted to meet requirements for an award at this or any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made.

Signature: _ QUT Verified Signature_____

Date: __21-08-2019_____

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Chapter 1: Introduction

> *"Touch lies at the heart of our experience of ourselves and the world yet it often remains unspoken"* (Constance Classen, A Cultural History of Touch, 2012)

We live in a world overflowing with sensations (Solomon, 2013). From the sweater we touch at the fashion store to sense its smoothness, to the feel of paper to determine its texture, to the mobile phone we lift in our hands to assess its weight, to the coffee table we handle to determine its hardness, our lives are full of haptic interactions. The sense of touch connects a consumer with a product (Spence & Gallace, 2011). However, touch is the least understood sense in marketing (Hultén, 2015). The research seeks to address this knowledge gap.

1.1 Research Rationale

Humans perceive the world around them through their senses. The emergence of the field of sensory marketing marks a new epoch that incorporates the five human senses: sight, sound, smell, taste, and touch into key marketing decisions (Hultén, 2015). Krishna (2012, p. 333), defines sensory marketing as "marketing that engages the consumers' senses and affects their behaviour." Sensory marketing is an application of the understanding of sensation and perception to the field of marketing: to consumer perception, cognition, emotion, learning, preference, choice, or evaluation (Krishna, 2012). However, there are a myriad of unexplored topics within sensory marketing literature (Krishna, 2012). Among these is the sense of touch, which has been the least examined sense in sensory marketing (Kampfer, Ivens, & Brem, 2017; Peck & Childers, 2008). Touch plays a crucial but often unacknowledged role in our evaluation of many different products (Spence & Gallace, 2011).

Touch is the first sense to develop (Gallace & Spence, 2011) and the last sense we lose with age (Krishna, 2012). From a marketing perspective, touch is a means of direct experience with a product (Krishna, 2010). The sense of touch connects a consumer and product through both physical and psychological interactions (Krishna, 2012; Peck & Childers, 2003a). Product differences and individual differences are the primary factors that determine the motivation of a consumer to touch a product, extract and utilise haptic information during the product evaluation process (Peck & Childers, 2003b). People are extremely capable at object

identification by touch as it is a highly efficient and accurate means of object identification (Klatzky & Lederman, 1992).

Psychophysics literature posits that haptic information attained through touch is important for the evaluation of objects that vary in terms of four material properties corresponding to texture, weight, hardness, and temperature (Klatzky & Lederman, 1992; Klatzky & Lederman, 1993). Haptics can differentiate products, in terms of product performances of the brand as well as more symbolic, emotional and intangible aspects of what the brand represents. However, touch research has so far overlooked the impact of product-based salience of haptic information on the formation of brand impressions and decision making by consumers.

The majority of touch research in marketing has focused on the person-based individual differences in the need for touch, while scant attention has been paid to product differences (Citrin, Stem, Spangenberg, & Clark, 2003; Grohmann, Spangenberg, & Sprott, 2007; Peck & Childers, 2003a, 2006; Peck & Johnson, 2011; Peck & Shu, 2009; Peck & Wiggins, 2006; Webb & Peck, 2015). This thesis aims to provide theoretical contributions and practical implications for touch literature by focusing on product-based salience of haptic information and its impact on consumer brand impressions, and more specifically, brand personality.

1.2 Conceptual Development

This thesis aims to uncover the impact of product differences of touch on consumer brand impressions inferred from different haptic characteristics. This thesis adopts the theoretical perspective of embodied cognition, which posits that human cognitive processes are deeply rooted in the body's interactions with the world to justify this premise (Krishna & Schwarz, 2014; Wilson, 2002).This study argues that because consumers experience the world through their sense of touch, the resulting haptic information influences their judgement, action and cognition. The spreading-activation theory of human semantic processing is also used as a theoretical lens to explain how product-based salience of haptic information is associated with consumer impressions of brands. The spreading-activation theory posits that human memory is organised along the lines of semantic similarities (Collins & Quillian, 1969). This thesis argues that when a person obtains haptic information through their sense of touch, memory nodes or possible activation sources corresponding to that particular haptic experience are activated and spread throughout the semantic network, eventually making

connections with similar nodes of brand impressions. For example, smooth textures imply sincerity.

This thesis seeks to primarily examine the impact of the product-based salience of haptic information corresponding to texture and weight in evoking consumer brand personality impressions (Aaker, 1997). Brand personality is a key branding construct in marketing, which systematically captures and classifies aspects of brands in terms of generalizable impressions responses (Aaker, 1997). Despite many studies on brand personality, surprisingly little research has been done on the antecedent factors contributing to the creation of brand personality (Labrecque & Milne, 2012). Most brand personality studies define the construct (Aaker, 1997; Geuens, Weijters, & De Wulf, 2009; Grohmann, 2009) and examine the consequences of brand personality on brand equity and various other brand-related constructs (Aaker, Fournier, & Brasel, 2004; Freling & Forbes, 2005; Govers & Schoormans, 2005; Ramaseshan & Hsiu-Yuan, 2007). Literature suggests that personality traits are associated with a brand in an indirect way through product-related attributes (Aaker, 1997). This thesis examines the impact of products' intrinsic haptic information on consumer impressions of brand personality. In addition to brand personality, this thesis also examines three other brand impressions: aesthetic appeal of a product, perceived quality and willingness to buy. This leads to the first research question of this thesis: **To what extent are the haptic properties of texture and weight associated with consumer brand impressions?**

However, product differences of touch alone cannot explain the proposed haptic effects, because the processing of haptic information depends on the individual differences in the need for touch (NFT). The effects of touch are stronger for some people than for others (Peck & Wiggins, 2006). This individual trait is defined as "a preference for the extraction and utilization of information obtained through the haptic system" (Peck & Childers, 2003a, p. 431). The mental-processing differences among high and low NFT individuals can be explained by the theoretical notion of chronic accessibility, which refers to an activation readiness of stored information and reflects long-term processing influences on activation (Kruglanski & Higgins, 2013). In this view, individuals with higher NFT have higher chronic accessibility to access haptic information more efficiently than their counterparts. NFT consists of two dimensions: instrumental and autotelic. The instrumental dimension is associated with goal-oriented product evaluation that lacks the sensory enjoyment, whereas the autotelic dimension is related to consumers' hedonic-oriented responses (Peck &

Childers, 2003a). Adhering to this theoretical perspective that individuals differ in their preference for touch, this thesis posits that haptic sensory elements capture an individual's attention and consequently evoke stronger brand impressions in a more haptically-oriented consumer's memory than for their lower haptically-oriented counterparts. However, the affective nature of autotelic NFT consumers seems to evoke stronger reactions to touch than instrumental NFT consumers (Peck & Childers, 2006; Peck & Johnson, 2011; Peck & Wiggins, 2006). Therefore, this thesis examines the role individual differences in the need for touch plays in predicting haptic effects on consumer brand impressions. This leads to the second research question of this thesis: **To what extent do individual differences in the need for touch influence consumer brand impressions evoked by haptics?**

The findings of an exploratory study (reported in 3.5.6), addressed two novel haptic concepts: *the multidimensionality of haptics and haptic cue congruity*. This thesis defines the multidimensionality of haptics: "*haptic perception as an integration of several haptic inputs rather than a single haptic sensory modality*". This thesis draws on perception and psychophysics literature which suggests that touch integrates multiple sensory inputs rather than a single sensory modality (Klatzky & Lederman, 2003) to posit that haptic perception is multidimensional. While previous touch studies that examined the embodiment nature of touch are limited to one single haptic dimension, this is the first research to conceptualise and empirically examine how physical experience with multiple haptic dimensions affect consumer impressions and decisions.

The multidimensionality of haptics further provides insight with regard to how haptic cues correspond with each other. Consequently, this thesis conceptualises the notion of haptic cue congruity. While the extant sensory literature shows effects of congruence between touch and other sensory modals, touch and vision (Krishna, 2006); touch and smell (Krishna, Elder, & Caldara, 2010) and touch and taste (Krishna & Morrin, 2008), this is the first research to posit haptic cue congruity. This thesis defines haptic cue congruity as: "*the degree of fit among haptic cues*". The perspective of schema congruity as a basis for product evaluation provides a theoretical lens (Meyers-Levy & Tybout, 1989). This thesis seeks to examine how haptic cue congruence plays out in responses to smooth and light weight and rough and heavy weight haptic conditions as well as haptic cue incongruence under smooth and heavy weight and rough and light weight haptic conditions. Focusing on individual differences in the need for touch (Peck & Childers, 2003a), this thesis examines whether a consumer's hedonic-

oriented autotelic NFT influences haptic cue congruity effects on brand impressions. This leads to the third research question of this thesis: **What is the nature of the relationship between haptic cue congruity and an individual's autotelic need for touch on consumer brand impressions?**

This thesis first studies the association between haptics, individual differences in the need for touch and brand personality impressions. To further shed light on the underlying mechanisms, the research investigates the mediational role of brand personality on the interactive effect of haptics and an individual's autotelic NFT on willingness to buy. This leads to the fourth research question of this thesis: **To what extent does brand personality influence the interactive effect of haptics and an individual's autotelic need for touch on willingness to buy?**

1.3 Research Approach

This thesis has two distinct data collection phases: a qualitative exploratory phase and an experimental phase. An overview of the research approach is illustrated in table 1.1.

Prior to investigating its impacts, it was first necessary to gain a preliminary understanding about haptics via a qualitative exploratory investigation. Three exploratory studies were conducted to understand the dynamic nature of haptics in marketing. The first was an in-depth literature search to identify key haptic properties corresponding to texture, weight, hardness, and temperature. This study reviewed literature from three distinct research domains: perception and psychophysics, marketing and consumer behaviour and product design.

The second exploratory study was a consumer-free recall task to gain an initial understanding of the type of products in which touch plays a key role in consumer purchase decisions. This study empirically supported the key assumption of this thesis, that touch plays a significant role in consumer behaviour.

The third exploratory study, conducted with expert interviews, identified how these haptic properties related to the four material properties. Amongst all the categories, smooth–rough to indicate texture and light weight–heavy weight to indicate weight were the most consistent among interviewees. Subsequently, these haptic properties were selected to explore the associations with consumer brand impressions. This study developed *a conceptual model of*

consumers' haptic perception (reported in 3.5.6). This was the basis for the conceptual development and experimental design of this thesis. In particular, the themes, haptic sensation, haptic perception and individual factors on haptic perception supported the theoretical direction of this thesis. As explained above, the two novel concepts, the multidimensionality of haptics and haptic cue-congruity emerged as key theoretical directions of this thesis.

Upon completion of the exploratory studies, three consumer behavioural experimental studies were designed to address the research questions and test the hypotheses developed. This thesis utilised a convenience sampling approach comprised with a student sample. The primary objective of this research is to establish a causality between haptics and brand impressions. In order to avoid any potential confounding effects from demographic variables, this thesis used a homogenous student sample. Experimental study one was designed to examine texture effects by considering smooth and rough haptic conditions. Experimental study two was designed to examine weight effects by considering light weight and heavy weight haptic conditions. Experiment three was designed to examine texture and weight effects in combination through four haptic conditions: smooth and light weight, rough and light weight, smooth and heavy weight, rough and heavy weight.

Table 1.1

Overview of the Research Approach

	Study	**Sample Size**	**Objective of the Research**	**Sub Research Question (SRQ) and Research Question (RQ)**	**Data Analysis Procedure**
Exploratory Phase	In-depth literature search	Referred Journal Papers (N=69)	To gain a preliminary understanding of the dynamic nature of haptics in marketing	SRQ1: What are the key differential haptic properties corresponding to texture, weight, hardness and temperature?	Systematic review of literature utilising a literature search strategy
	A consumer free recall task	Consumers (N=45)		SRQ2: What are the products in which touch plays a key role in consumer purchase decision?	Qualitative interpretation utilising manual coding

	Expert Interviews	Fashion and Textile Industry Professionals (N=13)		SRQ3: How are these haptic properties related to four material properties?	Thematic Analysis utilising NVivo coding
Experimental Phase	Pre-Test	Consumers (N= 24)	To examine the haptic associations and consumer brand impressions in the context of two primarily material properties: texture and weight	RQ1: To what extent are the haptic properties of texture and weight associated with consumer brand impressions?	Quantitative data analysis using statistical methods: ANOVA, MANOVA, MANCOVA, PROCESS Macro
	Main Experimental Study One	Consumers (N= 84)			
	Pre-Test	Consumers (N= 24)	To examine the role of individual differences in the need for touch plays on the predicted haptic effects on consumer brand impressions To examine the mediational role of brand personality on the interactive effect of haptics and an individual's hedonic-oriented autotelic need for touch on willingness to buy	RQ2: To what extent do individual differences in the need for touch influence consumer brand impressions evoked by haptics? RQ4: To what extent does brand personality influence the interactive effect of haptics and an individual's autotelic need for touch on willingness to buy?	
	Main Experimental Study Two	Consumers (N= 100)			
	Pre- Test	Consumers (N= 84)	To examine if there is a relationship between haptic cue congruity and an individual's autotelic need for touch on consumer brand impressions	RQ3: What is the nature of the relationship between haptic cue congruity and an individual's autotelic need for touch on consumer brand impressions? Replicate: RQ1, RQ2, RQ4	
	Main Experimental Study Three	Consumers (N= 160)			

1.4 Research Contributions

This thesis makes significant contributions to marketing theory and practice. These contributions are briefly discussed in the following sections.

1.4.1 Theoretical Contributions

This thesis makes several important contributions to theory. The foremost contribution of this thesis is to the evolving literature of sensory marketing (Hultén, 2015; Krishna, 2012). First, embracing the embodied nature of human cognition (Krishna & Schwarz, 2014; Wilson, 2002) with respect to human touch sense, this thesis contributes to sensory marketing literature by demonstrating that product-based salience of haptic information attained through touch drives consumer impressions of brands, and more specifically, brand personality. Second, this thesis extends prior theorising on person-based salience on haptic information (Peck & Childers, 2003a, 2003b) by demonstrating the moderating role of NFT on haptic-evoked brand impressions. Third, this thesis expands the knowledge boundaries of haptics in marketing by conceptualising and empirically examining two haptic notions: the multidimensionality of haptics and haptic cue congruity. More specifically, by illustrating how the effects of haptic cue congruity differ across hedonic-oriented autotelic NFT consumers on their haptic-evoked brand personality impressions. Fourth, this thesis advances the extant brand personality literature by illustrating the influence of products' intrinsic haptics cues in evoking brand personality, as well as those that are influenced by brand personality, in particular consumer's willingness to buy. This is the first study to demonstrate how brand personality mediates the interactive effect of haptics and an individual's autotelic NFT on willingness to buy. Last, the qualitative findings of this thesis and more specifically a conceptual model of consumers' haptic perception further extends the existing knowledge about touch in marketing.

1.4.2 Practical Contributions

There are also practical implications of this empirically developed understanding of the nature of consumers' product touch in marketing. Broadly, this thesis stresses to marketers that it is of the utmost importance that firms understand the underlying cognitive and affective reactions of their consumers' sense of touch. Firms can develop strategies to evoke consumer brand impressions, particularly brand personality impressions, through understanding the product-based salience of haptic information. This thesis provides useful

insights for practitioners on market segmentation in terms of product differences via haptics and individual differences in processing haptic information. This thesis suggests that exciting brands should have incongruent haptic designs to increase high autotelic NFT consumer's willingness to buy them. In contrast, sophisticated brands should have congruent haptic designs to increase low autotelic NFT consumers' willingness to buy them.

1.5 Structure of the Thesis

This thesis comprises nine chapters. They are briefly described in figure 1.1, followed by an overview explained the content of each chapters.

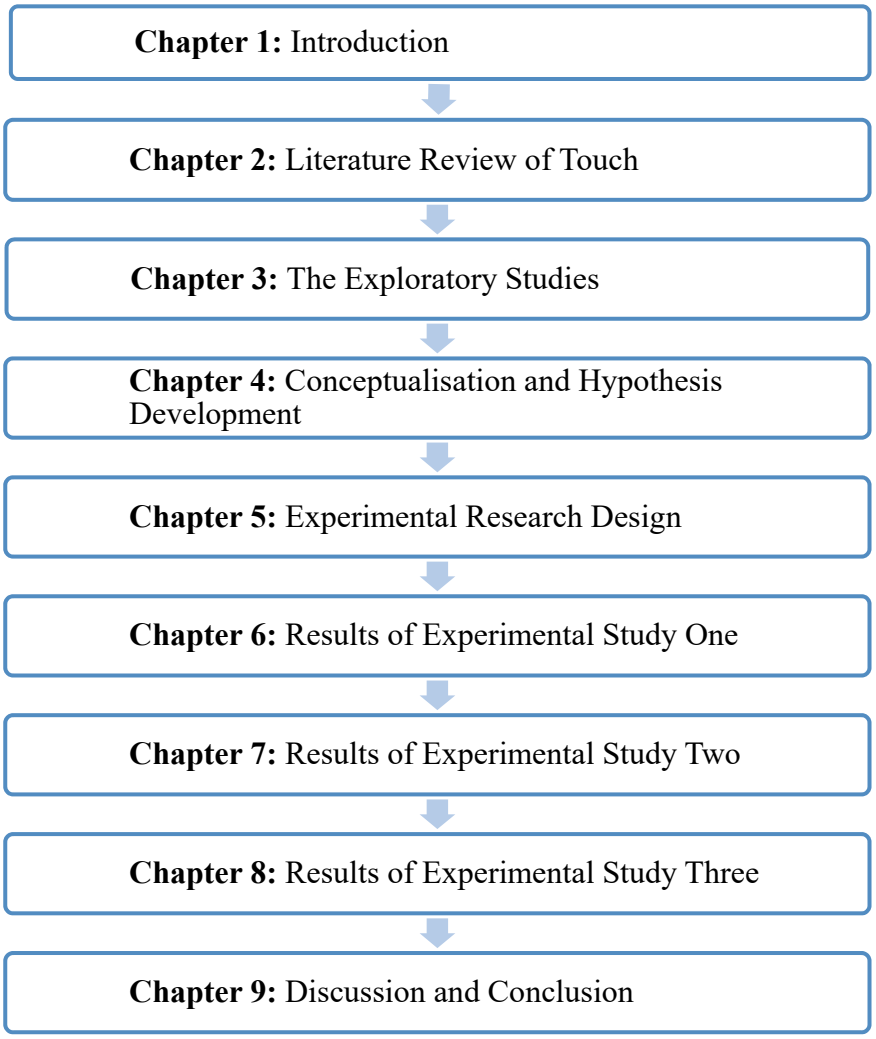

Figure 1.1: Structure of the Thesis

Chapter One introduces this research program by explaining the research rationale, conceptual development, research aims, and research approach and research contributions.

Chapter Two first draws on the literature of sensory marketing to outline the background of this thesis. Subsequently, this chapter provides the theoretical background of the sense of touch and its influence on consumer behaviour. This chapter next presents literature pertaining to the two primary theoretical models of touch: the taxonomy of touch and the motivation to touch framework. The chapter next reviews literature pertaining to the key focus of this thesis: product-based salience of haptics.

Chapter Three reports the findings of the three exploratory studies undertaken in this thesis in order to gain a preliminary understanding of the dynamic nature of haptics in marketing. This chapter presents key findings of exploratory study one: In-depth literature search, exploratory study two: A consumer free recall task, and exploratory study three: Expert interviews.

Chapter Four presents the conceptualisation and hypothesis development of this thesis. The chapter reflects upon theoretical foundations concerning touch and describes the knowledge gaps this thesis aims to address. This chapter discusses the four theoretical perspectives used to justify the predicted haptic effects: brand personality, embodied cognition, the spreading activation theory of semantic processing and the individual differences in the need for touch. This chapter draws the empirical findings from exploratory studies towards the conceptual development, in particular the notions of the multidimensionality of haptics and haptic cue congruity.

Chapter Five presents the research design of the experimental phase of this thesis. It first discusses the philosophical stance of positivism. Subsequently, the chapter provides a justification of the experimental research approach which includes three experimental studies, the sampling strategy, data collection procedures, measurement instruments, statistical data analysis techniques, internal and external validity measures and ethical considerations.

Chapter Six reports the findings of pre-test one and experimental study one designed to investigate how texture properties elicit consumer brand impressions.

Chapter Seven reports the findings of pre-test two and experimental study two designed to investigate how weight properties elicit consumer brand impressions.

Chapter Eight reports the findings of pre-test three and experimental study three designed to empirically investigate the novel haptic concepts: the multidimensionality of haptics and haptic cue congruity. Consequently, this thesis examined how multiple effects of texture and weight elicit consumer brand impressions.

Chapter Nine concludes this research. It first provides a discussion of how the findings of the three experimental studies address the research questions of this thesis. Subsequently, the chapter discusses the theoretical contributions and managerial implications, limitations and future research directions that emerge from this thesis.

Chapter 2: Literature Review of Touch

2.1 Overview of the Chapter

This chapter presents a review of the literature on touch. The first section reviews the broader literature on sensory marketing. The subsequent sections focus on the sense of touch: its taxonomy and motivation. Finally, the review considers the way consumers derive product information through haptics and how they affect consumer behaviour. Lastly, a chapter summary is presented.

2.2 Marketing to the Senses: Sensory Marketing

People have recognised the importance of human senses for centuries. The emergence of sensory marketing marks a new epoch that incorporates five human senses: sight, sound, smell, taste, and touch into key marketing decisions. Sensory marketing is defined as "marketing that engages the consumers' senses and affects their behaviour" (Krishna, 2010, p. 2). Sensory marketing has increasingly gained attention from researchers in recent years from a theoretical point of view (Achrol & Kotler, 2012; Hultén, 2015; Hultén, Broweus, & van Dijk, 2009; Krishna, 2010, 2013) as well as from a practical point of view (Lindström, 2005; Schifferstein & Hekkert, 2008; Velasco & Spence, 2019). Sensory marketing can be used to create subconscious triggers that characterise consumer perceptions of abstract notions of products, such as product quality, innovativeness or the brand's personality (Krishna, 2012). For example, sensory cues attained by the hand stimulate the brain, and as a result produce mental images to make critical judgements (Hultén, 2015). Soars (2009) stresses that sensory stimuli can make a great impact on the product purchase probability even without a consumer's conscious awareness.

Sense-based marketing centres on the principles of embodied cognition. This perspective posits that human cognitive processes are deeply rooted in the body's interactions or sensorimotor processing with the world (Wilson, 2002). Thus, the mind is understood in the context of its relationship to a physical body that interacts with the world (Wilson, 2002). Embodied cognition models theorise that perceptual-motor simulations are an integral part of mental representations and the processing of concepts (Batra, Seifert, & Brei, 2016). The role

of metaphorical constructs as a means of linking physical experiences and abstract concepts is greatly evident within the embodied cognition literature (Batra et al., 2016). For example, haptic sensory experience with the physical and social world: feeling warm and safe in the presence of a caregiver (Krishna & Schwarz, 2014). The theoretical perspective of embodied cognition will be extensively discussed in chapter 4 under the conceptualisation and hypothesis development of this thesis.

The conceptual framework of sensory marketing posits that sensory marketing is an application of the understanding of sensation through five human senses and perception to the field of marketing: to consumer perception, cognition, emotion, learning, preference, choices or evaluation (Krishna, 2012, p. 335). This is illustrated in figure 2.1 below. Sensation and perception are stages of processing of the senses (Krishna, 2012). Sensation is when sensory stimuli impinge upon the receptor cells of a sensory organ, whereas perception is the awareness of this sensory information (Krishna, 2012). Prior researchers recognise explicit differences between sensation and perception focusing on five senses and demonstrate how various mental activities pertaining to judgement and decision making are grounded in sensory experience (Krishna & Schwarz, 2014).

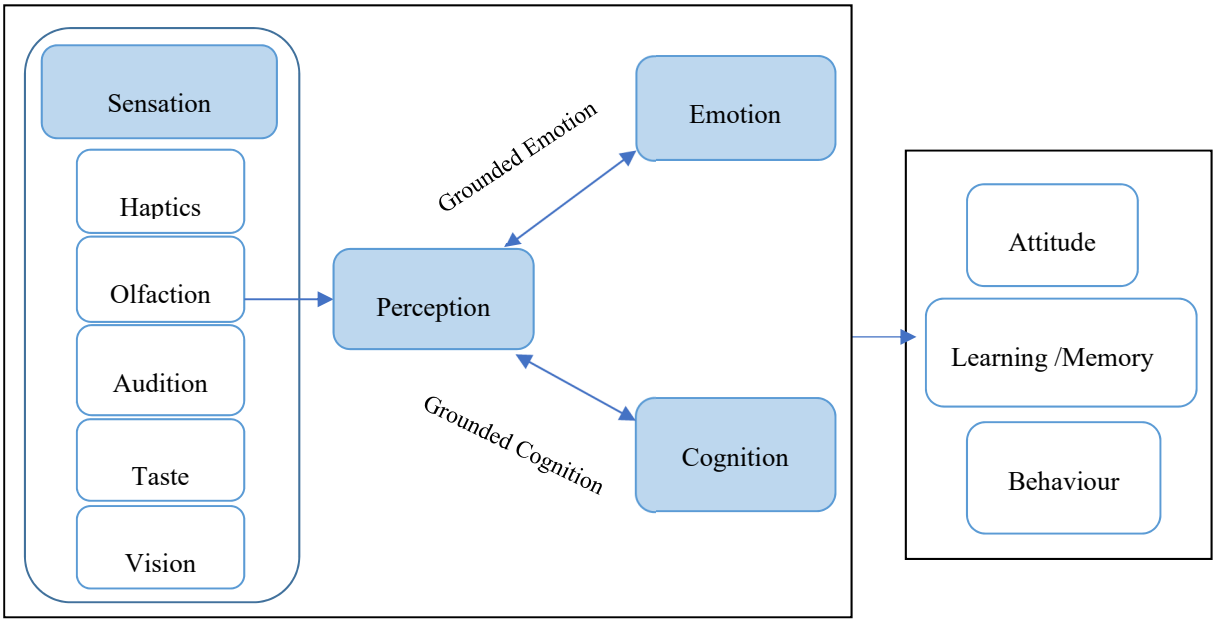

Figure 2.1: The Conceptual Framework of Sensory Marketing

Adapted from "An Integrative Review of Sensory Marketing: Engaging the Senses to Affect Perception, Judgment and Behaviour," by A. Krishna, 2012, *Journal of Consumer Psychology*, *22,* p. 355.

The sense of sight is the most dominant sense used in identifying products and services, and is crucial for determining differences and changes in the environment (Hultén, 2011). In terms of the other senses, Garlin and Owen (2006), and Sweeney and Wyber (2002) show the impact of sound on consumers' perception of service and merchandise quality as well as emotions, feelings and effects on brand experience. The sense of smell is associated with emotional pleasure, well-being and memories (Krishna, 2010). The sense of taste conveys the sensory experience through both the aesthetic taste and gastronomic or physical taste (Hultén, 2015). The sense of touch is 'our three dimensional sense' as it allows us to establish a sense of form, which tells if a sweater is soft or a cup is firm (Hultén et al., 2009).

In essence, sensory marketing posits that our bodily sensations help us to determine the decisions we make without our conscious awareness (Krishna & Schwarz, 2014). Therefore, the more sensations leveraged when building brands, the more the degree of sensory memories activated, which leads to a stronger bond among brands and consumers (Lindström, 2005). Even though touch is a fundamental part of our day to day experience, influencing our decision making, the sensation of touch is the least understood sense in marketing (Peck & Childers, 2008; Solomon, 2013). The sense of touch has received the least scholarly attention, where only ten research articles have been published before 2008 and thirteen in the last seven years (Kampfer et al., 2017). Nonetheless, there is an increase of scholarly attention. In this context, this thesis focuses on the sense of touch, which is a dynamic human sense linked to information and feelings about a product through physical and psychological interactions. An extensive review of literature pertaining to this unique sense, underpinning this thesis is thus presented.

2.3 The Sense of Touch

Touch is the first sense to develop in human senses (Gallace & Spence, 2011), remains the most emotionally central sense throughout human lives and the last sense to be lost with age (Krishna, 2012). The sense of touch utilises the widest bodily distribution of receptors of any sense (Gibson, 1966). Touch has been identified as an important human sense for centuries and the important role of touch is reflected in many disciplines, in particular psychology and linguistics (Krishna, 2010, 2012). Touch is fundamental to human social life (Martin, 2012). Many important events in human lives involve the sense of touch, which has a powerful affective component as well as a cognitive one (Heller & Schiff, 1991). "The metaphors of

the search for contact hold true intellectual; one can be "in touch" with other people, or with world affairs or with reality" (Gibson, 1966, p. 123).

Aristotle's theory of sensation suggests that human five senses are ordered hierarchically, with the sense of touch on top and other senses increasing the acuity of the touch sensation (Krishna, 2012). Katz posits the historical prominences of touch by providing a phenomenological analysis of everyday tactual capability and experience and discusses the importance of movement of touch perception (Krueger, 1970; Loomis, 1991). Love and touch are inseparable (Montagu, 1984). Touch links with friendship and warmth (Mehrabian, 1981). Support, appreciation, inclusion, intent, affection, playful affection, attention-getting and announcing a response are several distinct meanings of touch (Jones & Yarbrough, 1985). Touch has diverse perspectives: as a physical encounter and awareness of oneself, as a foundation for knowledge of the material world, as a foundation for feelings and emotions and as a communication channel for affection (Schifferstein & Hekkert, 2008).

From a marketing perspective, touch is a means of direct experience with a product (Peck & Childers, 2003b, p. 35). While studies in other disciplines have considered any tactile surface on the human body, marketing research has focused on the hands as the prime source of tactile input to the perceptual system. The growing body of research in touch shows that touch sense's abilities are uniquely involved in two functions: the gathering of information and the direct manipulation of stimuli and environments (Batra et al., 2016). Consequently, touch affects two mental analogues of these physical functions: impression formation and decision making (Batra et al., 2016). Therefore, touch plays a pivotal role in individual and interpersonal domains including consumer behaviour (Batra et al., 2016; Martin, 2012). Touch research in marketing has studied consumers touching products (Krishna & Morrin, 2008; Peck & Childers, 2003a; Peck & Shu, 2009; Peck & Wiggins, 2006); accidental interpersonal touch (Martin, 2012; Webb & Peck, 2015); product contagion caused by products touching other products (Morales & Fitzsimons, 2007) as well as products touched by other consumers or incidental touch (Argo, Dahl, & Morales, 2006). This thesis focuses on consumers touching products.

2.3.1 The Taxonomy of Touch

As illustrated in figure 2.2, the taxonomy of touch contains four categories of touch to elaborate on the various reasons why consumers touch products (Krishna, 2010).

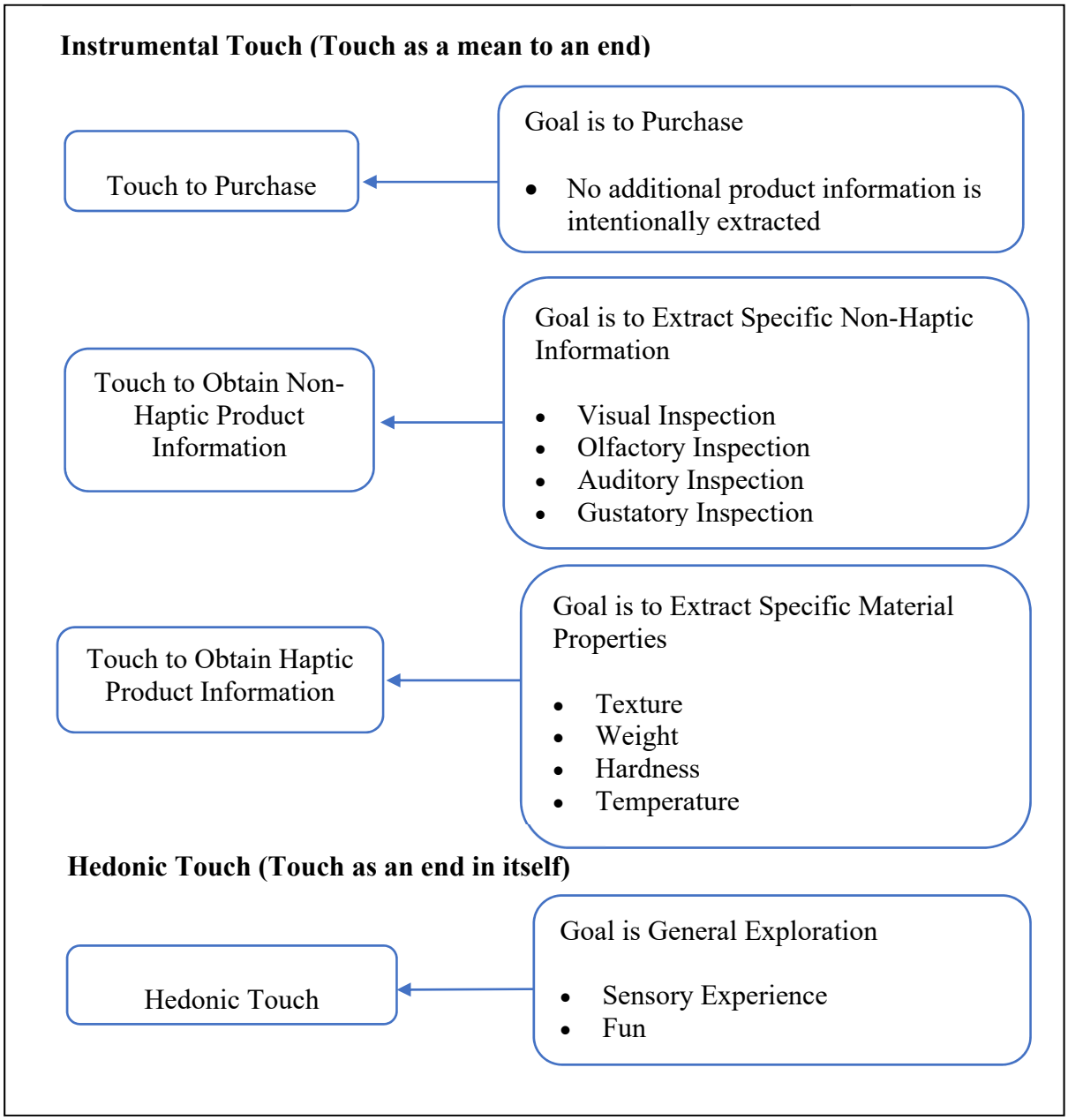

Figure 2.2: The Taxonomy of Touch

Adapted from "Sensory Marketing: Research on the Sensuality of Products," by A. Krishna, 2010, p. 20.

The first category, touch to purchase, is at the most basic level of consumer touch. This refers to a consumer who touches a product only to make a purchase or merely to place it in the shopping cart (Krishna, 2010).

Touch to obtain non-haptic product information is the second type of touch, which occurs when a consumer touches a product with the intention to seek non-haptic information: visual, olfactory, auditory and gustatory (Krishna, 2010). For example, a person may touch a product to visually inspect it or read the information in the package. In the same way, a consumer might touch a product for an olfactory inspection, such as smelling fruits to judge the ripeness or deciding which perfume smells the best. Similarly, a person might push a button of a GPS navigation device to receive auditory information or obtain gustatory information at a grocery store by sampling products (Krishna, 2010).

The third type of touch is touch to obtain haptic product information: a consumer touches a product to obtain information and gain knowledge about the product through specific material properties: texture, weight, hardness and temperature (Krishna, 2010). These three types of touch are classified under instrumental touch.

The fourth type of touch is hedonic touch, wherein the goal is a general exploration and engagement with pleasurable emotions like sensory experience, arousal, fun and enjoyment (Krishna, 2010). The instrumental nature of touch views the consumer as a problem solver, whereas hedonic touch is oriented towards a pleasant sensory experience (Krishna, 2010). This thesis focuses on the third and the fourth types of touch: touch to obtain haptic product information and hedonic touch.

2.3.2 Motivation to Touch

As shown in figure 2.3, product or object factors, individual factors and situational factors interact together to determine the motivation of a consumer to touch a product, extract and utilise information prior to purchase (Peck & Childers, 2003b).

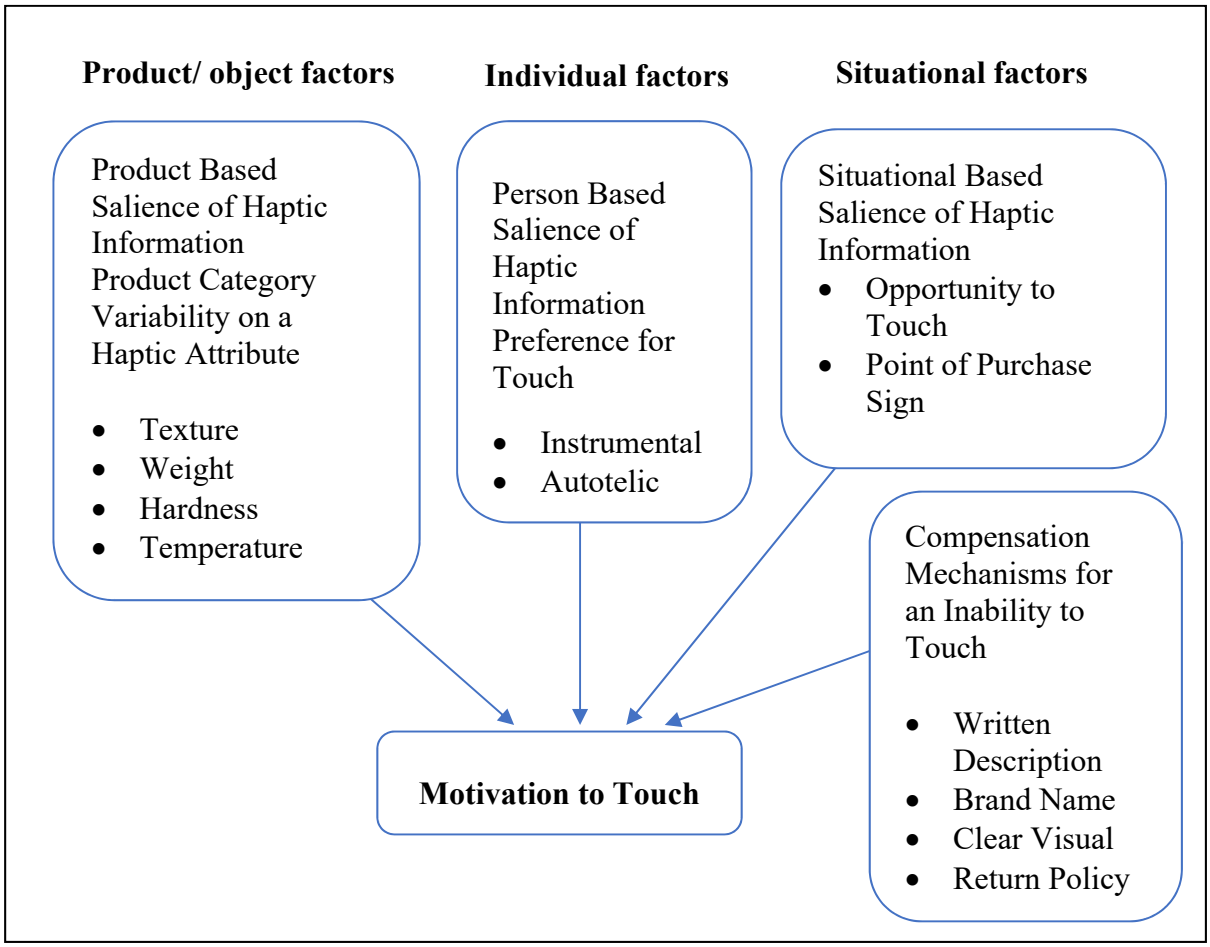

Figure 2.3: Motivation to Touch Framework

Adapted from "Sensory Marketing: Research on the Sensuality of Products," by A. Krishna, 2010, p. 28.

Prior marketing scholars have largely focused on the person based individual differences in the need for touch (Citrin et al., 2003; Grohmann et al., 2007; Peck & Childers, 2003a, 2006; Peck & Johnson, 2011; Peck & Shu, 2009; Peck & Wiggins, 2006; Webb & Peck, 2015), while scant attention has been paid to the product differences. This thesis seeks to extend the current understanding of the first determinant of the motivation to touch: product factors which vary in the way they possess their material properties. A comprehensive review is presented in section 2.3.3.

Individuals differ greatly in how they touch when shopping. This individual difference in the need for touch (NFT) is defined "as a preference for the extraction and use of information obtained through touch" (Peck & Childers, 2003a, p. 431). NFT consisted of two dimensions: instrumental and autotelic. As the name denotes, the instrumental dimension of NFT captures the functional aspect of touch. In contrast, the autotelic dimension of NFT measures the emotional aspect of touch or the sensory enjoyment of touch. This thesis considers NFT as an influencer on consumers' haptic information processing. Therefore, the theoritical foundation pretaining to touch and individual differences will be comprehensively discussed in chapter 4 to support conceptualisation and hypothesis development of this thesis.

In addition to product and individual factors, situations may also vary if touch is salient (Krishna, 2010; Peck & Childers, 2003b). Despite the power of touch, unfortunately, touch is not always feasible. In situations such as online, television, catalogue retail channels, consumers have no or impaired opportunity to touch products (Peck & Childers, 2003b). For example, the inability to touch and physically inspect products is a risk of shopping by direct mail (Spence, Engel, & Blackwell, 1970). Thus, in the absence of direct touch experience, often due to non-touch retail channels, compensation mechanisms such as visual or a clear written description help consumers in their product judgement and decision making (Krishna, 2010).

2.3.3 Product Factors: Product-Based Salience of Haptic Information

Haptics Defined

Haptics in marketing refers to the "active seeking and perception by the hands" (Krishna, 2010). The word haptics derives from a Greek term meaning "able to lay hold of" (Gibson, 1966, p. 97). Haptics is referred as the functionally discrete system involved in the seeking and extraction of information by the hand (Gibson, 1966). The haptic system is defined as "the sensibility of the individual to the world adjacent to his body by the use of his body" (Gibson, 1966, p. 97). The haptic system has its own unique pathways for encoding objects and that ease of encoding is a strong influence on the salience of object attributes (Klatzky, Lederman, & Reed, 1987). People are extremely capable at object identification by touch via the haptic system which has a significant capacity, and is highly efficient and accurate for reading and object identification (Klatzky & Lederman, 1992). For example, a consumer would evaluate a sweater's texture and weight by touching the surface of the material and

holding the garment than visually inspecting it. The haptic system has its own unique pathways for encoding objects and that ease of encoding is a strong influence on the salience of object attributes (Klatzky et al., 1987).

Perception and psychophysics literature posits that haptic information attained through the sense of touch is important for the evaluation of products that vary in terms of four primary material properties corresponding to texture, weight, hardness, and temperature (Lederman & Klatzky, 1987; Peck & Childers, 2003b). Prior literature suggests that these four material properties of products are the most accessible to our sense of touch (Klatzky & Lederman, 1993; Klatzky & Peck, 2012). The term "property'' is described at different levels of specificity and potentially with many measures, such as roughness or warmness (Klatzky & Lederman, 1993; Klatzky & Peck, 2012). These material properties serve to differentiate objects at a more specific degree of categorisation, whereas geometric information, particularly size and shape, help the recognition of objects at a more basic level (Klatzky & Lederman, 1993; Klatzky & Peck, 2012).

