

CRANFIELD UNIVERSITY

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SEGMENTING CUSTOMERS BASED ON THEIR UNCONSCIOUS
NEEDS

Cranfield School of Management

DBA

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Abstract

This paper contributes to the literature by proposing a new methodological approach for understanding customers' unconscious needs. This approach combines Unconscious Thought Theory (UTT) with Choice-Based Conjoint (CBC), for the first time, to identify needs that segment members are either unaware of, or unable/unwilling to articulate. This methodological approach identified an additional market segment, distinct from those identified by a traditional customer segmentation approach based on customer need articulation. Ergo, understanding unconscious needs may provide additional customer insight and aid marketers in developing new propositions and gaining market share. This study, therefore, makes a methodological contribution to the literature.

The study involves the segmentation of buyers of snack bars (i.e. cereal bars), based on subjective nutritional information importance (as revealed on packaging). Separate samples of buyers were recruited: one group as a control sample completing a traditional CBC exercise; a second group completing the same CBC exercise but asked to complete a UTT working memory distraction-task between each choice-task and responding to it. This allowed a comparison of the segmentations of two groups (one which incorporated unconscious thought theory and the other which did not).

Latent Class Segmentation (LCS) analysis indicated that whilst both approaches generate four similar segments, the CBC/UTT approach revealed a fifth (hidden) segment, unidentified in the other sample. In addition, the nutritional preferences of four of the five segments produced via the CBC/UTT approach matched those demonstrated by the participants' store card behavioural data in a manner unobserved for the traditional CBC approach.

This research provides a framework for further exploration and identifies a number of issues, such as which types of working memory distraction-tasks are most effective, that could potentially improve the approach if replicated.

Keywords: Customer needs, subconscious needs, implicit needs, segmentation, measurement, Unconscious Thought Theory, Distraction-task, Working Memory, Latent Class Segmentation

Paper type: Empirical Study

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List of Abbreviations

AIDA	Awareness, Interest, Desire and Action
ANS	Autonomic Nervous System
CAIC	Consistent Akaike Information Criterion
CCEA	Convergent Cluster & Ensemble Analysis
CBC	Choice-Based Conjoint
ESOMAR	European Society for Opinion and Market Research
GSR	Galvanic Skin Responses
HB	Hierarchical Bayes
IAT	Implicit Association Test
LCS	Latent Class Segmentation
PLAM	Psychometric Latent Agreement Model
RCUK	Research Councils UK
RLH	Root Likelihood
SOM	School of Management
SQD	Split Questionnaire Design
SSVEP	Steady State Visually Evoked Potential
TAT	Thematic Apperception test
TMS	Transcranial Magnetic Stimulation
UT	Unconscious Thought
UTT	Unconscious Thought Theory
WM	Working Memory

1 Introduction to the Study

1.1 Introduction

Needs-based segmentation has become the segmentation method of choice in contemporary market research (Myers, 1996), but empirical evidence suggests that the outputs from this work often fail to deliver the impact expected. A survey of 215 UK marketing professionals found that while over four-fifths of this group had conducted segmentation research, less than half felt that the findings played a crucial part in shaping their company's marketing strategy (Tancock, 2004).

Dibb (1998: 396) defines segmentation failure as a "segmentation process which has failed to generate a solution that can be implemented." While a number of different factors could contribute to this reason for failure, a key one could be the lack of insight provided by a segmentation based on conscious needs (Nevid, 2010). This would suggest that a segmentation which is based on unconscious needs may provide more insight and so may ultimately be more successful.

This chapter, therefore, outlines the rationale for developing a methodology that could be used to segment customers on the basis of their unconscious needs rather than their conscious needs, in the hope that such an approach would more effectively capture a target market's "real" needs. It describes the specific purpose of the research, with clear evaluative criteria, along with the philosophical position used to guide the work. Finally, it describes the intended contribution of the research before presenting an overview of the remaining chapters.

1.2 Research Context

This DBA is a reflection of the insights identified during an extensive review of the literature, the needs and wishes of the Retailer agreeing to support the author through the empirical project, and the author's own desire to challenge the conventional orthodoxy around how customer segmentation studies should be conducted and what can be achieved.

Three aspects were considered as part of this overall research context:

- The definition of customer needs
- The research design adopted
- The category chosen.

Each is discussed below:

1.2.1 The Definition of Customer Needs

A person's true or "real" needs are generally viewed as a combination of their conscious and unconscious goals and motivators (Bargh and Morsella, 2010). Historically, needs-based segmentation has always focused on explicit, or conscious customer needs (Greenberg and Schwartz McDonald, 1989). When seeking to understand a customer's needs, researchers will typically ask them direct questions (Bradburn et al., 2004). These questions may be