While the touch and vision interact together in extracting information about the world, the two modalities represent different priorities, with touch emphasising information about the four material properties and vision emphasising spatial and geometric properties (Klatzky & Lederman, 2003). Literature emphasises that in relation to sufficiency, though vision has high weights for geometric properties of size and shape, it has a weak association with the four material properties (Klatzky, Lederman, & Metzger, 1985). In contrast, for the four material properties the probability of using haptics is greater; however, there is a little use of touch for the judgement of geometric properties of size and shape. In general, people accurately identify the integrity of objects when they only use their sense of touch (Schifferstein & Hekkert, 2008). "Touch may perform well in the apprehension texture, hardness, thermal properties and weight, all substance related dimensions; visual imagery may not be necessary, and direct haptic encoding is likely for these substance qualities" (Heller, 1989, p. 53). Klatzky and Lederman (2003), explain the link between object and haptic property components by defining the construct of 'diagnosticity'. They explain that certain haptic properties are more diagnostic than others, for example surface smoothness is often diagnosed with infant clothing. Klatzky et al. (1987) refer to this aspect that may affect the salience of haptic information as stimulus-set discriminability, and suggest that if all the stimuli have similar values along a dimension, then this dimension should not be highly

salient. Therefore, consumers are more prone to touch if a product category differs in a diagnostic manner on the four material properties (Peck & Childers, 2003a).

While the importance of haptics is apparent, the next section discusses the role it plays in marketing.

2.3.4 The Impact of Touch and Haptics on Marketing

How things feel via our physical touch has extensive psychological implications beyond simply being good or bad. Prior research suggests that the opportunity to touch increases unplanned purchasing (Peck & Childers, 2006); psychological ownership of that object and endowment (Peck & Shu, 2009; Shu & Peck, 2011). Moreover, the persuasiveness of touch elements incorporated in a marketing message influence donation behaviours and marketing communications (Peck & Wiggins, 2006).

From a managerial perspective, touch is an opportunity for firms to engage an individual's heart and mind through various forms of haptic interactions. Especially, for brick-and-mortar retailers who are struggling to remain competitive with the rise of online retailers. The haptic experiences they offer can restore competitive advantages in response to online retailing where touch is unavailable. Firms tend to create and bring out haptic sensuality of their products to make them more appealing to their customers through the sense of touch. For instance, tech giant Apple facilitates their customers to handle products in their retail stores (Solomon, Russell-Bennett, & Previte, 2013); Swedish home furniture retailer IKEA enables their customers to touch and interact with products (Hultén, 2015); Britain's ASDA removed the wrapping from several toilet tissue brands to encourage shoppers to touch, feel and compare textures which boosted sales for their own in-store brand (Solomon et al., 2013) and fashion retailer Land's End delivers fabric swatches to customers to facilitate their touch-based information processing (Peck & Wiggins, 2006). A survey reports that 49% of consumers would make a choice of a car after experiencing how it feels, such as by sitting and running their hands over the steering wheel; 35% of consumers believed that the feel of their phone was more important than the visual appeal and 46% stated that the weight of the phone was more important than the look in their buying decisions (Lindström, 2005).

Despite the surge in e-commerce, which caused brick and mortar stores to suffer from a retail slump, the majority of American consumers still desire the haptic experience offered by physical stores (Skrovan, 2017). The ability to touch and feel products ranks highest among

the reasons why consumers choose to shop in stores versus online channels (Skrovan, 2017). In particular, consumers first visit brick-and-mortar stores to physically interact with products, and subsequently look for it on the internet to actually purchase (showrooming). In contrast, consumers evaluate products online, but then visit physical retail stores to actually purchase them (web rooming). This emphasises the powerful influence of product touch and haptic experience on shopping (Skrovan, 2017). The haptic market is expected to grow by 1600% by 2025 (Koetsier, 2013). The goal with haptics is to improve user interfaces of products from mobile phones to X box controller, to ATMS and even hospital applications by making them more intuitive and more enjoyable to use. We are starting to benefit from having machines that touch us back (Koetsier, 2013). For instance, the Ford motor company is considering whether to retain touch screens or return to knobs and buttons (Koetsier, 2013).

Touch matters for how people engage with and interpret products. Products differ in their haptic information which significantly impact on the functional and aesthetic performance goals of a product design, and consequently on consumers' psychological and behavioural responses (Batra et al., 2016). Touch plays a vital role across product categories, such as clothing, shoes, fruits/vegetables, cars, books, furniture, bed linens, pillows, bath towels (Grohmann et al., 2007). However, product categories, such as soda pop, detergent, shampoo, toothpaste, milk, pens/pencils, cereal, CDs, soap do not encourage touch very much (Grohmann et al., 2007). McCabe and Nowlis (2003); Peck and Childers (2003b) recognise products with primarily material properties, such as clothing and carpeting, as product categories consumers are less willing to forgo the need for touch and recommend brick-and-mortar strategies in selling them. In contrast, less haptic diagnostic product categories, such as books or music CDs are more likely to flourish through non-touch distribution channels, particularly online retailing (Peck & Childers, 2003b). Haptic sensation plays a pivotal role within the realm of technological products as well. For example, consumers display negative attitudes towards digital only devices, for example digital keyboards opposed to keyboards with physical keys (Batra et al., 2016).

Although product packaging or containers mainly serve functional and visual necessities, their haptic inputs play an integral role in shaping consumer impressions and decisions (Batra et al., 2016). For instance, the tactile sensation of Coca-Cola's famous nostalgic bottle design reinforces its brand image (Lindström, 2005). There is a perceptual transfer of haptic information from package or container to the judgement of the product (Krishna & Morrin,

2008). For example, the firmness of the cup in which the water is served influences consumer judgement of the water, more specifically water tasted better when drunk from a firm cup than a flimsy cup. Williams and Ackerman (2011) show that mobile phones designed using metal instead of plastic casings, and heavy, solid packaging instead of light, plastic packaging increase the value consumers perceive in the product itself.

Haptic inputs of the product container held in a consumer's hand can influence consumers' perception and preferences of food. For example, the surface textural properties of the food containers concerning tough/grainy versus smooth influence in-mouth perception (Piqueras-Fiszman & Spence, 2012a); yoghurt was perceived as being significantly more dense when consumed from a heavy bowl than when consumed from a light weight bowl (Piqueras-Fiszman & Spence, 2012b). Participants described the biscuit as being both crunchier and rougher when taken from the rougher plate than others who perceived the biscuit as smoother and as melting when tasted from the smooth plate (Biggs, Juravle, & Spence, 2016). In a similar study, consumers' perceived stainless-steel spoons as higher quality conveyed by their heaviness compared to plastic spoons; consequently they perceived food as higher quality (Piqueras-Fiszman & Spence, 2011). Nevertheless, product packaging often prevents shoppers from physically engaging with the product. This barrier to touch frustrates shoppers and influences the confident in their attitude towards the product (Peck & Childers, 2003b).

Moreover, haptics surrounding customers while they shop also influences their shopping behaviour (Batra et al., 2016). For instance, point-of-purchase signs with rich haptic inputs motivate touch and ultimately increase impulsive purchasing (Peck & Childers, 2006). Further, retail environments that enable tactile interaction between consumers and products can engage a range of psychological processes, such as perceived ownership (Peck & Shu, 2009). Therefore, shopping environments which include retail spaces, retail displays and point-of-purchase signage can potentially benefit from attention to the relevance of consumers haptic experience (Batra et al., 2016).

As discussed above, haptics differentiates products, packaging as well as physical surrounding in terms of functional as well as more symbolic, emotional and intangible aspects of what the brand represents. However, prior marketing researchers have overlooked the impact of product-based salience of haptic information attained corresponding to four material properties of products: texture, weight, hardness and temperature on the formation of brand impressions and decision making among consumers. Therefore, it is of paramount

importance that we capture the dynamism of haptics as a key driver of successful marketing. The research addresses this knowledge gap by investigating the impact of product-based haptic information in evoking consumer impressions of brands and more specifically brand personality impressions.

2.4 Chapter Conclusion

This chapter commenced by delineating the key theoretical grounds with respect to sensory marketing that underpin this thesis. Following this, a review of background literature pertaining to the sense of touch and the two fundamental theoretical frameworks: the taxonomy of touch and the motivation to touch were discussed. Subsequently, a theoretical review of product differences of touch through haptics was undertaken. The chapter then presented a review of the extant research to outline the impact of touch and haptic perception on marketing. The next chapter presents the three exploratory studies of this thesis, which have been conducted to gain a preliminary understanding about the dynamic nature of haptics.

Chapter 3: The Exploratory Studies

3.1 Overview of the Chapter

Chapter 2 emphasised the motivation of this thesis to examine the impact of product-based salience of haptic information corresponding to texture and weight in evoking consumer impressions of brands. The lack of prior knowledge, with respect to product-based salience of haptic information and its influence on consumer behaviour motivates this thesis to conduct three exploratory studies to gain a preliminary understanding about the dynamic nature of haptics. This chapter contains the findings of these three exploratory studies: an in-depth literature search, a consumer free recall task and expert interviews. The ethical considerations which underpin the studies are also presented.

3.2 Overview of the Exploratory Phase

A qualitative phase can enhance a quantitative study (Babbie, 2015; Sekaran & Bougie, 2013). Tashakkori and Teddlie (1998) stress the importance of starting with a qualitative phase, especially on unexplored topics and subsequently integrating these findings in the design of the quantitative phase of the research. Hence, this thesis employed three exploratory studies to first gain a preliminary understanding of the dynamic effects of haptics on consumer responses to products. Although sensory researchers recognise the importance of touch in consumption, their attention so far has been largely on the personal factors or the individual differences in the need for touch. To date, researchers have neglected the critical role product-based haptic salience plays on marketing. However, the motivation to touch model suggests that product differences play a critical role in motivating a consumer to touch a product, in order to obtain haptic information which helps them to make their judgements about the product (Peck & Childers, 2003b). This thesis investigates how product-based haptic information corresponding to texture or weight could evoke consumer impressions of brands. With this aim, the overarching research objective of this exploratory phase is to gain a preliminary understanding of the dynamic nature of haptics in marketing. The first study, which is an in-depth literature search intends to identify the key differential haptic properties corresponding to the four primary material properties of products attained through touch: texture, weight, hardness, and temperature (Lederman & Klatzky, 1993). The second study,

which is a consumer free recall task aims to identify products in which touch plays a key role in consumer purchase decisions. The thesis next conducts expert interviews to understand how these haptic properties relate to four material properties. A brief overview of the three exploratory studies is presented in table 3.1 below.

Table 3.1

Overview of the Exploratory Phase

Study	**Sample Size**	**Corresponding Research Question**	**Objectives of the Research**	**Data Analysis Procedure**
Study One: In-depth literature search	Referred Journals Papers (N=69)	SRQ1: What are the key differential haptic properties corresponding to texture, weight, hardness, and temperature?	To gain a preliminary understanding of the dynamic nature of haptics in marketing	Systematic review of literature utilising a literature search strategy
Study Two: A consumer free recall task	Consumers (N=45)	SRQ2: What are the products in which touch plays a key role in consumer purchase decision?		Qualitative interpretation utilising manual coding
Study Three: Expert interviews	Fashion and Textile Industry Professionals (N=13)	SRQ3: How are these haptic properties related to four material properties?		Thematic Analysis utilising NVivo coding

3.3 Exploratory Study One: In-depth Literature Search

This study aims to gain a preliminary understanding of haptics by determining the differential haptic properties corresponding to the four material properties of products: texture, weight, temperature and hardness. The sub-research question one asks: **What are the key differential haptic properties corresponding to texture, weight, hardness and temperature?**

This study embraces a research strategy used in two previous sensory marketing studies. Orth and Malkewitz (2008) conducted a literature review to obtain an initial list of package design elements as the initial step to investigate how holistic package design types are related to consumer brand evaluations. Similarly, Littel and Orth (2013) determined visual and haptic package design elements by reviewing prevailing literature pertaining to both visual and haptic information. In a similar vein, exploratory study one draws on the literature of psychophysics, marketing and consumer behaviour as well as product design to identify haptic properties relevant to texture, weight, hardness and temperature. Following Saunders, Lewis, and Thornhill (2009), the literature search strategy included subject area, key words and search terms, information search techniques, databases and search engines and respective academic journals (summarised in table 3.2). The parameters of the literature review are journals published in the last 50 years in the English language from North America and Europe.

Haptics has its roots in the domains of psychophysics and psychology. Thus, the literature review began with those fields. The early experimental psychology studies theorised the phenomenological aspects of touch, and subsequently extend to more empirically based examinations of touch, such as identification of objects by touch (Klatzky & Lederman, 1992; Klatzky et al., 1985; Lederman & Klatzky, 2009), haptic exploration of objects and hand movements (Lederman & Klatzky, 1987, 1993; Wu, Klatzky, & Hollis, 2011), object properties that invite touch (Klatzky & Peck, 2012) and identification of materials by touch (Heller & Schiff, 1991; Katz & Krueger, 1989). For example, Krantz (1972), identifies a multidimensional haptic classification system which includes sixteen touch dimensions, such as tall-short, heavy-light, sharp-dull, warm-cold and thick-thin. The literature review next determined research papers focused on the sense of touch published in top marketing and consumer behaviour journals, such as *Journal of consumer research, Journal of marketing and Journal of consumer psychology.* The study also referred product design literature due to their growing interest in the implications of haptic experience in product design. In all, 69

research papers were identified. Figure 3.1 illustrates the haptic search results, in particular the number of papers published on the respective time period under the three literature domains.

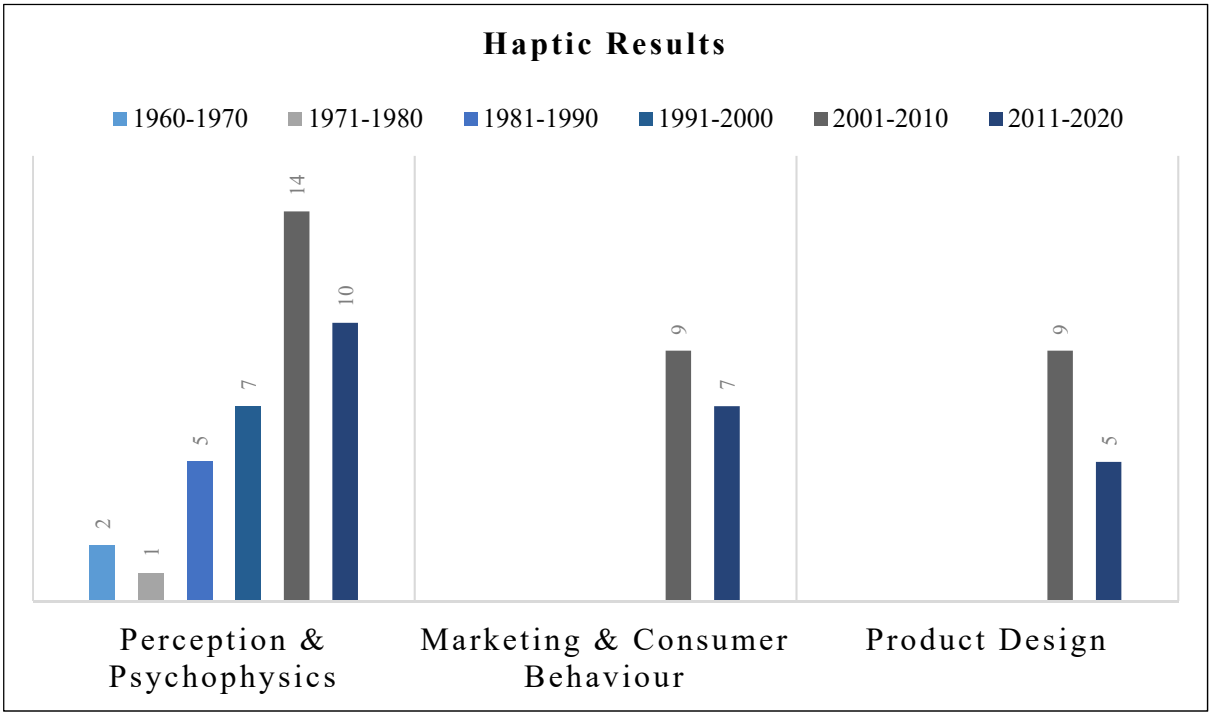

Figure 3.1: Haptic Results

Table 3.2

Literature Search Strategy

Subject Area	**Key Words and Search Terms**	**Search Techniques**	**Databases and Search Engines**	**Journal Name**	**Count**
Perception and psychophysics	Haptic Perception Tactual Perception Material Properties	Boolean Truncation Phrase and proximity searching	PsycINFO Science Direct	Acta Psychologica	7
				Perception and Psychophysics	6
				Journal of experimental Psychology	4
				Science	2
				Attention, Perception, & Psychophysics	2
				IEEE transactions on haptics	2
				Perception	2
				Experimental Brain Research	2

				Infant Behaviour and Development	1
				Japanese Psychological Research	1
				The Journal of Genetic Psychology	1
				Neuroscience Letters	1
				Child Development	1
				Science Education	1
				WIREs Cognitive Science	1
				Canadian Journal of Experimental	1
				Brain Research Bulletin	1
				Multisensory Research	1
				Philosophical Psychology	1
Marketing and Consumer Behaviour	Sensory Marketing Touch Haptics Tactile Perception	Boolean Truncation Phrase and proximity searching	ABI/INFORM complete (via ProQuest) Emerging market case studies (via Emerald, Taylor & Francis)	Journal of Consumer Research	5
				Journal of Consumer Psychology	3
				Journal of Marketing	2
				Psychology and Marketing	2
				Journal of Retailing	1
				European Journal of Marketing	1
				Journal of Consumer Marketing	1
				Journal of Business Research	1
				Journal of Product and Brand Management	1
Product Design	Touch Product Design Haptic Experience Haptic Design Tactile Design	Boolean Truncation Phrase and proximity searching	Design and applied arts index (DAAI) (via ProQuest)	Textile Research Journal	4
				Textile: The Journal of Cloth and Culture	2
				International Journal of Design	1
				Design issues	2
				Journal of Design Research	1
				The Design Journal	1
				The Journal of The Textile Institute	1
				Psychology of Aesthetics, Creativity, and the Arts	1
				Journal of Design & Nature	1
Total					69

The literature review resulted in an initial master list consisting of over 200 references to haptics drawn from 69 research papers (see Appendix A). As suggested in the scale development literature, it is not unusual to begin with a master list that is a few times larger than the final list (Churchill, 1979). Repeating occurring similar haptic items was considered as a saturation point. If a paper contained haptic properties that were already identified, that particular paper was eliminated from final analysis. The academic team eliminated some items based on a priori criteria: lack of clarity, ambiguity, undesirable similarity to other items and questionable relevance to marketing. The final haptic list consisted of 45 haptic pairs of the most frequently used terms to represent four material properties with all redundant items eliminated. This is illustrated in figure 3.2.

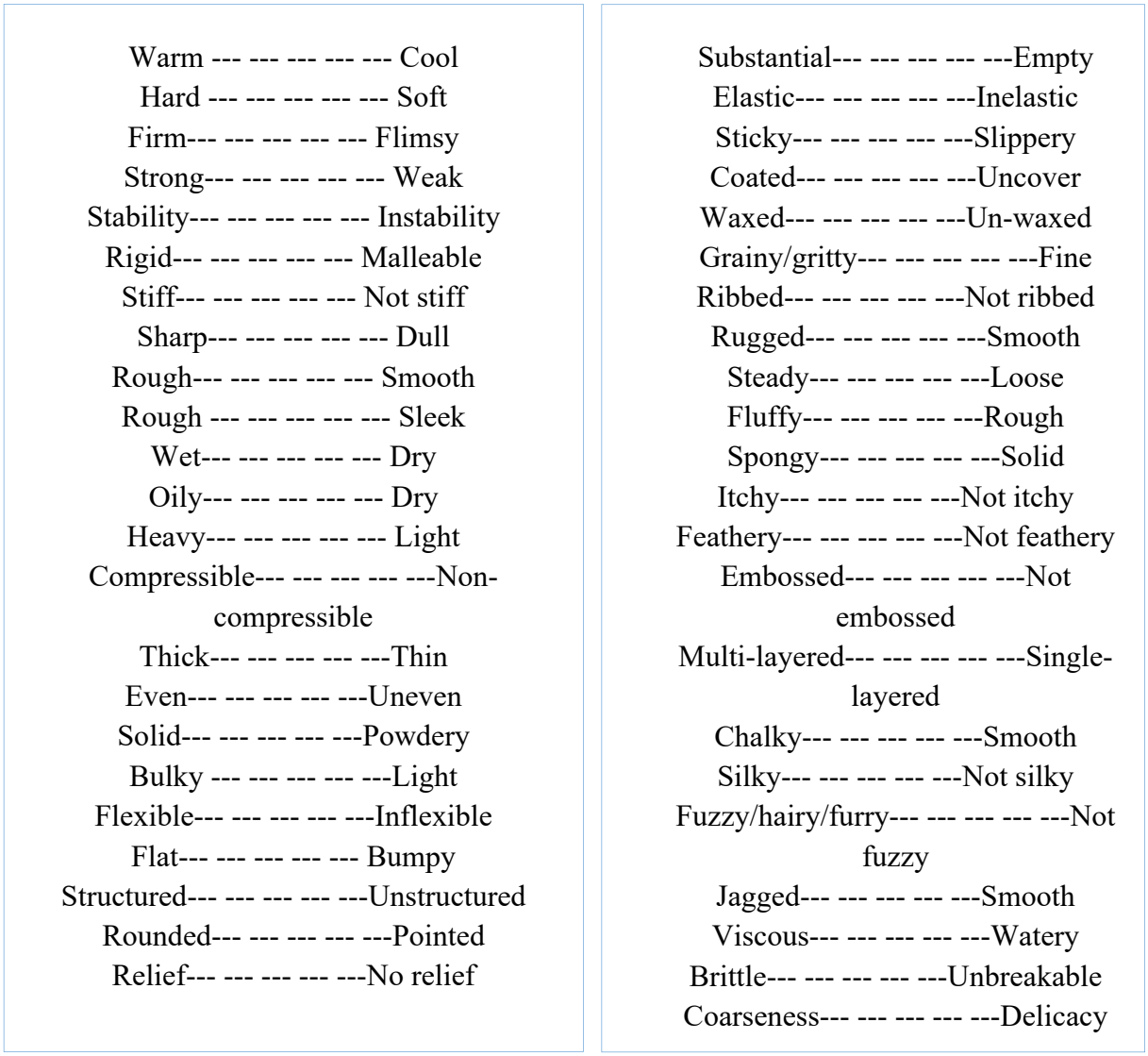

Figure 3.2: Haptic Items

The final haptic list consisted of both bipolar and unipolar adjectives. Bipolar adjectives express the presence of opposite characteristics, such as warm and cold, rough and smooth, thick and thin or heavy and light. Unipolar adjective pairs indicate the presence and absence of a single attribute, such as stiff and not stiff, structured and unstructured or compressible and non-compressible. The individual lines represent points along the continuum defined by the haptic adjectives. This exploratory study helped us to gain a preliminary understanding of the haptic dimensions. This study provides some intellectual foundations to predict possible haptic effects with respect to consumer behaviour. Further, this study took the first step in designing a realistic and workable protocol for the main experimental study by determining measurement scales to be used in the main experimental study. In particular, a respondent could place a mark on one of the lines to indicate the point along the continuum that characterises their evaluation of the stimulus. For example, if someone perceived a product's texture as extremely smooth they might select the line closest to that adjective.

3.4 Exploratory Study Two: A Consumer Free Recall Task

The purpose of the exploratory study two, a consumer free recall task, is to provide an empirical justification for the thesis. Consequently, the second exploratory study aims to understand the types of products in which touch is likely to be critical for consumers. The sub research question two asks: **What are the products in which touch plays a key role in consumer purchase decision?**

Adopting the methodology used by Grohmann et al. (2007) and Peck (1999), a random sample of participants was asked to list products for which touch influences their purchase decision (see Appendix B). All participants were Australian residents from 18 years old and above, with prior shopping experiences. Participants were asked to "list any products which they evaluate with touch before buying". They were asked to submit their answers in an enclosed envelope. Out of the 50 participants who were initially approached, 45 participants returned the written answers. The data collection took place on 4th August 2017- 18th August 2017 at the Queensland University of Technology, Gardens Point campus.

This study suggested many product categories for which touch is likely to be critical. The study participants indicated a wide range of products they prefer to evaluate with touch before buying, resulting in a list of 14 product categories. Among all the categories, clothing was named first by a total of 40 of the 45 participants and this was listed first by a total of 30

participants. This is consistent with prior studies which have similar findings (Grohmann et al., 2007; Peck, 1999). Categories for which touch is important included in descending order: clothing, accessories, produce, consumer electronics, furniture, home wear, cosmetics and beauty products, office, household and kitchen appliances, automobiles, toys and kids items, plants, sports equipment and music instruments. Table 3.3 illustrates participants' responses.

Table 3.3

The Summary of Participants' Responses

	Product Category	**Frequency**
1	Clothing (e.g., dresses, shirt, and trousers)	40
2	Accessories (e.g., shoes, bags, jewellery, sunglasses, watches, wallet)	35
3	Produce (e.g., fruit and vegetables)	27
4	Consumer Electronics (e.g., mobile phones, laptops, tablets)	23
5	Furniture	17
6	Home wear (e.g., pillow, bed linen)	14
7	Cosmetics and beauty products	12
8	Office supplies (e.g., pens, books, stationery, greeting cards)	11
9	Household and kitchen appliances	11
10	Automobiles	10
11	Toys and kids items	8
12	Plants	3
13	Sports equipment	2
14	Music instruments	2

Some participants explained why they desire to touch specific products prior to purchase. For example, they mentioned the need to physically examine touch screens of laptops and to get a sense of their weight, to feel the smoothness of a silk material or to decide if the surface of the furniture is smooth. One of the respondents stated that they would touch paper products to evaluate the thickness of paper. Some spoke of the importance of knowing the oiliness of creams and lotions or whether makeup sponges are porous/soft. A few respondents mentioned that they wish to see the softness of toys before they purchase them for their kids.

This study showed that touch is an important source of information to consumers. More specifically, haptic information of products such as softness or thickness plays a vital role in their purchase decision-making process. The study further revealed clothing as an important product category consumers prefer to touch and obtain haptic information prior to purchase,

thereby suggesting the fashion and textile industry as a potential industry context to further validate the findings of the exploratory study one via obtaining experts' views.

3.5 Exploratory Study Three: Expert Interviews

Exploratory study one identified a set of haptic properties corresponding to the four material properties of products: texture, weight, hardness and temperature, such as rough and smooth, heavy and light, warm and cool or firm and flimsy. The third exploratory study seeks to validate these initial findings by obtaining qualitative data through expert interviews. The sub-research question three asks: **How are these haptic properties related to four material properties?**

Qualitative research can be used to distinguish subtle aspects that researchers cannot otherwise capture. In particular, interviews allow the researcher to refine the questions and ask extra questions to confirm the sufficiency of the exploration (Creswell, 2013). This study adopts expert interviews as an effective means of qualitative data collection. Talking to experts can serve to shorten the time-consuming data collection process, especially if the experts are seen as "crystallization points" for practical insider knowledge (Bogner, Littig, & Menz, 2009). The decision to use expert interviews and design professionals is further supported by two similar sensory marketing studies. To recognise prototypical holistic package designs and their underlying design factors, Orth and Malkewitz (2008) used a sample of professional designers attached to several design firms and asked them to rate a subset of design elements. Similarly, Littel and Orth (2013) acquired experts' feedback on visual elements by consulting professional designers. The following section outlines the sampling strategy and the data collection procedure.

3.5.1 Sampling Strategy

In qualitative data collection, sample selection has a significant influence on the quality of the research project (Sekaran & Bougie, 2013). This study used judgement sampling in order to select interviewees on the basis of their expertise in the subject investigated (Babbie, 2015).

The selection of the industry context was determined by the findings of exploratory study three which asked consumers to list any products they evaluate with touch before buying. A total of 40 out of the 45 participants listed clothing as an important category. It was also listed as the first category by 30 participants. These preliminary findings suggested the fashion and

textile industry as a suitable industry context for this study. Literature also discusses how the handling of fabrics plays a vital role all through the fashion supply chain: from raw material to the end product. When fashion and textile industry professionals judge the fabric handle, they express the feeling perceived from the hand via haptic expressions, such as soft, flexible and smooth feeling (Kawabata & Niwa, 1991). Therefore, Australian fashion and textile industry professionals, who can provide the desired information about haptics were approached by contacting their respective professional bodies, in accordance with the selection criteria set by the research team. Consequently, a set of fashion and textile industry experts such as fashion designers, and textile technologists who possess expert knowledge with ten to twenty years of experience with international clients/brands were approached. Mono-operation bias in the interviews was avoided by selecting experts from various organisations, education backgrounds and importantly from various professional careers (Shadish, Cook, & Campbell, 2002, p. 75). The sample size is based on the completeness of the information obtained from analysis of the transcripts, with interview quality and participant diversity in the included sample being considered more important than the absolute number of interviews (Kerr, Nixon, & Wild, 2010). The sample size was not determined a priori; instead data saturation occurred at the latter stage of the study. In particular, data saturation point was determined when no new information or themes were observed after conducting thirteen interviews. All interview participants were engaged in various job roles in the Australian fashion and textile industry. The majority of them had over ten years of industry experience (see table 3.4).

Table 3.4

Interview Sample Characteristics

Interviewee ID	**Job Description of the Respondent**	**Industry Experience**	**Education**
Respondent 1	Fashion designer and a senior lecturer	10 years	Doctor of Philosophy
Respondent 2	Fashion designer, skilled pattern maker and a lecturer	25 years	Master's Degree
Respondent 3	Fashion studio technician	10 years	Bachelor's Degree
Respondent 4	Fashion development manager	16 years	Bachelor's Degree

Respondent 5	Fashion designer, pattern maker, Queensland based wholesale fabric agent, former design and a production manager	30 years	Diploma
Respondent 6	Fashion designer	25 years	Doctor of Philosophy
Respondent 7	Textile technologist	20 years	Bachelor's Degree
Respondent 8	High end fashion designer	30 years	Bachelor's Degree
Respondent 9	Bridal couture designer	20 years	High School
Respondent 10	High end fashion designer and a past design manager	15 years	Master's Degree
Respondent 11	Associate lecturer, sourcing and purchasing support officer, business and brand development manager, creative director and designer	10 years	Professional Doctorate
Respondent 12	Associate lecturer, costume maker and a designer	8 years	Bachelor's Degree
Respondent 13	Textile engineer, consultant for start-ups, past: open innovation entrepreneur	9 years	Doctor of Philosophy (reading)

3.5.2 Data Collection Procedure

Amongst the two general types of interviews used in qualitative studies, this research adopted the semi-structured interview approach due to its flexible nature, which allows the interviewer to modify the details of how topics are covered (Bernard, Wutich, & Ryan, 2016). The interview guide was primarily developed from the findings of the exploratory study one (see Appendix C). Probing was used as an interview technique. The opening question, a classification task, asked interviewees to relate and classify the given set of haptic properties (45) under the most suitable material property of products. This phase ensured face validity for a comprehensive and representative set of haptic properties corresponding to texture, weight, temperature and hardness. Following this, interviewees were questioned about the importance of haptics, in particular their influence on the perception of products. Eleven out of thirteen interviews were conducted face-to-face, one was a telephone interview and one interviewee emailed the answers. The key advantage of the face-to-face interview is that the researcher was able to establish a good rapport with the interviewees and motivate them towards the research goals. Most interviews were conducted in the workplace: offices, retail stores or design houses/boutiques. This allowed interviewees to use real products and materials to elaborate discussion points. This provided a better opportunity for the researcher

to gain a greater understanding of haptic properties. A voice recording device was used during the interviews, with permission. Data collection took place between 22nd August 2017 and 28th April 2018, in Brisbane, Queensland, Australia.

3.5.3 Findings: Haptic Classification Task

This study took the preliminary step of classifying the 45 haptic properties identified in exploratory study one, under the most appropriate material property. Interviewees were asked: *Based on your knowledge and experience being a fashion industry professional, please classify the following haptic properties under the most suitable material property: texture, weight, hardness and temperature*. Ten participants out of the thirteen gave useful answers to include in the final analysis. The other three have provided incomplete answers to this haptic classification task. Therefore, their answers were removed from the final analysis.

As shown in table 3.5 below, haptic properties rough-smooth to indicate texture and heavy-light to indicate weight were consistent among all respondents. Haptic properties warm-cool to indicate temperature were consistent among the majority of respondents. However, haptic properties to represent hardness were found to have the least consistency among respondents. Consequently, the bipolar haptic properties smooth-rough and heavy-light were selected to investigate the predicted haptic effects of texture and weight on consumer brand impressions.

Table 3.5

Haptic Classification

Haptic Items		**R1**	**R2**	**R3**	**R4**	**R5**	**R6**	**R10**	**R11**	**R12**	**R13**
1	Warm-Cool	*Temperature*	*Temperature*	*Temperature*	*Temperature & Weight*	*Temperature*	*Temperature*	*Thermal*	*Temperature*	*Temperature & Weight*	*Temperature*
2	Hard-Soft	*Texture & Hardness*	*Hardness & bit of texture*	*Hardness*	*Hardness Texture*	*Texture & Hardness*	*Hardness*	*Hardness*	*Hardness & Weight*	*Texture*	*Hardness*
3	Firm-Flimsy	*Weight & Hardness*	*Weight*	*Hardness & Weight*	*Texture Hardness Weight*	*Hardness &Weight*	*Hardness or Weight*	*Hardness*	*Hardness & Weight*	*Weight*	*Temperature*
4	Strong-Weak	*Hardness or Weight*	*Texture*	*Hardness & Weight*	*Hardness Weight*	*Weight &Texture*	*Hardness or Weight*	*Covers under firm/flimsy*	*Hardness & Weight*	*Weight*	*N/A*
5	Stability-Instability	*Stability-drapeability or flexibility*	*Weight*	*Not sure*	*Texture, weight & hardness*	*Weight &Texture*	*Hardness*	*Not sure*	*Texture*	*Weight & Texture*	*Hardness & Weight*
6	Rigid-Malleable	*N/A*	*Hardness*	*Hardness*	*Hardness Temperature*	*Hardness*	*Hardness*	*Texture or Hardness*	*Hardness & Texture*	*Hardness & Texture*	*Hardness*
7	Stiff-Not stiff	*Texture & Hardness*	*Hardness*	*Similar to rigidness*	*Hardness Temperature Weight*	*Texture*	*Hardness*	*Hardness or Stiffness*	*Weight & Hardness*	*Texture*	*Hardness*
8	Sharp-Dull	*N/A*	*Texture*	*N/A*	*N/A*	*N/A*	*Texture*	*Maybe thermal*	*Texture*	*Texture & Hardness*	*Texture*
9	**Rough-Smooth**	***Texture***	***Texture***	***Texture***	***Texture***	***Texture***	***Texture***	***Texture***	***Texture***	***Texture***	***Texture***

10	Rough-Sleek	*Distinguish smooth & sleek*	*Texture*	*Very similar to smoothness*	*Rough-smooth applies better*	*Rough-smooth rather than sleek*	*Texture Smooth is preferred than sleek*	*Texture or thermal*	*Hardness and Texture*	*N/A*	*Texture*
11	Wet-Dry	*Temperature & Weight*	*Not sure*	*Texture*	*Not sure*	*Texture*	*Texture or hardness*	*Thermal*	*Texture & Temperature*	*N/A*	*Temperature*
12	Oily-Dry	*Weight & Texture*	*Texture*	*texture*	*Not sure*	*Only use dry*	*Hardness*	*Thermal*	*Texture & Temperature*	*N/A*	*N/A*
13	**Heavy-Light**	***Weight***	***Weight***	***Weight***	***Weight***	***Weight***	***Weight***	***Weight***	***Weight***	***Weight***	***Weight***
14	Compressible-Non compressible	*N/A*	*Texture*	*Texture*	*Texture or Hardness*	*Texture*	*Hardness*	*Resilience*	*Texture & Weight*	*Texture & Hardness*	*Hardness*
15	Thick-Thin	*Texture & Weight, could be hardness too*	*Weight*	*Weight*	*Weight or Hardness*	*Texture or Weight*	*Weight*	*Hardness Weight & thermal*	*Weight*	*Construction*	*Weight*
16	Even-Uneven	*N/A*	*Texture*	*Texture*	*Texture*	*Texture*	*Texture*	*Texture*	*Texture*	*Weight or Texture*	*Texture*
17	Solid-Powdery	*N/A*	*N/A*	*Texture*	*Texture*	*N/A*	*Texture*	*Hardness*	*Hardness & Texture*	*Texture*	*N/A*
18	Bulky-Light	*Texture Weight, could be hardness too*	*Hardness*	*Weight*	*Weight*	*Texture & Weight*	*Weight*	*Weight can be thermal too*	*Weight & Texture*	*Size*	*Weight & Hardness*
19	Flexible-Inflexible	*Stability - Fluidity*	*Hardness*	*Hardness*	*Temperature Texture Hardness*	*Weight*	*Hardness*	*Stiffness or Hardness*	*Hardness & Weight*	*Hardness*	*Hardness*
20	Flat-Bumpy	*Texture*	*Texture*	*Texture*	*Texture*	*Texture*	*Texture*	*Texture*	*Texture*	*Texture*	*Texture*
21	Structured-Unstructured	*Texture & Hardness*	*Hardness*	*Texture*	*Texture Hardness Weight*	*Texture*	*Texture*	*Not clear*	*Texture*	*N/A*	*N/A*
22	Rounded-Pointed	*Hardness*	*Texture*	*Texture*	*Hardness Weight*	*N/A*	*Hardness & Texture*	*Same as flat-bumpy*	*Hardness & Texture*	*Hardness*	*Texture*

23	Relief-No relief	*Texture*	*Hardness*	*N/A*	*Temperature*	*N/A*	*Texture*	*Texture*	*Weight & Texture*	*Not familiar with*	*N/A*
24	Substantial-Empty	*N/A*	*Weight*	*N/A*	*Temperature*	*Bulky instead of substantial*	*Not sure Perhaps weight*	*N/A*	*Weight*	*Texture*	*N/A*
25	Elastic-Inelastic	*Hardness Texture*	*Hardness*	*Texture*	*Texture Temperature*	*Texture*	*Hardness*	*Resilience Texture*	*Texture & Hardness*	*Texture*	*Hardness*
26	Sticky-Slippery	*N/A*	*Texture*	*Hardness & Weight*	*Texture*	*Texture*	*Texture*	*Temperature*	*Temperature*	*Texture*	*Texture & Hardness*
27	Coated-Uncoated	*Texture*	*Texture*	*Texture*	*Texture*	*Texture finishes*	*Texture*	*Temperature Hardness Texture or Weight*	*Texture*	*Texture & Hardness*	*Texture*
28	Waxed- Un-waxed	*Texture*	*Texture*	*Texture (similar to coated)*	*Similar to coated*	*Similar to coated*	*Hardness*	*Temperature or stiffness*	*Texture*	*Texture*	*Texture*
29	Grainy/gritty-Fine	*Texture*	*Texture*	*Texture*	*Texture*	*Would not use gritty*	*Texture*	*Texture & Temperature*	*Texture*	*Texture*	*Texture*
30	Ribbed-Not ribbed	*Texture*	*Texture*	*Texture*	*Texture*	*Texture*	*Texture*	*Texture & Weight*	*Texture & Hardness*	*Texture*	*N/A*
31	Rugged-Smooth	*Hardness & Texture*	*Texture*	*Texture*	*Texture*	*Texture*	*Texture*	*Texture, Hardness*	*Texture*	*Aesthetics*	*Texture & Hardness*
32	Steady-Loose	*N/A*	*Weight*	*Texture*	*Hardness*	*N/A*	*Hardness*	*Hardness*	*Weight & Texture*	*N/A*	*Hardness*
33	Fluffy-Rough	*Texture*	*Texture*	*Texture*	*Texture*	*Texture*	*Hardness*	*Texture Temperature*	*Texture*	*Texture*	*Texture & Hardness*
34	Spongy-Solid	*Texture*	*Weight*	*Texture*	*Hardness Texture*	*Texture*	*Hardness*	*Hardness (Resilience)*	*Texture*	*Hardness*	*Hardness & Weight*
35	Itchy-Not itchy	*Texture*	*Not sure*	*Texture*	*Texture*	*Texture & Temperature*	*Texture*	*Hardness Texture*	*Temperature & Hardness*	*Texture*	*Texture*
36	Feathery-Not feathery	*Texture*	*Weight*	*Texture*	*Texture*	*Weight*	*Weight*	*Hardness Temperature*	*Texture & Temperature*	*Weight*	*Texture*
37	Embossed-Not embossed	*Texture*	*Hardness*	*Texture*	*Texture*	*Texture*	*Hardness*	*Texture*	*Texture*	*Texture & Hardness*	*Texture & Hardness*
38	Multi-layered-Single-layered	*Texture & Weight*	*Weight*	*Weight*	*Weight*	*Weight*	*Texture*	*Weight*	*Weight, Texture & Hardness*	*Weight*	*Weight & Hardness & Texture*

39	Chalky-Smooth	*Texture*	*Texture*	*Texture*	*Texture*	*Texture*	*Texture & Hardness*	*Texture*	*Texture*	*Texture*	*Texture*
40	Silky-Not silky	*Texture*	*Texture*	*Hardness &Weight*	*Texture*	*N/A*	*Texture*	*Hardness Temperature*	*Temperature & Texture*	*Texture & Weight*	*Texture*
41	Fuzzy/hairy/furry -Not fuzzy	*Texture*	*Texture*	*Texture*	*Texture*	*Temperature*	*Texture & Hardness*	*Texture Temperature Weight*	*Texture*	*Texture*	*Texture*
42	Jagged-Smooth	*Hardness*	*Texture*	*Texture*	*Texture*	*Wouldn't use jagged*	*Texture*	*Texture*	*Texture*	*Hardness*	*Texture*
43	Viscous-Watery	*N/A*	*Weight*	*Texture*	*Texture Temperature*	*N/A*	*Weight*	*Hardness or stiffness*	*Temperature*	*N/A*	*Hardness*
44	Brittle-unbreakable	*N/A*	*Weight*	*Hardness*	*Hardness Temperature*	*N/A*	*Hardness*	*Maybe hardness*	*Hardness*	*N/A*	*Hardness*
45	Coarseness-Delicacy	*Texture*	*Texture*	*Hardness*	*Texture*	*Texture & Weight*	*Texture*	*Temperature, Weight Texture*	*Texture*	*Texture & Hardness*	*Texture & Hardness*

3.5.4 Thematic Analysis Process

Qualitative data analysis and interpretation is a non-numerical examination for the purpose of discovering patterns of relationships and underlying meanings. Therefore, an inductive thematic analysis in which themes are strongly linked to the data themselves was used in analysing the interview data (Braun & Clarke, 2006; Creswell, 2013). Verbatim transcripts from audiotaped interviews served as the primary texts for interpretations. The data analysis process is demonstrated in figure 3.3.

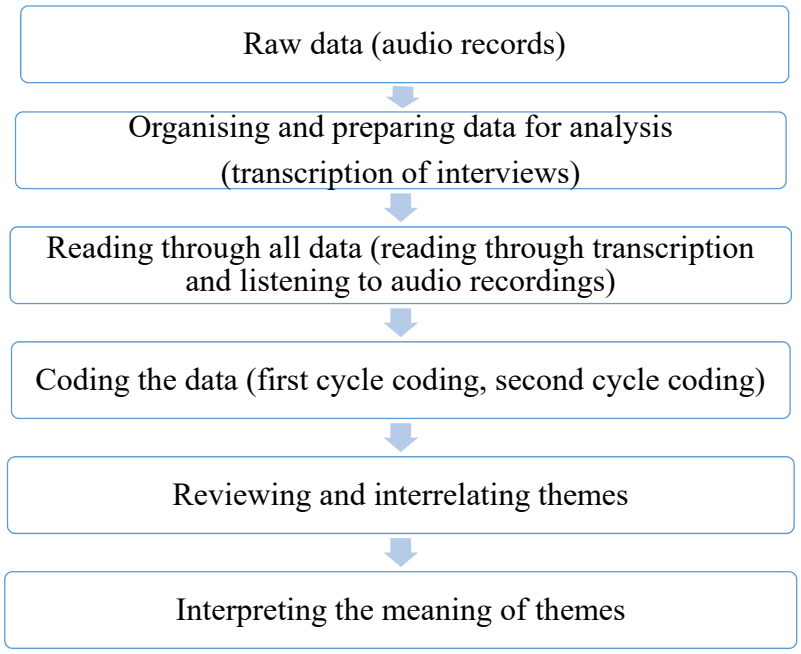

Figure 3.3: Data Analysis Process

As the initial step, raw audio recorded data were organised and prepared for analysis according to the date and time of the interview and details of the interviewees. The next step involved transcribing interviews and arranging them depending on the sources of information. After receiving a general sense of the information collected and reflecting on its overall meaning, the next step involved a thorough reading of all the data. The researcher reflected on the general ideas interviewees present and the tone of these ideas. The next step was data coding, which allowed the researcher to draw meaningful conclusions about the data. All interview transcripts were electronically coded using NVivo 11, which assisted the researcher to store, organise, manage and reconfigure the data more efficiently than manual coding.

This research adopted two types of coding: the first cycle of coding and the second cycle of coding (Saldaña, 2015). In the first cycle of coding, an open-ended initial coding approach was used to break down qualitative data into discrete parts, closely examined and compared for similarities and differences. The aim was to remain open to all potential theoretical directions indicated by the reading of the data. The first cycle coding process generated 49 codes, which were carefully recoded as required and then categorised according to their relationships during the second cycle. In the second cycle coding process, an axial coding approach was used to classify and categorise data obtained through the first cycle coding process. This process generated 17 codes. Axial coding is recommended for the second cycle of coding, after initial coding and development of themes from the data (Saldaña, 2015). For example, performance and durability were identified in the first cycle coding. They were then categorised under haptic quality perception which was then integrated in theme two: haptic perception. An example of the coding process is illustrated in figure 3.4 (see Appendix D for the complete coding process using the format suggested by (Gioia, Corley, & Hamilton, 2013).

In this process some initial codes were merged together due to their frequency, inter-relationship and conceptual similarity. Infrequent codes were revaluated for their usefulness, and also some redundant codes emerged in the first cycle coding process were dropped. In the second cycle of coding, responses were classified, integrated and synthesised into themes: an analytical reflection of coding. Finally, all second cycle codes were collated into seven potential themes. Content in these codes and contents within the emerging themes were re-read during both first and second coding process to ensure accuracy. After checking whether the themes were closely associated to the codes and also the data set, clear names for each theme were generated. At this point, themes were further refined. The next step was the selection of vivid, compelling examples which capture the essence of themes to present with the final analysis.

Following Saunders et al. (2018) this study used an inductive thematic saturation approach, where theoretical saturation focuses on the identification of new codes or themes. In this approach, the saturation was confined to the level of analysis, thus the principal focus in the research process lies in the analysis. Accordingly, the study reached theoretical saturation at the point when mounting instances of the same codes but no new codes occurred in the data. Thus, the study relates saturation to the termination of the analysis, rather than to the process of conducting further interviews to collect new data.

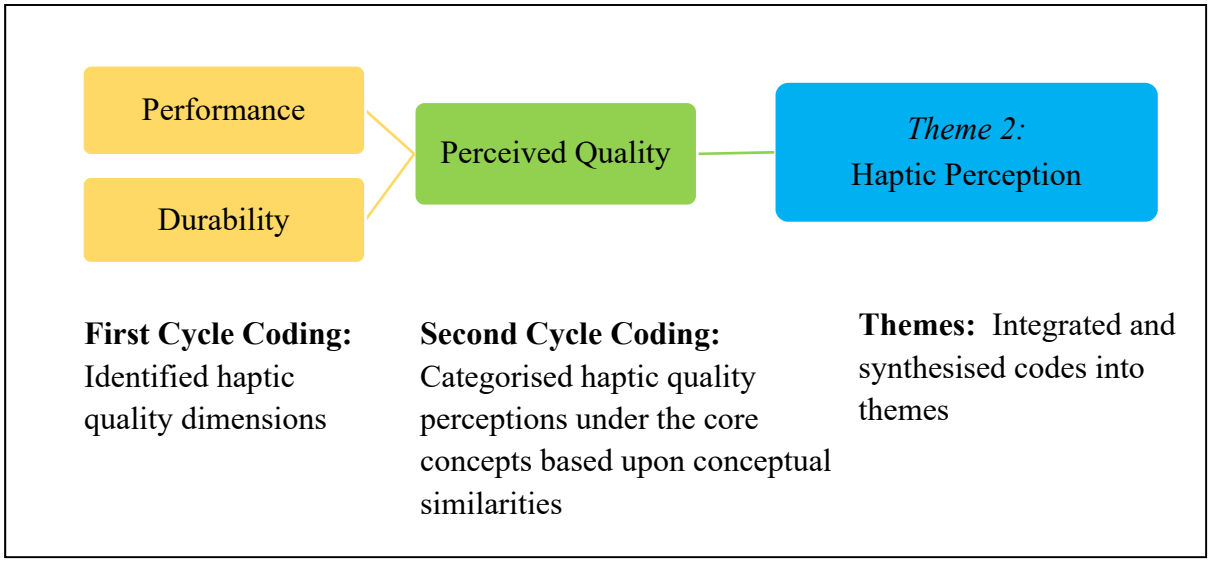

Figure 3.4: An Example of the Coding Process

3.5.5 A Conceptual Model of Consumers' Haptic Perception

The qualitative analysis identified seven key themes: haptic sensation, haptic perception, the influence of individual factors on haptic perception, and the influences of external environmental factors on haptic perception, the multidimensionality of haptics, haptic cue congruity and haptic dominance. A key step in the qualitative data analysis involves showing the linkages among the key constructs and displaying them in a visual model (Bernard et al., 2016). Accordingly, these key themes that emerged in the qualitative analysis were conceptually related. Subsequently, they were visually represented in a concept model. Principles of embodied cognition (Wilson, 2002), the conceptual framework of sensory marketing (Krishna, 2012) and fundamentals of touch (Peck & Childers, 2003a) provided the theoretical support to develop a conceptual model of consumers' haptic perception (see figure 3.5).

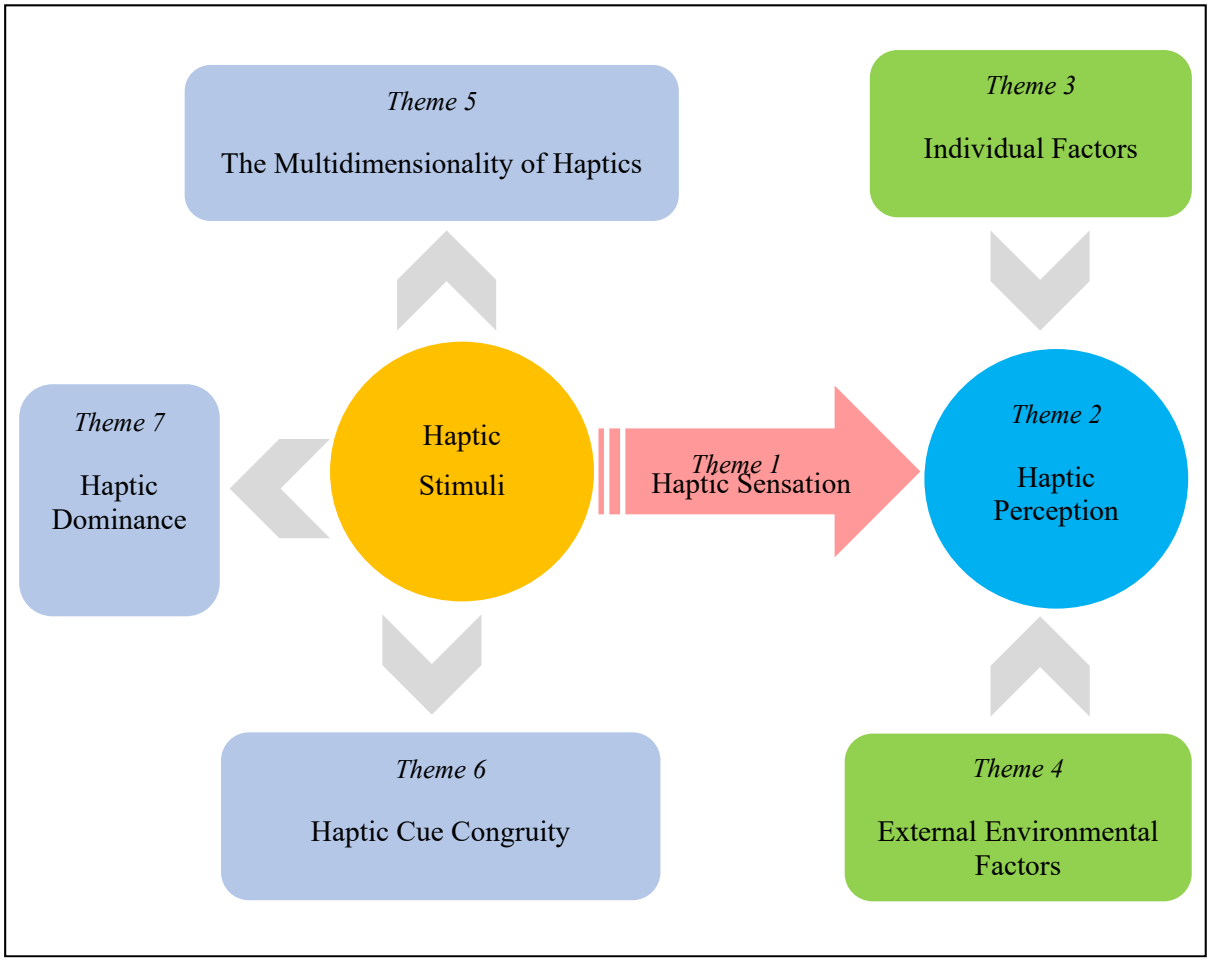

Figure 3.5: A Conceptual Model of Consumers' Haptic Perception

3.5.6 Thematic Findings

This section discusses the seven themes represented in the conceptual model of consumers' haptic perception. Sample quotes along with the anonymous ID are provided to exemplify these thematic findings.

3.5.6.1 Theme 1: Haptic Sensation

The first theme which emerged from the qualitative data is the notion of haptic sensation. This thesis defines haptic sensation as: *"the physical feeling that results through touching and obtaining haptic information"*. As indicated by the interviewees, how things "feel" has extensive psychological implications beyond simply being good or bad. "Seduce', 'impress, 'influence' 'love', 'nice', 'like' and 'connection' were some of the adjectives participants used to describe the powerful interactive indicators of their consumers' haptic sensation. Data supported the notion that the sense of touch is linked to the information and feelings about a product not only through mere physical interactions, but through powerful psychological interactions (Krishna, 2012; Peck & Childers, 2003a). This is clearly illustrated in the following quotes. For example, Respondent 6 stated that ultimately consumers can be seduced by their sense of touch. Respondent 9 stated that their consumers love the feel of silk against their skin.

"Ultimately, they could be seduced if you like, by touching the actual fabric themselves. It could be the weight of it. As they are holding it, you know, like a sample you would hold up or you would hold up the whole dress and feel how heavy it is. They would be quite impressed with the weight of the dress, again I think that would influence their opinion of it" Respondent 6.

"Ah! Yes, they love the feel of the lining. Because all the organza are lined in silk. And when the brides put them on when their gown are made they love the feel of the silk against the skin you know. Because it is very soft and drapes. So that really does make a difference to the feel of the gown and the wearing of the gown, because they can feel the softness of the silk against their skin, that's something that they like" Respondent 9.

Respondent 5 stated the sensation of softness in a metaphorical way, as if the material has a real life of its own.

"It's all about the touch and the hand feel with silk. People are like "Oh I love this" there is nothing else like it... Soft…it's like a feather weight. It's like wearing very little at all. And it floats. It moves with you and it's almost got a life of its own" Respondent 5.

Interviewees suggested that the interpretation of the exact haptic sensation of their consumers' desire is vital in successful retailing. Respondent 6 explained that mere visual information makes them imagine what their clients' sense of touch and feel is, which is different from walking into a store and actually feeling and physically touching products.

"If you were given pictures for example, you need to interpret that, as I said for the client and almost imagine what their sense of touch and feel is in a way. What their interpretation of that is. So that customer experience is quite different than walking into a shop and just go along and feeling touching fabrics and deciding, oh! Yes, I like this" Respondent 6.

Respondent 1 explained how haptic sensation could reinforce a successful design development process.

"Haptics? Oh enormously important. It is all about the feeling, the handle and then translating that into design: So how is the feel of something, the fabric you feel, how you are going to draw that, how you are going to communicate that and how you can form that into a final garment" Respondent 1.

As explained by Respondent 12, the physical connection a consumer builds with a product leads to a strong emotional connection with it, which ultimately goes a long way towards easing consumers into buying the product.

"I have worked in luxury retail before and one of the things I really discovered doing that is if you get someone into a change room with a garment, they are ten times more likely to purchase that, because they actually make a physical connection with it and so even that idea of just putting it on their body and seeing how it works and feeling how it feels when it's on them, they actual make a bit more of an emotional connection with it" Respondent 12.

The degree which haptic sensation plays in second-hand retailing is another interesting aspect that appeared in the discussion. This perspective is vital given the fact that every single product is different from each other in the context of second-hand shopping, and as a result consumers usually do not have time to try out many products in the stores. As illustrated by

Respondent 12, consumers rely on their haptic sensation to make quick judgements about the products.

"I think visuals and touch are really important, particularly when you go to a store where everything single of the rack is different, so like if you go to a retail store and you can see oh! there is ten specific kind of aesthetics for this season and here they are lined up on manikins or displayed at the front, so second-hand shopping is very different because you might want to spend only 20 minutes or half an hour in a store, but you got a whole store with every single item is different. So for me the role of touch and particularly like going through racks and touching things is highly important for my selection, because I am not willing to look at every single garment, because there is so much choice and variety but I am going to kind of use my hands and my sight to highlight different textures or colours that I am really drawn to and kind of inspect those garments in more detail. So in that sense that experience I find it really helpful" Respondent 12.

Nevertheless, as reflected by some participants, certain haptic sensations are more desirable than others. For example, Respondents 4 and 10 stated that smoothness is more desirable than roughness.

"Obviously smooth is going to usually be more desirable against the skin, the body. Obviously, rough is not unless it is something that people are seeking for its purpose. Let's just say you wear like hessian for example is quite rough: so if it's not like a bag or maybe even a hat that you wanted to make with hessian it's not going to be desirable against the sensitivity parts of the skin, unless they finish it off with something quite, you know a finishing with softener. So smooth generally is going to be more desirable" Respondent 4.

"Smoothness is preferred more in terms of fashion rather than roughness, because if you are wearing something close to your skin especially, people prefer whatever it is being soft rather than hard" Respondent 10.

3.5.6.2 Theme 2: Haptic Perception

The interview data supported the perspective that haptic sensation through touch by the hands, ultimately affects consumer perception of the product, and subsequently create subconscious triggers that inform consumers' product judgement and impression formation. Theoretical perspective of sensory marketing, which suggests that consumer's senses affect their perception, judgement and behaviour (Krishna, 2012) provides a theoretical justification of this phenomena. This thesis defines haptic perception as: *"our awareness and interpretation of haptic sensory information"*. Interview data suggested that haptic input attained by touching, significantly influence consumer perception of products, in particular aesthetic appeal, perceived quality, personality perception, perceived comfort, perceived price, luxury perception, perceived confidence and negative perception of touch: disgust.

Aesthetic Appeal

The sensations and movements associated within haptics have strong associations among consumer's aesthetic appeal of the product or the aesthetic aspects of a product design, which is centred on the perceptions of beauty and how a product appeals to the senses (Candi, Jae, Makarem, & Mohan, 2017). In the response below, Respondent 8 stressed that their brand mainly uses soft materials and avoids rigid and rough materials to reinforce the aesthetic appeal of their products.

"No, I think because our fabrics are very soft and tactile. I am not probably doing rigid, because rigid doesn't feel beautiful against the skin – not my look. I think it's tactile. Again I probably don't think it within my brand. I don't really like rough fabrics because they just don't transpire on to the body" Respondent 8.

Some participants emphasised that consumers' desire for haptic-evoked aesthetic appeal of a product design could change over the years. Reflecting on their design context, Respondent 6 explained that although consumers embrace rough, thick and stiff haptics as a current market trend, they would have rejected the same a few years ago.

"You can see soft laces, heavy laces, thick ones and thin ones and there are lots of different fashions at the movement as far as lace is concerned as well. The 1970's laces that are around at the moment are really quite thick, and stiff and not very malleable, now that you ask those questions, honestly five to ten years ago if I would have presented that kind of lace to a client they would have been no way, because it was too thick and too heavy and you

know not flexible and so on. All of this has very much to do with fashion and perception as well [aesthetic appeal] as to what weight or touch or feel people really like at the moment" Respondent 6.

"See something like that is really quite rough and thick at the same time. But, that is very modern at the moment and people would want to wear that, but there might have been a time where they wouldn't have wanted to use that at all. See these are 3D and there is plenty of them going on. I just want to point out that styles change so much. So they might just not want that sort of thing right now. You know if you offer them hard and smooth, they could be just a fashion [aesthetic] reason why they say, no I don't want that...a couple of years ago nobody would have touched it because it was too thick and heavy" Respondent 6.

However, this anticipated aesthetic appeal via haptics may differ across different product types. This is illustrated in the following quote:

"Again you know there's times when you want a really beautiful [aesthetic appeal] soft drape feel. But I wouldn't want that in a pair of jeans. I still like it to feel soft to touch, but you want a bit of structure and the sturdiness in the fabrics. So, you don't want it to feel crunchy or rough against the skin, If you are after a tailored jacket you don't want it too flimsy but the silk blouse underneath it you might want it feels flimsy" Respondent 7.

Perceived Quality

Interview data suggested that haptics influence a consumer's perception of a product's quality. Our findings support the four critical dimensions of quality: perceived quality, performance, reliability and durability (Garvin, 1987). For example, Respondent 6 explained that consumers usually associate heavier weight with better quality. Respondent 7 believed that people generally perceived flimsiness as high quality.

"It could be the weight of it... as they are holding it. You know, like a sample you would hold up or you would hold up the whole dress and feel how heavy it is. They would be quite impressed with the weight of the dress, again I think that would influence their opinion of it. They would consider it better quality if it was a heavier weight, generally" Respondent 6.

"I think when something is flimsy, you generally think its high quality" Respondent 7.

Respondents 10 and 11 shared their client's quality judgements, concerning performance and reliability of products based on the hand feel.

"Of course, I think it's very important. Some soft and very delicate looking dresses, people doubt the stability of the products [reliability]. I think that is a very applicable one actually. If it's very flimsy and soft and if it does not look stable in terms of structure, for me I always say clothing is just like buildings, there is no difference. So if they feel that it is not stable, they do not want to buy it because they think ah! You can't use it. Because it will tear apart. Or how do I wear this and walk because it is not balanced [product performance]. Those things are so important. People are sensitive [rely] towards that" Respondent 10.

"I think when you feel something soft, you can feel its quality. Straightaway to me that product then goes up, whereas if you feel something and if it does feel like little bit unstable [performance] or like if it's really polyester or something like that. Immediately the value for me shifts [reliability]" Respondent 11.

Durability is another aspect related to perceived quality of haptics. Respondent 12 stated that light weight products are considered less durable compared to heavier weight products.

"So working with something, let's say is a light weight that is lightly woven, which might be a bit more flimsy in structure. So the wear on it is perhaps less durable opposed to something that has a heavier weight and has that durability in them" Respondent 12.

Personality Perception

Another interesting subtheme which emerged from the qualitative data is the metaphorical association of haptics and the perception of a person's personality. Respondent 12 exemplified this by using two famous male celebrities. She described that a classic, handsome Australian actor, such as Hugh Jackman is often identified as a rugged person, whereas American actor George Clooney is considered to have a sleek personality.

"I think rugged and sleek are the most subjective words in there. So like, you would often use that definitely to describe aesthetics, but we often talk in costume about characters and so you will describe maybe a character, like a person as rugged or sleek. The characteristics of the person that is made up of elements of their costumes, well, it's definitely based more in aesthetics and it's a bit more subjective in that way. So, rugged and sleek to me is the classic, handsome Australian man is considered a rugged handsome man…someone like Hugh Jackman is often playing rugged characters. Masculine. Yes, but then you have someone like George Clooney, who is always sleek. He always plays sleek characters. So, even like that little difference, absolutely we apply that to clothing as well. Yeah" Respondent 12.

This notion is further supported by the following response of Respondent 12, where the haptic property of coarseness is related to something that is crude and unrefined. The respondent stressed that if you call a person coarse, they may refer to someone of an inferior standard who has a rough personality.

"Coarseness is often used to describe something that's crude, not very refined. So it's also a bit moralistic as well and I think delicacy is as well. So I think that they have much more subjective and perhaps even moralistic. So if you call a person coarse, it meant that they are perhaps a low class, and they are a bit rude, they don't have very good manners. Yes, they got a rough personality" Respondent 12.

As explained by Respondent 6, some consumers desire to express their feminine personalities by wearing soft and smooth materials. This implies that feminine personality and smoothness is closely associated. On the contrary, legal professionals seem to be quite fond of thick and heavy materials to symbolise their personality status.

"They definitely as I say like to have that soft smooth feel… they want to be flattered. They want to express their femininity and sometimes they want to express their status as well" Respondent 6.

"Twill for instance: a couple of years ago nobody would have touched it because it was too thick and heavy and now. It is… Lawyers love it because it is understated" Respondent 6.

Perceived Comfort

Some of the interview participants recognised comfort as another haptic-evoked perception. For example, Respondent 10 explained how their clients rely on their sense of touch to evaluate the comfort of products.

"The most important thing is the comfort for me and for what I have seen for clients, I think if they find that the fabric not looks very comfortable… Not the look… when you touch it…if it is soft. Does not have to be flimsy soft. It can be hard and soft also, but as long as it feels comfortable. It has to feel comfortable" Respondent 10.

This aspect is further illustrated by Respondent 2 who stated that stretchiness brings comfort to the wearer. Similarly, Respondent 7 stressed that if something feels cool it does not feel comfortable. Respondent 4 explained if the feel is uncomfortable consumers are less likely to

purchase that product. This implies how consumers' haptic perception consequently impacts their purchase intention.

"Yes, I think so… yes. Because of movement and also comfort as well. I think it's a big part. And I think that is why people wear athleisure stuff now…like you know, they will go the gym and they will wear yoga pant or something…you know. It's because of its stretchy and it's really comfortable" Respondent 2.

"Something feels too cool it doesn't feel like it's going to be comfortable" Respondent 7.

"So when people actually have a look at textiles and they feel it and if it feels sharp they are less likely to buy that item. Because it is going to be uncomfortable. Particularly, in a warm environment, it's not going to be comfortable" Respondent 4.

Perceived Price

This study indicated the influencing role haptic perception plays on consumers' perception of price. As illustrated by some respondents, regardless of their knowledge and experience, inputs they gain from touching products and obtain haptic information is a crucial driver of their price perception. For example, light weight of a product evokes a cheaper price perception.

"But once you touch, you should know what you are touching, what the bases. So when I touch, I am taking the whole thing. So, I can tell it's a crepe weave, I can tell it's a polyester, its light weight and I know it's going to be cheap" Respondent 5.

"So I guess they can be weightier with the bead work but generally silk is kind of light to wear as opposed to a synthetic fabric. They like the light weight gowns, silk fabrics as opposed to the weight of the polyester gowns which are the cheaper gowns you know" Respondent 9.

"So it always feels nice on the body. Organic ones are really nice, But it's more expensive" Respondent 3.

Luxury Perception

Some of the interviewees suggested that certain haptic properties evoked a perception of luxury. For example, interviewees suggested that softness, thickness and heaviness elicit a more luxurious perception, whereas fluffy and flimsy materials evoke the opposite.

"Thick has a more luxurious feel" Respondent 6.

"This is silk [softness] velvet. But it is on a silk component, so it is just a little bit more luxurious" Respondent 8.

"Because twill for instance, a couple of years ago nobody would have touched it because it was too thick and heavy. Expensive looking and it is expensive and it separated themselves from all the fluffy and flimsy stuff" Respondent 9.

Perceived Confidence

Interview data also suggested the association between haptic perception and perceived confidence of the consumer. This is reflected in the below responses of Respondent 2 and Respondent 4.

"And also two of the other things. Like comfort comes through stretchy. But I think there is also the fact that if something is holding you in …you know something is stretchy and little bit tight you know. I think, it sort of makes you stand up straighter. I think it can give you a little bit of confidence as well... because things do not move around quite as much... If you are bit fat. Like what I have put on my middle. If I wore something tight. It would hold me. That would be a just a confidence that comes from that material, so that is another attribute" Respondent 2.

Similarly, Respondent 4 suggested that if a material feels strong, it gives consumers more confidence to purchase the product.

"Again, a texture that feels strong gives people more confidence to purchase, I suppose they feel like there is better quality" Respondent 4.

Negative Perception of Touch: Disgust

Qualitative data demonstrated that touch can also influence a consumer's negative reactions towards products, particularly if they have been previously touched by another person. This negative consequence of touch is referred to in this thesis as "disgust" (perception we have in the presence of impurity). This is consistent with the view that consumers evaluate products previously touched by other shoppers less favourably (Argo et al., 2006).

As explained by Respondent 6, some consumers are sensitive to potential impurities of the product when it has been previously touched by another person.

"What I also found is girls will actually stand there and rub their dresses in their bodies, which drove me crazy. Because as soon as you put your hand on the fabric it starts to have an effect on the fabric… and especially things like silk stain crepe… those very soft satin somehow tend to absorb any kind of body oil or any kind of makeup. So that would eat instantly in to the garment and you could hold the material slightly sideways and see where they have touched with their figure tips, which would just drive me crazy because the next time they try on they say oh! It's been soiled. It's dirty" Respondent 6.

According to Respondent 12, this negative consequence of touch seriously impacts second-hand retailing because people dislike wearing someone else's used clothes.

"I know that a lot of people are put-off second hand clothes because of the idea that other people have worn them. That has never been an issue for me, but I do know that a lot of people are concerned about that and I think it's not only an individual perspective, but there is also variety of different cultural perspectives of that. I know in China a lot of people believe that it is bad luck to wear someone's clothes that have been worn beforehand. It doesn't bother me personally, but I do have some friends, they kind of feel a bit disgusted by it" Respondent 12.

3.5.6.3 Theme 3: Individual Factors

The third theme is the influence of individual factors on haptic perception, which this study defines: "*individual factors that influence consumer haptic perception*". The majority of interviewees explained that people have a big connection with touch and people are sensitive towards touch and feel. For example, Respondent 8 stated that her clientele is very tactile.

"Yes, I think we just have such a big connection with touch" Respondent 2.

"I think people are sensitive towards touch and feel" Respondent 10.

"Tactility is absolutely important. Because, again my client is very tactile" Respondent 8.

Prior touch research shows that individuals differ in the motivation to acquire and utilise haptic information (Peck & Childers, 2003a). This study provided empirical evidence to support the two types of individual orientations of touch: the goal driven utilitarian-oriented touch and sensory pleasure driven hedonic-oriented touch.

Utilitarian-orientation of Touch

Data supported the utilitarian-orientation of touch. As indicated by interviewees, our sense of touch provides essential information related to the goal-driven evaluative outcomes of a purchase decision which usually lacks sensory pleasure. For example, consumers generally inspect a product generally through both visual and haptic information in their pre-purchase decision-making process. Typically, sight is considered more important than touch. However, as reflected by some industry experts, touch is the factor that immediately sends a customer back if they are not satisfied by the haptic information they gained via touching, consequently impacting their decision to purchase it. This notion is reflected in the selected quote from Respondent 7 below.

"Because you move it. You look at the whole garment, you pick it up, you look at how it drapes. So touch is a factor and it might immediately send you back if you don't like the touch" Respondent 7.

The quote below also shows that if consumers are satisfied with the hand feel they are willing to put up with other evaluative measures, for instance colour.

"If it's something feels nice. Something that feels nice to the touch, I think people will put up with other things" Respondent 2.

Respondent 11 explained that despite having prior knowledge and prior experience, the physical touch and feel always assist their final decision-making process.

"I just think it's such a tactile experience: going and feeling fabrics and seeing what works and what you want to do and usually I might have a bit of an idea in mind what I am going to use, but going to see or feel something can go oh no! That is not exactly what I want anymore, I want that. I feel that's really important" Respondent 11.

Hedonic-orientation of Touch

Interview data also supported the hedonic-orientation of touch. Some interviewees suggested that consumers truly enjoy the feel and the sensation from touching, holding or sometimes squeezing products or materials. For example, Respondent 5 admitted that she cannot resist the desire of touching products wherever she goes.

"…like a lot of the time when I used to be designing and whenever when I am out anyway, I can't help myself. I have always done it. I am just touching all the clothes wherever I go" Respondent 5.

Despite consumers' choice of online shopping, which mostly is a goal-driven action, they still prefer to visit physical stores to enjoy the sensation of touching and feeling products. This is illustrated in the below response of Respondent 12.

"I have to say that as a consumer I often shop online, but I love going into stores and looking and feeling and touching fabrics and clothes" Respondent 12.

Desire for Unique Haptics

Another important individual factor evident in this qualitative exploration was the notion of consumers' preference towards uniqueness when acquiring and possessing haptic information. The pursuit of haptic differentness seems to be varied across individuals. This notion underpins the concept of consumers' need for uniqueness, which is defined as the trait of pursuing differentness relative to others that is achieved through the acquisition, utilisation, and disposition of consumer goods for the purpose of developing and enhancing one's personal and social identity (Tian, Bearden, & Hunter, 2001, p. 52). For example, Respondent 10 emphasised that, although softness is usually considered as a very desirable haptic property there could be customers who prefer unique haptic attributes, such as a paperish feel. Respondent 10 further described that some of their clients desire heavy, bulky products/materials merely to create a unique appearance. Respondent 4 also explained that while the majority of their customers like softness against their skin, there could still be customers who want to stand out from the crowd by seeking unique haptics.

"See. I think softness is important. But it depends on the customer's requirement also. There are customers who likes a paperish feel. Some people like stiffness in their products. So it does not always have to be soft" Respondent 10.

"There are people who wear heavy bulky things that create different silhouettes. So it's very niche. It becomes a very, very niche thing" Respondent 10.

"And I think the majority of customers like softness. They like softness against their skin. That is the usual. However, if they were a little bit more fashion conscious and unique and it was something that they particular wanted to stand out, and it really highlights, I suppose

certain features. They might have like rounded features and they are quite cluey about how to dress themselves, so they balance features…then they might go for something a bit harder in certain areas… with accessories as well. So perhaps like you know, if you got a heavy weight necklace, then you could balance it with something medium weight. What you are wearing with. If you are wearing something structured then you can go the opposite" Respondent 4.

3.5.6.4 Theme 4: External Environmental Factors

Another salient thematic context that emerged in the discussion is the influence of external environmental factors on consumers' haptic perception, which this thesis defines as: *"external environmental factors that influence consumer haptic perception"*. Data suggested two major external environmental factors: ambient temperature and technological advancements.

Ambient Temperature

Prior marketing literature posits that physical surroundings or the atmosphere impact consumer judgement and decision making (Bitner, 1992). For example, the effects of ambient temperature influence consumers' product preferences (Huang, Zhang, Hui, & Wyer, 2014). This study suggested ambient temperature influences consumers' haptic preference. Respondent 7 explained that if the outside temperature is cold, people have a natural tendency towards warm and cosy haptics.

"I actually think that a lot of this also impacted by the ambient temperature you stood in while you are shopping. If it is a really cold day, you're just going naturally to anything warm and cosy" Respondent 7.

Respondents 3, 8, 11, 12 and 6 similarly emphasised that the Australian state of Queensland, which is renowned for its subtropical climate drives people towards seeking lightweight materials that feel cool to touch.

"In Queensland I won't wear synthetic fabrics. It is too hot. The climate being sub topical. So temperature is definitely important in climates like this. So I don't have a lot of heavy coats in my wardrobe. Occasionally you do have. But most of my stuff are light weight and cool. That is always going to be more attractive to people in this climate" Respondent 3.

"You know it's quite important as well, depending on what season and the area that you are living. Especially in Brisbane, where it's really hot or you go somewhere really cold" Respondent 11.

"Absolutely, I suppose because I am based here in Brisbane I tend to go for fabrics that feel cool, which I work with a lot of natural fibres for that reason. So I work with mainly cool fabrics, saying that little bit in to the winter I will work with corduroys and brocades which you can see. That is just the edge. I always have that in the store because people are going overseas and to Melbourne which is a different climate" Respondent 8.

"Being in a tropical climate, weight actually effects warm and cool as well, so like the weight of your garment, and like for me the fibres as well. So like any protein-based fibres is going to be a warm fibre within this climate" Respondent 12.

"Potentially, cool would be better, obviously in Australia. And especially for destination weddings. Some girls might consider that. How it is going to feel for them in a warm or cool climate, in a warm or cool setting, therefore the feel of the fabric would want to be quite cool" Respondent 6.

Respondent 10 similarly stressed that ambient temperature influences their consumers' preference for haptics. The quote below exemplified this aspect observed in tropical Asia. Despite retail spaces and service settings being air conditioned and improved for thermal comfort, the hot and humid environment consumers come from has a strong influence on their haptic preference. On the contrary, a British consumer's haptic preference could vary during the cold winter season. For example, consumers dislike products made out of silk which is quite cool to the touch during winter.

"Sri Lanka is always hot and humid. So, all the retail spaces are air conditioned. But when they come into the store and if they touch a product, if that product does not give, if it gives that hot vibe when they touch it... they are not interested in buying it. Because they come from an environment which is hot and humid. So they don't want anything hot and humid. It is like, when you are in a country…say if you are in England, it is very important during winter when you shop. If you would touch and I mean ...you are first asking about feeling warm and cool isn't? Right...so if it's a country where there are seasonal changes and say if its winter. You wouldn't want to buy something which looks really great, but say for instance silk during winter. Silk has bit of coolness to it…it's not. Like say, sometimes you might not tend to

purchase it, because in your head you know that you are purchasing something for that climate that you are actually in. Because, I face that a lot with the products that I do here. If it's something that people feel is hot when you touch a product. It is not a matter between cotton and synthetic. That you can't just touch and experience right. So people are sensitive towards that. I think it's an important point" Respondent 10.

Respondent 4 also said that ambient temperature can influence consumers' preferences for haptics, which consequently impact other evaluative measures, such as comfortability.

"If its summer. You want something that is going to be nice and light. You just feel like really comfortable or not. Substantial would be temperature, but be more winter. Something weighty, something warm" Respondent 4.

Technological Advancements

Technological advancements have changed the world in countless ways. This study revealed some influences of technology towards consumers' haptic information processing. For example, Respondent 12 stated haptic-oriented innovations in textile and fashion industry, such as electronic fabrics that change their colour and patterns in response to touch.

"I come across a lot of innovative fabrics that give different senses, amplify senses when you touch rather than a normal fabric. Innovative fabrics of course, you can find all sources. You can find things that emit heat when you touch to change colour to, you can even make finger prints when you touch the surface. Those things are available in the market, it has so many varieties" Respondent 10.

As stated by Respondent 3, traditional heaviness of warm materials are rapidly changing with the recent technological advancements.

"Usually warmer fabrics are heavier weight. They are not usually very fine. But that is changing these days with all of the new developments they are doing with polyesters" Respondent 3.

Nevertheless, technological advancements also have some negative consequences as far as touch is concerned. For example, Respondent 5 explained how technology enabled certain haptic qualities to be mimicked, and as a result inexpert consumers have troubles distinguishing an original product from a copied one.

"I get tricked sometimes and then I will look at the label to check. Because, there is some polyesters these days, I won't say they are light silk, but they are mimicking silks in a very good way and the untrained eye would have trouble, because the hand feel is so good" Respondent 5.

3.5.6.5 Theme 5: The Multidimensionality of Haptics

The next important theme which emerged from the interview data is the multidimensionality of haptics. This thesis defines the multidimensionality of haptics as: *"integration of several haptic inputs rather than a single haptic modality"*. This notion is exemplified by Respondent 2 who stressed that we cannot just isolate one haptic attribute because people are feeling more than just one at the same time. Respondent 13 suggested that we unconsciously process multiple haptic information.

Respondent 2 stressed that *"I don't think you can just isolate one attribute."*

Similarly, Respondent 5 described, *"Because you are feeling more than just one at the same time*, *you are taking a fair bit of information."*

Respondent 13 described, *"Unconsciously when a material is bulky [weight], it's considered as less breathable, so temperature also represented indirectly."*

Psychophysics literature posits that haptic information attained through touch is important for the evaluation of products that vary in terms of four material properties corresponding to texture, weight, hardness, and temperature (Lederman & Klatzky, 1993). This thesis sheds more light on this by revealing that people could possibly acquire, store and retrieve multiple amounts of haptic information simultaneously. This notion is clearly demonstrated in the extracted quotes summarised in table 3.6. For example, Respondent 1 perceived softness and warmness simultaneously. Respondent 2 described that there are products that are light but warm at the same time. Respondent 3 observed a closer relationship between hardness and firm haptics and soft and flimsy haptics. Respondent 11 said that if a product is soft, you perceive it as more light weight. Some respondents have even used several haptic properties to support their claims. For example, Respondent 10 stressed that some consumers doubt the stability of soft, delicate and flimsy products.

Table 3.6

The Multidimensionality of Haptics

Respondent	Selected Quotes	The Multidimensionality of Haptics
Respondent 1	*"I suppose I would associate with how fluffy or soft a texture is, I think of that as being a warm texture"*	Fluffy or Soft + Warm
Respondent 1	*"Yes, absolutely, and I would say rather than hard, it might be the firmness of the weave. How firm it is and how malleable and flexible it is"*	Hard or Firmness + Malleable + Flexible
Respondent 1	*"Because you can think of a thick fabric being soft and bouncy"*	Thick + Soft + Bouncy
Respondent 1	*"If it was a very stiff, firm fabric, then we could call hard fabric"*	Stiff + Firm + Hard
Respondent 2	*"Yes, I think so. Yes, again you know there are things that are quite light, but warm at the same time"*	Light Weight + Warm
Respondent 2	*"I think some. Just metals. Like jewelleries. You have that hardness against you and it feels cold"*	Hard + Cold
Respondent 2	*"Leather is probably a good one too, you made something about, stickiness before. You know a patent leather. It's very shiny and glossy. And you think it would be smooth. But sometimes when touch it, it's sort of a bit sticky. So, I don't know whether its necessarily cool to the touch-but it would be something sticky to the touch"*	Smooth + Stickiness
Respondent 2	*"Especially like a 100% linen and a thick one as well. They are quite cool to the touch"*	Thick + Cool
Respondent 3	*"With some respect Firm-Flimsy is very similar to the hard and soft. So a hard fabric is usually quite firm, whereas a soft fabric is flimsy"*	Hard + Firm Soft + Flimsy
Respondent 3	*"Coolness can relate to light weight. Warm to heaviness. Yes, exactly"*	Cool + Light Weight Warm + Heavy
Respondent 3	*"But it could also be about weight as well. Usually warmer fabrics are heavier weight"*	Warm + Heavy
Respondent 4	*"So I think that most people will generally relate coolness with cotton and linens and then warm with the wool – anything that is thickly woven. The thickness will definitely attributes to warmness and then thinness obviously would be the opposite"*	Thickness + Warmness Thinness + Coolness
Respondent 4	*"Thick you straightway think something to be warmer… and thick would also relate to weight. Because it is going to be heavier"*	Thick + Warm + Heavy
Respondent 4	*"I guess there are all related in some way I suppose. Heavy – people would generally relate*	Heavy + Hot

	to temperature... If it's something that's quite heavy, they feel bit hot"	
Respondent 5	*"Yes, you can get heavy wool and also you could also get a very light weight, warm wool. Very light weight. And you can also probably get a cool heavy fabric as well"*	Light Weight + Warm Heavy + Cool
Respondent 6	*"Crisp is something that, is a way you would describe certain silk. Silk Taffeta. They are quite crisp and crunchy and therefore hard"*	Crisp + Crunchy + Hard
Respondent 6	*"It is the same even with silk. Because there is Twill, for instance a couple of years ago nobody would have touched it because it was too thick and heavy"*	Thick + Heavy
Respondent 7	*"Yes, you can it would be heavy for a silk-silk zibeline. Still feels smooth to touch, feel like silk"*	Smooth + Heavy
Respondent 7	*"There is probably fluffy in smooth again"*	Fluffy + Smooth
Respondent 8	*"We also do cotton organdie which I would call hard. But at the same time it is cool because it's pure cotton"*	Hard + Cool
Respondent 9	*"Corseted gowns are very firm and some girls love the feeling that has to wear something like that. Because they like feeling structured and corseted in to something in. other girls don't like that feeling…they like to be very sort of unstructured and not restricted by the gown and all and they prefer to go for very softer and floater kind of lines"*	Firm + Structured Soft + Unstructured
Respondent 10	*"Of course I think it is very important. Some soft and very delicate looking dresses people doubt the stability of the products. So they don't want to. I think that is a very applicable one actually. If it's very flimsy and soft and if it does not look stable in terms of structure"*	Soft + Delicate + Flimsy + Instability
Respondent 11	*"I think sometimes, yes, If it's soft, you feel like it is light and then I guess the next step is picking it up and seeing how light weight it is"*	Soft + Light Weight
Respondent 12	*"Hard-Soft is really about texture, so again you can probably throw some other words in there, like hard fabrics usually also stiff as well"*	Hard + Stiff
Respondent 12	*"Say, if you have got a bit puffed jacket, like those feathered stuff, there are very bulky as in they take up a lot of space and they are very big, but also very light weight"*	Bulky + Light Weight

3.5.6.6 Theme 6: Haptic Cue Congruity

The multidimensionality of haptics further provides insight on how haptic cues correspond with each other. This novel haptic notion is recognised in this thesis as haptic cue congruity. From a sensory marketing perspective, Krishna et al. (2010, p. 412) define cue congruence among different senses as the degree of fit among characteristics of a stimulus. In a similar vein, this thesis defines haptic cue congruity: *"the degree of fit among haptic cues".* For example, hard and firm properties have a strong match among their characteristics. Similarly, soft and flimsy or warm and heavy, or cool and light weight or soft and light weight properties have the same natural fit among themselves. The extracted quotes from interview data to support haptic cue congruence are summarised in table 3.7.

Table 3.7

Haptic Cue Congruence

Respondent	Selected Quotes	The Multidimensionality of Haptics	Haptic Cue Congruence
Respondent 3	*"With some respect firm-flimsy is very similar to the hard and soft. So a hard fabric is usually quite firm, whereas a soft fabric is flimsy"*	Hard + Firm Soft + Flimsy	Haptic cue Congruence
Respondent 3	*"Coolness can relate to light weight. Warm to heaviness. Yes, exactly"*	Coolness + Light Weight Warm + Heavy	Haptic cue Congruence
Respondent 3	*"But it could also be about weight as well. Usually warmer fabrics are heavier weight"*	Warm + Heavy	Haptic cue Congruence
Respondent 4	*"So I think that most people will generally relate coolness with cotton and linens and then warm with the wool… anything that is thickly woven. The thickness will definitely attributes to warmness and then thinness obviously would be the opposite"*	Thickness + Warmness Thinness + Coolness	Haptic cue Congruence
Respondent 4	*"Thick, you straightway think something to be warmer and thick would also relate to weight. Because it is going to be heavier"*	Thick + Warm + Heavy	Haptic cue Congruence
Respondent 6	*"It's the same even with silk, because there is Twill for*	Thick + Heavy	Haptic cue Congruence

	instance, a couple of years ago nobody would have touched it because it was too thick and heavy"		
Respondent 9	*"Some of the gowns are very structured. Corseted gown are very firm and some girls love the feeling that has to wear something like that. Because they like feeling structured and corseted in to something in. other girls don't like that feeling… they like to be very sort of unstructured and not restricted by the gown and all and they prefer to go for very softer and floater kind of lines"*	Firm + Structured Soft + Unstructured	Haptic cue Congruence
Respondent 11	*"I think sometimes, yes. If it's soft, you feel like it is light and then I guess the next step is picking it up and seeing how light weight it is"*	Soft + Light Weight	Haptic cue Congruence

Table 3.8 illustrated the extracted quotes to support haptic cue incongruence. For example, smooth and heavy properties have a natural mismatch among themselves. Similarly, smooth and heavy, soft and heavy, light weight and warm or heavy and cold properties have the same unfit among their characteristics.

Table 3.8

Haptic Cue Incongruence

Respondent	**Selected Quotes**	**The Multidimensionality of Haptics**	**Haptic Cue Incongruence**
Respondent 2	*"Yes, I think so. Yes, again you know there are things that are quite light, but warm at the same time"*	Light Weight + Warm	Haptic cue Incongruence
Respondent 2	*"I think some. Just metals. Like jewelleries. You have that hardness against you and it feels cold"*	Hard + Cold	Haptic cue Incongruence
Respondent 7	*"Yes, you can. It would be heavy for a silk zibeline. Still feels smooth to touch, feels like silk"*	Smooth + Heavy	Haptic cue Incongruence
Respondent 1	*"I suppose I would associate with how soft a texture is, I think of that as being a warm texture"*	Soft + Warm	Haptic cue Incongruence

Respondent 1	*"Because you can think of a thick fabric being soft and bouncy"*	Thick + Soft	Haptic cue Incongruence
Respondent 2	*"Especially like a 100% linen and a thick one as well. They are quite cool to the touch"*	Thick + Cool	Haptic cue Incongruence
Respondent 5	*"Yes, you can get heavy wool and also you could also get a very light weight, warm wool. Very light weight. And you can also probably get a cool heavy fabric as well"*	Light Weight + Warm Heavy + Cool	Haptic cue Incongruence

3.5.6.7 Theme 7: Haptic Dominance

The final theme is the notion of haptic dominance. There is a large body of evidence on cross-modal interactions among senses, with respect to sensory dominance (Colavita, 1974; Schifferstein, Otten, Thoolen, & Hekkert, 2010). In particular, prepotency of visual stimulus over other senses (Colavita, 1974; Hecht & Reiner, 2009; Hoegg & Alba, 2007). However, no prior research suggests similar dominance effects among four material properties: texture, weight, hardness and temperature (Lederman & Klatzky, 1987). For example, a sweater's smooth texture dominance haptic perception over its light weight. This study posits that our brain may not give equal weight to the information coming from different haptic modalities. Rather, sometimes one haptic modality could dominate over others, consequently consumers are likely to be attending to them first. This thesis defines haptic dominance as: "haptic information that have the greatest relevance for a given task will dominate haptic perception".

The majority of interviewees assert that for fashion products, haptic perception via texture significantly dominates over other material properties. This is illustrated in the following responses.

"If you go and touch something, I definitely would go texture, and then weight. They are the two that I would straightaway go for" Respondent 4.

"You know, for me feeling fabrics... I am just thinking if I am looking at the shops and the feel of fabrics... It is the texture. Because I want to feel if it is a synthetic or if it's a natural fibre. And I can do that through the texture of it...I do not do it through weight. Because the weight could be any of those, I do not think it's the weight…I think it's the texture... Yes" Respondent 1.

As illustrated in the below quotes, Respondents 2, 11 and 4 used the adverb 'definitely' as a way of emphasising that texture is the more important property than others.

"I think definitely the feel, like the texture of a garment and probably better than some of the others because if it's something feels nice. It's something that feels nice to the touch, I think people will put up with other things. Like if something, if a garment is particular heavy or bit clumsy to wear...I think if it feels nice on the body, then people probably more likely to wear it anyway… Yes, like all those dresses you see on the red carpet...They weigh so much… They are willing to put up with the weight of the garment …I think touch, the texture is the most important" Respondent 2.

Respondent 11 claimed that although all four properties could cross over each other, she is always drawn to texture first.

"Yes, I think for me texture first. Definitely a thing. I think they do all go hand in hand. But I feel like if you look at something textured and you really like it, depending on whether it needs to be like really simple or something quite chunky sort of, for me then looking at the weight kind of tells you bit about things like durability, and those sort of things. So I really look at that. Probably before I consider temperature…to me they all cross, and they are all important, but I think just personally, I am always drawn to texture first. It's just me though" Respondent 11.

Similarly, Respondent 4 stated that if she touches something, she would immediately feel the texture, subsequently the weight of the product.

"If you go and touch something, I definitely would go texture. And then weight, there are the two that I would straightaway go for" Respondent 4.

Respondent 5 also suggested that texture comes first and weight and other attributes fall behind them.

"Lot of fabrics is about the texture and the hand feel and then the other things… the weight and the other things come behind them" Respondent 5.

Interview data suggested that haptic information corresponding to weight is potentially the second important. Respondent 10, stressed that weight of the product could drive consumers' ultimate decision to buy, despite their being satisfied with the textural qualities of the product.

"So the weight of the fabric is important... Say if it is a skirt. The way it drapes around the body and how it is when you walk is important…that comes with weight. And also say if you are draping instead of cutting and sewing, the weight of the fabric is important to get the drape right. If there is no weight, there is no drape basically… it just puffs up. So weight is important to the design, depending on what the shape is…what kind of volume you need to give, how the consumer needs to feel when you wear it and walk. Consumers will definitely reject it...if it's too heavy. Even if it is soft and even if it is breathable and all those things, still they wouldn't buy" Respondent 10.

Respondent 3 emphasised that weight plays a pivotal role in the product design and development process. She explained that inexpert design students often fail to foresee the correct weight that fits with the design. Nevertheless, she stressed that texture is the most important aspect amongst all four material properties.

"Weight is definitely important depending on your designs. And I see students often not getting their final fabric they really like. It won't sit with their design and it's usually got to do with weight and the way the fabric handles. So they are all important. But I guess texture is the most important and the others apply more to comfort in wearing" Respondent 3.

As illustrated in the quote below, irrespective of a smooth textural appeal of a product, it should also have a nice body [weight] to support it because weight is the key factor that holds the product.

"Yes, it's more than just being smooth and having a nice feel… the fabric wants to have a nice body to it supports it, weight nicely. You get some fabrics that can be overly soft for the weight of the fabric and it just kind of hangs. So you want a fabric that holds its weight" Respondent 9.

Some interviewees suggested that temperature or a thermal sensation could also play a role when people touch products. In the quotes below, Respondent 2 stated that warmth has a big connection with our sense of touch. The respondent further explained that certain materials such as linen could intensify the feel of the surface temperature.

"There are things that are quite light, but warm at the same time. So, I think… Yes, I think they just have such a big connection with touch" Respondent 2.

"Temperature, exactly I feel in fabrics, especially like a 100% linen and a thick one as well. They are quite cool to the touch" Respondent 2.

However, there could also be some negative consequences of temperature as far as haptic perception is considered. As Respondent 10, claimed when their consumers come into the store and if they feel that hot [warmth] vibe when they touch, they seem to be less interested in buying that product.

"When they come into the store and if they touch the product and if it gives that hot vibe when they touch it. They are not interested in buying it" Respondent 10.

Hardness was the least emerged material property in interview data. Respondent 1 suggested that hardness only relates to the silhouette of a particular design, therefore in terms of properties she thinks chiefly about texture. Similarly, Respondent 4 emphasised that hardness is only one particular aspect and further stressed that weight covers a wider spectrum than hardness. Respondent 4 further stressed that hardness is a broad interpretation and difficult to place.

"Hardness might relate to design lines or silhouette, but in terms of properties I tend to think chiefly texture" Respondent 1.

"Yes, I think weight covers a bigger a wider spectrum than hardness. Hardness to me really looks at one particular aspect" Respondent 4.

"I find hardness really difficult to place. It is such a broad interpretation that you make, difficult to place I suppose" Respondent 4.

3.6 Ethical Considerations

Researchers must take into account many ethical considerations when designing and executing social research that takes place in a social context (Babbie, 2015). Accordingly, exploratory study two and exploratory study three were undertaken adhering to the guidelines provided by the national statement on ethical conduct on human research (2007) and the Queensland University of Technology. The University Human Research Ethics Committee (UHREC) assessed this study and granted Human-Negligible-Low-Risk ethical clearance (UHREC reference number: 1700000655) from 02/08/2017 to 02/08/2020.

In order to protect respondent's anonymity and confidentiality, the researcher employed the following steps during the data collection:

- By obtaining consent from all the respondents to confirm their agreement to participate to the study.
- By providing participants with all the necessary information about the research through an invitation letter and participant information form which covers; intention of the research, voluntary nature of their participation and the possibility to withdraw their participation at any time, measures to be used to keep confidentiality of the information they provide and contact details of the research team named in this application for any further information or clarification if needed.
- Identifiers of the re-identifiable data were removed and replaced by codes.
- All obtained data were stored in a safe and secure manner adhering to QUT's data management policy.

3.7 Chapter Conclusion

This chapter presented the findings of the three exploratory studies which aimed to gain a preliminary understanding of the dynamic nature of haptics in marketing. Study one was an in-depth literature search that determined a set of key differential haptic properties corresponding to four material properties of products: texture, weight, hardness, and temperature. Study two was a consumer free recall task that revealed product types people would like to touch prior to purchase. Study three further explored these initial findings by obtaining qualitative data through expert interviews. This study developed a conceptual model of consumers' haptic perception consisting seven haptic notions: haptic sensation, haptic perception, the influences of individual factors on haptic perception, and the influences of environmental factors on haptic perception, the multidimensionality of haptics, haptic cue congruity and haptic dominance. The findings of these exploratory studies provided new insights on the existing touch literature. More importantly, these preliminary findings lay the basis for the conceptual development and experimental design of this thesis. The next chapter provides the conceptualisation and hypothesis development of this thesis.

Chapter 4: Conceptualisation and Hypothesis Development

4.1 Overview of the Chapter

This chapter provides the conceptualisation and hypothesis development of this thesis. This research is a preliminary investigation to examine the impact of haptics in evoking consumer impressions of brands. The chapter reflects upon theoretical foundations concerning touch and haptic perception and outlines knowledge gaps underpinning this thesis. This chapter discusses the theoretical lens used to justify the predicted haptic effects. This discussion also integrates several key empirical findings from the exploratory studies as they shaped some of the key research decisions of this thesis. Finally, a chapter summary is presented.

4.2 Touch and Product Differences

This thesis focuses on consumers touching products. As discussed in chapter 2 under motivation to touch framework, product differences, individual differences and situational factors interact together to determine the motivation of a consumer to touch a product, extract and utilise haptic information prior to purchase (Peck & Childers, 2003b). As explained in chapter 2 section 2.3.3, product-based salience of haptic information attained through touch is important for the evaluation of products that differ in terms of four material properties: texture, weight, hardness and temperature (Peck & Childers, 2003b). Despite the importance of product differences, touch research in marketing has mainly focused on individual differences in the need for touch (Peck, Barger, & Webb, 2013; Peck & Childers, 2003a, 2006; Peck & Johnson, 2011; Peck & Shu, 2009). The current research seeks to provide theoretical and practical implications by investigating the impact of product differences of touch through haptics on consumer brand impressions. This thesis aims to explore these associations in the context of two primarily material properties: texture and weight.

4.3 Haptic-evoked Brand Personality Impressions

Consumers obtain different impressions of brands by means of various product-related intrinsic sensory cues. For example, warm colours evoke a successful, desirable and expensive appeal (Boudreaux & Palmer, 2007); smoother shutting doors with low frequency sounds enhance the luxury appeal of a car (Krishna, 2012). Despite the fact that information derived from a consumer's sense of touch can bias impressions and judgements in unforeseen ways (Batra et al., 2016), marketers seem to have overlooked the ability to elicit consumer brand impressions through product-based salience of haptic information. The current research addresses this knowledge gap by examining the impact of haptic information corresponding to texture and weight on consumer brand impressions, and more specifically, brand personality (Aaker, 1997).

This thesis primarily looks at consumer brand personality impressions for several reasons. Brand personality is a key branding construct which systematically captures and classifies aspects of brands in terms of generalizable impressions responses (Aaker, 1997). Aaker (1997, p. 347) defines brand personality as "the set of human characteristics associated with a brand". The five brand personality dimensions: sincerity, excitement, competence, sophistication and ruggedness are clustered around 15 facets. Brand personality is a key driver of a brand's image (Park & Roedder John, 2010). For example, Harley Davidson is famous for its rugged and masculine personality (Solomon, 2013); French luxury jeweller Cartier is associated with sophistication (Park & Roedder John, 2010) and Pepsi is recognised as an exciting soft drink brand for its irreverent and adventurous nature (Solomon, 2013). Thus, it is essential to focus on personality branding in the way that connects the brand to the consumer (Sundar & Noseworthy, 2016).

Brand personality concept assists firms in brand positioning and differentiation (Orth & Malkewitz, 2008). Thus, creating a brand personality is a key marketing process (Stern, 2006). Perception of brand personality traits are formed and impacted by either direct or indirect association that the consumer has with the brand (Aaker, 1997). Personality traits are associated with a brand directly by the people associated with the brand, whereas personality traits are associated with a brand indirectly via product-related attributes (Singh, 2013). Prior research suggests that consumers depend on product-related intrinsic cues or physical composition of the product itself, including its sensory information, such as colour, texture and taste more strongly than extrinsic attributes as they have high predictive values at the

point of purchase or during the consumption (Sprott & Shimp, 2004; Sundar & Noseworthy, 2016; Szybillo & Jacoby, 1974; Zeithaml, 1988). However, most studies on brand personality define the construct (Aaker, 1997; Geuens et al., 2009; Grohmann, 2009) and examine its consequences on brand equity and various other brand-related constructs (Aaker et al., 2004; Freling & Forbes, 2005; Govers & Schoormans, 2005; Ramaseshan & Hsiu-Yuan, 2007). There is a lack of research on product-related antecedent factors contributing to the creation of brand personality. However, it is vital to identify how brand personality is created, since a successful brand personality is a key to building brand loyalty (Solomon, 2013). Aaker (1997) stresses that by isolating these distinct dimensions as opposed to treating brand personality as a unidimensional construct, the different types of brand personalities can be distinguished, consequently the multiple ways in which the brand personality construct influences consumer preference may be understood better. Therefore, this study considers all five dimensions and seeks to examine whether product-related haptic cues could forge consumer perceptions of brand personality impressions.

Second, despite the lack of sensory marketing research linking a products' intrinsic sensory cues to brand personality impressions, some interesting research findings on the sense of sight further encourage this research direction. Since holistic types of visual designs are related to generalizable consumer brand personality impressions, consumers infer significant differences in brand personality: sincere brands have more natural package design elements, while rugged brands have massive and contrasting package design elements (Orth & Malkewitz, 2008). Further, visual and haptic package design characteristics jointly affect consumers' brand personality impressions (Littel & Orth, 2013). In particular, congruent visual and haptic design elements lead to positive evaluations of competence and sophistication brand personality evaluations, whereas consumers evaluate brands as more exciting under low congruency conditions (Littel & Orth, 2013). Sundar and Noseworthy (2016) show that consumers intuitively relate sensory disconfirmation among visual and haptic cues to a brand's personality. These empirical findings encourage this research to examine unimodal haptic effects in eliciting brand personality impressions.

Third, a key sub-theme which emerged from the qualitative data (as discussed in chapter 3, section 3.5) is the metaphorical association of haptics and human personality perception. For instance, a male celebrity famous for his on-screen roles of virile masculinity was metaphorically linked to a rugged personality. Although the findings of this study did not show direct associations of haptics with brand personality, the big five human personality

traits laid the theoretical foundation for brand personality concept (Aaker, 1997). These empirical findings further support this conceptual reasoning.

This thesis bridges the identified knowledge gaps in brand personality and touch literature by investigating how product-based salience of haptic properties evoke consumer brand personality impressions. To the best of my knowledge, this is the first research to predict single-modal haptic effects on brand personality. In addition to brand personality impressions, this thesis also examines three more brand impressions: aesthetic appeal of a product, perceived quality, and willingness to buy. While, exploratory qualitative findings (presented in chapter 3 under theme 2: haptic perception) empirically support this research decision, few prior literature provides theoretical support. In brief, extending the line of research that shows that connection between sensory inputs, particularly visual components and aesthetic experience (Hagtvedt & Patrick, 2008; Hirschman, 1986), Krishna et al. (2010) show the effect of smell and touch on the aesthetic experience. Zeithaml (1988) links products intrinsic cues or the physical composition of the product with perceived quality and stresses that a top priority for marketers is finding which of the many intrinsic cues consumers use to signal quality.

4.4 Embodied Cognition

This thesis embraces the principles of embodied cognition. The notion of embodiment suggests that human cognitive processes are deeply rooted in the body's interactions or sensorimotor processing with the world around it (Wilson, 2002). "Because people experience the world through their senses, sensory information and the accompanying subjective experiences play a key role in human action and cognition" (Krishna & Schwarz, 2014, p. 160). As explained in the psychological literature, these "higher mental processes" are grounded in the sensory experiences or bodily interactions with the world (Krishna & Schwarz, 2014). This thesis begins with the premise that because consumers experience the world through their sense of touch, the accompanying sensory information plays a key role in their action and cognition.

However, there is a great diversity of the emerging viewpoint of embodied cognition (Wilson, 2002). This thesis adopts the cornerstone view that cognition takes place in the context of a real task relevant environment, such as shopping, and it inherently involves perception and action: "By definition, situated cognition involved interaction with the things

that the cognitive activity is about" (Wilson, 2002, p. 626). Situated cognition is cognition that takes place in the context of task-relevant inputs and outputs, thus represents our fundamental cognitive architecture. In this view, a person touching and interacting with a product yields to a situated cognitive activity. That is, while a cognitive process is being carried out, perpetual information through the haptic system continues to affect processing, and subsequently motor activity is executed that affects the environment in task-relevant ways (Wilson, 2002).

This thesis further uses a prominent viewpoint in the embodied cognition literature: the role of metaphorical constructs as a means of linking physical experiences and abstract concepts (Krishna, 2012; Krishna & Schwarz, 2014). For example, the metaphorical expression of social suspicion as 'something smells fishy' (Lee & Schwarz, 2012) or social status and power represent a vertical dimension (Von Hecker, Klauer, & Sankaran, 2013) or haptic sensory experience in the physical and social world could constitute feeling warm and safe in the presence of a caregiver (Krishna & Schwarz, 2014). These effects arise non-consciously, such that people are not aware of the increased mental accessibility of the concepts (Batra et al., 2016). Prior research discusses metaphorical expressions as a means of linking touch and haptic perception with the abstract concept of personality. Products can be regarded as entities that express personality and people metaphorically talk about them as if they possess human characteristics (Schifferstein & Hekkert, 2008). For example, "this feels strong and playful" or "it is obeying, but with dignity". Human personalities are often described by haptic characteristics: rough, strong, hard, soft, flexible, warm, rigid, and cold (Krishna, 2010). Similarly, product personalities can also be linked to haptics: a cold product expresses a cold personality and a flexible product has a flexible personality (Schifferstein & Hekkert, 2008).

Despite haptics being considered as a key driver that encourages touch, there is an absence of knowledge concerning haptic properties, such as smoothness or roughness and its implications of such embodied stimulations within consumer behaviour. Therefore, this thesis draws on social psychology literature to portray the powerful associations of haptic information caused by perceptual-motor simulations of touch and intangible abstract concepts to support the fundamental assumption that underpins this thesis.

Roughness, a fundamental haptic property of texture is metaphorically linked with general human states, such as difficulty and harshness: having a rough day or going through a rough

patch (Batra et al., 2016). People's affective reactions may also be impacted by haptics (Schifferstein & Hekkert, 2008). Ackerman, Nocera, and Bargh (2010) examine the material property of texture via roughness and smoothness and show how the physical interactions with haptics influence higher social cognitive processing in dimension-specific and metaphor-specific ways. Participants who completed the rough puzzle rated social interaction as more difficult and harsh, than those who completed the smooth puzzle. The study further reports that roughness appeared to promote compensatory bargaining behaviour in a situation perceived as uncoordinated (Ackerman et al., 2010). In a similar vein, Williams and Ackerman (2011) suggest that people are more vulnerable to outside persuasive influences when touching relatively soft products. Na and Kim (2001) reveal that fabrics with flat and warm touch resulted in a classic sensibility, whereas flat and cool represent a modern feeling. Delong, Wu, and Park (2012) show how silk and wool fabrics, which are often associated with social status and high price evoke entirely opposite touch experiences: a positive touch experience with silk fabrics and a negative touch experience with wool fabrics. Delong et al. (2012) suggest that soft and smooth tactile properties associated with silk make it a liked material, whereas rough, itchy and scratchy haptic properties associated with wool make it a disliked material.

Weight, often exemplified by heaviness and lightness, is associated with concepts of seriousness and importance. Thus, people tend to use general touch-related metaphors, such as weighty matters or gravity of the situation (Batra et al., 2016). Ackerman et al. (2010) show that participants evaluating a job candidate reviewing a resume on a heavy clipboard rated high on the candidate's suitability to the job role, job interest, conversely low on the candidate's social coordination. The weight that products or packaging possess, or rather perceived heaviness has clear associations with the quality and expense, for instance in the case of perfume and wine bottles (Lindström, 2005). Therefore, consumers often lift products while shopping to assess their weight as an indication of the product's quality or durability (Hultén et al., 2009). For instance, consumers usually perceive heavy objects as high quality, whereas light and plastic products are seen as low quality and cheap (Hultén et al., 2009).

Warmth is generally considered as the most powerful personality trait in social judgement (Williams & Bargh, 2008). Physical and social warmth is reflected by metaphorical languages, such as a warm person who is unlikely to be shown a cold shoulder (Krishna & Schwarz, 2014). The experience of physical warmth (or coldness) could increase feelings of interpersonal warmth (coldness) (Williams & Bargh, 2008). In particular, people who held a

warm cup of coffee judged a target person as having a warmer personality (warmer people) and people who held a hot therapeutic pad were more likely to choose a gift for a friend instead of for themselves (Williams & Bargh, 2008). Williams and Ackerman (2011) suggest that a small gesture, such as offering a warm cup of coffee conveys a sense of trust and sincerity, which could go a long way towards easing consumers into transactions. Williams and Ackerman (2011) report that people invested 43% more money after holding a therapeutic pad. The physical sensation of warmth led people to feel psychologically warmer and safer and more trusting (Williams & Ackerman, 2011). In a similar study, people in physical contact with cold objects preferred warm romantic movies (Hong & Sun, 2012).

Hardness is also associated with various abstract concepts. Metaphors of hardness relate to both positive concepts: stability or strength (he is my rock) or negative concepts: rigidity or strictness (hard-hearted) (Batra et al., 2016). Ackerman et al. (2010) show that participants who felt a hard block of wood, judged an employee as more rigid and stricter than participants who felt a soft piece of blanket.

In essence, the perspective of embodied cognition, and more specifically the role of metaphorical constructs as a means of linking physical experiences and abstract concepts support the key premise of this thesis. From this perspective, this thesis assumes that when consumers obtain product-based salience of haptic information such as a product's smooth textures or its light weight through their sense of touch, higher mental processes such as brand impressions formation are grounded in their bodily touch-based experience.

4.5 The Spreading-Activation Theory of Semantic Processing

The spreading-activation theory of human semantic processing, which is concerned with the structure of human memory and its processing (Collins & Loftus, 1975), sheds light on the predicted haptic effects on consumer brand impressions. This thesis uses the premise that the conceptual (semantic) network is organised along the lines of semantic similarity (Collins & Loftus, 1975). "The more properties two concepts have in common, the more links there are between the two nodes via these properties and the more closely related are the concepts" (Collins & Loftus, 1975, p. 411). The theory suggests that concepts can be represented as a node in a network, with properties of the concept represented as relational links from the node to other concept nodes. For example, if the original colour is 'red' and the concept 'vehicles' is primed, the activation that spreads to 'fire engine' highly interlink the two

concepts through their common property. In this view, semantic relatedness or similarity is based on an aggregate of the interconnections between two paths (Collins & Loftus, 1975, p. 412).

There are various paths between the two concepts that constitute positive or negative evidence or about the decision process for evaluating whether or not two concepts match semantically. This thesis uses two assumptions to explain the semantic matching process seen in categorisation tasks. First, there is a superordinate connection between memory nodes (X and Y). This suggests that if the memory search discovers a superordinate connection from X to Y, this can merely push the decision over the positive (or negative) criterion. For example, it is certain that a mallard is a bird, if there is a positive superordinate link among mallard and duck and between duck and bird.

Second, the property comparison or matching property postulates that if the memory search finds properties on which X and Y match (e.g., common properties), this is positive evidence proportional to the criticality of the property for Y (Collins & Loftus, 1975). Conversely, if the memory search discovers properties on which X and Y mismatch (e.g., distinguishing properties) this is negative evidence proportional to the criticality of the property for Y. A priming experiment shows how one concept was activated before the other by asking participants to name a fruit that is red. The results suggest that when a noun, such as a 'fruit' is given first, the activation spreads to nodes linked to fruit, such as apple or peach. These concepts are strongly interlinked, consequently the full activation is spread among a considerably small number of closely connected notions (Collins & Loftus, 1975).

The spreading-activation theory explains results of different experimental paradigms and predicts a range of memory phenomena, such as interference results in human memory, judgements of associative relatedness, impact of extensive practice on memory and effects of elaborative processing (Anderson, 1983). Thus, it is a fundamental psychological theory to predict consumer behaviour. Therefore, this thesis draws related literature from marketing to further justify the decision to adopt this theory to explain the association between two concept nodes: haptics and consumer brand impressions.

Keller (1993) adopts the spreading-activation theory of human semantic processing to support the conceptualisation of consumer-based brand equity modal. As explained by Keller (1993, p. 2), "A spreading activation process from node to node determines the extent of retrieval in memory". In this regard, a node becomes an activation for other nodes when

information is encoded externally or retrieved internally from long-term memory. Every node can be more or less activated and the strength of these interlinked associative memory nodes determines the extent of this spreading activation and the exact information that can be retrieved from memory. Product-related and non-product related attributes are key brand associations that drive elements of brand image, which is a fundamental measurement of consumer-based brand equality model (Keller, 1993). In this view, an automatic activation of human memory could be generated by both product-related attributes and non-product related attributes, particularly product packaging. Haptics are one such essential component that relates to a product's physical composition and also non-product related attributes. Therefore, when a consumer obtains haptic information through their sense of touch, memory nodes or possible activation sources corresponding to this exact haptic experience are activated. From the activated nodes, activation spreads throughout the semantic network, which is organised along the lines of semantic similarity. Based on this notion that human memory is organised as to a semantic similarity, this thesis predicts that human memory makes connections among the similar properties of haptics and brand impressions, and consequently closely relate these two nodes. For example, smoothness may imply with sincere brands, whereas roughness might imply with ruggedness.

This assumption is further supported by Krishna et al. (2010, p. 413) who stress that "tactile properties lead to semantic associations: firm haptics imply strong and soft haptics imply weak, rough haptics suggest masculinity and smooth haptics suggest femininity". This thesis further draws on Solomon's (2013) explanation on how the human brain encodes information, in particular how consumers retain incoming data when they associate them with other things already in memory. "As one node is activated, other nodes associated with it also begin to be triggered. Meaning consequently spreads across the network, bringing up concepts including competing brands and relevant attributes that are used to form attitudes towards the brand" (Solomon, 2013, p. 91). Spreading activation allows consumers to shift back and forth between levels of meaning and determine how and when the meaning is activated (Solomon, 2013). For example, the memory trace for a product could be stored via evaluative reactions: positive or negative emotions stored in the memory, such as that looks cool or it had a smooth but heavy touch (Solomon, 2013). For example, the memory nodes connect the distinctive smoothness of Dove products to its sincere brand personality or aesthetic appeal. Further, the process of automatic stimulus recognition can also be explained as one of spreading activation (Grunert, 1996). Thus, when an activation results from external

stimulation, such as when a sound is heard, the memory node corresponding to that concept becomes activated. The process of spreading activation is automatic, that is unconscious, parallel and not subject to capacity limitations. Hence, it is involved in the perception of advertising and brand evaluation (Grunert, 1996).

In summary, based on the above explained theoretical perspectives of embodied cognition (section 4.3) and the spreading-activation theory of semantic processing (section 4.4), this thesis predicts that product-based salience of haptic information is associated with consumer impressions of brands. In particular, this thesis examines the haptic associations and consumer brand impressions in the context of two primarily material properties: texture (smooth-rough) and weight (light weight-heavy weight). Accordingly, the first research question is: **To what extent are the haptic properties of texture and weight associated with consumer brand impressions?** This leads to the two baseline hypotheses of this thesis:

H1: Texture is associated with consumer brand impressions.

H2: Weight is associated with consumer brand impressions.

4.6 Individual Factors: Person Based Salience of Haptic Information

The effects of touch are stronger for some people than for others (Peck & Wiggins, 2006). As introduced in chapter 2 under section 2.3.2, the person-based salience of haptic information, commonly referred to as the individual differences in the need for touch (NFT), is a major determinant of a consumer's motivation and evaluation of products through touch (Peck & Childers, 2003b). NFT is primarily motivational in nature and is multidimensional in structure (Batra et al., 2016). Therefore, it is imperative that this thesis examines the influence of individual differences in the need for touch on the predicted haptic effects on consumer brand impressions.

The construct of individual difference refers to how people vary with respect to different factors, such as personality, motives, abilities and also refers to different aspects of mental activities, such as need to evaluate (Kruglanski & Higgins, 2013). Similarly, the need for and the effect of touch differ from person to person. This internal motivation to engage in haptic experience is captured by one individual difference measure: the need for touch (NFT). Peck and Childers (2003a, p. 431), define NFT as "a preference for the extraction and utilization of information obtained through the haptic system". The underlying theoretical explanation for

the mental-processing differences among high and low NFT individuals is based on the psychological construct of chronic accessibility.

4.6.1 Chronic Accessibility

Chronic accessibility refers to an activation readiness of stored information and reflects long-term processing influences on activation (Kruglanski & Higgins, 2013). Social psychology literature identifies the association between the individual differences in the chronic accessibility of certain constructs and the way people respond to various stimuli (Kruglanski & Higgins, 2013). In the context of touch, this suggests that higher NFT individuals have higher chronic accessibility to access haptic information more efficiently. They can more readily retrieve this information from memory, store it, and form richer mental product representations, while using less of their cognitive-processing capacity, consequently forming more confident judgements than less haptically motivated individuals (Peck & Childers, 2003a). This also suggests that people who inherently like to touch and feel objects more, eventually gain expert knowledge about them (Peck & Childers, 2003a). NFT consists of two dimensions: instrumental and autotelic (Peck & Childers, 2003b).

4.6.2 The Instrumental Dimension

The instrumental dimension of NFT relates to various aspects of pre-purchase touch behaviour, primarily with a salient purchase intention (Peck & Childers, 2003a). This view is consistent with the traditional understanding of consumption which serves as a means of pursuing an aim known as the "instrumental" consumer behaviour (Havlena & Holbrook, 1986). The instrumental NFT is associated with the goal-directed product evaluation of a product's performance or its purchase that lacks the sensory enjoyment. The instrumental dimension is concerned with how consumers solve problems with touch, from gathering information to manipulating products (Batra et al., 2016). The NFT scale contains six questions to measure the instrumental dimension of NFT, for example "I place more trust in products that can be touched before purchase" (Peck & Childers, 2003a, p. 432).

4.6.3 The Autotelic Dimension

The autotelic dimension of NFT involves a hedonic-oriented response seeking fun, amusement, fantasy, arousal, sensory stimulation and enjoyment (Peck & Childers, 2003a). The autotelic nature of touch relates to the sensory aspects of touching a product, wherein the purchase intention of that product is not necessarily noticeable, however relates to the

spontaneous exploration of multisensory psychophysical product relationships (Holbrook & Hirschman, 1982; Peck & Childers, 2003a). The NFT scale contains six questions to measure the autotelic dimension of NFT, for example "when walking through stores, I can't help touching all kinds of products" (Peck & Childers, 2003a, p. 432).

Haptic information is more chronically accessible for high NFT individuals; however this differs across instrumental and autotelic nature of touch (Peck & Childers, 2003a). In the absence of a purchase goal, high autotelic NFT individuals show faster access to haptic information than instrumental NFT individuals. Individuals higher in autotelic touch purchase more impulsively than individuals higher in instrumental touch (Peck & Childers, 2006). Conversely, high instrumental NFT consumers are more adept at gathering information about the product through touch, especially information which is not accessible through other sensory means, for instance, reading a product description or touching a sweater to check if the fabric is thick and warm enough to wear in winter (Peck & Childers, 2003a). Therefore, an instrumental NFT consumer is fundamentally a problem solver who deliberately is involved in the goal-oriented activities of utilising haptic information that reflects a product's texture, weight, hardness or temperature and arriving at a final judgement about the product (Peck & Childers, 2003a).

From a memory theorist's perspective, the distinction between these two motives of touch is similar to the distinction between two types of memories: the conscious goal-setting nature of instrumental NFT analogous to episodic recall, whereas the automatically influence hedonic nature of autotelic NFT without a conscious effort analogous to semantic memory (McClelland, Koestner, & Weinberger, 1989). The affective nature of autotelic NFT suggests that they are more likely to have stronger affective reactions to touch than instrumental NFT consumers. For example, it influences a customer's decision making even though the touch adds no product- related information to the decision (Peck & Wiggins, 2006). They are the type of consumers who shop for sensory experience (Holbrook & Hirschman, 1982) and engage in touch because it is pleasurable and enjoyable (Peck & Wiggins, 2006). Therefore, an autotelic NFT consumer is fundamentally a hedonic-oriented shopper, who possesses a compulsive or an irresistible need to engage in exploratory variety seeking through their sense of touch (Peck & Childers, 2003a). The theoretical perspective of hedonic consumption: "the facets of consumer behaviour that relate to the multisensory, fantasy and emotive aspects of product usage experience" (Hirschman & Holbrook, 1982, p. 92) further justifies the affective nature of the autotelic dimension of touch. The choices among hedonic

experience centre on subjective benefits that tend to carry emotional overtones (Havlena & Holbrook, 1986, p. 394). The construct of emotive response is explained as both psychological and physiological in nature that generates altered states in both mind and body (Hirschman & Holbrook, 1982).

Prior studies show that high autotelic NFT consumers are more strongly influenced by touch and haptic inputs than low autotelic NFT consumers. For instance, a persuasive haptic element incorporated into a marketing communication results in a greater persuasion for high autotelic NFT consumers than their low autotelic NFT counterparts (Peck & Wiggins, 2006). Consequently, when a haptic element is present they are likely to be persuaded regardless of their involvement with the message (Peck & Johnson, 2011). However, Krishna and Morrin (2008) argue that more haptically-oriented individuals will not always be more influenced by haptic inputs compared to less haptically-oriented individuals. Due to high autotelic NFT individual's lower need of processing capacity for haptic information and their ability to assess diagnosticity of haptic inputs, they tend to disregard the haptic input that is non-diagnostic to the task. In contrast, low autotelic NFT individuals, who are less practiced in processing haptic information expend greater resources to retrieve haptic information from memory, thus have less cognitive capacity available to focus on other information. Consequently, they will not recognise as easily when haptic information is diagnostic. As such, these low autotelic individuals will be more influenced by non-diagnostic haptic information. Krishna and Morrin (2008) show that the effect of a firmness of a cup, a non-diagnostic haptic cue, has a greater effect on low autotelic individuals than high autotelic NFT individuals' quality perceptions of water being served. The proposed research is further motivated by these inconsistencies of the prevailing knowledge on the sensory feedback gained through touch and the individual responses to it.

Based on the above theoretical and empirical grounds in regard to individual differences in the need for touch, this thesis expects that the haptic orientation of individuals has a moderating influence on the capacity of haptic stimuli to capture an individual's attention, thus evoking stronger brand impressions on a hedonic-oriented consumer's memory. This thesis assumes that hedonic-oriented autotelic NFT consumers will be more strongly influenced than goal-oriented instrumental NFT consumers, who lack the sensory pleasure and enjoyment. Consequently, this thesis expects that high autotelic NFT consumers will have stronger effects than low autotelic NFT consumers. This thesis examines the role

individual differences in the need for touch plays on the predicted haptic effects on consumer brand impressions.

The second research question is: **To what extent do individual differences in the need for touch influence consumer brand impressions evoked by haptics?** This leads to the next set of hypotheses:

H3: The effect of haptics on consumer brand impressions is moderated by an individual's NFT.
H3a: The effect of haptics on consumer brand impressions is stronger for autotelic NFT consumers but weaker for instrumental NFT consumers.
H3b: The effect of haptics on consumer brand impressions is stronger for higher autotelic NFT consumers but weaker for low autotelic NFT consumers.

4.7 The Multidimensionality of Haptics

To my knowledge, this is the first research to conceptualise and empirically investigate the novel haptic concept: the multidimensionality of haptics. This thesis defines *"haptic perception as an integration of several haptic inputs rather than a single haptic sensory modality".* While the current understanding of the embodiment effects with respect to touch are specific to haptic information corresponding to a single material property, this thesis stresses the importance of generating new knowledge by embracing the integrative nature of haptic information corresponding to all four material properties. Thus, the research examines how consumers' physical experience with multiple haptic dimensions corresponding to texture and weight affect their impressions and decisions.

The notion of the multidimensionality of haptics is a key theme which emerged in the previous qualitative exploratory study three. As presented in chapter 3, under theme 5, the interview data shows that people could possibly acquire, store and retrieve multiple amounts of haptic information at once. For example, Respondent 11 stated, "I think sometimes, yes. If it's soft, you feel like its light". Respondent 1 perceived a soft texture and expected it to be warm at the same time. Respondent 3 suggested that hard and firm haptics are more closely linked, so do soft and flimsy haptics. Respondent 11 recalled a soft product being a light weight one. It is imperative for this research to empirically investigate how multiple effects

of haptics shape consumer touch behaviour: for example, how a product with a rough texture and light weight affect consumer brand impressions.

Heller and Schiff 's (1991) discussion on the theoretical issues pertaining to haptic processing questions "whether we process tactile input in serial form or in parallel?" They suggest that this issue indicates the possibility of attending to more than one haptic property at a time. Therefore, a person's haptic perception of a stimuli or product could be stimulated by multiple haptic properties simultaneously. For instance, "we can feel the cold impersonal hardness of steel" (Heller & Schiff, 1991, p. 3), or the smooth texture and the light weight of a mobile phone or the roughness and firmness of a wooden jewel box. Another consideration is that everyday products vary in their degree of haptically salient material properties. For example, the degree of texture: softness or roughness, the degree of weight, the degree of hardness: firmness or flimsiness and the degree of surface temperature of two laptop computers varies. As a result, in their daily lives consumers experience a range of product discrimination.

The rationale behind this new haptic notion is further supported by drawing insights from original haptic literature roots in perception and psychophysics, in which touch is referred to an active multidimensional sense derived from the integration of different sensory inputs rather than a single sensory modality (Klatzky & Lederman, 2003). Touch appears to encompass three distinct sensory systems: cutaneous, kinaesthetic, and haptic (Klatzky & Lederman, 2003). The cutaneous sense receives inputs from the outer surface of the body by means of receptors within the skin and the associated nervous system that respond to mechanical stimulation. Kinaesthetic sensory system receives sensory inputs from mechanoreceptors located within the body's muscles, tendons and joints. The haptic system uses combined inputs from both the cutaneous and kinaesthetic systems (Loomis & Lederman, 1986). Therefore, most of our everyday haptic perception and tactually controlled performance falls into this category. Lederman and Klatzky (1987) show that the haptic system extracts information about objects through a series of hand movements they refer to as a "stereotypical exploratory procedure (EP's)". Accordingly, texture of an object is assessed by the lateral motion or the sideway movements between skin and object surface. Weight is assessed by lifting the object above the supporting surface. Hardness is assessed by applying some force to one part of the object, while the other part is stabilised. Temperature is assessed by the static contact produced by laying the object in the hand. On this basis, this thesis argues that more than one of these hand movements, possibly all four simultaneously are

involved in the process of consumers touching products. Consequently one could acquire and utilise multiple haptic information.

Nevertheless, haptic perception as a multidimensional process has not been studied within sensory marketing literature yet. Prior research has studied haptic perception treating the four material properties as four separate entities. For example, Krishna and Morrin (2008), use hardness to show the perceptual transfer of haptic information from product containers to the judgement of the product. Peck and Childers (2003b), examine the influence of haptic information on product judgement, considering weight and softness as two separate entities. Klatzky and Peck (2012), use surface texture to examine the influence of object properties on touch-ability.

Based on the multisensory nature of haptic perception, this thesis seeks to examine the impact of haptic properties corresponding to texture and weight in combination. Exploratory studies one and three suggest that smooth-rough to corresponding texture and light weight-heavy weight corresponding weight as primary haptic properties of most of our consumer goods. Therefore, this thesis proposes four multidimensional haptic conditions: smooth x light weight, smooth x heavy weight, rough x light weight and rough x heavy weight.

4.8 Haptic Cue Congruity

The multidimensionality of haptics further leads this thesis to conceptualise a novel haptic concept: haptic cue congruity. This thesis defines haptic cue congruity as *"the degree of fit among haptic cues"*. As discussed in chapter 3 under theme 6, haptic cues may correspond with each other in multifaceted ways. For instance, haptic properties of smooth and light weight have a natural fit. Similarly, hard and firm or soft and flimsy have a natural tendency to correspond with each other. On the contrary, smooth and heavy weight or rough and light weight have a natural mismatch. In this perspective, this thesis posits an association between cross-modal haptic cues and consumer brand impressions.

This thesis draws on schema congruity theory to support the notion of haptic cue congruity. From a psychological perspective, "Schemas are representations of experience that guide action, perception, and thought" (Mandler, 1982, p. 3). Schemas, which are available at different levels of generality and abstraction occur as a result of our interactions with the environment. Such activation arises out the concatenation certain variables of a schema, such as a certain size or a range of colours (Mandler, 1982). Thus, this thesis argues that when a

consumer physically interacts with a product via their sense of touch, representative activation arising out of product-based haptic schemas, which could be either congruent or incongruent guide their action and perception.

Prior consumer behavioural researchers use the concept of scheme congruity to explain information processing and the consequent consumers' product evaluative judgements (Mandler, 1982; Meyers-Levy & Tybout, 1989). Congruity is represented by a match between the attributes of an object/product and a relevant schema (Meyers-Levy & Tybout, 1989). "Perceived congruity resulting from a match between the feature of an item and those of a schema provides a sense of satisfaction that may carry over the evaluation of the stimulus" (Aggarwal & McGill, 2007, p. 469). Therefore, schema congruity leads to a favourable response because consumers desire products that conform to their expectations and allow predictability (Meyers-Levy & Tybout, 1989). In general, congruence among two stimuli improves information processing, thus facilitate decision making (Mitchell, Kahn, & Knasko, 1995). For example, schema-congruity processing influences consumer's evaluations of anthropomorphised products (Aggarwal & McGill, 2007).

In contrast, incongruity involves some form of mismatch (Meyers-Levy & Tybout, 1989). Heckler and Childers (1992) posit two-dimensions of incongruence: relevancy and expectancy. Relevancy refers to the degree to which a piece of information contributes to the identification of the primary message being communicated, whereas expectancy is defined as the degree to which an item or piece of information falls into some predetermined pattern or structure evoked by the theme (Heckler & Childers, 1992; Lee & Mason, 1999). Some scholars suggest that individuals engage in a more elaborative processing when the information presented is somehow incongruent with prior expectations (Heckler & Childers, 1992) and perceived incongruity may lead to a sense of frustration (Aggarwal & McGill, 2007). However, Mandler (1982) suggests that incongruity rises to arousal and evaluative states that may be either positive or negative. In particular, affects generated by responding to moderate incongruity are more favourable than that typically generated by responding to either congruity or extreme incongruity. More specifically, encountering a stimulus that confirms expectations (congruity) is not arousing, rather it promotes a mild positive response due to familiarity (Peracchio & Tybout, 1996). On the contrary, unexpected incongruity evokes arousal and cognitive elaboration directed toward making sense of the incongruity (Peracchio & Tybout, 1996). In keeping with this view, Meyers-Levy and Tybout (1989) show that moderate schema incongruity enhances evaluations more than either schema

congruity or extreme incongruity. Similarly, Peracchio and Tybout (1996) suggest that a new product is evaluated more positively when its attributes are moderately incongruent with an activated product category schema than when its attributes are either congruent or extremely incongruent with the schema when consumers have limited knowledge about the product category.

Cue congruence is important when understanding the cross-modal interactions among senses (Krishna et al., 2010). From a sensory marketing perspective, sensory congruence is "the degree of fit among characteristics of a stimulus (Krishna et al., 2010, p. 412). Prior research suggests that congruence between senses has important impact on marketing (Krishna et al., 2010, p. 417). For example, semantic congruence between visuals and haptics improves the evaluation of brands (Littel & Orth, 2013); congruence of smell and sound drives in-store evaluations and impulsive buying (Mattila & Wirtz, 2001); congruence between ambient scent and music influences consumer evaluations of its retail environment and offered merchandise (Spangenberg, Grohmann, & Sprott, 2005); modality representation via audio-visual programming influences brand memory and attitude change (Russell, 2002); sensory modality between touch and vision affects the extent and the direction of the elongation bias (Krishna, 2006); multisensory semantic congruence between smell and touch drives positive product evaluation (Krishna et al., 2010). However, incongruence among sensory modalities is an overlooked phenomenon within the extant sensory marketing literature. Few recent research report important findings. For example, the effect of brand personality on sensory disconfirmation (Sundar & Noseworthy, 2016) and the role of sensory dissimilarity when sequentially sampling products (Biswas, Labrecque, Lehmann, & Markos , 2014). However, no prior research predicts possible haptic cue congruity effects among touch sense itself.

To my knowledge, this thesis is the first to conceptualise the notions of haptic cue congruity and empirically examine their influence on consumer brand impressions. The findings from the exploratory study three laid the foundation for this research direction. For example, smooth and light weight is recognised as a haptic cue congruence condition, whereas smooth and heavy weight is considered as a haptic cue incongruence condition. Peracchio and Tybout (1996) further support this argument by using dessert (cake) as the stimuli to examine the schema-congruity effect. Some representative verbal comments from subjects in congruity condition are: *"I think it will be a very soft cake. I would suspect that it will be light, not heavy". "Very sweet and light in terms of texture".* Moreover, Etzi, Spence, Zampini, and Gallace's (2016) exploration of the association between words, emotional states and tactile

attributes further strengthens this research direction. They report a match between smooth textures with words, such as ‘bright’, ‘light’, ‘quiet’ and ‘lightweight’ and adjectives ‘feminine’ and ‘beautiful’. In contrast, rough textures were associated with the words ‘dim’, ‘dark’, ‘loud’ and ‘heavy’ and were associated with the opposite adjectives ‘masculine’ and ‘ugly” (Etzi et al., 2016). These empirical studies further guide this thesis to posit that the properties smooth and light weight constitute a haptic cue congruence condition, whereas the opposite smooth and heavy weight is a haptic cue incongruence condition. This thesis expects haptic cue congruence effects of: smooth and light weight and similarly on rough and heavy weight. Conversely, haptic cue incongruence effects expected are: smooth and heavy weight and rough and light weight.

As discussed earlier in section 4.5, hedonic-oriented autotelic NFT consumers who seek fun, amusement, fantasy, arousal, sensory stimulation and enjoyment out of touching (Holbrook & Hirschman, 1982) are more likely to have stronger affective reactions to touch, which consequently affect their haptic information processing than the goal-oriented instrumental NFT consumers, who are not motivated by sensory pleasure or enjoyment of touch. Therefore, this thesis argues that hedonic-oriented autotelic NFT consumers are more likely to be influenced by a product’s haptic cue congruity than instrumental-oriented NFT consumers. In particular, more hedonic-oriented autotelic NFT consumers will be aroused and stimulated by the unexpected haptic cue incongruity, while less hedonic-oriented autotelic NFT consumers are stimulated by the expected familiarity of haptic cue congruity. Accordingly, the third research question asks: **What is the nature of the relationship between haptic cue congruity and an individual’s autotelic need for touch on consumer brand impressions?**

This leads to the following hypothesis:

H4: The effect of haptic cue congruity on consumer brand impressions is moderated by an individual’s hedonic motivation to touch.

4.9 The Mediational Role of Brand Personality

As discussed earlier in section 4.2, brand personality is a multidimensional and multifaceted phenomenon (Aaker, 1997). Brand personality drives a consumer's perception of a brand's attributions and functional characteristics, and thus offers significant managerial implications (Aaker, 1997). Prior research reveals various consequences of brand personality: perceived quality (Beldona & Wysong, 2007; Ramaseshan & Hsiu-Yuan, 2007); product attachment (Govers & Mugge, 2004); brand attitudes (Freling & Forbes, 2005; Grønhaug, 2003; Helgeson & Supphellen, 2004); loyalty (Louis & Lombart, 2010); trust and emotional attachment (Louis & Lombart, 2010; Siguaw, Mattila, & Austin, 1999); consumer-brand relationships (Aaker et al., 2004) and loyalty (Siguaw et al., 1999).

As well, brand personality is a strong predictor of purchase intention (Boudreaux & Palmer, 2007; Freling & Forbes, 2005; Grohmann, 2009). From a sensory marketing perspective, Sundar and Noseworthy (2016) show purchase intention as a function of brand personality elicited by the sensory confirmation between touch and vision. Therefore, it seems reasonable to expect that haptic-evoked brand personality impressions could also drive consumers' willingness to buy.

This thesis first studies antecedents of brand personality, assuming that product-based salience of haptic information evoked consumer impressions of brand personality. To further shed light on the underlying mechanisms, the research next examines the mediational role of brand personality on the interactive effect of haptics and an individual's autotelic NFT on willingness to buy. Drawing upon past work that show autotelic NFT consumers are more likely to have stronger affective reactions to touch than instrumental NFT consumers (Peck & Wiggins, 2006), this study assumes that autotelic NFT consumers are more likely to be influenced by haptic effects on brand personality, consequently impact their willingness to buy the product. Accordingly, the fourth research question asks: **To what extent does brand personality influence the interactive effect of haptics and an individual's autotelic need for touch on willingness to buy?**

This leads to the following hypothesis:

H5: The interactive effect of haptics and an individual's autotelic NFT on willingness to buy will be mediated by brand personality.

4.10 Chapter Conclusion

The chapter presented the conceptualisation and hypothesis development of this thesis, beginning with outlining the predicted association between the two key constructs of this thesis: haptics and brand personality impressions. It next discussed the theoretical perspectives of embodied cognition that guided this research to study human touch sensation and perception as a key driver of human action and cognition. Following this, the spreading-activation theory of human semantic processing was used to explain how haptics could evoke consumer brand impressions. Particularly, how human memory could make semantic connections among the similar properties of haptics and brand impressions, thus closely relating these two nodes. The chapter then discussed the moderating influence of person-based individual differences in the need for touch on this relationship. Subsequently, the chapter presented the conceptualisation of two novel haptic concepts: the multidimensionality of haptics and haptic cue congruity. It then discussed the meditating influence of brand personality on haptics and individual's autotelic NFT on willingness to buy. The next chapter describes the experimental research design used to test the hypothesised haptic effects.

Chapter 5: Experimental Research Design

5.1 Overview of the Chapter

The previous chapter provided the theoretical and conceptual foundation of this thesis. This chapter provides a justification for the experimental research approach adopted to test the hypothesised haptic effects. To begin with, the chapter explains the philosophical assumptions that underpin this research. Following this, the sampling strategy, an overview of the factorial designs, data collection procedures, measurement instruments used and statistical data analysis techniques employed in this thesis are discussed. The chapter next describes the measures taken to ensure internal and external validity of this research, as well as the way in which this thesis addressed ethical issues.

5.2 Positivist Perspective of the Research

This thesis is underpinned by the ontological assumption that the nature of reality is real, external and independent. This research has an epistemological thinking which concerns what constitutes acceptable knowledge in the field of consumer touch behaviour. The research falls under the philosophical stance of positivism, wherein the researcher obtains credible data only through observable phenomena, thereby focus on causality and law like generalisations, reducing phenomena to their simplest elements (Saunders et al., 2009). This is a value-free research; thus the researcher is detached, neutral, and independent of what is researched, and the research maintains an objective stance. The research bears a positivist research philosophy in which causes (haptic information attained by the sense of touch) determine effects or outcomes (consumer brand impressions). Therefore, it seeks to recognise cause and effect relationships among touch and consumer brand impressions by using deductive reasoning, and thereby the development of hypotheses which can be tested by means of a fixed, predetermined research design, and objective measures (Saunders et al., 2009). In this view, key conceptual ideas are reduced into a discrete set of variables that embrace these hypotheses. Consequently, this research involves the development of five hypotheses and adopts an experimental research strategy, which is usually associated with deductive research to systematically test these hypotheses. The time horizon of this research is cross-sectional,

which involves observations and data collection of the phenomenon at one point in time. This allowed the researcher to accommodate many different variables at the same time.

5.3 Justification of the Experimental Research Approach

This thesis seeks to establish causal relationships between haptics and consumer brand impressions by systematically testing the hypotheses developed in the previous chapter. Experiments are the most suitable scientific method for studying causal relationships (Shadish et al., 2002). Experiments are the only research design in which causal inferences can be made with a high degree of certainty (Sawyer, Worthing, & Sendak, 1979).

All three experimental studies in this research illuminate causal inference, recognised in the literature as the key strength of experimentation. At the same time, the research aspires to attain a more generalised causal goal by adopting a randomised experimental strategy. This ensured that the research outcomes are due to the treatment, not to the differences between the subjects. Experiments explore the effect of entities that can be manipulated. Haptics are the manipulable causes in this research. However, this research aims to examine the effects of multiple manipulation causes on dependent measures. Thus, the association of haptics and consumer brand impressions has been examined through three factorial designs; a rather complex experimental design technique.

5.4 Sampling Strategy

The population of interest in this thesis is everyday consumers. The research design involved utilising a convenience sample of students as surrogates of the population. This research has a primary focus to establish a causality between haptics and consumer brand impressions. Therefore, in order to avoid any potential confounding effects from demographic variables, the research used a homogenous student sample. Further, prior marketing and consumer behaviour research are frequently based on convenience samples of college students. They justify the choice of students, emphasising that students exhibited a high degree of similarity on demographic and psychographic dimensions, and thus could be compared with minimal extraneous basis (Peterson & Merunka, 2014). In particular, the vast majority of prior sensory marketing research published in top journals (Peck & Childers, 2003a, 2003b; Peck & Johnson, 2011; Peck & Shu, 2009; Peck & Wiggins, 2006; Shu & Peck, 2011; Webb & Peck, 2015; Krishna, 2006; Krishna et al., 2010; Krishna & Morrin, 2008; Citrin et al., 2003; Peck et al., 2013) have used convenience student samples. Therefore, no screening process was

necessary to determine the eligibility for participation in the research. The majority of participants were recruited face-to-face at a large public university in Brisbane, Australia, while some were recruited via emails. Following Hair's (2010) rule of thumb for determining sample size for simple experimental research with strict experimental control, this research took 40-50 participants per cell. The unit of analysis is individuals.

5.5 Experimental Designs

This research designed three experiments to study the impact of haptics in evoking consumer brand impressions and the role individual differences in the need for touch plays in this relationship. The research explored these associations in the context of two material properties: texture and weight. Experiment one was designed to examine texture effects by considering smooth and rough haptic conditions. Experiment two was designed to examine weight effects by considering light weight and heavy weight haptic conditions. The final experiment was designed to examine texture and weight effects in combination, by considering smooth, rough and light weight and heavy weight haptic conditions. Table 5.1 illustrates the three experimental studies. All three experiments comprised a pre-test to check for any errors in the experimental design, improper control of extraneous condition, confirm experimental manipulations and the assumptions prior to conducting the main experimental study. A questionnaire consisting of six questions was used to check the experimental manipulations (see Appendix E). None of the respondents in the pre-tests were involved in any of the main experimental studies.

Table 5.1

Summary of the Three Experimental Studies

Experiment	Design	Hypotheses
Experiment One	2 (Texture: smooth, rough) x 2 (Need for touch: high NFT, low NFT) design Haptic stimulus 1: smooth Haptic stimulus 2: rough	H1, H3, H5
Experiment Two	2 (Weight: light weight, heavy weight) x 2 (Need for touch: high NFT, low NFT) design Haptic stimulus 1: light weight Haptic stimulus 2: heavy weight	H2, H3, H5
Experiment Three	2 (Texture: smooth, rough) x 2 (Weight: light weight, heavy weight) x 2 (Need for touch: high NFT, low NFT) design Haptic stimulus 1: smooth x light weight Haptic stimulus 2: smooth x heavy weight Haptic stimulus 3: rough x light weight Haptic stimulus 4: rough x heavy weight	H1-H5

5.5.1 Experimental Study One

Experimental study one was a 2 (Texture: smooth, rough) x 2 (Need for touch: high NFT, low NFT) design. Texture was manipulated between subjects and need for touch was measured using the NFT scale (Peck & Childers, 2003a). The two haptic stimuli were: smooth vs. rough.

5.5.1.1 Stimuli Creation

The manipulation of this study were properties of texture. Therefore, this study used paper-based materials to manipulate smooth and rough texture conditions. The paper-based stimuli were previously used by Krishna et al. (2010) in their sensory marketing study. A smooth coated paper and a medium coarse sand paper were used to create two identical photo frames. They were in the same size, shape, thickness, weight and had no surface emblements or marking or any sort. Figure 5.1 displays the two haptic stimuli used in experimental study one.

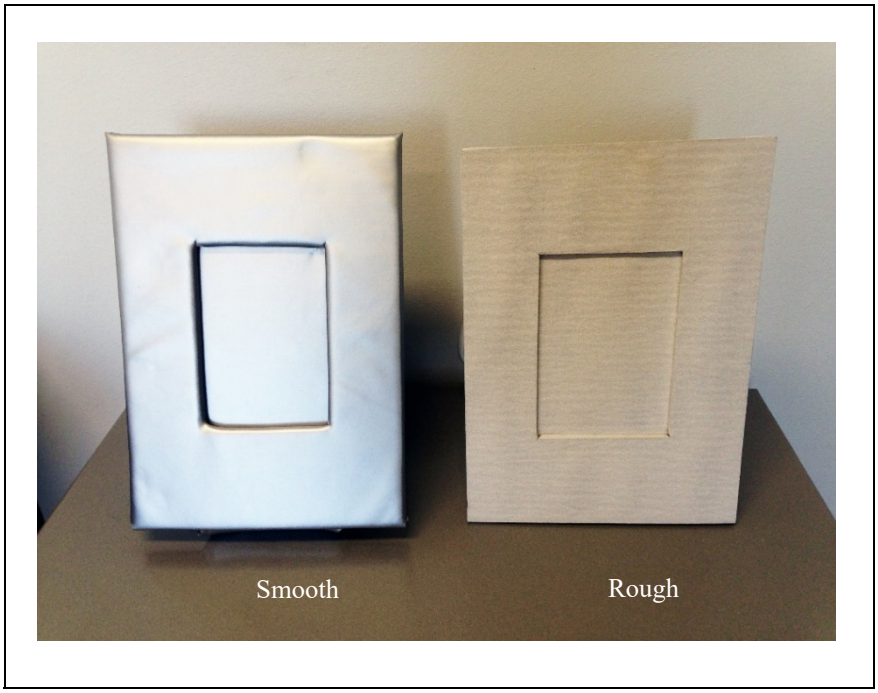

Figure 5.1: Haptic Stimuli Used in Experimental Study One

5.5.1.2 Procedure

Participants took part in the experiment held in an experimental lab one at a time. The experimenter was seated behind the table and participants were invited to sit in front of the chair provided. Subsequently, the experimenter briefly explained the purpose of the research. Following, Krishna and Morrin (2008) the experiment focused on the effect of touch alone, without any visual input, to obtain a measure of brand impressions from the pure haptic sensation for both high versus low need for touch consumers. Adopting the method used by Dagman, Karlsson, and Wikström (2010), possible visual interferences were avoided by having the stimuli kept behind a screen. Once the participant was seated and prepared, the experimenter asked the participant, "please insert your hands through this barrier, hold and examine the product as long as you want and get a good feel/grasp of it." On average participants spent no longer than 60 seconds for the product touch task. Immediately after this, participants were asked to fill in the anonymous survey using the tablet /laptop provided. The survey was hosted by Qualtrics, a web-based survey tool that enables researchers to collect data on respondents. On average participants took approximately 10-15 minutes to complete the survey. Finally, they were thanked and offered a $4.50 coffee voucher for participating in the study. Each session followed the same procedure. Figure 5.2 illustrates

the two steps involved in the experimental procedure. All three experimental studies had the same procedure.

Step 1: Participants evaluating the product via their sense of touch

Step 2: Recoding the responses immediately after the product touch task on a survey

Figure 5.2: Experimental Procedure

5.5.2 Experimental Study Two

Experimental study two was a 2 (Weight: light weight, heavy weight) x 2 (Need for touch: high NFT, low NFT) design. Weight was manipulated between subjects and need for touch was measured using the NFT scale (Peck & Childers, 2003a). The two haptic stimuli were: light weight vs. heavy weight.

5.5.2.1 Stimuli Creation

The manipulation of this study were properties of weight. Therefore, this study used two universal portable remote controllers. They were identical in size, shape, thickness, colour, and had no surface emblements or marking of any sort. To create the light weight stimulus, some internal parts were removed. To create the heavy weight stimulus, some coins were inserted inside the product. All coins were glued together to avoid any confounding sound effects. Figure 5.3 displays the two haptic stimuli used in experimental study two.

Figure 5.3: Haptic Stimuli Used in Experimental Study Two

5.5.3 Experimental Study Three

Experimental study three was a 2 (Texture: smooth, rough) x 2 (Weight: light weight, heavy weight) x 2 (Need for touch: high NFT, low NFT) design. Texture and weight were manipulated between subjects and need for touch factor was measured using the NFT scale (Peck & Childers, 2003a). The four haptic stimuli were: smooth x light weight, smooth x heavy weight, rough x light weight and rough x heavy weight.

5.5.3.2 Stimuli Creation

This experiment required manipulation of properties of both texture and weight. Exploratory study two suggested that clothing was an important product category in which touch plays a key role in consumer purchase decision. However, it was challenging to practically use clothing in a lab based experimental setting which used a visual barrier during the experimental procedure. Moreover, manipulation of their weight to a noticeable degree was problematic. Therefore, this study used textile-based materials to manipulate texture properties. In particular, this study used an extremely smooth fabric (ultra-soft fleece) and an extremely rough fabric (hemp) to infuse pouches for four identical water bottles. The bottle water category was previously used as an experimental stimulus by Littel and Orth (2013) in their sensory marketing study and Freling and Forbes (2005) in their brand personality study.

These pouches were all the same size, shape and had no surface emblements or marking of any sort. To infuse the bottles with each texture conditions, we had a professional seamstress sew four custom pouches, two using the smooth textural fabric and the other two using a rough textural fabric. Similar techniques were used in earlier studies (Jansson-Boyd & Marlow, 2007; Krishna et al., 2010). To create heavy weight conditions, bottles were completely filled with fine sand and water. No sound was created by sand on water when sand/water was filled. Conversely, in the light weight condition the bottles were kept empty. Figure 5.4 displays the four haptic stimuli used in experimental study three.

Figure 5.4: Haptic Stimuli Used in Experimental Study Three

5.6 Measurement Instruments

The same questionnaire was used in all three experimental studies. The measurement instruments were as follows (see Appendix F for full questionnaire).

5.6.1 Independent Measures

Consumers' haptic perception was measured on a seven-point semantic scale using the haptic differential scale developed in exploratory study one and validated in exploratory study three. The questions were: I felt the texture of the product was: smooth-rough. I felt the weight of the product was: light weight-heavy weight. The individual differences in the need for touch were measured using the 12 item NFT scale consisting of six items to measure the autotelic dimension of NFT and another six items to measure the instrument dimension of NFT on a seven-point Likert scale (Peck & Childers, 2003a, p. 432).

5.6.2 Dependent Measures

Brand personality was measured using the 15 brand personality facets on a seven-point Likert scale (Aaker, 1997). Aesthetic appeal was measured using a 5 item scale: not beautiful-beautiful, does not make me like this product-makes me like this product, not attractive-attractive, not desirable-desirable, not arousing-arousing on a seven-point Likert scale (Hirschman, 1986). Perceived quality was measured using a 5 item scale which are product's reliability, workmanship, product's dependability, durability and quality on a seven-point Likert scale (Dodds, Monroe, & Grewal, 1991). Willingness to buy was measured using a 3 item scale on a seven-point Likert scale (Dodds et al., 1991).

5.6.3 Covariate Measures

Understanding gender differences is a key to predicting consumer behaviour. Males and females differ in their information processing which influences their attitudes and judgements (Martin, 2003). Neurophysiology literature posits that basic sensory differences between males and females do exist and are vital on the development of perceptual differences between the sexes (McGuinness & Pribram, 1979). Research on touch differences and sensitivities between the two sexes suggests that, the trend favouring females in tactile threshold is strongly exhibited in children and continues into adulthood (McGuinness &

Pribram, 1979). There is an overwhelming sensitivity in the figures and hands of females (McGuinness & Pribram, 1979, p. 7).

Further, the self-concept governs basic perceptual and cognitive processes of men and women (Markus & Oyserman, 1989). Men and women fundamentally differ due to the different patterns of social interactions and interpersonal experiences that characterise them throughout their lives. Women have a collectivist, or connected schema for the self, whereas men have an individualist or autonomous schema of the self. This connectedness and separateness self-schemas influence thinking not merely about self but also about all objects, events, and situations (Markus & Oyserman, 1989, p. 101). Specially, this makes women more expert in being sensitive to, placing greater value on, interpreting and learning based on affective cues than men (Markus & Oyserman, 1989).

Prior marketing research has shown gender differences in touch. Citrin et al. (2003) reveal that women exhibit a greater need for tactile input compared to men during their product evaluation. Cho and Fiore (2015) suggest that NFT varies by gender and report that women were higher in both autotelic and instrumental NFT than men. Similarly, in Workman's (2010) study, women scored higher than men on both dimensions of NFT. However, Schifferstein and Cleiren (2005) claim that men and women did not differ in terms of product identification based on sensory modality including touch. Based on the above theoretical and empirical grounds, this thesis predicts that gender could affect consumers' processing of haptic information. Therefore, this research considers gender as a covariate. Accordingly, participants' gender was recorded as male or female.

5.7 Analysis

Data was analysed using the SPSS Statistical software package. The research used descriptive statistics to assess the characteristics of the data. Graphical and numerical analyses were used to check any missing data, for any data entry errors, histograms and measures of skewness and kurtosis and to assess the reliability of the scales used in the study. The degree of reliability of scales used were interpreted using Cronbach's Alpha (α), where Cronbach's Alpha greater than 0.7 was considered an adequate level (Schmitt, 1996). All the scales used in this research consisted of three or more scale items. Gender was dummy-coded (female: "1"), and all other variables were continuous variables. High and low levels of individual differences in the need for touch were determined by a median split. Following the vast

majority of prior sensory marketing researchers (Peck & Childers, 2003b; Peck & Johnson, 2011; Peck & Shu, 2009; Krishna, 2006; Krishna, Elder, & Caldara, 2010; Krishna & Morrin, 2008; Peck, Barger, & Webb, 2013), the statistical data analysis techniques used in this thesis were t-tests, ANOVA, MANOVA, MANCOVA. Also, this is a traditional experimental design looking at group mean differences, thus ANOVA is appropriate. This research also used PROCESS Macro, which is a commonly used analysis package for meditation in psychology and marketing. This thesis considered results of $p < 0.05$ as significant.

5.8 Validity Measures

Following Campbell and Stanley (1967), this thesis took the necessary steps to ensure validity of the experimental designs. This research took measures to achieve internal validity by conducting all three experimental studies and their pre-tests in a laboratory setting, wherein contamination from extraneous variables was controlled. To further ensure internal validity, this research adopted classic randomised experimental approach, coupled with proper subject selection, random assignment of participants, manipulation of IV (haptics) to come before the measurement of DV, sufficient clarity about which variable was the cause and which the effect and elimination of sample selection bias through randomly formed groups (Shadish et al., 2002). This research controlled history effects by isolating respondents from outside events (all experimental studies were conducted in the same location). History was further reduced by recruiting participants from the same general location and by using similar time schedules (morning hours: 9-11am and evening hours: 1-3 pm on working days) for all experimental groups. This research reduced the possible threat from sample maturation by designing all three experimental studies which required participants to spend only a short time (approximately 15-20 minutes) to complete the experiment. Sample attrition was reduced by offering monetary incentives (a complimentary coffee voucher worth $4.50 was offered to each participant after completing experimental tasks). Measuring instruments were not changed during and within studies, where no major switches were required, except the product types and materials used to create different stimuli.

Further, this research identified dimensions of haptics and individual differences in the need for touch at a level specific to consumer behaviour and marketing to ensure face and

construct validity from operations of constructs. The research reduced reactivity to the experimental situation by not using pre-tests that provided clues about expected outcomes and using masking procedures that prevented participants from knowing the research aims. Further, this research created the most minimally threating experimental setting to reduce evaluation apprehension, including confidentiality and anonymity. The experimenter used the same script and dialogues when corresponding with the participants in all experimental conditions.

This research used a student sample from a large public university in the Australian state of Queensland. However, this sample comprised students from diverse demographic backgrounds. They all were real-life consumers with prior shopping experience. There is no compelling reason to expect that haptic perception is affected by utilising a student sample. Therefore, this research assumed that students have responded in the same way as the general population. Consequently, the subject selection process had minimum threat to external validity.

This research achieved statistic conclusion validity by appropriate use of statistics to infer if the covariation between the assumed IV and DV (Cook & Campbell, 1979). In particular, by using a sufficiently large sample size, sufficient cell size, using equal sample size per each experimental cell and the use of homogenous respondents: Australian residents over 18 years of age, with prior shopping experiences. All the dependent measures were pre-validated scales and the internal consistency of them was checked using Cronbach's alpha measures to ensure the reliability of these experiments.

5.9 Ethical Considerations

All three pre-tests and three main experimental studies were undertaken according to the guidelines provided by the national statement on ethical conduct on human research (2007) and the Queensland University of Technology. UHREC assessed this study and granted Human-Negligible-Low-Risk ethical clearance (UHREC reference number: 1700001156) from 19/12/2017 to 19/12/2019. In order to protect the respondent's anonymity and confidentiality, the researcher employed the following steps during the data collection procedures:

- By obtaining consent from all the respondents to confirm their agreement to participate to the study.

- By providing participants with all the necessary information about the research through invitation letter and participant information form which covers the intention of the research, voluntary nature of their participation and the possibility to withdraw their participation at any time, measures to be used to keep confidentiality of the information they provide and contact details of the research team named in this application for any further information or clarification if needed.
- All obtained data were stored in a safe and secure manner adhering to QUT's data management policy.

Data collection took place between 19th March 2018 and 12th October 2018, in the main library of the Queensland University of Technology, Brisbane, Queensland, Australia.

5.10 Chapter Conclusion

This chapter presented a detailed overview of the experimental research design approach adopted by this thesis. This chapter first discussed the philosophical stance of positivism and approaches this thesis has embraced as these assumptions underpin the research design and the methods chosen. It then provided a justification of the experimental research approach. Following this, the sampling strategy and an overview of the three experimental studies including their experimental procedures and stimuli used were discussed. The measurement instruments used, statistical analysis techniques used and validity measured taken were then described. Lastly, ethical consideration of this research was discussed. The next chapter presents the findings of the first experimental study.

Chapter 6: Results of Experimental Study One

6.1 Overview of the Chapter

This chapter presents the results of pre-test one (section 6.2) and main experimental study one (section 6.3) which was conducted to examine texture effects via smooth and rough haptic conditions on consumer brand impressions.

6.2 Pre-test

Pre-test was a one-way (Texture: smooth, rough) design. The aim of this study was to assess if the respondents perceived the experimental manipulation of texture properties as expected. Participants (N=24) were randomly placed into one of two experimental treatments, resulting in (N=12) participants per experimental condition. An independent sample t-test was used for the manipulation check. As expected, there was a significant statistical difference in the scores of smooth, (M =1.17, SD = .389) and rough, (M =5.50, SD =1.00) for perceived texture (t (14) =13.98, p <.001). This result concluded that the experimental manipulation of IV: texture was satisfactory and can be used for further analysis.

6.3 Main Experimental Study One

Main experimental study one was a 2 (texture: rough, smooth) x 2 (need for touch: high NFT, low NFT) design to test H1, H3, H5. Texture was controlled between the group and NFT was measured within the group.

6.3.1 Preliminary Data Analysis

A sample of (N=84) participants was randomly placed into one of the two treatments, resulting in (N=42) participants per treatment. Gender was equally balanced in the sample: female (48.8 %). The average age of the sample was 20.46 years (SD =3.087). The survey hosted Qualtrics, a web-based survey tool that forced all answers before submitting. Therefore, no missing data were observed in the data set.

6.3.1.1 Scale Assessment

The reliability of scales used was assessed to ensure the accuracy of measurements employed in this study. The reliability alpha levels for brand personality (α = .78), NFT (α =.913) autotelic NFT (α =.94), instrumental NFT (α =.84), perceived quality (α=.88), aesthetic appeal (α=.90), willingness to buy (α=.91) were all greater than 0.7. Therefore, a composite score for each variable was created by averaging items.

6.3.1.2 Manipulation Check

A manipulation check assessed if respondents perceived the experimental manipulations of texture properties as expected (Hair, 2010). To check the experimental manipulations, the study used a seven-point haptic semantic scale: I felt the texture of the product was: 1= smooth to 7= rough. Eleven participants failed the manipulation check out of a total of 84 participants. As recommended by Hair (2010), they were eliminated from further analysis.

The study also checked if participants could recognise the product through their sense of touch. Therefore, at the end of the survey they were asked to provide written answers to the question: what do you think the product is?

Accordingly, 63% of participants recognised the product as a photo frame. Some participants commented on the product, for example: "*a photo frame with a soft velvet material". "Photo frame made from rough wood". "A squishy picture frame".* These qualitative data further confirmed that experimental manipulations were successful.

6.3.1.3 Assumptions of MANOVA

As recommended by Hair (2010), for the multivariate test procedures of MANOVA to be valid, three assumptions must be met. The first assumption of independence, relies on the data collection process. This study avoided possible violations of independence of observations by randomly assigning participants to an experimental condition. To ensure a minimum level of influence by one participant to other, all experimental sessions were individually conducted resulting in one participant after another. Therefore, this study met the assumption of independence. The second assumption of MANOVA is the equivalence of covariance matrices across the groups. The non-significant results from Box's M test proved that the study met this assumption. As recommended by Hair (2010), this thesis considered .01 level as the threshold level for the Box's M test indicating violation of the assumption.

Except kurtosis value for BP ruggedness which was fractionally above 1.0, skewness and kurtosis statistics of other dependent measures were within the -1 to +1 range; thus the third assumption of normality was met.

6.3.2 Covariate Effect

This study used gender as a control measure. As recommended by Hair (2010) in assessing the impact of covariates, the study first ran the analysis with gender as a covariate using MANCOVA. Results revealed a non-significant covariate effect from gender, p =.48.

6.3.3 Hypotheses Testing: Effect of Texture and NFT on Brand Impressions

When multiple outcome variables are involved, it is recommended to use MANOVA (Field, 2009). Therefore, the predictions were tested using 2x2 MANOVA, resulting in the main effects of haptics: texture, and all possible two-way interactions between texture, and two dimensions of NFT: autotelic NFT and instrumental NFT. High and low levels of individual differences in the need for touch were determined by a median split. Results suggested a non-significant Box's M test of equality of covariance matrices, p =.18 which indicated the homoscedasticity (Hair, 2010). The assumption was not violated, therefore Wilks' Lambda was used.

Significant multivariate effects were found for the main effect of texture, F (8, 62) = 10.31, p <. 001. Two-way interactions between texture and autotelic NFT were significant, F (8, 62) = 2.38, p =.026. Two-way interactions between texture and instrumental NFT were not significant, F (8, 62) = 1.14, p=.349. These multivariate results are presented in table 6.1.

Table 6.1

Multivariate Results for Texture and NFT on Brand Impressions

Variable(s)	Wilks' Lambda	F	Sig.	df	Error df
Texture	.43	10.31	.000	8	62
Texture x Autotelic NFT	.76	2.38	.026	8	62
Texture x Instrumental NFT	.87	1.14	.349	8	62

6.3.3.1 Main Effects: Texture

The Levene's test of equality of error variance was non-significant for seven dependent variables at $p > .05$ level and for perceived quality at $p > .01$ level. The assumption of homogeneity of variance has been met, which gave us confidence in the reliability of the univariate tests to follow. Significant univariate results are presented in table 6.2.

Table 6.2

Significant Univariate Results for Texture Effects on Brand Impressions

Dependent Variable (s)	Smooth Condition	Rough Condition	F
BP Sincerity	5.17	4.26	17.68***
BP Competence	4.83	3.89	15.55***
BP Sophistication	4.62	3.00	33.30***
BP Ruggedness	3.35	5.43	34.68***
Aesthetic Appeal	4.54	3.13	36.93***
Perceived Quality	4.67	4.12	4.50*

*$P < 0.05$, **$P < 0.01$, ***$P < 0.001$

Note: Mean Values

The above results supported hypothesised haptic effects from texture. H1: Texture is associated with consumer brand impressions. Smooth texture condition showed higher mean values for BP sincerity (M=5.17 > M=4.26), BP competence (M=4.83 > M=3.89) and BP sophistication (M= 4.62 > M=3.00). In contrast, rough texture condition showed higher mean values for BP ruggedness (M=5.43 > M=3.35). Moreover, smooth texture condition showed higher mean values for aesthetic appeal (M=4.54 > M=3.13) and perceived quality (M= 4.67 > M= 4.12) in consumer products.

6.3.3.2 Two-way Interactions: Texture & Autotelic NFT

MANOVA results indicated statistically significant two-way interactions between texture and autotelic NFT on three brand personality impressions: BP sincerity, BP excitement, BP competence and perceived quality. Two-way factorial univariate analysis of variance (ANOVA) examined these interactions effects. These univariate results are presented in table 6.3.

Table 6.3

Significant Univariate Results for Interactions Effects between Texture and Autotelic NFT on Brand Impressions

Dependent Variable (s)	Smooth Condition		Rough Condition		F
	Low Autotelic NFT	High Autotelic NFT	Low Autotelic NFT	High Autotelic NFT	
BP Sincerity	4.85	5.50	4.48	4.04	6.35**
BP Excitement	4.50	5.38	4.73	4.33	6.32**
BP Competence	4.56	5.10	4.10	3.68	4.10*
Perceived Quality	4.18	5.17	4.34	3.92	7.56**

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

Note: Mean Values

BP Sincerity

According to simple main effects analysis, there were significant differences in BP sincerity scores of high autotelic NFT (mean scores= 1.46, smooth (M=5.50), rough (M=4.04), p <.001) for texture. High autotelic NFT consumers showed higher mean values for BP sincerity when the product's texture was smooth than rough. There was a non-significant difference in BP sincerity scores of low autotelic NFT consumers (mean scores= .366, smooth (M=4.85), rough (M=4.48), p =.21). The profile plot is illustrated in figure 6.1.

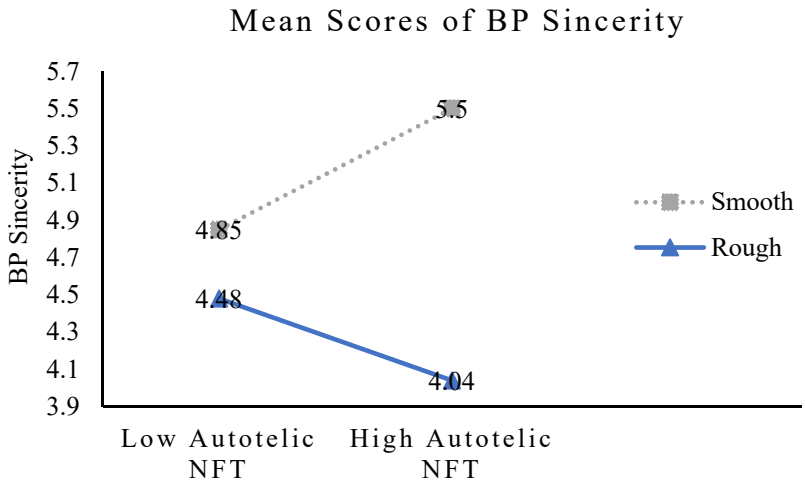

Figure 6.1: The Effects of Texture and Autotelic NFT on BP Sincerity

Results suggested that high autotelic NFT consumers preferred smooth textures to rough textures for BP sincerity.

BP Excitement

According to simple main effects analysis, there were significant differences in BP excitement scores of high autotelic NFT consumers (mean scores = 1.05, smooth (M = 5.38), rough (M= 4.33), $p < 0.01$) for texture. High autotelic NFT consumers showed higher mean values for BP excitement when the product's texture was smooth than rough. There was a non-significant difference in BP excitement scores of low autotelic NFT consumers (mean scores = .222, smooth (M=4.51), rough (M=4.73), p =.511). The profile plot is illustrated in figure 6.2.

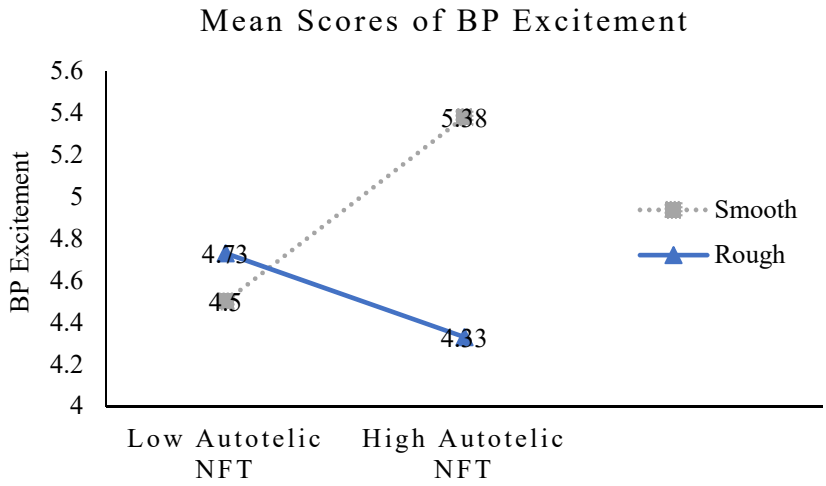

Figure 6.2: The Effects of Texture and Autotelic NFT on BP Excitement

Results suggested that high autotelic NFT consumers preferred smooth textures to rough textures for BP excitement.

BP Competence

According to simple main effects analysis, there were significant differences in BP competence scores of high autotelic NFT consumers (mean scores = 1.41, smooth (M=5.10), rough (M=3.68), p <.001) for texture. High autotelic NFT consumers showed higher mean values for BP competence when the product's texture was smooth than rough. There was a non-significant difference in BP sincerity scores of low autotelic NFT consumers (mean scores = .222, smooth (M=4.56), rough (M=4.10), p =.511). The profile plot is illustrated in figure 6.3.

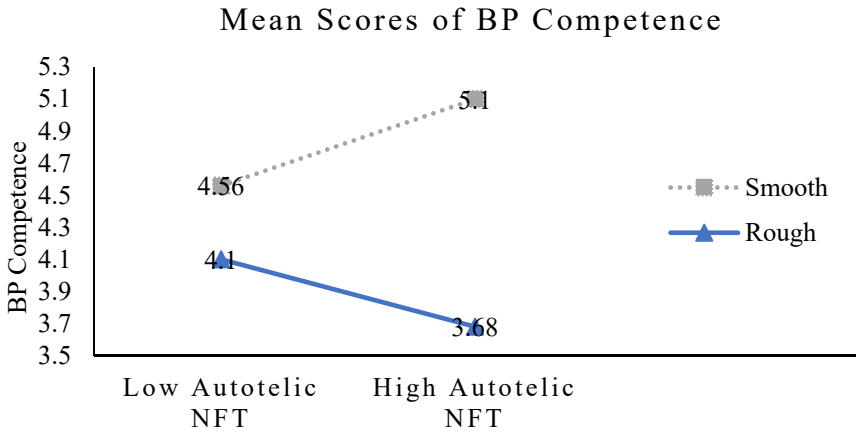

Figure 6.3: The Effects of Texture and Autotelic NFT on BP Competence

Results suggested that high autotelic NFT consumers preferred smooth textures to rough textures for BP competence.

Perceived Quality

According to simple main effects analysis, there were significant differences in perceived quality scores of high autotelic NFT consumers (mean scores = 1.253, smooth (M=5.17), rough (M=3.92), p <.01) for texture. High autotelic NFT consumers showed higher mean values for perceived quality when the product's texture was smooth than rough. There was a non-significant difference in perceived quality scores of low autotelic NFT consumers (mean scores = .161, smooth (M=4.18), rough (M=4.34), p =.638). The profile plot is illustrated in figure 6.4.

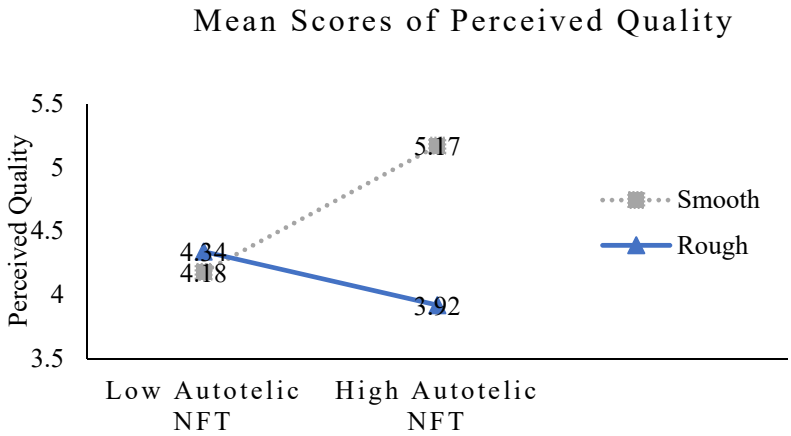

Figure 6.4: The Effects of Texture and Autotelic NFT on Perceived Quality

Results suggested that high autotelic NFT consumers perceived smooth textures to be of a better quality than rough textures.

In summary, the above results supported H3: The effect of haptics on consumer brand impressions is moderated by an individual's NFT. As expected, two-way interactions between texture and autotelic NFT were significant, however two-way interactions between texture and instrumental NFT were not significant. Therefore, these results supported H3a: The effect of haptics on consumer brand impressions is stronger for autotelic NFT consumers but weaker for instrumental NFT consumers.

Simple main effects analysis resulted a significant difference between high and low autotelic NFT consumers' brand impression measures within each haptic conditions of texture. As expected, high autotelic NFT consumers significantly differ on their brand personality impressions: sincerity, excitement, competence and perceived quality. However, there were non-significant differences for low autotelic NFT consumers. Therefore, these results supported H3b: The effect of haptics on consumer brand impressions is stronger for higher autotelic NFT consumers but weaker for low autotelic NFT consumers.

6.3.3.3 Brand Personality as a Mediator

This thesis examined whether the interaction effect of texture and autotelic NFT on a consumer's willingness to buy is mediated by brand personality. This study used all three brand personality dimensions that gave significant results from the previous analyses: sincerity, excitement and competence. The mediated moderation model is illustrated in figure 6.5.

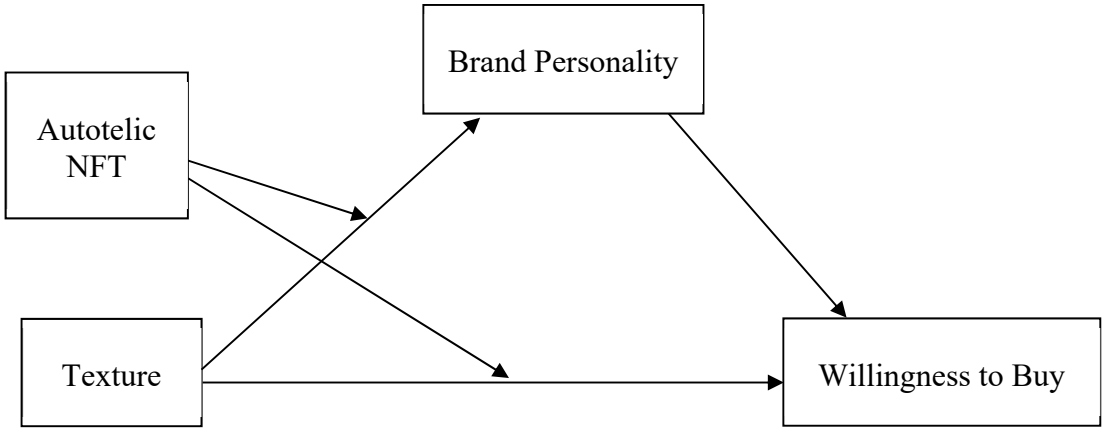

Figure 6.5: The Mediated Moderation Model

The study followed a bootstrapping procedure using PROCESS Macro, Model 8 (Hayes, 2018). PROCESS macro allows the interaction effect of IV(texture) and the moderator (autotelic NFT) on the DV (willingness to buy), the interaction effect of IV (texture) and the moderator (autotelic NFT) on the mediator (brand personality) and the main effects of the mediator (brand personality) on the DV (willingness to buy) together in one model (Hayes, 2018). For analyses the thesis sets bootstrap samples to 1000. This study received significant results for two of the BP dimensions. Indirect effect of texture and autotelic NFT on willingness to buy through brand personality was significant for BP sincerity (95% CI= [-1.3133, -.1596]) and BP competence (95% CI= [-1.5914, -.0021]). Results were non-significant for BP excitement. These results supported H5: The interactive effect of haptics and an individual's autotelic NFT on willingness to buy will be mediated by brand personality.

6.4 Chapter Conclusion

This chapter provided the analysis and the findings of experimental study one. This study supported the hypothesised texture effects on creating brand impressions. The results from this study supported the moderation effect of NFT on this relationship, in particular hedonic-oriented autotelic NFT. As expected, texture effects on consumer brand impressions are stronger for higher autotelic NFT consumers but weaker for low autotelic NFT consumers. The results supported the assumption that it is through brand personality that haptics and individual's hedonic motivation to touch effect a consumer's willingness to buy. The results revealed a non-significant covariate effect from gender. The next chapter presents the analysis and the findings of experimental study two.

Chapter 7: Results of Experimental Study Two

7.1 Overview of the Chapter

This chapter presents the results of pre-test two (section 7.2) and main experimental study two (section 7.3) which was conducted to examine weight effects via light weight and heavy weight haptic conditions on consumer brand impressions.

7.2 Pre-test

Pre-test was a one-way (weight: light weight, heavy weight) design. The aim of this study was to assess if the respondents perceived the experimental manipulations of weight properties as expected. Participants (N=24) were randomly placed into one of two experimental treatments, resulting in (N=12) participants per experimental condition. An independent sample t-test was used for the manipulation check. As expected, there was a significant statistical difference in the scores of light weight, (M =1.58, SD = .515) and heavy weight, (M =5.75, SD =.866) for perceived weight (t (18) =14.33, p <.001). These results concluded that experimental manipulation of IV: weight was satisfactory and can be used for further analysis.

7.3 Main Experimental Study Two

Main experimental study two was a 2 (weight: light weight, heavy weight) x 2 (need for touch: high NFT, low NFT) design to test H2, H3 and H5. Weight was controlled between the group and NFT was measured within the group.

7.3.1 Preliminary Data Analysis

A sample size of (N=100) participants was randomly placed into one of the two treatments, resulting in (N=50) participants per treatment. Gender was equally balanced in the sample: female (55 %). The average age of the sample was 21.67 years (SD =4.37). No missing data were observed in the data set.

7.3.1.1 Scale Assessment

The reliability of scales used was assessed to ensure the accuracy of measurements employed in this study. The reliability alpha levels for brand personality (α =.83), NFT (α =.90)

autotelic NFT (α =.94), instrumental NFT (α =.82), perceived quality (α=.87), aesthetic appeal (α=.84), willingness to buy (α=.83) were all greater than 0.7. Therefore, a composite score for each variable was created by averaging items.

7.3.1.2 Manipulation Check

To check the experimental manipulations, the study used a seven-point haptic semantic scale: I felt the weight of the product was: 1= light weight to 7= heavy weight. Five participants failed the manipulation out of a total of 100 participants. They were eliminated from further analysis.

As in the previous experiment, this study also checked if participants could recognise the product through their sense of touch. Ninety-five percent of participants recognised the product as a remote controller. Some of their comments were: *"the product is heavy but not uncomfortable and very well balanced", Feels sturdy and strong, weight is nice but its old rubber buttons makes it feel outdated".* These qualitative data further confirmed that experimental manipulations were successful.

7.3.1.2 Assumptions of MANOVA

This study also took measures to satisfy the key assumptions of MANOVA. Box's M test results were non-significant and skewness and kurtosis statistics of all DVs were within the -1 to +1 range.

7.3.2 Covariate Effect

This study also checked if there were any covariate effects from gender. Results revealed a non-significant effect from gender, p =.18.

7.3.3 Hypotheses Testing: Effect of Weight and NFT on Brand impressions

The predictions were tested using 2x2 MANOVA, resulting main effects of haptics: weight, and all possible two-way interactions of weight, and two dimensions of NFT: autotelic NFT and instrumental NFT. High and low levels of individual differences in the need for touch were determined by a median split. The Box's M test of equality of covariance matrices was non-significant, p =.048 which indicated the homoscedasticity (Hair, 2010). The assumption was not violated, therefore Wilks' Lambda was used.

Significant multivariate effects were found for the main effect of weight, F (8, 84) = 9.48, p <. 001. Two-way interactions between weight and autotelic NFT were significant, F (8, 84) =2.07, p <.05. Two-way interactions between weight and instrumental NFT were not significant, F (8, 84) =1.04, p=.409. These multivariate results are presented in table 7.1.

Table 7.1

Multivariate Results for Weight and NFT on Brand Impressions

Variable(s)	Wilks' Lambda	F	Sig.	df	Error df
Weight	.52	9.48	.000	8	84
Weight x Autotelic NFT	.83	2.07	.047	8	84
Weight x Instrumental NFT	.90	1.04	.409	8	84

7.3.3.1 Main Effects: Weight

The Levene's test of equality of error variance was non-significant for six dependent variables at p >.05 level, and for perceived quality and willingness to buy p >.01 level. The assumptions of homogeneity of variance have been met, which gave us confidence in the reliability of the univariate tests to follow. Significant univariate results are presented in table 7.2.

Table 7.2

Significant Univariate Results for Weight Effects on Brand Impressions

Dependent Variable (s)	Light Weight Condition	Heavy Weight Condition	F
BP Excitement	3.54	4.07	5.22*
BP Competence	4.59	5.35	10.65**
BP Sophistication	3.43	4.48	17.57***
BP Ruggedness	3.29	4.10	8.81**
Aesthetic Appeal	3.31	4.10	13.57***
Perceived Quality	4.29	5.75	69.84***
Willingness to Buy	3.80	4.32	5.15*

*p < 0.05, **p < 0.01, ***p < 0.001

Note: Mean Values

The above results supported the hypothesised haptic effects from weight. H2: Weight is associated with consumer brand impressions. Heavy weight condition showed higher mean values for BP excitement (M=4.07 > M=3.54), BP competence (M= 5.35 > 4.59), BP

sophistication (M=4.48 > 3.43) and BP ruggedness (M=4.10 > 3.29). Heavy weight showed higher mean values for aesthetic appeal (M= 4.10 > 3.31), perceived quality (M= 5.75 > 4.29) and willingness to buy (M= 4.32 > 3.80).

7.3.3.2 Two-way Interactions: Weight & Autotelic NFT

MANOVA results indicated significant two-way interactions between weight and autotelic NFT on brand impressions: competence, ruggedness and willingness to buy. Two-way ANOVA examined these interactions effects. These univariate results are presented in table 7.3.

Table 7.3

Significant Univariate Results for Interactions between Weight and Autotelic NFT on Brand Impressions

Dependent Variable (s)	Light Weight Condition		Heavy Weight Condition		F
	Low Autotelic NFT	High Autotelic NFT	Low Autotelic NFT	High Autotelic NFT	
BP Competence	4.99	4.19	5.18	5.52	5.99**
BP Ruggedness	3.58	3.00	3.61	4.59	8.34**
Willingness to Buy	4.15	3.45	4.00	4.65	8.65**

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

Note: Mean Values

BP Competence

According to simple main effects analysis, there were significant differences in BP competence scores of high autotelic NFT consumers (mean scores = 1.32, heavy weight (M=5.52), light weight (M=4.19), $p < .001$) for weight. High autotelic NFT consumers showed higher mean values for BP competence when the product's weight was heavy than light. There was a non-significant difference in BP competence scores of low autotelic NFT consumers (mean scores = .18, heavy weight (M=5.18), light weight (M=4.99), $p = .57$). The profile plot is illustrated in figure 7.1.

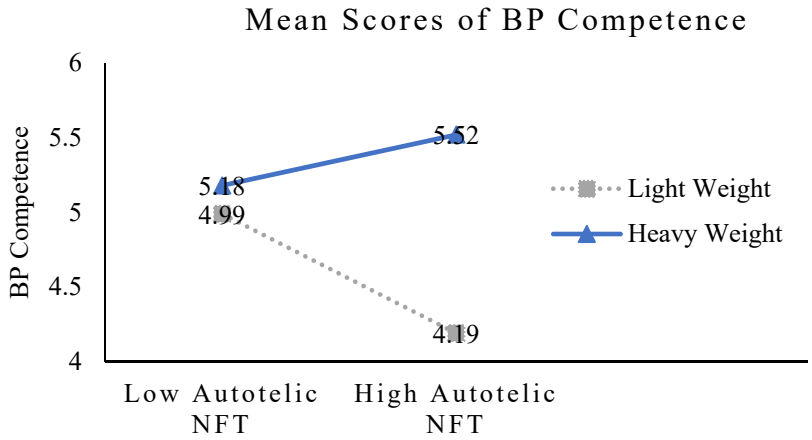

Figure 7.1: The Effects of Weight and Autotelic NFT on BP Competence

Results suggested that high autotelic NFT consumers preferred heavy weight to light weight for BP competence.

BP Ruggedness

According to simple main effects analysis, there were significant differences in BP ruggedness scores of high autotelic NFT consumers (mean scores = 1.59, heavy weight (M=4.59), light weight (M= 3.00), p <.001) for weight. High autotelic NFT consumers showed higher mean values for BP ruggedness when the product's weight was heavy than light. There was a non-significant difference in BP ruggedness scores of low autotelic NFT consumers (mean scores = .02, heavy weight (M=3.61), light weight (M=3.58), p =.95). The profile plot is illustrated in figure 7.2.

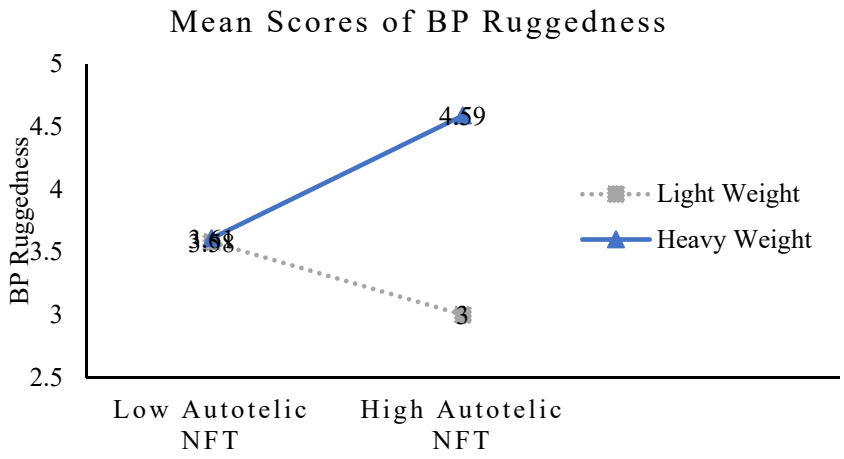

Figure 7.2: The Effects of Weight and Autotelic NFT on BP Ruggedness

Results suggested that high autotelic NFT consumers preferred heavy weight to light weight for BP ruggedness.

Willingness to Buy

According to simple main effects analysis, there were significant differences in willingness to buy scores of high autotelic NFT (mean scores = 1.2, heavy weight (M= 4.65), light weight (M=3.45), p <.001) for weight. High autotelic NFT consumers showed a significant effect for willingness to buy when the product's weight was heavy than light. There was a non-significant difference in willingness to buy scores of low autotelic NFT consumers (mean scores = .15, heavy weight (M=4.00), light weight (M=3.45), p =.64). The profile plot is illustrated in figure 7.3.

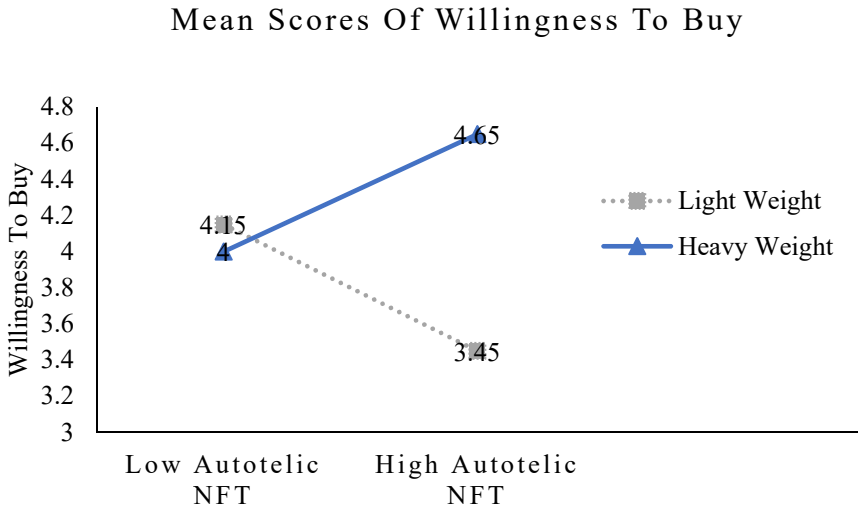

Figure 7.3: The Effects of Weight and Autotelic NFT on Willingness to Buy

Results suggested that high autotelic NFT consumer are more willing to buy heavy weight products than light weight products.

The above results supported H3: The effect of haptics on consumer brand impressions is moderated by an individual's NFT. As expected, two-way interactions between weight and autotelic NFT were significant, however two-way interactions between weight and instrumental NFT were not significant. Therefore, these results supported H3a: The effect of haptics on brand impressions is stronger for autotelic NFT consumers but weaker for instrumental NFT consumers.

The simple main effects analysis resulted in a significant difference between high and low autotelic NFT consumers' brand impression measures within each haptic condition of weight. As expected, high autotelic NFT consumers significantly differ on their brand personality impressions: competence, ruggedness, and willingness to buy. However, there were non-significant differences for low autotelic NFT consumers. Therefore, these results supported H3b: The effect of haptics on consumer brand impressions is stronger for higher autotelic NFT consumers but weaker for low autotelic NFT consumers. These results are consistent with the findings of the previous experiment.

7.3.3.3 Brand Personality as a Meditator

Next, the study examined whether the interaction effect of weight and autotelic NFT on a consumers' willingness to buy is mediated by brand personality. This study used the two brand personality dimensions that gave significant results from the previous analyses: competence and ruggedness. The mediated moderation model is illustrated in figure 7.4.

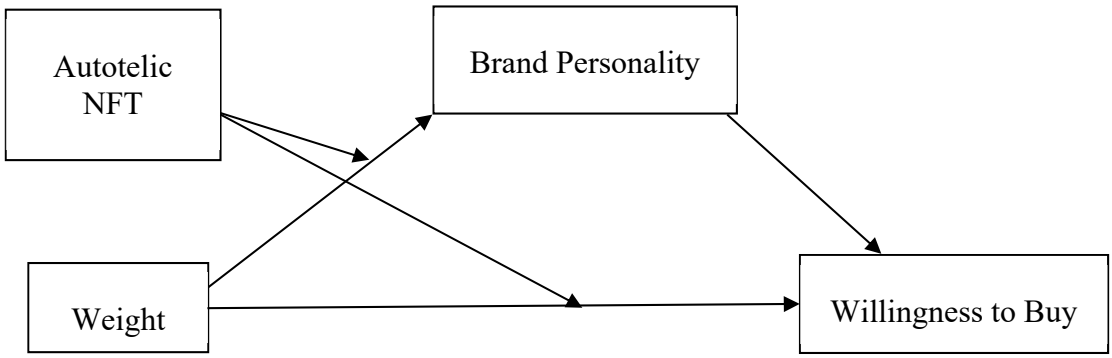

Figure 7.4: The Mediated Moderation Model

This study followed a bootstrapping procedure using PROCESS Macro, Model 8 (Hayes, 2018). For analyses the thesis sets bootstrap samples to 1000. As expected, indirect effect of weight and autotelic NFT on willingness to buy through brand personality was significant for BP competence (95% CI= [.0722, .9155]). However, results were non-significant for BP ruggedness. These results further support H5: The interactive effect of haptics and an individual's autotelic NFT on willingness to buy will be mediated by brand personality.

7.4 Chapter Conclusion

This chapter provided the analysis and the findings of experimental study two. This study supported the hypothesised weight effects on creating brand impressions. Consistent with the findings of experimental study, this study also supported the moderation effect of NFT on this relationship, in particular hedonic-oriented autotelic NFT. As expected, this study showed that weight effects on consumer brand impressions are stronger for higher autotelic NFT consumers but weaker for low autotelic NFT consumers. Our findings are strong enough to support the assumption that brand personality mediates the relationship between haptics and autotelic NFT on willingness to buy. This study also suggested a non-significant covariate effect from gender.

Before discussing experimental study three findings, it is important to discuss experiment study one and experimental study two results as they lay the foundation of study three. Table 7.4 presents a summary of significant findings of experimental studies one and two.

Table 7.4

Summary of Significant Results of Study One and Study Two

Study	Effects	Haptic Conditions	Significant Haptic Effects on Brand Impressions		Hypothesis
Study One	Main Effects of Texture	Smooth vs. Rough	BP Sincerity	Smooth > Rough	H1: Supported
			BP Competence	Smooth > Rough	H1: Supported
			BP Sophistication	Smooth > Rough	H1: Supported
			BP Ruggedness	Rough > Smooth	H1: Supported
			Aesthetic Appeal	Smooth > Rough	H1: Supported
			Perceived Quality	Smooth > Rough	H1: Supported
	Interactions Effects of Texture and NFT	Texture x High Autotelic NFT	BP Sincerity	Smooth > Rough	H3: Supported
			BP Excitement	Smooth > Rough	H3: Supported
			BP Competence	Smooth > Rough	H3: Supported
			Perceived Quality	Smooth > Rough	H3: Supported
Study Two	Main Effects of Weight	Heavy Weight vs. Light Weight	BP Excitement	Heavy Weight > Light Weight	H2: Supported
			BP Competence	Heavy Weight > Light Weight	H2: Supported
			BP Sophistication	Heavy Weight > Light Weight	H2: Supported
			BP Ruggedness	Heavy Weight > Light Weight	H2: Supported

		Aesthetic Appeal	Heavy Weight > Light Weight	H2: Supported
		Perceived Quality	Heavy Weight > Light Weight	H2: Supported
		Willingness to Buy	Heavy Weight > Light Weight	H2: Supported
Interactions Effects of Weight and NFT	Weight x High Autotelic NFT	BP Competence	Heavy Weight > Light Weight	H3: Supported
		BP Ruggedness	Heavy Weight > Light Weight	H3: Supported
		Willingness to Buy	Heavy Weight > Light Weight	H3: Supported

As illustrated in table 7.4, experimental studies one and two showed that haptic properties of texture and weight are associated with consumer brand impressions. Results of experimental study one illustrated that texture is associated with consumer brand impressions. In particular, this study showed that smooth textures have stronger effects in evoking consumer brand impressions than rough textures. Results of experimental study two illustrated that weight is associated with consumer brand impressions. In particular, this study showed that heavy weight has stronger effects in evoking consumer brand impressions than light weight. Significantly, these results demonstrated that haptic properties corresponding to texture and weight differently affect brand impressions. Results showed that while BP sincerity is strongly associated with texture, BP excitement and willingness to buy has stronger associations with weight. The findings of both studies consistently showed that individual differences in the need for touch influence consumer brand impressions evoked by haptics. In particular, autotelic NFT influenced consumer brand impressions evoked by haptics but not instrumental NFT. Both studies similarly suggested that higher autotelic NFT individuals were strongly affected by haptic effects. Results of experimental study one showed that smooth textures have stronger effects in evoking brand impressions than rough textures for higher autotelic NFT. On the other hand, results of experimental study two revealed that heavy weight has stronger effects in evoking brand impressions than light weight.

These two studies showed how haptic properties of texture and weight differently affect consumer brand impressions. These results empirically supported the conceptual direction of this thesis to examine combined haptic effects of texture and weight. The next chapter presents an analysis and the findings of experimental study three which examined the combined haptic effects on consumer brand impressions.

Chapter 8: Results of Experimental Study Three

8.1 Overview of the Chapter

This chapter presents the results of pre-test three (section 8.2) and main experimental study three (section 8.2) which was conducted to examine combined effects of texture and weight effects via smooth and light weight, rough and light weight, smooth and heavy weight and rough and heavy weight haptic conditions on consumer brand impressions.

8.2 Pre-test

Pre-test was a 2 (Texture: smooth, rough) x 2 (Weight: light weight, heavy weight) design. The aim of this study was to assess if the respondents perceived experimental manipulations of texture and weight properties as expected. Participants (N=84) were randomly placed into one of four experimental treatments, resulting in (N= 21) participants per experimental condition.

8.2.1 Haptic Perception via the Entire Product

The first aim of pre-test was to measure if participants' haptic perception were based on the entire product or solely on the surface. This was an important measurement because haptic properties of texture were manipulated on the surface of the product, however weight was manipulated from the inside. Thus, participants were asked to rate this on seven-point Likert scales (I considered only the surface of the product during my product evaluation task and I considered the entire product during my product evaluation task). As expected, the mean value for entire product (M=3.64) was higher than surface only (M= 2.86).

A two-way ANOVA examined the main effects and interactions of texture and weight on haptic perception via the entire product. There were non-significant main effects from both texture and weight on haptic perception through the entire product. As expected, there was a significant interaction effect, (F (1, 80) =8.40, p < .01). According to simple main effects analysis, there was a difference in haptic perception via entire product when the product was heavy weight (mean scores= 1.048, rough (M= 4.14), smooth (M=3.1), p <.001). When the product was heavy weight it showed a significant effect for consumers' haptic perception via

-the entire product when the product's texture was rough than smooth. The profile plot is presented in figure 8.1.

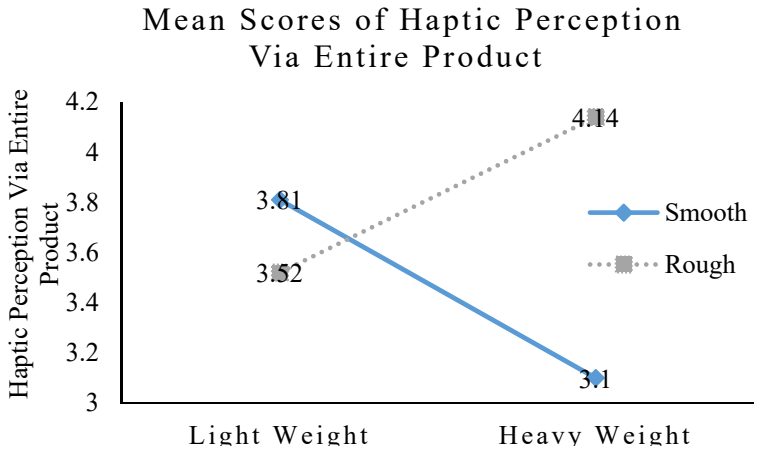

Figure 8.1: Haptic Perception via the Entire Product

A two-way ANOVA examined the main effects and interactions of texture and weight on haptic perception through the surface of the product. There was a non-significant main effect of both texture, and weight. There was also a non-significant interaction effect. As predicted pre-test results concluded that consumers' perceived haptics via the entire product not only through its surface.

The second aim of pre-test was to examine if there were any perceived differences between texture and weight. These results are presented next.

8.2.2 Perceived Texture

A two-way factorial ANOVA was conducted to examine the main effects and interactions of texture and weight on perceived texture. There was a significant main effect of texture on perceived texture, (F (1, 80) =119.5, p <.001): rough (M =5.19) > smooth (M =2.17). There was a non-significant main effect of weight on perceived texture. Results concluded that a product's texture has a strong effect on a consumer's perceived texture and a product's weight does not influence its texture perception. There was a significant interaction effect, (F (1, 80) =3.92, p <.05). The profile plot is illustrated in figure 8.2.

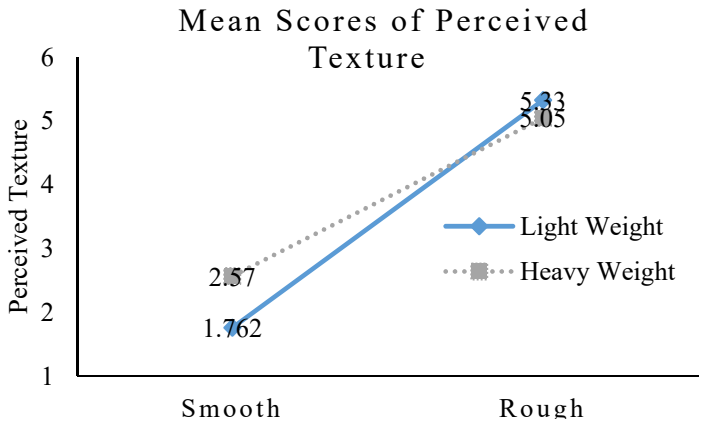

Figure 8.2: The Effects of Texture and Weight on Perceived Texture

According to simple main effects analysis, there was a significant difference in perceived texture between light weight and heavy weight conditions (mean scores= .810, heavy weight (M= 2.57), light weight (M= 1.76), p =.042). Thus, when consumers touched a smooth surface, they tend to feel less smooth when the product is heavy.

8.2.3 Perceived Weight

A two-way factorial ANOVA was conducted to examine the main effects and interactions of texture and weight on perceived weight. There was a significant main effect of weight on perceived weight, (F (1, 80) =245, p <.001): heavy weight (M =4.64) > light weight (M =1.92). There was also a significant main effect of texture on perceived weight, (F (1, 80) =6.12, p <.01): rough (M =3.50) > smooth (M =3.07). There was a non-significant interaction effect. The profile plot is presented in figure 8.3.

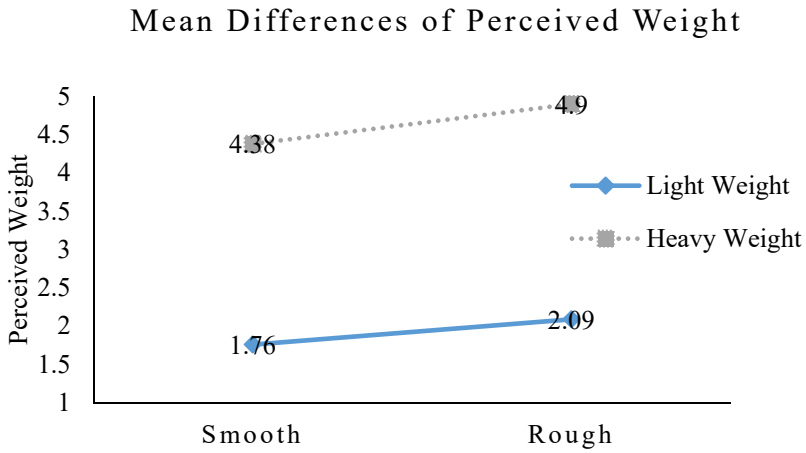

Figure 8.3: The Effects of Texture and Weight on Perceived Weight

Results concluded that a product's weight has a strong effect on a consumer's perceived weight. Nevertheless, texture was also found to have some influence on perceived weight. In particular, this study suggested that when someone touches a rough material, they feel it is heavier in general.

8.3 Main Experimental Study Three

Main experimental study three was a 2 (texture: rough, smooth) x 2 (weight: heavy weight, light weight) x 2 (need for touch: high NFT, low NFT) designed to test H1-H5. Texture and weight were controlled between groups and NFT was measured within group.

8.3.1 Preliminary Data Analysis

A sample of (N=160) were randomly placed into one of the four treatments, resulting in (N= 40) participants per treatment. Gender was equally balanced in the sample: female (52.5%). The average age of the sample was 22.63 years (*SD* =6.99). No missing data were observed in the data set.

8.3.1.1 Scale Assessment

The reliability of scales used were assessed to ensure the accuracy of measurements employed in this study. The reliability alpha levels for brand personality (α = .75), NFT (α =.90) autotelic NFT (α =.90), instrumental NFT (α =.84), perceived quality (α=.82), willingness to buy (α=.91), aesthetic appeal (α=.84), were all greater than 0.7. Therefore, a composite score for each variable was created by averaging items.

8.3.1.2 Manipulation Check

To check the experimental manipulations, the study used same seven-point haptic semantic scales used in previous studies: I felt the texture of the product was: 1= smooth to 7= rough. I felt the weight of the product was: 1= light weight to 7=heavy weight. Twenty participants failed the manipulation, out of a total of 160 participants. They were eliminated from further analysis.

8.3.1.3 Assumptions of MANOVA

This study took some measures to satisfy the key assumptions of MANOVA. Box's M test results were non-significant. Except for kurtosis value for BP sincerity, which was

fractionally above 1.0, all other dependent measures' skewness and kurtosis statistics were within the -1 to +1 range.

8.3.2 Covariate Effect

This study also considered gender as a control measure. Consistent with the previous studies, results revealed a non-significant effect from gender, p =.67.

8.3.3 Hypotheses Testing: Effect of Texture, Weight and NFT on Brand Impressions

The predictions were tested using 2x2x2 MANOVA, which resulted main effects of haptics: texture and weight, and all possible two-way and three-way interactions of texture, weight and two dimensions of NFT: autotelic NFT and instrumental NFT. The Box's M test of equality of covariance matrices was non-significant, p =.01 which indicated the homoscedasticity (Hair, 2010). The assumption was not violated, therefore Wilks' Lambda was used.

Significant multivariate effects were found for both main effects of texture, F (8,125) =15.31, p <.001 and weight, F (8,125) =4.22, p <.001. Two-way interactions between texture and autotelic NFT were significant, F (8,125) =2.14, p <.05. Two-way interactions between texture and instrumental NFT were not significant, F (8,125) = .354, p=.94. Two-way interactions between weight and autotelic NFT were not significant, F (8,125) = 1.41, p =.19. Two-way interactions between weight and instrumental NFT were not significant, F (8,125) = .95, p=.49. Three-way interactions between texture, weight and autotelic NFT were significant, F (8,125) = 2.34, p <.05. Three-way interactions between texture, weight and instrumental NFT were not significant, F (8,125) =.94, p =.48. These multivariate results are presented in table 8.1.

Table 8.1

Multivariate Results for Texture, Weight and NFT on Brand Impressions

Variable(s)	Wilks' Lambda	F	Sig.	df	Error df
Texture	.50	15.31	.000	8	125
Weight	.78	4.22	.000	8	125
Texture x Autotelic NFT	.88	2.14	.037	8	125
Texture x Instrumental NFT	.97	.35	.943	8	125
Weight x Autotelic NFT	.91	1.41	.195	8	125
Weight x Instrumental NFT	.94	.95	.490	8	125
Texture x Weight x Autotelic NFT	.87	2.34	.022	8	125
Texture x Weight x Instrumental NFT	.94	.94	.483	8	125

8.3.3.1 Main Effects: Texture and Weight

The Levene's test of equality of error variance was non-significant for seven dependent variables at $p > .05$ level and for BP ruggedness at $p > .01$ level. The assumptions of homogeneity of variance have been met, which gives us confidence in the reliability of the univariate tests to follow. Significant multivariate results of texture and weight are presented in table 8.2 and table 8.3.

Table 8.2

Significant Univariate Results for Texture Effects on Brand Impressions

Dependent Variable (s)	Smooth Condition	Rough Condition	F
BP Excitement	4.56	4.17	6.60 **
BP Sophistication	4.72	3.32	63.40***
BP Ruggedness	3.80	5.43	61.50***
Aesthetic Appeal	4.15	3.39	19.66***
Willingness to Buy	3.71	3.14	6.11**

*$P < 0.05$, **$P < 0.01$, ***$P < 0.001$

Note: Mean Values

Table 8.3

Significant Univariate Results for Weight Effects on Brand Impressions

Dependent Variable (s)	Light Weight Condition	Heavy Weight Condition	F
BP Competence	4.17	4.67	10.54***
BP Ruggedness	4.15	5.08	20.02***
Perceived Quality	4.11	4.79	17.86***

*$P < 0.05$, **$P < 0.01$, ***$P < 0.001$

Note: Mean Values

This study further supported H1: Texture is associated with consumer brand impressions and H2: Weight is associated with consumer brand impressions. Smooth texture condition showed higher mean values for BP excitement, BP sophistication, whereas rough texture condition showed higher mean values for BP ruggedness. Smooth texture condition showed higher mean valued for aesthetic appeal in consumer products as well as willingness to buy. On the other hand, heavy weight condition showed higher mean values for BP competence and BP ruggedness, as well as with perceived quality.

8.3.3.2 Two-way Interactions: Texture & Autotelic NFT

MANOVA results indicated statistically significant two-way interactions between texture and autotelic NFT on BP ruggedness and aesthetic appeal. Two-way ANOVA examined these interactions effects. The Levene's test of equality of error variance was non-significant for aesthetic appeal at $p > .05$ level and for BP ruggedness at $p > .01$ level. The assumptions of homogeneity of variance have been met, which gave us confidence in the reliability of the univariate tests to follow. These univariate results are presented in table 8.4.

Table 8.4

Significant Univariate Results for Interaction Effects between Texture and Autotelic NFT on Brand Impressions

Dependent Variable (s)	Smooth Condition		Rough Condition		F
	Low Autotelic NFT	High Autotelic NFT	Low Autotelic NFT	High Autotelic NFT	
BP Ruggedness	4.23	3.28	5.23	5.60	9.10**
Aesthetic Appeal	3.93	4.35	3.56	3.25	4.58*

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

Note: Mean Values

BP Ruggedness

According to simple main effects analysis, there was a significant difference in BP ruggedness scores of high autotelic NFT (mean scores = 2.31, rough (M=5.60), smooth (M=3.28), $p < .001$) for texture. There was also a significant difference in BP ruggedness scores of low autotelic NFT (mean scores = 1.00, rough (M=5.23), smooth (M=4.23), $p < .01$). Both high and low autotelic NFT consumers showed higher scores for BP ruggedness when the product's texture is rough than smooth, however high autotelic NFT consumers showed higher mean effects than low autotelic NFT consumers. The profile plot is illustrated in figure 8.4.

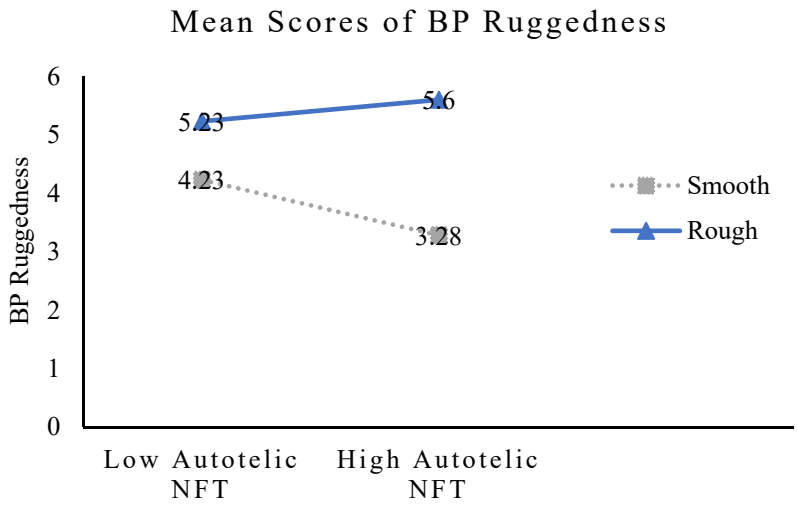

Figure 8.4: The Effects of Texture and Autotelic NFT on BP Ruggedness

Results suggested that high autotelic NFT consumers preferred rough textures to smooth textures for BP ruggedness.

Aesthetic Appeal

According to simple main effects analysis, there was a significant difference in aesthetic appeal scores of high autotelic NFT (mean scores = 1.1, smooth (M= 4.35), rough (M=3.25), $p < .001$) for texture. High autotelic NFT consumers showed higher mean values for aesthetic appeal when the product's texture is smooth than rough. There was a non-significant difference in aesthetic appeal scores of low autotelic NFT consumers (mean scores = .36, smooth (M=3.93), rough (M= 3.56), $p = .14$) for texture. The profile plot is illustrated in figure 8.5.

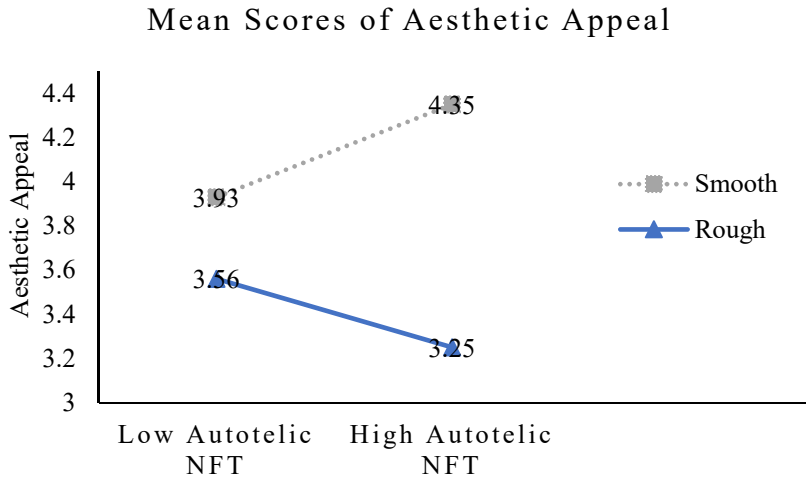

Figure 8.5: The Effects of Texture and Autotelic NFT on Aesthetic Appeal

Results suggested that high autotelic NFT consumers perceived smooth textures to be more aesthetically appealing than rough textures.

8.3.3.3 Two-way Interactions: Weight & Autotelic NFT

MANOVA results indicated a nonsignificant interaction between weight and autotelic NFT, F (8,125) = 1.41, p =.19 at the multivariate level. However, significant univariate effects were observed for BP excitement and willingness to buy. Two-way ANOVA examined these interactions effects. The Levene's test of equality of error variance was non-significant for both BP excitement and willingness to buy aesthetic appeal at p >.05 level. The assumption of homogeneity of variance has been met, which gave us confidence in the reliability of the univariate tests to follow. These univariate results are presented in table 8.5.

Table 8.5

Significant Univariate Results for Interaction Effects between Weight and Autotelic NFT on Brand Impressions

Dependent Variable (s)	Light Weight Condition		Heavy Weight Condition		F
	Low Autotelic NFT	High Autotelic NFT	Low Autotelic NFT	High Autotelic NFT	
BP Excitement	4.26	4.15	4.21	4.70	3.77*
Willingness to Buy	3.64	2.94	3.31	3.80	6.51**

*p < 0.05, **p < 0.01, ***p < 0.001

Note: Mean Values

BP Excitement

According to simple main effects analysis, there was a significant difference in BP excitement scores of high autotelic NFT (mean scores = .553, heavy weight (M=4.70), light weight (M=4.15), p < .01) for weight. High autotelic NFT consumers showed higher mean values for BP excitement when the product's weight is heavy weight than light weight. There was a non-significant difference in BP excitement scores of low autotelic NFT consumers (mean scores = .059, heavy weight (M=4.21), light weight (M=4.26), p =.791). The profile plot is illustrated in figure 8.6.

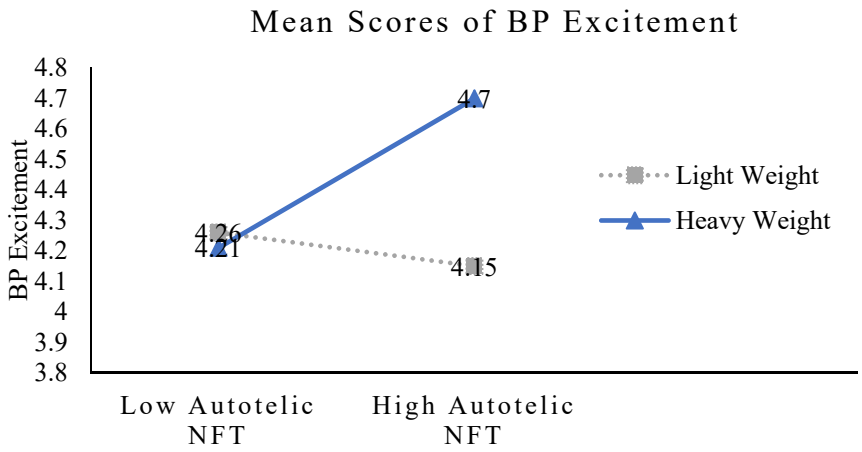

Figure 8.6: The Effects of Weight and Autotelic NFT on BP Excitement

Results suggested that high autotelic NFT consumers preferred heavy weight than light weight for BP excitement.

Willingness to Buy

According to simple main effects analysis, there was a significant difference in willingness to buy scores of high autotelic NFT (mean scores = .86, heavy weight (M=3.80), light weight (M=2.94), $p < .01$) for weight. High autotelic NFT consumers showed higher mean values for willingness to buy when the product's weight is heavy than light. There was a non-significant difference in willingness to buy scores of low autotelic NFT consumers (mean scores = .33, heavy weight (M= 3.31), light weight (M=3.64), p =.317. The profile plot is illustrated in figure 8.7.

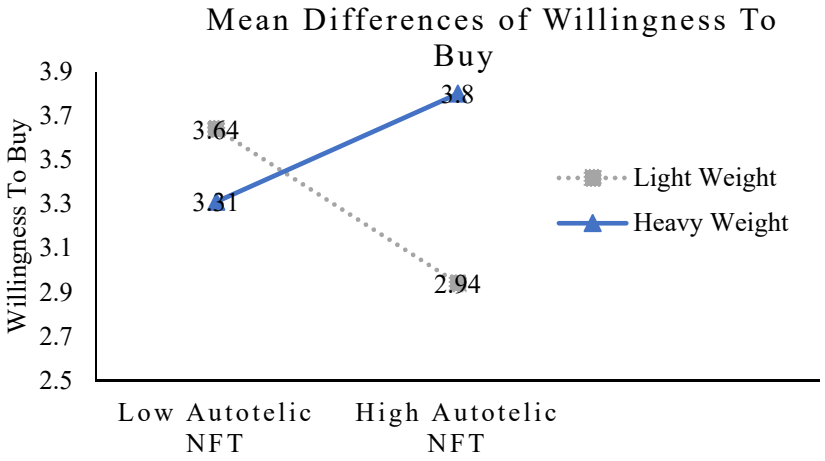

Figure 8.7: The Effects of Weight and Autotelic NFT on Willingness to Buy

Results suggested that high autotelic NFT consumers are more willing to buy heavy weight products than light weight products.

This study further supported H3: The effect of haptics on consumer brand impressions is moderated by an individual's NFT. As expected, two-way interactions between texture and autotelic NFT as well as weight and autotelic NFT were significant, however two-way interactions between texture and instrumental NFT and weight and instrumental NFT were not significant. Therefore, these results further supported H3a: The effect of haptics on consumer brand impressions is stronger for autotelic NFT consumers but weaker for instrumental NFT consumers.

Simple main effects analysis resulted in a significant difference between high and low autotelic NFT consumers' brand impression measures within each haptic condition of texture as well as weight. There were significant differences for high autotelic NFT consumers. However, there were non-significant differences for low autotelic NFT consumers. These results further supported H3b: The effect of haptics on brand impressions is stronger for higher autotelic NFT consumers, but weaker for low autotelic NFT consumers. These results are consistent with the findings of previous experiments.

8.3.3.4 Three-way interactions: Texture, Weight & Autotelic NFT

MANOVA results indicated significant three-way interactions between texture, weight, and autotelic NFT on two brand personality impressions: BP excitement and BP sophistication.

The Levene's test of equality of error variance was non-significant for both dependent variables at $p > .05$ level. The assumption of homogeneity of variance has been met, which gives us confidence in the reliability of the univariate tests to follow. Significant univariate results for three-way interaction between texture, weight, and autotelic NFT for BP excitement and BP sophistication are presented in table 8.6. Profile plots are illustrated in figure 8.8 to figure 8.10.

Table 8.6

Significant Univariate Results for Interaction between Texture, Weight and Autotelic NFT

Dependent Variable (s)	Smooth				Rough				F
	Light Weight		Heavy Weight		Light Weight		Heavy Weight		
	Low Autotelic NFT	High Autotelic NFT	Low Autotelic NFT	High Autotelic NFT	Low Autotelic NFT	High Autotelic NFT	Low Autotelic NFT	High Autotelic NFT	
BP Excitement	4.75	4.01	4.28	5.18	3.91	4.33	4.14	4.30	9.97**
BP Sophistication	5.23	4.15	4.33	5.18	3.24	3.30	3.43	3.31	8.96**

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

Note: Mean Values

BP Excitement

High autotelic NFT consumers and low autotelic NFT consumers showed a significant difference in their BP excitement mean scores based on their haptic perception on texture and weight. High autotelic NFT perceived smooth and heavy weight products (M=5.18) as more exciting. In contrast, low autotelic NFT consumers perceived, smooth and light weight products (M= 4.75) as more exciting.

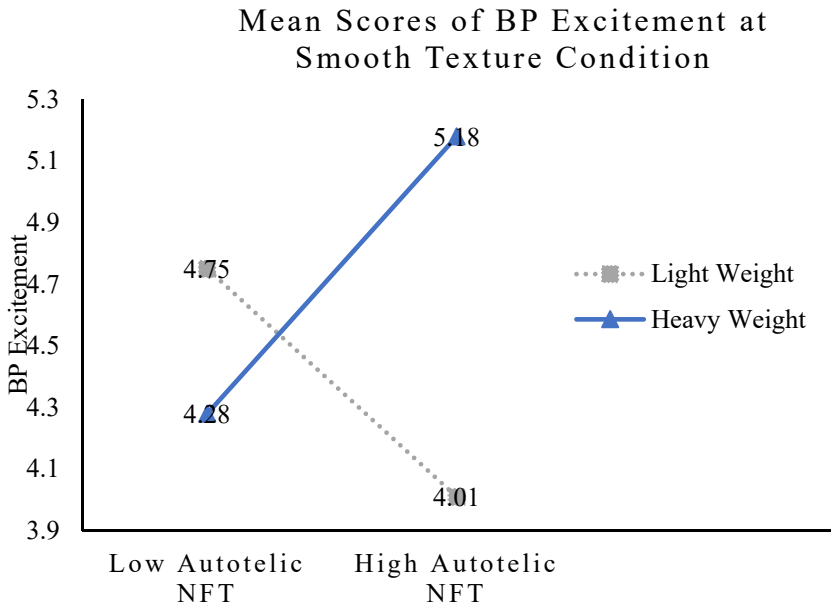

Figure 8.8: The Effects of Smooth Texture, Weight and Autotelic NFT on BP Excitement

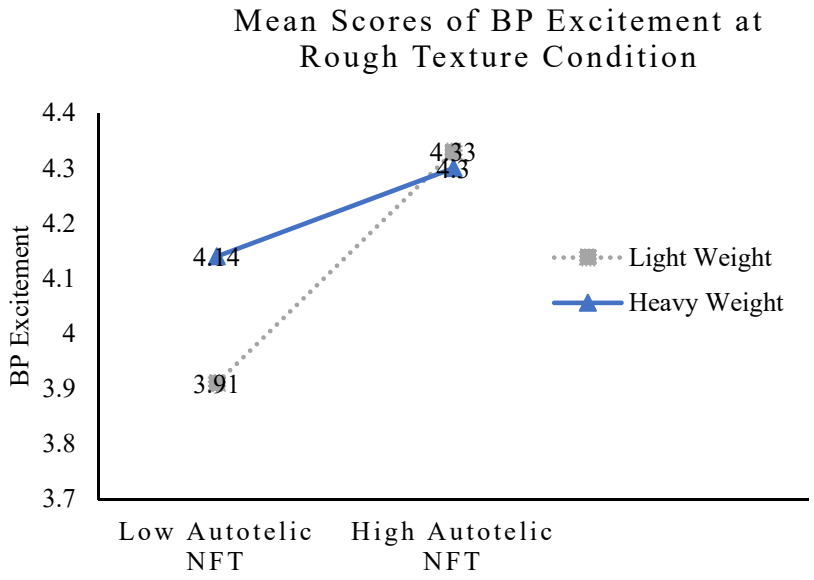

Figure 8.9: The Effects of Rough Texture, Weight and Autotelic NFT on BP Excitement

BP Sophistication

High autotelic NFT consumers and low autotelic NFT consumers showed a significant difference in their BP sophistication mean scores based on their haptic perception on texture and weight. Low autotelic NFT consumers perceived smooth and light weight products (M=5.23) as more sophisticated. In contrast, high autotelic NFT consumers perceive, smooth and heavy weight products (M= 5.18) as more sophisticated.

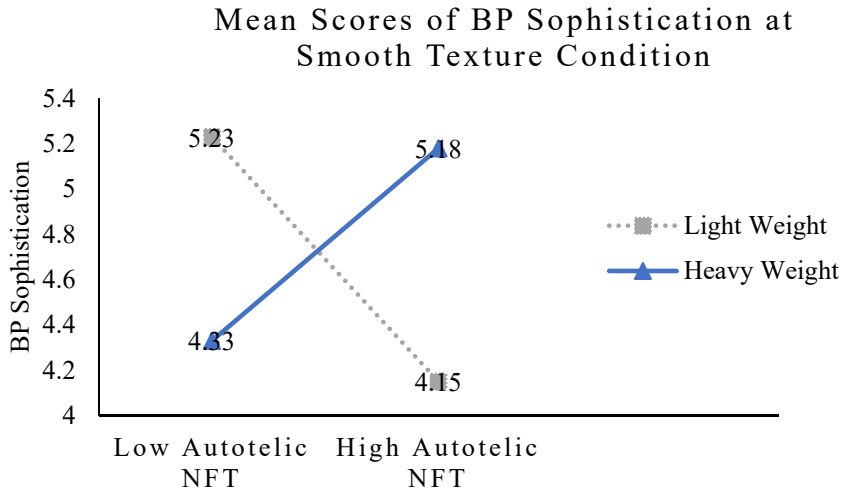

Figure 8.10: The Effects of Smooth Texture, Weight and Autotelic NFT on BP Sophistication

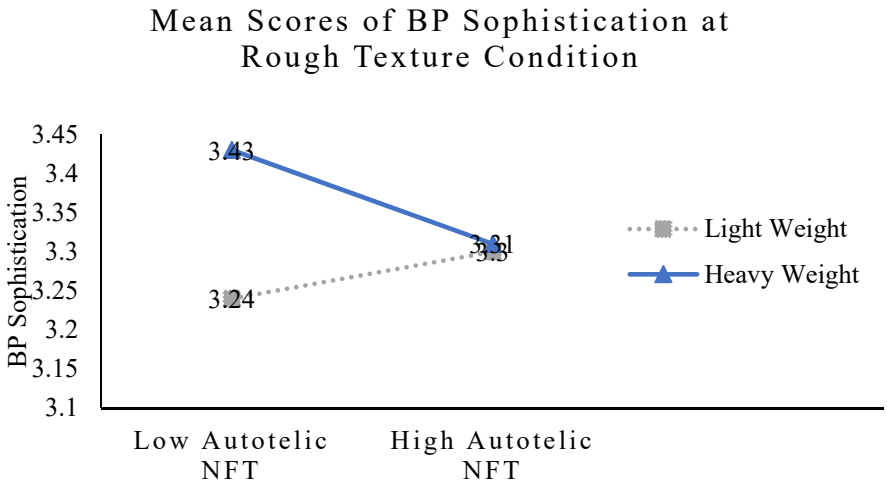

Figure 8.11 : The Effects of Rough Texture, Weight and Autotelic NFT on BP Sophistication

These results supported H4: The effect of haptic cue congruity is moderated by an individual's hedonic-oriented autotelic NFT. More hedonic-oriented autotelic NFT consumers are excited by products when haptic cues are in incongruence (smooth x heavy weight). In contrast, low hedonic-oriented autotelic NFT consumers perceive products as sophisticated when haptic cues are in congruence (smooth x light weight).

8.3.3.5 Brand Personality as a Mediator

Next, the study examined whether the interaction effect of both haptics: texture and weight and autotelic NFT on a consumer's willingness to buy is mediated by brand personality. This study used the two brand personality dimensions that gave significant results from the previous analyses: excitement, and sophistication. The mediated moderation model is illustrated in Figure 8.12.

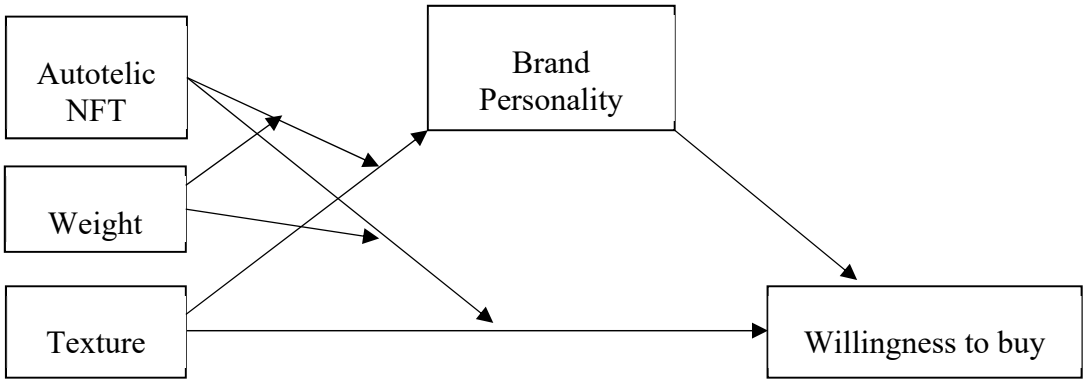

Figure 8.12: The Mediated Moderation Model

The study followed a bootstrapping procedure using PROCESS Macro, Model 12 (Hayes, 2018). For analyses the thesis sets bootstrap samples to 1000. As expected, indirect effect of texture and weight and autotelic NFT on willingness to buy through brand personality was significant for: BP excitement (95% CI= [-1.2369, -.1138]) and BP sophistication (95% CI= [-1.1271, -.0275]). These results further support H5: The interactive effect of haptics and an individual's autotelic NFT on willingness to buy will be mediated by brand personality.

8.4 Chapter Conclusion

This chapter provided the analysis and the findings of experimental study three of this thesis. The study supported all five hypothesised haptic effects. Consistent with the findings of previous experimental studies, this study similarly showed main effects for both texture and weight, thereby supporting H1 and H2. This study also supported the moderation effect of NFT on this relationship, in particular hedonic-oriented autotelic NFT. This study showed that both texture and weight effects on consumer brand impressions are stronger for higher autotelic NFT consumers, but weaker for low autotelic NFT consumers. Therefore, H3 is further supported. The primary objective of this experimental study was to test the notions of haptic cue congruity. As expected, the study suggested that the effect of haptic cue congruity is moderated by an individual's hedonic motivation to touch. Therefore, H4 is supported. This study further supported the assumption that brand personality mediates the interactive effect of haptics and an individual's autotelic NFT on willingness to buy. Consistent with previous experimental studies, this study also showed a non-significant covariate effect from gender. The next chapter provides a discussion of the findings of all three experimental studies, the contributions this thesis makes to marketing theory and practice, and lastly provides a conclusion of this thesis.

Chapter 9: Discussion and Conclusion

9.1 Overview of the Chapter

The primary purpose of this thesis was to examine the impact of haptics on consumer brand impressions. Chapter one outlined the focus of the research, chapter two provided a review of the literature related to touch, chapter three outlined the findings of exploratory studies, chapter four presented the conceptual and hypothesis development of this thesis, chapter five discussed the experimental research design, chapters six, seven and eight reported the findings of the three experimental studies. This chapter concludes this thesis. The chapter discusses how the three experimental studies addressed the research questions. Following this, the theoretical contributions and practical implications, the limitations and the future research directions of this thesis are presented.

9.2 Discussion of the Research Findings

On the basis of the identified research gaps in the extant literature and the findings of exploratory studies, four research questions were developed.

RQ1: To what extent are the haptic properties of texture and weight associated with consumer brand impressions?
RQ2: To what extent do individual differences in the need for touch influence consumer brand impressions evoked by haptics?
RQ3: What is the nature of the relationship between haptic cue congruity and an individual's autotelic need for touch on consumer brand impressions?
RQ4: To what extent does brand personality influence the interactive effect of haptics and an individual's autotelic need for touch on willingness to buy?

To address these research questions three experimental studies were designed. Experimental studies one and two addressed RQ1, RQ2 and RQ4. Experimental study three was designed to primarily address RQ3. The study further addressed RQ1, RQ2 and RQ4. The following sections discuss these findings.

9.2.1 The Product: Haptic-evoked Consumer Brand impressions

The product, the individual and the situation are the three drivers of a consumer's motivation to touch (Krishna, 2010). This research focused on the product differences of touch. This research provided preliminary evidence to support the premise that product-based salience of haptic information evokes consumer brand impressions by addressing the first research question: **To what extent are the haptic properties of texture and weight associated with consumer brand impressions?**

It was found across three experimental studies using three distinct products that haptics evoke consumer brand impressions, and more specifically brand personality. The results of experimental studies one and three jointly showed that when a product's texture is smooth, it has positive evaluations on four brand personality impressions: sincerity, excitement, competence and sophistication. In addition, these studies showed that when a product's texture is smooth, it has positive evaluations on aesthetic appeal and the perceived quality of a product. In contrast, when a product's texture is rough, it has positive evaluations on rugged brand personality. On the other hand, experimental studies two and three jointly showed that when the product's weight is heavy, it has positive evaluations on four brand personality impressions: excitement, competence, sophistication, and ruggedness. The findings also showed that heavy weight is associated with two other brand impressions: perceived quality and willingness to buy.

This thesis supports the fundamental assumptions of sensory marketing (Krishna, 2012) by demonstrating an application of the understanding of an individual's touch sense based haptic sensation and perception to the field of marketing. The research provides a new theoretical understanding about product differences of touch through haptics and its impact towards consumer brand impressions. This adds to the theoretical perspective that touch enables people to extract and utilise haptic information, and consequently enables more efficient and effective identification of product differences through haptic properties corresponding to texture and weight (Klatzky & Lederman, 1993; Lederman & Klatzky, 1993). This thesis supports the theoretical perspective of embodied cognition (Krishna & Schwarz, 2014; Wilson, 2002) by confirming that human bodily experience is a source of information, and more specifically illustrating that when consumers physically engage with a product through their sense of touch and gather haptic information, this perceptual-motor state informs their judgement, action and cognition. The research provides a thorough understanding about the

process that consumers' higher mental activity, in particular consumer brand impressions is grounded in their touch sense-based experience. Further, this research embraced the perspective of human memory structure and its semantic processing (Collins & Quillian, 1969) and demonstrated that human memory makes connections among haptics and brand impressions and consequently relates them. For example, rough textures relate to rugged brand personality or heavy weight is associated with high quality. This offers a new understanding about product-based salience of haptic information and its association with abstract notions such as brand impression formation.

This thesis adds to the theoretical notion that brand personality is created by a variety of product-related attributes (Aaker, 1997), and more specifically to the extant understanding that consumers perceive brand personality impressions by means of a product's intrinsic sensory cues (Labrecque & Milne, 2012; Littel & Orth, 2013; Orth & Malkewitz, 2008; Sundar & Noseworthy, 2016). This thesis provides a new theoretical perspective on brand personality literature by demonstrating product-based salience of haptic information as a powerful creator of brand personality.

Besides brand personality impressions, the research offers insights into the connection between haptics and aesthetic appeal or the relationship of beauty to the sense of touch (Etzi, Spence, & Gallace, 2014). More specifically, the findings showed that smooth textures increase aesthetic appeal. Moreover, the research provides insights on conditions under which consumers make inferences about perceived quality of products as well as willingness to buy based on their haptic perception pertaining to texture and weight.

9.2.2 The Individual: Autotelic NFT as a Strong Influencer

The haptic responses alone cannot explain the above haptic effects, since some consumers are more affected by touch than others. Therefore, this thesis focused on how motivations differ in terms of consumers' need for touch on their brand impressions. This was addressed in the second research question: **To what extent do individual differences in the need for touch influence consumer brand impressions evoked by haptics?**

The results across all three experimental studies showed that the effect of haptics on consumer brand impressions is moderated by an individual's NFT. This finding offers insights on the theoretical perspective of individual differences in the need for touch (Peck & Childers, 2003a). Experimental studies one and two similarly showed significant interactions

between texture and autotelic NFT and weight and autotelic NFT respectively. However, the interactions between texture and instrumental NFT and also weight and instrumental NFT was not significant. The results of experimental study three were similar. This research evidenced that the effect of haptics on consumer brand impressions is stronger for hedonic-oriented autotelic NFT consumers, but weaker for goal-oriented instrumental NFT consumers. Importantly, this offers a new understanding that autotelic NFT consumers are influenced by haptics corresponding to texture and weight more than instrumental NFT consumers. This supports the theoretical notion that haptic information is more chronically accessible for high NFT individuals and differing across autotelic and instrumental dimensions of NFT. More specifically, this thesis shows that the hedonic-oriented autotelic nature of touch is more adept at processing haptic information than the goal-driven evaluative outcomes related instrumental NFT.

The results across all three experimental studies revealed that high and low autotelic NFT consumers differ in their brand impression measures evoked by haptics corresponding to texture and weight. In particular, high autotelic NFT consumers showed stronger effects for brand personality impressions: sincerity, excitement, competence and also aesthetic appeal and perceived quality when the product's texture was smooth. In contrast, they showed stronger effects for brand personality ruggedness when the product's texture is rough. However, there were non-significant differences for low autotelic NFT consumers. On the other hand, high autotelic NFT consumers showed stronger effects for brand personality impressions: excitement, competence, ruggedness and also willingness to buy when the product's weight was heavy rather than light. The findings once more reported non-significant differences for low autotelic NFT consumers.

This thesis provides rigorous evidence to extend the current theoretical understanding of the distinct nature autotelic NFT individuals (Peck & Childers, 2003a). Prior touch research which focused on the autotelic nature of touch reports strong influence from high autotelic NFT than low autotelic NFT on various marketing constructs, such as impulsive purchasing (Peck & Childers, 2006); affective responses and greater persuasion (Peck & Wiggins, 2006) and involvement with the message (Peck & Johnson, 2011). To the best of my knowlegde, this is the first research in touch literature to demonstrate the impact of haptics corresponding to texture and weight on consumer brand impressions, and consequently show that this effect is stronger for those with higher autotelic NFT than their low autotelic NFT counterparts.

9.2.3 Haptic Cue Congruity and Brand Personality Impressions

This thesis is the first to conceptualise the multidimensionality of haptics. On this basis, the research posited that embodiment touch effects on consumer behaviour must be studied embracing the integrative nature among haptics pertaining to four material properties, instead of studying their effects separately. This aspect was formally investigated in the final experimental study, which examined effects of multiple haptics: texture (smooth, rough) and weight (light weight, heavy weight) resulting in four unique haptic conditions.

Grounded on the multidimensionality of haptics, this thesis further conceptualised the notion of haptic-cue congruity: the degree of fit among haptic cues. The theoretical lens of schema congruity (Meyers-Levy & Tybout, 1989) and the perspective of sensory congruence (Krishna et al., 2010) were used to explain that haptic cues correspond with each other, and more specifically this level of congruity between properties haptics influences their associative brand impression schema. This was addressed in the third experimental study. In particular, the effects of smooth and light weight and rough and heavy weight corresponding to haptic cue congruence and smooth and heavy weight and rough and light weight corresponding to haptic cue incongruence were proposed. Adhering to the theoretical perspective of individual differences in the need for touch (Peck & Childers, 2003a), this thesis further examined whether a consumer's hedonic motivation to touch influences this relationship. Subsequently, this thesis answered the third research question: **What is the nature of the relationship between haptic cue congruity and an individual's autotelic need for touch on consumer brand impressions?**

The results of the experimental study three revealed significant interactions between haptic properties corresponding to texture and weight and autotelic NFT and consumer impressions of brand personalities. The findings demonstrated a relationship between haptic cue congruity and a consumer' hedonic motivation to touch in evoking consumer brand personality impressions. This thesis provides a new theoretical perspective on sensory marketing literature by conceptualising and empirically demonstrating the multidimensionality of haptics and the notion of haptic cue congruity. More precisely, these findings showed that brand personality impression, more specifically excitement and sophistication are evoked by a combination of haptic properties related to both texture and weight. This offers new insights into the variables that influence brand personality (Aaker, 1997). This is the first research to show that haptic cue congruity differently drives hedonic-oriented autotelic NFT consumers'

brand personality impressions, depending on their level of autotelic NFT. Consequently, the research provides important theoretical contributions to marketing literature by illustrating that brand personality impressions are evoked by product-related haptic factors, as well as showing the influence of an individual's motivation or preference to touch.

Experimental study three showed that when haptic cues are incongruent (smooth and heavy weight), they are strongly associated with an exciting brand personality. This finding offers insights into the current theoretical understanding of schema-congruity. More specifically, to the view that moderate incongruity is more favourable than that typically generated by responding to either congruity or extreme incongruity (Mandler, 1982). This thesis further extends the view that information that is unexpected (Lee & Mason 1999), such as the incongruence of a product's smoothness and heaviness increases favourable evaluations.

This research adds to the current knowledge about exciting brand personality dimensions, which is often recognised as the brand personality dimension that captures much of the variance in personality rating of brands (Aaker, 1997). In particular, this thesis provides new insights into brand personality literature, in which exciting brand personality construct is typified as attractive, appealing, and capable of generating interest (Sundar & Noseworthy, 2016), conveys vitality, uniqueness, and independence (Swaminathan, Stilley, & Ahluwalia, 2009), trendy (Park & Roedder John, 2010), daring, imaginative and exciting (Freling & Forbes, 2005) and offers consumers an exciting feeling (Maehle, Otnes, & Supphellen, 2011). The current research shows an underlying mechanism in eliciting this distinct nature of exciting brand personality. More specifically, demonstrating how haptic cue incongruence creates a more imaginative, unique appeal and generates a greater interest as opposed to haptic cue congruence. More precisely, the findings showed that high autotelic NFT consumers are strongly affected by haptic incongruence more than low autotelic NFT consumers. High autotelic individuals enjoyed the unexpected incongruity or the mismatch between smooth and heavy haptic cues, and consequently showed favourable evaluations towards exciting brands. Therefore, this thesis is the first to posit that the uniqueness and imaginativeness caused by incongruent haptics increase high autotelic NFT consumers' haptic sensation and perception, and consequently lead to a greater cognitive elaboration in a high autotelic NFT individual's mind than a low autotelic NFT individual.

Experimental study three further reported when haptic cues are congruent (smooth and lightweight), they are strongly associated with sophistication brand personality. This thesis

provides new insights towards brand personality literature, which describes sophisticated brand personality as upper class, good looking and sensual (Aaker, 1997; Park & Roedder John, 2010), usually of feminine nature (Maehle et al., 2011), glamorous, smooth, and charming (Freling & Forbes, 2005) and upscale (Siguaw et al., 1999). In this context, the current research reveals an underlying mechanism in evoking sophistication, in particular showing that haptic cue congruence elicits sophistication. In contrast to high autotelic NFT consumers' preference for haptic cue incongruence, low autotelic NFT consumers are strongly affected by the anticipated match between smooth and light weight haptic information, and consequently associated with sophisticated brand personality. The finding offers insights on the mainstream proposition of schema congruity literature, which suggests that people like objects that conform to their expectations and allow predictability which ultimately leads to a favourable response (Aggarwal & McGill, 2007). In this regard, the research explains that low autotelic individuals provided favourable responses towards sophisticated brand personalities, since haptic cue congruence of the product evoked by the smooth texture and light weight conformed to their expectation about the nature of the sophisticated brand personality.

9.2.4 The Meditational Role of Brand Personality

This thesis first studied antecedents of brand personality, assuming that product-based salience of haptics evoke consumer brand personality impressions. To further shed light on this underlying mechanism, the research further examined the mediational role of brand personality on the interactive effect of haptics and an individual's autotelic NFT on willingness to buy. Although some consequences of brand personality are known, there is scant evidence about the effects of brand personality on a consumer's willingness to buy a product. This thesis responded by investigating the fourth research question: **To what extent does brand personality influence the interactive effect of haptics and an individual's autotelic need for touch on willingness to buy?**

The mediation moderation analysis across all three experimental studies showed the indirect effect of haptics and an individual's autotelic NFT on willingness to buy through brand personalities. They found positive mediation from four brand personality dimensions.

Experimental study one showed that the interaction effect of texture and autotelic NFT on a consumer's willingness to buy is mediated by brand personality: BP sincerity and BP competence. Experimental study two showed that the interaction effect of weight and

autotelic NFT on a consumer's willingness to buy is mediated by BP competence. The final experimental study provided significant results to support that the interaction effect both texture and weight and autotelic NFT have on a consumer's willingness to buy is mediated by brand personality: BP excitement and BP sophistication. These experiments yielded robust results to show the interactive effect of haptics and an individual's hedonic-oriented autotelic NFT on willingness to buy is mediated by brand personality. Importantly, the findings showed that BP excitement evoked by incongruent haptic cues increases high autotelic NFT consumer's willingness to buy. In contrast, BP sophistication evoked by congruent haptic cues increases low autotelic NFT consumers' willingness to buy.

This thesis offers new theoretical insights on the current understanding of brand personality, in terms of its consequences (Aaker, 1997). The research is the first to show the implications of haptic-evoked brand personality in marketing as a means of enhancing consumers' willingness to buy products. More specifically, this thesis contributes by not merely positing the importance of single modal haptic effects on brand personality as a key driver of consumers' willingness to buy products, but also demonstrating the multidimensionality of haptics and the distinctive nature of haptic cue congruity as a powerful creator of brand personality.

9.2.5 Gender Difference in Haptic Processing

Sensory marketing research has previously examined gender effects on consumers' sensory information processing and responses (Cho & Workman, 2011; Citrin et al., 2003; Workman & Caldwell, 2007). The current research predicted that gender will affect consumers' processing of haptic information, consequently gender was tested as a covariate. However, it was found across all three experiment studies that males and females do not differ in their haptic processing. This finding is not in agreement with prior research which shows women exhibit greater need for tactile input than men during their product evaluations (Citrin et al., 2003). This thesis adopted a unidimensional perspective of gender and measured male and female as opposite constructs. However, from a gender identity perspective, gender is a socially constructed phenomena and it is possible for females to identify with masculine traits and males to identify with feminine traits (Martin & Gnoth, 2009; Neale, Robbie, & Martin, 2016). Therefore, this is an important concept waiting to be further discussed within touch research.

9.3 Contributions to Theory

The previous section discussed the key findings by addressing the research questions posed by this thesis. This section discusses the theoretical contributions the research makes to three bodies of knowledge: sensory marketing literature, brand personality literature, and product design literature.

9.3.1 Contributions to Sensory Marketing Literature

This thesis gained its momentum from the fundamentals of sensory marketing to advance the theoretical understanding of the premise that consumer product touch impacts their impressions and decision making (Krishna, 2012). Foremost, this thesis contributes to the current knowledge of the sense of touch, which has been underestimated for a long time in marketing literature (Hultén, 2015). The research supports the theoretical view of embodied cognition by illustrating that when consumers experience products through their sense of touch, this product-based haptic information plays a key role in their action and cognition.

While the majority of prior touch research focused on individual factors as a preference for touch, the current research has executed in the true spirit of discovering 'product factors' as a primary motivation to touch products. Consequently, the thesis supports the theoretical perspective that haptic information is adept at encoding a product variability corresponding to two of the four salient material properties, in particular texture and weight (Lederman & Klatzky, 1987). This research is the first to show that haptic information relating to texture and weight impacts consumer brand impressions, in particular brand personalities, aesthetic appeal, perceived quality and willingness to buy. This thesis supports the spreading activation theory of semantic processing by demonstrating the association between haptics and consumer brand impressions (e.g., smooth texture implies sincerity and enhances aesthetic appeal or heaviness increases perceived quality).

The research offers new insights on the premise that individuals differ in preference for haptic information (Peck & Childers, 2003a). It was found across all three experimental studies that haptic information is more chronically accessible for individuals higher in NFT. In particular, the research contributes to the current understanding of individual differences in haptic information processing as a key aspect that determines the motivation of a consumer to touch products by demonstrating its influence on consumer brand impressions. Broadly, this suggests that individual differences in the need for touch should be considered when

exploring the role of product-related haptics on future marketing constructs. Prior scholars called for addition research to examine the nature of autotelic and instrumental NFT (Peck & Childers, 2003a). This thesis is the first to demonstrate that higher autotelic NFT consumers are more influenced by haptic information corresponding to texture and weight than lower autotelic NFT consumers. This identification of the association among haptics on consumer's brand impressions and the influence of autotelic NFT on this relationship contributes to a better understanding of consumer behaviour across a wide range of domains.

The mediation moderation analysis, which examined the meditational role of brand personality on the interactive effects of haptics and an individual's autotelic NFT on willingness to buy resulted in a positive moderation effect from autotelic NFT. This sheds new light on the current understanding of the autotelic dimension of NFT, which involves a hedonic-oriented response seeking fun, amusement, fantasy, arousal, sensory stimulation and enjoyment (Peck & Childers, 2003a). Although the nature of instrumental touch was recognised as a means to an end, possibly purchase, hedonic touch was so far considered as an end in itself with the mere focus being the sensory experience of touch (Krishna, 2010). Krishna (2010) suggests that hedonic touch may or may not ultimately result in product purchase. This thesis offers the first evidence to show that hedonic touch results in consumers' willingness to buy. In particular, the research shows that higher autotelic NFT consumers are strongly impacted by haptic-evoked brand personality impressions which eventually increase their willingness to buy the product.

To the best of my knowledge, this is the first research to conceptualise and empirically examine the multidimensionality of haptics. In this view, this thesis evidences that multiple haptic properties, such as a product's smooth texture and light weight could drive consumers' haptic perception. Broadly, this novel understanding provides insights on future theory building in sensory research, in particular to explore the multidimensionality of other senses. This thesis is the first to establish the notion of haptic cue congruity, and consequently demonstrates its impacts on marketing. Although prior sensory research has studied the effect of congruence among touch and other senses, such as touch and vision (Krishna, 2006) touch and smell (Krishna et al., 2010) and touch and taste (Krishna & Morrin, 2008), no earlier research has suggested if haptic cues could correspond amongst themselves. In this background, this thesis contributes immensely to extant touch literature by demonstrating the distinctive nature of haptic cue-congruity on consumer brand personality impressions moderated by an individual's autotelic nature to touch. From a broad sensory marketing

perspective, this stresses the importance of studying not only the congruence among sensory cues, but also the consequence of incongruence.

Besides these direct implications for theory, the current research has few other important findings for future theory building in sensory marketing. The qualitative exploratory findings emphasise the dynamic nature of touch, and recommending further theorising around this concept. More specifically, the conceptual model of consumers' haptic perception posits notable haptic concepts, which this current research did not extensively examined. For example, the notion of haptic dominance: the haptic information that has the greatest relevance for a given task will dominate haptic perception. Although, sensory dominance is an established concept in both psychology (Klatzky, Lederman, & Matula, 1993) and marketing (Krishna, 2012; Schifferstein et al., 2010), haptic dominance is a novel concept, which this thesis provided both qualitative and some quantitative support. In particular, the results of pre-test three showed that a product's texture strongly drives a consumer's perceived texture, while weight drives a consumer's perceived weight. However, texture was also found to have some influence over perceived weight. Thus, this thesis posits that texture plays a dominant role over weight. In addition, this research contributes to touch literature by taking the first step in identifying a haptic scale to measure consumers' haptic perception. Last, the robust design of the experiments and the stimuli created has a methodological contribution towards future sensory marketing research.

9.3.2 Contributions to Brand Personality Literature

Psychologists have metaphorically linked haptics to human personality (Krishna & Schwarz, 2014). Marketers have linked human personality traits to brand personality (Aaker, 1997). This thesis links haptics to brand personality. Using the spreading activation theory of human semantic processing as a theoretical basis, this thesis brought together touch literature with brand personality literature and demonstrated that haptics evoke consumer brand personality impressions. Prior brand personality research has examined that brand personality is created by a variety of marketing variables, such as product packaging or advertising (Aaker, 1997). However, the degree to which such variables influence brand personality required further understanding (Aaker, 1997; Freling & Forbes, 2005). Given that background, this research provides much needed insight on how brand personality is created and communicated through product-related haptic information. To my knowledge, this is the first research to demonstrate both the unimodal and the multidimensional haptic effects corresponding to

texture and weight on eliciting consumer brand personality impressions. Importantly, this thesis demonstrated how haptic cue congruity can be used as an effective means of evoking two distinct brand personality impressions: incongruent haptic cues to evoke exciting brand personality, as opposed to congruent haptic cues to convey sophistication.

This research not only offers significant theoretical insights by illustrating how haptic sensory cues relate to brand personality impressions, but also develops an understanding of consumers' product evaluative measures that are influenced by brand personality. To the best of my knowledge, this is the first research to demonstrate the underlying mediational role of brand personality on the interactive effect of haptics and an individual's autotelic NFT on a consumer's willingness to buy. This thesis shows that exciting brands evoked by incongruent haptic cues increase high autotelic NFT consumer's willingness to buy, whereas sophisticated brands evoked by congruent haptic cues increase low autotelic NFT consumers' willingness to buy. This learning offers a novel understanding of the useful implications of brand personality in marketing.

9.3.3 Contributions to Product Design Literature

Despite the growing interest towards multisensory product design, the focus on haptic experience is still in its infancy within product design literature (Kampfer et al., 2017; Velasco & Spence, 2019). The product design process involves numerous considerations ranging from the functional concerns to the external and aesthetic aspects of the product which consumers interact with (Veryzer, 1999). Product design theories intend to discover how products should be designed in relation to consumers' design preferences (Veryzer, 1999). Design theorists use different theoretical perspectives, mostly drawing from psychology to explain this cognitive mechanism underlying responses to designs (Batra et al., 2016; Lawson, 2006). This thesis examined the impact of product touch, and showed that haptic sensory mechanisms influence consumers' impression formation and decision making. More specifically, this research offers insights on design literature by introducing the theoretical view of embodied cognition. This thesis empirically demonstrated how our bodily simulations drive our brains' process of concepts. Similarly, this thesis suggests theories of design to integrate embodied models of cognition to explain the influence of haptic experience on consumers' response to product design. This implication of haptic sensations and their consequences could transmit across a wide scope in the design process including

idea generation, concept development, design interpretation and realisation, and consumer information search to innovation and new product development.

9.4 Contributions to Practice

This thesis contributes not only theoretically, but also practically.

This thesis, which focused on consumer's product touch illustrates how they can be touched by thoughtful and creative use of haptics as a powerful marketing tool. The research assists firms in effectively using product-based salience of haptic information for conveying brand impressions. Firms can develop marketing strategies to elicit brand impressions, in particular brand personalities, aesthetic appeal, and perceived quality by integrating haptic inputs corresponding to texture and weight in their products. For example, using smooth haptics to enhance the aesthetic appeal and sincerity of the product. Marketers must determine which haptic-evoked brand impressions are more desirable for their brand. Practitioners could deliver amusing, surprising or exciting products by combining incongruent haptic cues, for instance applying an extra smooth finish on a heavy metallic base. In contrast, they could convey sophistication by permitting haptic cues to be congruent.

This research shows that some consumers rely more heavily on their haptic inputs than others. There are useful insights for practitioners on market segmentation in terms of product differences via haptics as well as individual differences in processing haptic information. This thesis suggests that exciting brands should have incongruent haptic designs to increase hedonic-oriented high autotelic NFT consumer's willingness to buy them. In contrast, sophisticated brands should have congruent haptic designs to increase low autotelic NFT consumers' willingness to buy them. Therefore, considering what would appeal to high as opposed to low autotelic NFT consumers might be a way of reaching both cohorts. Integrating consumers' haptic inputs and preferences during marketing planning and a new product development process is an effective way of addressing this.

9.5 Limitations and Future Research Directions

This thesis has been subject to certain limitations.

Limits in time and resource restricted this thesis to only investigate haptic effects of texture and weight on consumer brand impressions. Future studies could explore the haptic effects of hardness and temperature. The current research is limited by its understanding of the multidimensionality of haptics and haptic cue congruity corresponding to texture and weight. Future research should capture the multidimensionality of haptics by considering hardness and temperature. For example, three-way haptic effects, such as cool, smooth and heavy or even four-way: cool, firm, smooth and light weight. A fruitful avenue for future research is to explore instances where haptic cues are matched and mismatched concerning hardness and temperature as well. As multiple haptic information integrates to form consumers' haptic perception, future research on how these four material properties interact with each other will certainly open new research avenues within touch literature. For example, cool and flimsy, warm and flimsy or cool and firm or cool and flimsy haptic conditions. Nevertheless, this requires a comprehensive understanding of what combinations of haptic properties entail noteworthy associations.

Despite Aaker's (1997) brand personality being considered a pioneering concept, some research has criticised the brand personality dimensions (Geuens et al., 2009) which might limit the generalisability of the research findings.

The results gained from the artificial environment of the laboratory may limit external validity as participants might have reacted differently than in real life. Follow-up field experiments in real-life settings, such as inside a shopping mall, could further validate these research findings.

The use of convenience samples of university students in the research could also limit the generalisability of some of its findings. In particular, age could play a role in terms of their interpretation of haptics, product evaluation and haptic cue congruence. Therefore, future research needs to use older participants as well.

Further, this research is limited by its cross-sectional design nature. Future research could employ a longitudinal research design to examine consumers' needs and changes of haptic perception over time. In particular, a situation like a consumer's product touch at a shopping mall could have a timely demand, the current research does not capture time pressure or any

time responsiveness which underpins a consumer's touch-based product evaluation. Yet, this aspect can be examined in extended studies from this research.

Although this research took measurements to rule out other sensory interactions, in particular vision, to uncover sole effects of haptics, future studies could explore the multisensory interaction of senses and more specifically, cross modal interactions of haptics and vision. For example, to explore if a product's image could be made to vary in terms of haptic attributes and see if these effects are replicated in an online shopping scenario.

This research suggests future research to capture how other human senses evoke consumer brand impressions. For example, sight (e.g., blue may evoke sincerity), smell (e.g., earthy aroma might imply a rugged and outdoorsy impression), taste (e.g., sweet and sour could be more excitement), sound (e.g., soft music implies sophistication). Future studies could explore the effects of multidimensionality and cue congruity on consumer brand impressions within other sensory realms. For example, the impact of unimodal cue congruity among properties of colour, such as hue, saturation and lightness and multimodal cue incongruence among music and colour: loud music and cool colours as opposed to quiet music and warm colours on consumer brand impressions.

Since it was beyond the scope of the current research, a future research is recommended to validate some of the preliminary findings through a different data collection process. Initial findings of exploratory studies could be continued with a follow-up survey towards a scale development to measure consumer's haptic perception of products. Further, replication studies are necessary to examine the notion of haptic dominance which could be limited by the fashion and texture context. For example, hardness may play a more pivotal role than texture in the context of interior design or consumer electronics.

The current research has focused on product and individual factors as the primary touch motivators. Hence, this research recommends future studies to explore the third aspect, situational factors and more importantly as suggested by the conceptual model of consumers' haptic perception, environmental factors and their impact on haptic-evoked consumer brand impressions. Although the current research did not find gender differences in consumer brand impressions evoked by haptics, a future research is recommended to further explore the relationship between other demographic factors, in particular age and haptics.

9.6 Conclusion

This is a major haptic research in the evolving field of sensory marketing. While there are many aspects within touch literature yet to be explored, the current research offers significant findings on consumers' haptic sensation and perception to understand their behaviour. This thesis demonstrates that product-based salience of haptic information corresponding to texture and weight are associated with consumer brand impressions. The research showed that person-based individual differences in the need for touch, in particular hedonic-oriented touch influences haptic-evoked consumer brand impressions. This thesis offers a novel theoretical perspective on touch literature by conceptualising the multidimensionality of haptics and haptic cue congruity. These notions are highlighted in an examination of the relationship between haptic cue congruity and an individual's autotelic NFT on consumer brand impressions. This thesis is the first to show how brand personality mediates the interactive effect of haptics and an individual's autotelic NFT on willingness to buy. In short, *"What you touch, touches you"*.

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Appendix A: Initial Findings of Exploratory Study One

No	Journal Name	Authors	Haptic Properties
	Literature: Perception and Psychophysics		
1	Perception & Psychophysics	Klatzky, Lederman, and Metzger (1985)	Size, Shape, Texture, Temperature, Function of the whole object or a component
2	Perception & Psychophysics	Klatzky and Lederman (1992b)	Texture, Temperature, Hardness and Weight
3	Perception	Klatzky and Lederman (1993)	Texture, Temperature, Hardness and Weight
4	Acta Psychologica	Lederman and Klatzky (1993)	Texture, Temperature, Hardness and Weight
5	Infant Behaviour and Development	Klatzky, Lederman, and Mankinen (2005)	Roughness, Hardness, Weight, Size, Shape
6	Journal of Experimental Psychology	Klatzky, Lederman and Reed (1987)	Texture (Roughness), Hardness (Brittleness, Elasticity, Torque), Size, Shape
7	Attention, Perception, & Psychophysics	Lederman and Klatzky (2009)	Roughness, Stickiness, Slipperiness, Friction, Warmth, Coolness, Rough vs. Smooth, Soft vs. Hard, Cool vs. Warm
8	IEEE Transactions on Haptics	Klatzky and Peck (2012)	Texture, Hardness, Temperature, Weight, Rough, Smooth, Bumpy
9	Journal of Experimental Psychology: Learning, Memory, and Cognition,	Klatzky, Lederman, and Matula (1991)	Roughness, Hardness, Temperature, Weight, Size, Shape

10	Perception & Psychophysics	Klatzky, Loomis, Lederman, Wake, and Fujita (1993)	Roughness, Compliance and thermal properties, (Conductivity)
11	Journal of Experimental Psychology: Human Perception and Performance	Lederman, Thorne, and Jones (1986)	Texture: Roughness, Coarseness, Jaggedness, Spatial density configuration
12	Japanese Psychological Research	Yoshida (1968)	Substantial-Empty, Stiff-not stiff, Powdery-Massive, Rough-Smooth, Wet-Dry, Heavy-Light, Sharp-Dull, Cold-Warm, Painful-not painful, Hard-Soft, Elastic-Dead, Plastic-Claylike, Viscous-Runny, Koshi-Weak Koshi, Thick-Thin, Glossy-not glossy, Brittle-Not brittle, Large-Small, Clean-Dirty, Pointed-Round
13	The Journal of Genetic Psychology	Krantz (1972)	Flexibility, Compressibility and Integrity, Wet-Dry, Round-Square and Sharp-Dull, Tall-Short, Heavy-Light, Sharp-Dull, Warm-Cold, Thick-Thin, Compressible-not compressible, Rough-Smooth, Concave-Convex, Open-Closed, Circle to square, Sticky-Slippery, Flexible-Inflexible
14	Perception & Psychophysics	Hollins, Faldowski, Rao, and Young (1993)	Smooth-Rough, Hard-Soft, Slippery-Sticky, Flat-Bumpy, Warm-Cool, Bumpy, Coarse, Flat, Fuzzy, Grainy, Slick, Wood, Grainy, Polished, Sanded, Chalky, Powdery, Steel, Unfished steel, Durable, Velvety
15	Perception & Psychophysics	Hollins, Bensmaïa, Karlof, and Young (2000)	Springy (Elastic)-Moldable (Inelastic), Soft-Hard Rough-Smooth, Sticky-Slippery, Cool-Warm
16	Acta Psychologica	Picard, Dacremont, Valentin, and Giboreau (2003)	Soft-Harsh, Thin-Thick, Relief and Hardness, Texture- Soft, Harsh, Rough, Smooth, Supple, Elastic, Rigid, Thin and Thick, Temperature-Warm, Cold, Hardness-Hard, Mellow, Limp, Weight-Light, Heavy, Relief /no relief
17	Journal of Consumer Psychology	McCabe and Nowlis (2003)	Softness, Weight, Texture, Temperature, Hardness, Smoothness-Roughness

18	Neuroscience Letters	Zampini, Mawhinney, and Spence (2006)	Texture, Roughness, Smooth, Size, Shape, Density, arrangements of bumps, Grooves
19	Perception & Psychophysics	Heller (1989)	Smoothness- Coarse-Fine
20	IEEE Transactions on Haptics	Wu et al. (2011)	Force, Torque, Stiffness, Soft
21	Science	Ackerman et al. (2010)	Weight-Heaviness, Lightness, Texture-Roughness, Smoothness, Hardness- Stability, Rigidity, Strictness
22	Science	Williams and Bargh (2008)	Warmth /Warmer, Coldness
23	Journal of Experimental Psychology	Ekman, Hosman, and Lindstrom (1965)	Roughness, Smoothness
24	Acta Psychologica	Tiest and Kappers (2006)	Roughness, Compressibility
25	Child Development	Streri and Spelke (1989)	Rigid, Heavy, Smooth, Rectangular, Flexible, Light, Rough, Rounded
26	Science Education	Jones et al. (2006)	Force feedback (stimulating object hardness, weight and inertia), Tactile feedback (simulating surface contact geometry, Smoothness, Slippage and Temperature)
27	WIREs Cognitive Science	Kappers and Bergmann Tiest (2013)	Material properties: Roughness, Compliance, Coldness, Friction, Viscosity (Thickness), Density and Weight (Heaviness), Spatial properties: Shape (Curvature), Size (Length and Volume), Orientation
28	Acta Psychologica	Tiest, Kosters, Kappers, and Daanen (2012)	Wetness (Evaporation, Stickiness, Thermal conductance, Pressure)
29	Canadian Journal of Experimental Psychology	Purdy, Lederman, and Klatzky (2004)	Material properties (Texture, Hardness and thermal conductivity), Abrupt surface discontinuities (edges and holes in otherwise flat surfaces), Relative orientation properties, Three-dimensional continuous surfaces (ramps and curved surfaces)
30	Brain Research Bulletin	Hilsenrat and Reiner (2011)	Roughness -Smoothness, Softness-Stiffness

31	Acta Psychologica	van Polanen, Bergmann Tiest, and Kappers (2014)	Texture: Roughness-Smoothness
32	Acta Psychologica	Eck, Kaas, Mulders, and Goebel (2013)	Texture: Roughness-Smoothness
33	Attention, Perception, & Psychophysics	Bergmann Tiest, Kahrimanovic, Niemantsverdriet, Bogale, and Kappers (2012)	Texture: Roughness-Smoothness, Thermal Conductivity- Cold-Warm, Compliance: Hardness-Softness
34	Multisensory Research	Baumgartner, Wiebel, and Gegenfurtner (2013)	Rough-Smooth, Hard-Soft, Warm-Cold, Elastic-Stiff, Friction (slippery), Three-Dimensionality (flat),Texture
35	Philosophical Psychology	Fulkerson (2011)	Solidity, Smoothness, Coolness, Hardness, Spherical shape, Weight, Size
36	Perception	Hollins, Seeger, Pelli, and Taylor (2004)	Roughness, Hardness, Stickiness
37	Experimental Brain Research	Guest, Catmur, Lloyd, and Spence (2002)	Rough/ Moist- Smooth/Dry
38	Experimental Brain Research	Guest and Spence (2003)	Roughness-Smoothness
39	Acta Psychologica	Schifferstein and Cleiren (2005)	Softness, Roughness, Suppleness, Coolness
	Literature: Marketing and Consumer Behaviour		
40	Journal of Consumer Research	Peck and Childers (2003a)	Softness, Firmness
41	Journal of Marketing	Peck and Childers (2003b)	Softness, Weight, Slim, Sleek, Light
42	Journal of Consumer Research	Peck and Shu (2009)	Texture, Hardness, Temperature, Weight, Softness, Firmness
43	Journal of Consumer Psychology	Peck et al. (2013)	Texture: Smoothness, Softness, Weight
44	Journal of Marketing	Peck and Wiggins (2006)	Thick, Warm, Softness, Rough

45	Journal of Consumer Psychology	Krishna et al. (2010)	Texture: Rough vs. Smooth, Temperature: Warm and Cold/Cool
46	Journal of Consumer Research	Krishna and Morrin (2008)	Hardness: Firmness and Flimsiness, Thinner (Firmer) Flimsy (Sturdier), Weight-Heavy, Softer
47	Journal of Consumer Research	Krishna (2006)	Tall-Short, Thin-Fat
48	European Journal of Marketing	Littel and Orth (2013)	Size: Weight (Light, Heavy) Height (Small, Large) Diameter (Thin, Thick), Hardness: Elasticity (Elastic, Inelastic), Hardness (Soft, Hard), Temperature (Cold, Warm),Surface (Smooth, Rough), Contour: Global shape (Round, Angular), Exact shape (Rounded, Edged), Texture: Evenness (Even, Uneven), Structure (Unstructured, Structured),Grasp presence (Weak, Strong)
49	Journal of Consumer Research	Sundar and Noseworthy (2016)	Softness, Thickness and Relief
50	Psychology and Marketing	Marlow and Jansson-Boyd (2011)	Thick, Hard, Matte Surface Smooth, Slippery, Thick-Ribbed, Uneven, Thin, Flimsy, Soft
51	Psychology and Marketing	Spence and Gallace (2011)	Texture, Weight, Warmth, Softness, Roughness, Smoothness, Temperature, Size, Shape, Naturalness, Fluffy, Firmness
52	Journal of Consumer Marketing	Cho and Fiore (2015)	Smooth, Rough, Hard, Soft, Wet, Dry, Hot and Cold
53	Journal of Retailing	Grohmann et al. (2007)	Roughness, Hardness, Temperature, Weight
54	Journal of Business Research	Citrin et al. (2003)	Hardness, Roughness, Smoothness
55	Journal of Product and Brand Management	Briand Decré and Cloonan (2019)	Roughness, Thickness, Lightness

	Literature: Product Design		
56	Design Issues	Fisher (2004)	Tackiness, Stickiness, Glossy, Oily, Fatty, Buttery-Smooth, Slick, Shiny, Soft, Flexible, Slimy
57	International Journal of Design	Dagman et al. (2010)	Size, Shape, Border, Point, Corner, Nook, Protuberance, Orientation, Balance, Weight, Material, Resistance, Stiffness, Structure, Resilience, Hardness, Temperature
58	Textile Research Journal	Na and Kim (2001)	Surface sense: Smooth, Sleek, Uncouth, Sandy, Hard and Lumpy, Soft, Flat, Rough, Rugged, Thermal sense: Warm, Cool, Spongy, Bulky, Heavy, Thin, Flexibility sense: Flabby, Flexible, Light, Flimsy, Dryness sense: Crispy, Stiff, Dry
59	Textile: The Journal of Cloth and Culture	Delong, Wu, and Bao (2007)	Soft, Smooth, Rough/Coarse, Warm, Cold/Cool, Scratchy/Itchy, Comfortable/Comforting
60	Textile: The Journal of Cloth and Culture	Delong et al. (2012)	Soft, Smooth, Warm, Cool, Silky, Fuzzy, Light, Fluffy, Thin, Rough, Itchy, Scratchy, Coarse, Thick, Heavy, Bumpy, Cold, Hard
61	Psychology of Aesthetics, Creativity, and the Arts	Jansson-Boyd and Marlow (2007)	Thin, Light weight, Thick, Texture, Ribbed, Hardness, Flimsy, Firmer, Hard
62	The Journal of The Textile Institute	Kawabata and Niwa (1991)	Stiffness, smoothness, fullness, softness, stiffness, crispness, limp, rough
63	Textile Research Journal	Ciesielska-Wrobel and Van Langenhove (2012)	Stiffness, smoothness, fullness, softness, roughness, harshness, pliability, hardness, cold, warmth, firmness, coarseness, thickness, warmth, soft-hard, limp-stiff, cold-warm, smooth-rough , Elastic or inelastic, springy or limp, compact (dense) or open (loose), rough or smooth, harsh or slippery, and warm or cool.
64	Textile Research Journal	Sztandera, Cardello, Winterhalter, and Schutz (2012)	Grainy, Gritty, Fuzzy, Thickness, Tensile stretch, Hand friction, Fabric to fabric friction, Depression depth, Springiness, Force to gather, Force to

			compress, Fullness/volume, Stiffness, Compression resilience.
65	Journal of Design & Nature	Pan (2007)	Stiffness, Smoothness, Softness
66	Textile Research Journal	Bacci et al. (2012)	Grittiness, Roughness, Homogeneity, Warmth, Softness, Thickness, Stiffness, Force of compression, Fullness, Tensile stretch, Hand friction, Fabric friction
67	Design Issues	Ludden Schifferstein, and Hekkert (2008)	Weight, Light, Heavy, Soft, Flexibility, Inflexible, Solid, Balance, Shape, Hard, Rigid, Smooth, Hollow, Flat
68	Journal of Design Research	Schifferstein et al. (2010)	Roughness, Heaviness, Weight, Texture: Smooth-Rough
69	The Design Journal	Zuo, Jones, Hope, and Jones (2016)	Geometrical dimension: Smooth-Rough, Fine-Coarse, Plain-Bumpy, Regular-Irregular, Linear-Nonlinear Physical-chemical dimension: Warm-Cold, Hard-Soft, Moist-Dry, Shiny-Non-shiny, Sticky-Non-sticky

Appendix B: Exploratory Study Two: Consumer Recall Task Information

PARTICIPANT INFORMATION FOR QUT RESEARCH PROJECT
– Survey –

What you touch, touches you: The impact of haptics on consumer brand impressions
QUT Ethics Approval Number 1700000655

RESEARCH TEAM

Principal Researcher:	Mrs HR Achini Ranaweera	PhD student
Associate Researchers:	Professor Brett Martin	Principal Supervisor
	Dr HS Jin	Associate Supervisor
	School of Advertising, Marketing and Public Relations	
	QUT Business School	
	Queensland University of Technology (QUT)	

DESCRIPTION

This research project is being undertaken as part of a PhD study by H.R Achini Ranaweera. The purpose of this study is to select a product category for which touch is likely to be critical across people.
You are invited to participate in this research project because you:

i. Are an Australian resident from 18 years old and above.
ii. Have prior shopping experiences.

PARTICIPATION

Participation will involve completing an open ended survey that will take approximately take 10-15 minutes of your time.

You will be asked to list any product categories in which touch plays an important role prior to purchase (e.g.: clothes, furniture).

You will be provided an envelope in which to place the completed survey for the researcher to collect. The survey will be collected within one week from the time you receive it.

Your participation in this research project is entirely voluntary. If you agree to participate you do not have to complete any question(s) you are uncomfortable answering. Your decision to participate or not participate will in no way impact upon your current or future relationship with QUT (for example your grades). If you do agree to participate you can withdraw from the research project during your participation without comment or penalty. However as the survey is anonymous once it has been submitted it will not be possible to withdraw.

EXPECTED BENEFITS

It is expected that this research project will not directly benefit you. However, it may benefit marketing academics and practitioners by enhancing the understanding of product touch.

If you wish you can obtain a summary of the research outcome by sending an email to hr.achini@hdr.qut.edu.au. *It is anticipated that a summary will be available in late 2017.*

RISKS

There are no risks beyond normal day-to-day living associated with your participation in this research project.

PRIVACY AND CONFIDENTIALITY

All comments and responses are anonymous and will be treated confidentially unless required by law. The names of individual persons are not required in any of the responses. Any data collected as part of this research project will be stored securely as per QUT's Management of research data policy.

Please note that non-identifiable data from this research project may be used as comparative data in future projects or stored on an open access database for secondary analysis.

CONSENT TO PARTICIPATE

The return of the completed survey is accepted as an indication of your consent to participate in this research project.

QUESTIONS / FURTHER INFORMATION ABOUT THE RESEARCH PROJECT

If you have any questions or require further information please contact one of the listed researchers:

H.R Achini Ranaweera	hr.achini@hdr.qut.edu.au	07 3138 8383
Brett Martin	brett.martin@qut.edu.au	07 3138 7739

CONCERNS / COMPLAINTS REGARDING THE CONDUCT OF THE RESEARCH PROJECT

QUT is committed to research integrity and the ethical conduct of research projects. However, if you do have any concerns or complaints about the ethical conduct of the research project you may contact the QUT Research Ethics Advisory Team on 07 3138 5123 or email humanethics@qut.edu.au. The QUT Research Ethics Advisory Team is not connected with the research project and can facilitate a resolution to your concern in an impartial manner.

THANK YOU FOR HELPING WITH THIS RESEARCH PROJECT.

PLEASE KEEP THIS SHEET FOR YOUR INFORMATION.

1) **Please list any products which you evaluate with "touch" before buying (E.g.: Clothing)**

Appendix C: Exploratory Study Three: Expert Interviews Information

PARTICIPANT INFORMATION FOR QUT RESEARCH PROJECT

– Interview –

What you touch, touches you: The impact of haptics on consumer brand impressions
QUT Ethics Approval Number 1700000655

RESEARCH TEAM

Principal Researcher:	Mrs HR Achini Ranaweera	PhD student
Associate Researchers:	Professor Brett Martin	Principal Supervisor
	Dr HS Jin	Associate Supervisor

School of Advertising, Marketing and Public Relations,
QUT Business School
Queensland University of Technology (QUT)

DESCRIPTION

This research project is being undertaken as part of a PhD study by H.R Achini Ranaweera. This study focuses on consumers' product touch behaviour. The overall purpose of this study is to investigate the effect of product touch on consumer's impressions of brands. You are invited to participate in this research project because you possess expert knowledge about material properties of products by working as a fashion industry professional of about 5-10 years and having dealt with international level brands.

PARTICIPATION

Your participation will involve an audio recorded interview that will take approximately 30-40 minutes of your time.
Questions will include your knowledge and understandings of product information which can be obtained by touch (for example: roughness or softness of fabric textures). The interviewer will present you with an initial list of items. You will be asked to categorise them under the four material properties: texture, hardness, temperature, and weight. You will be also asked to indicate any other important attributes that you know outside this given list.

Your participation in this research project is entirely voluntary. If you do agree to participate you can withdraw from the research project without comment or penalty. You can withdraw anytime during the interview or up till 2 weeks after the interview. On request any identifiable information already obtained from you will be destroyed. Your decision to participate or not participate will in no way impact upon your current or future relationship with QUT.

EXPECTED BENEFITS

It is expected that this research project might not benefit you directly. However, it may benefit fashion industry practitioners in general and contribute to a better understanding about the importance of haptics when they design, manufacture, and market their products.

If you wish you can obtain a summary of the research outcome by sending an email to hr.achini@hdr.qut.edu.au. *It is anticipated that a summary will be available in early 2018.*

RISKS

There are no risks beyond normal day-to-day living associated with your participation in this research project.

PRIVACY AND CONFIDENTIALITY

All comments and responses will be treated confidentially unless required by law. No names of participants will be used in the report of the project or other published material.

As the research project involves an audio recording:

- You will have the opportunity to verify your comments and responses prior to final inclusion.
- The audio recording will be destroyed 5 years after the last publication.
- The audio recording will not be used for any other purpose.
- Only the named researchers will have access to the audio recording.
- It is possible to participate in the research project without being audio recorded.

Any data collected as part of this research project will be stored securely as per QUT's Management of research data policy. All summaries of the interview will be kept in a secure place and only the research team will have access to them.
Please note that non-identifiable data from this research project may be used as comparative data in future research projects or stored on an open access database for secondary analysis.

CONSENT TO PARTICIPATE

We would like to ask you to sign a written consent form (enclosed) to confirm your agreement to participate.

QUESTIONS / FURTHER INFORMATION ABOUT THE RESEARCH PROJECT

If you have any questions or require further information please contact one of the listed researchers:

H.R Achini Ranaweera	hr.achini@hdr.qut.edu.au	07 3138 8383
Brett Martin	brett.martin@qut.edu.au	07 3138 7739

CONCERNS / COMPLAINTS REGARDING THE CONDUCT OF THE RESEARCH PROJECT

QUT is committed to research integrity and the ethical conduct of research projects. However, if you do have any concerns or complaints about the ethical conduct of the research project you may contact the QUT Research Ethics Advisory Team on 07 3138 5123 or email humanethics@qut.edu.au. The QUT Research Ethics Advisory Team is not connected with the research project and can facilitate a resolution to your concern in an impartial manner.

THANK YOU FOR HELPING WITH THIS RESEARCH PROJECT.

PLEASE KEEP THIS SHEET FOR YOUR INFORMATION.

CONSENT FORM FOR QUT RESEARCH PROJECT
– Interview–

What you touch, touches you: The impact of haptics on consumer brand impressions
QUT Ethics Approval Number 1700000655

RESEARCH TEAM

Principal Researcher:	Mrs H.R. Achini Ranaweera	PhD student
Associate Researchers:	Professor Brett Martin	Principal Supervisor
	Dr HS Jin	Associate Supervisor

School of Advertising, Marketing and Public Relations,
QUT Business School
Queensland University of Technology (QUT)

STATEMENT OF CONSENT

By signing below, you are indicating that you:

- Have read and understood the information document regarding this research project.
- Have had any questions answered to your satisfaction.
- Understand that if you have any additional questions you can contact the research team.
- Understand that you are free to withdraw without comment or penalty anytime during the interview or up till 2 weeks after the interview.
- Understand that if you have concerns about the ethical conduct of the research project you can contact the Research Ethics Advisory Team on 07 3138 5123 or email humanethics@qut.edu.au.
- Understand that non-identifiable data from this project may be used as comparative data in future research projects.
- Understand that the research project will include an audio recording.
- Agree to participate in the research project.

Name _____

Signature _____

Date _____

PLEASE RETURN THE SIGNED CONSENT FORM TO THE RESEARCHER.

Brief Introduction:

A consumer may touch a product to obtain haptic information about the product through four specific material properties: **Texture, Hardness, Weight and Temperature**. Below shows the final list of haptic scales found in the available literature.

*The term **haptics** in marketing often refers to the active seeking and perception by the hands.*

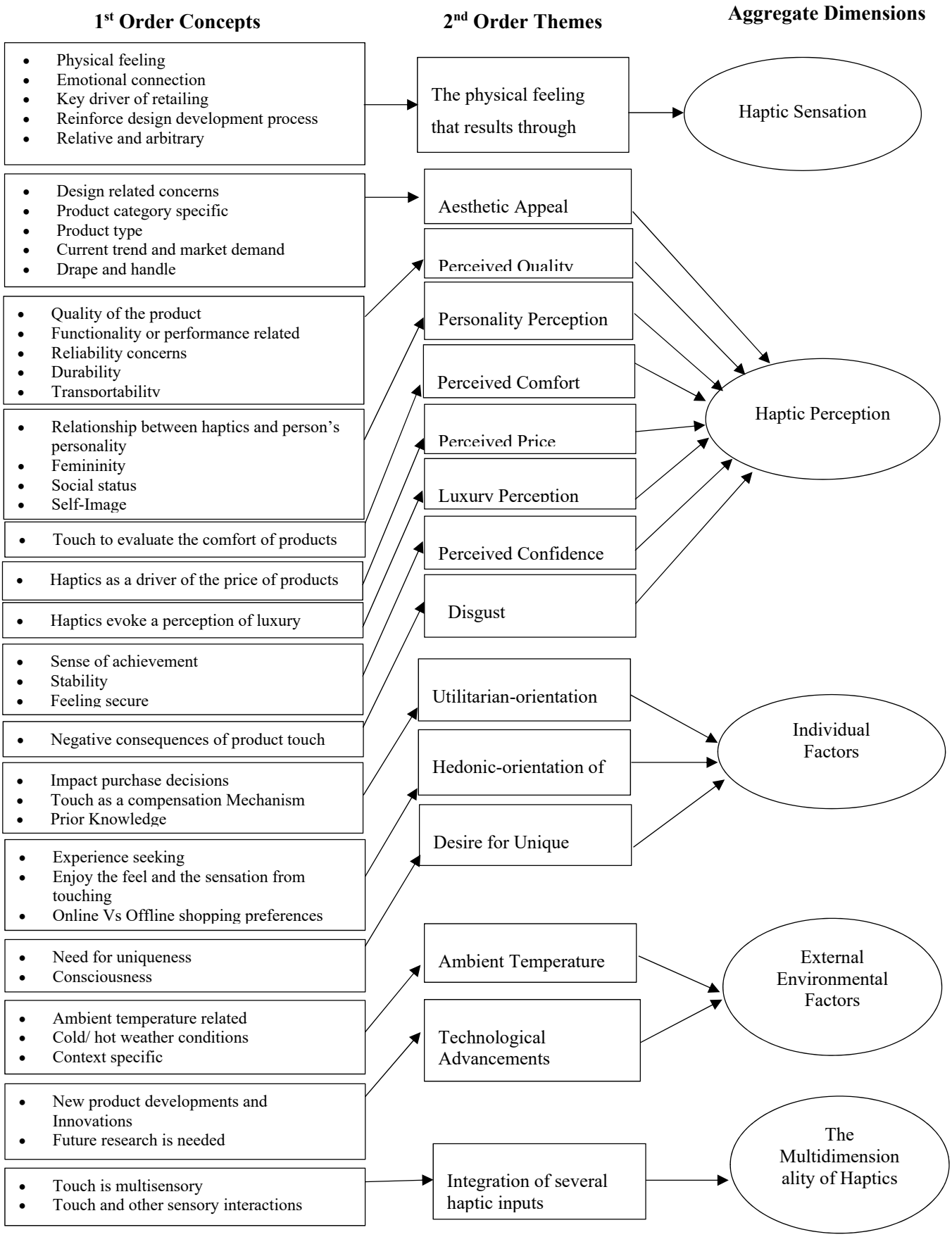
1) Based on your knowledge and experience being a fashion industry professional, please classify following haptic properties under the most suitable material property: Texture, Hardness, Weight and Temperature.
***E.g.: Warm–Cool = "Temperature"* or N/A, if it does not apply in the fashion context.**

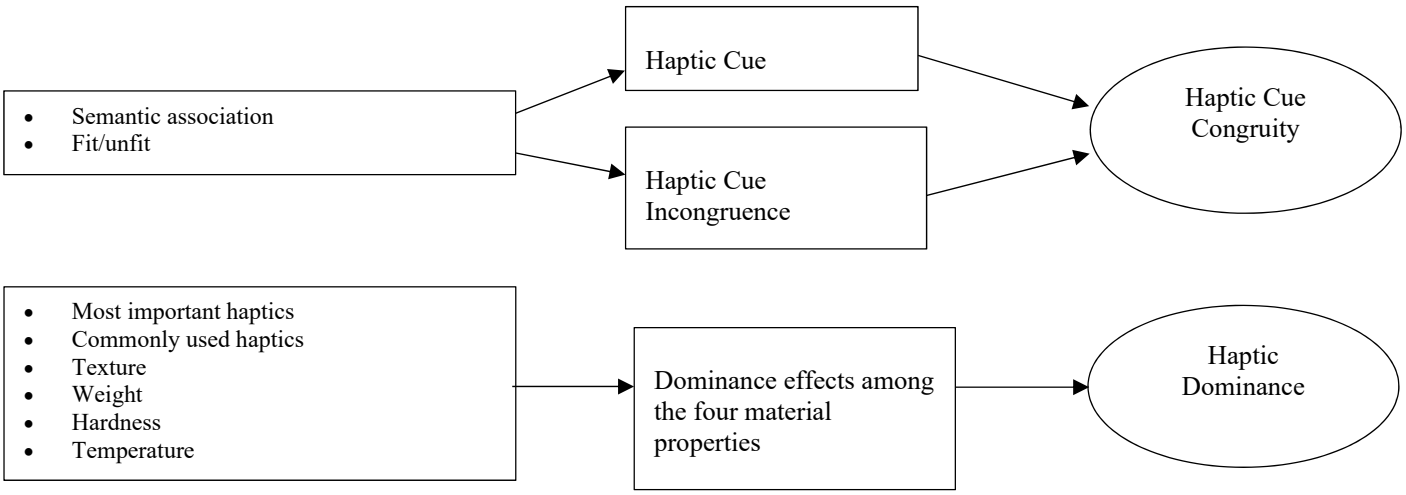
1. Warm - Cool
2. Hard- Soft
3. Firm- Flimsy
4. Strong-Weak
5. Stability-Instability
6. Rigid-Malleable
7. Stiff- Not stiff
8. Sharp- Dull
9. Rough- Smooth
10. Rough-Sleek
11. Wet- Dry
12. Oily-Dry
13. Heavy- Light
14. Compressible- Non compressible
15. Thick - Thin
16. Even-Uneven
17. Solid-Powdery
18. Bulky-Light
19. Flexible-Inflexible
20. Flat-Bumpy
21. Structured-Unstructured
22. Rounded- Pointed
23. Relief-No relief
24. Substantial- Empty
25. Elastic - Inelastic
26. Sticky- Slippery
27. Coated- Uncoated
28. Waxed- Un-waxed
29. Grainy/gritty- Fine
30. Ribbed-Not ribbed
31. Rugged - Smooth
32. Steady- Loose
33. Fluffy- Rough
34. Spongy-Solid
35. Itchy-Not itchy
36. Feathery- Not feathery
37. Embossed – Not embossed
38. Multi-layered-Single-layered
39. Chalky- Smooth
40. Silky- Not silky
41. Fuzzy/hairy/furry –Not fuzzy
42. Jagged - Smooth
43. Viscous-Watery
44. Brittle – unbreakable
45. Coarseness-Delicacy

2) What would be the most important haptic property in fashion?

3) Does this dimension determine the influence of other haptic dimensions?

Appendix D: The coding process




Semantic association
Fit/unfit
Haptic Cue
Haptic Cue Incongruence
Haptic Cue Congruity
Most important haptics
Commonly used haptics
Texture
Weight
Hardness
Temperature
Dominance effects among the four material properties
Haptic Dominance

Appendix E: Pre-test Information

PARTICIPANT INFORMATION FOR QUT RESEARCH PROJECT
– Pre-test –

What you touch, touches you: The impact of haptics on consumer brand impressions
QUT Ethics Approval Number 1700001156

RESEARCH TEAM

Principal Researcher:	H.R Achini Ranaweera	PhD student
Associate Researchers:	Professor Brett Martin	Principal Supervisor
	Dr HS Jin	Associate Supervisor

School of Advertising, Marketing and Public Relations
QUT Business School
Queensland University of Technology (QUT)

DESCRIPTION

This research project is being undertaken as part of a PhD study by H.R Achini Ranaweera.

This study focuses on consumers' product touch behaviour. The overall purpose of this study is to study the effect of product touch on consumer's impressions of brands.

You are invited to participate in this marketing experimental study because you:

1. Are an Australian resident from 18 years old and above.
2. Have prior shopping experiences.

PARTICIPATION

Participation will involve a product evaluation task for less than 60 seconds. Following this, you are required to complete a 6 item anonymous survey with Likert scales answers (strongly agree-strongly disagree) that will take approximately take 5 minutes of your time. This task must be done in a research lab (controlled environment) at QUT, so you must travel to the lab at QUT Gardens Point campus to participate to the study.
Questions will include:

- I felt the texture of the product as (1=smooth, 7=rough)
- I felt the weight of the product as (1= light weight, 7= heavy weight)

Your participation in this research project is entirely voluntary. If you agree to participate you do not have to complete any question(s) you are uncomfortable answering. Your decision to participate or not participate will in no way impact upon your current or future relationship with QUT (for example your grades). If you do agree to participate you can withdraw from the research project during your participation without comment or penalty. Partial surveys may or may not be used in the analysis. However as the survey is anonymous once it has been submitted it will not be possible to withdraw.

EXPECTED BENEFITS

It is expected that this research project will not directly benefit you. However, it may benefit marketing academics and practitioners by enhancing the understanding of product touch. *If you wish you can obtain a summary of the research outcome by sending an email to* hr.achini@hdr.qut.edu.au*. It is anticipated that a summary will be available in early 2019. To recognise your contribution should you choose to participate the research team is offering you a* complimentary coffee card from Merlo Coffee*. You must complete both tasks to receive this voucher.*

RISKS

There are no risks beyond normal day-to-day living associated with your participation in this research project.

PRIVACY AND CONFIDENTIALITY

All comments and responses are anonymous and will be treated confidentially unless required by law. The names of individual persons are not required in any of the responses. Any data collected as part of this research project will be stored securely as per QUT's Management of research data policy.

Please note that non-identifiable data from this research project may be used as comparative data in future projects or stored on an open access database for secondary analysis.

CONSENT TO PARTICIPATE

Participating to the experimental session that you have signed up for and completing the experimental tasks are accepted as an indication of your consent to participate in this research project.

QUESTIONS / FURTHER INFORMATION ABOUT THE RESEARCH PROJECT

If you have any questions or require further information please contact one of the listed researchers:

H.R Achini Ranaweera	hr.achini@hdr.qut.edu.au	07 3138 8383
Professor Brett Martin	brett.martin@qut.edu.au	07 3138 7739

CONCERNS / COMPLAINTS REGARDING THE CONDUCT OF THE RESEARCH PROJECT

QUT is committed to research integrity and the ethical conduct of research projects. However, if you do have any concerns or complaints about the ethical conduct of the research project you may contact the QUT Research Ethics Advisory Team on 07 3138 5123 or email humanethics@qut.edu.au. The QUT Research Ethics Advisory Team is not connected with the research project and can facilitate a resolution to your concern in an impartial manner.

THANK YOU FOR HELPING WITH THIS RESEARCH PROJECT.

PLEASE KEEP THIS SHEET FOR YOUR INFORMATION.

Questionnaire

I felt the **Texture** of the product was

	1	2	3	4	5	6	7	
Smooth	○	○	○	○	○	○	○	Rough

I felt the **Weight** of the product was

	1	2	3	4	5	6	7	
Light Weight	○	○	○	○	○	○	○	Heavy Weight

I only considered **the surface** of the product during my product evaluation task

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

I considered **the** entire product during my product evaluation task

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Appendix F: Main Experimental Study Information

PARTICIPANT INFORMATION FOR QUT RESEARCH PROJECT

– Experimental Study –

What you touch, touches you: The impact of haptics on consumer brand impressions
QUT Ethics Approval Number 1700001156

RESEARCH TEAM

Principal Researcher:	H.R Achini Ranaweera	PhD student
Associate Researchers:	Professor Brett Martin	Principal Supervisor
	Dr HS Jin	Associate Supervisor

School of Advertising, Marketing and Public Relations
QUT Business School
Queensland University of Technology (QUT)

DESCRIPTION

This research project is being undertaken as part of a PhD study by H.R Achini Ranaweera.

This study focuses on consumers' product touch behaviour. The overall purpose of this study is to study the effect of product touch on consumer's impressions of brands.

You are invited to participate in this in this marketing experimental study because you:

1. Are an Australian resident from 18 years old and above.
2. Have prior shopping experiences.

PARTICIPATION

Participation will involve a product evaluation task for less than 60 seconds. Following this, you are required to complete a 66 item anonymous survey with Likert scales answers (strongly agree-strongly disagree) that will take approximately take 10 minutes of your time. This task must be done in a research lab (controlled environment) at QUT, so you must travel to the lab at QUT Gardens Point campus to participate to the study.
Questions will include:

- How familiar you are with the product
- My willingness to buy the product is
- How confident you are in your product evaluation judgments

If you are interested in participating please reply to this email

Your participation in this research project is entirely voluntary. If you agree to participate you do not have to complete any question(s) you are uncomfortable answering. Your decision to participate or not participate will in no way impact upon your current or future relationship with QUT (for example your grades). If you do agree to participate you can withdraw from the research project during your participation without comment or penalty.

Partial surveys may or may not be used in the analysis. However as the survey is anonymous once it has been submitted it will not be possible to withdraw.

EXPECTED BENEFITS

It is expected that this research project will not directly benefit you. However, it may benefit marketing academics and practitioners by enhancing the understanding of product touch. *If you wish you can obtain a summary of the research outcome by sending an email to* hr.achini@hdr.qut.edu.au. *It is anticipated that a summary will be available in early 2019. To recognise your contribution should you choose to participate the research team is offering you a $4.50 worth complementary coffee voucher from Merlo Coffee. You must complete both tasks to receive this voucher.*

RISKS

There are no risks beyond normal day-to-day living associated with your participation in this research project.

PRIVACY AND CONFIDENTIALITY

All comments and responses are anonymous and will be treated confidentially unless required by law. The names of individual persons are not required in any of the responses. Any data collected as part of this research project will be stored securely as per QUT's Management of research data policy.

Please note that non-identifiable data from this research project may be used as comparative data in future projects or stored on an open access database for secondary analysis.

CONSENT TO PARTICIPATE

Participating to the experimental session that you have signed up for and completing the experimental tasks are accepted as an indication of your consent to participate in this research project.

QUESTIONS / FURTHER INFORMATION ABOUT THE RESEARCH PROJECT

If you have any questions or require further information please contact one of the listed researchers:

H.R Achini Ranaweera	hr.achini@hdr.qut.edu.au	07 3138 8383
Professor Brett Martin	brett.martin@qut.edu.au	07 3138 7739

CONCERNS / COMPLAINTS REGARDING THE CONDUCT OF THE RESEARCH PROJECT

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THANK YOU FOR HELPING WITH THIS RESEARCH PROJECT.
PLEASE KEEP THIS SHEET FOR YOUR INFORMATION.

Questionnaire

Age ----------

Gender

- ○ **Male**
- ○ **Female**
- ○ **Other**

I felt the Weight of the product was

	1	2	3	4	5	6	7	
Light Weight	○	○	○	○	○	○	○	Heavy

I felt the Texture of the product was

	1	2	3	4	5	6	7	
Smooth	○	○	○	○	○	○	○	Rough

I felt the Temperature of the product was

	1	2	3	4	5	6	7	
Cool	○	○	○	○	○	○	○	Warm

I felt the Hardness of the product was

	1	2	3	4	5	6	7	
Flimsy	○	○	○	○	○	○	○	Firm

The likelihood that the product would be reliable is

	1	2	3	4	5	6	7	
Very low	○	○	○	○	○	○	○	Very high

The product is

	1	2	3	4	5	6	7	
Very poor quality	○	○	○	○	○	○	○	Very good quality

The workmanship of the product is

	1	2	3	4	5	6	7	
Very low	○	○	○	○	○	○	○	Very high

The likelihood that this product is dependable is

	1	2	3	4	5	6	7	
Very low	○	○	○	○	○	○	○	Very high

The product seems to be durable

	1	2	3	4	5	6	7	
Strongly disagree	○	○	○	○	○	○	○	Strongly agree

The likelihood of purchasing this product is

	1	2	3	4	5	6	7	
Very low	○	○	○	○	○	○	○	Very high

The probability that I would consider buying this product is

	1	2	3	4	5	6	7	
Very low	○	○	○	○	○	○	○	Very high

My willingness to buy the product is

	1	2	3	4	5	6	7	
Very low	○	○	○	○	○	○	○	Very high

How familiar you are with the product

	1	2	3	4	5	6	7	
Not very familiar	○	○	○	○	○	○	○	Very familiar
Not known to me	○	○	○	○	○	○	○	Known to me

How would you rate the product?

	1	2	3	4	5	6	7	
Not attractive	○	○	○	○	○	○	○	Attractive
Not desirable	○	○	○	○	○	○	○	Desirable
Not arousing	○	○	○	○	○	○	○	Arousing
Not beautiful	○	○	○	○	○	○	○	Beautiful
Doesn't make me like this product	○	○	○	○	○	○	○	Makes me like this product

For each of the words listed below, Please ask yourself "if the product you have just evaluated was a person, how well would this word describe him or her"?

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Down-to-earth	○	○	○	○	○	○	○
Honest	○	○	○	○	○	○	○
Wholesome	○	○	○	○	○	○	○
Cheerful	○	○	○	○	○	○	○
Daring	○	○	○	○	○	○	○
Spirited	○	○	○	○	○	○	○
Imaginative	○	○	○	○	○	○	○
Up-to-date	○	○	○	○	○	○	○
Reliable	○	○	○	○	○	○	○
Intelligent	○	○	○	○	○	○	○
Successful	○	○	○	○	○	○	○
Upper-class	○	○	○	○	○	○	○
Charming	○	○	○	○	○	○	○
Outdoorsy	○	○	○	○	○	○	○
Tough	○	○	○	○	○	○	○

NFT Please answer the following questions

	Strongly disagree	Disagree	Somewh at disagree	Neither agree nor disagree	Somewh at agree	Agree	Strongly agree
When walking through stores, I can't help touching all kinds of products	○	○	○	○	○	○	○
Touching products can be fun	○	○	○	○	○	○	○
When browsing in stores, it is important for me to handle all kinds of products	○	○	○	○	○	○	○
I like to touch products even if I have no intention of buying them	○	○	○	○	○	○	○
When browsing in stores, I like to touch lots of products	○	○	○	○	○	○	○
I find myself touching all kinds of products in stores	○	○	○	○	○	○	○
I place more trust in products that can be touched before purchase	○	○	○	○	○	○	○
I feel more comfortable purchasing a product after physically examining it	○	○	○	○	○	○	○
If I can't touch a product in the store, I am reluctant to	○	○	○	○	○	○	○

purchase the product							
I feel more confident making a purchase after touching a product	○	○	○	○	○	○	○
The only way to make sure a product is worth buying is to actually touch it	○	○	○	○	○	○	○
There are many products that I would only buy if I could handle them before purchase	○	○	○	○	○	○	○

What do you think the product is?
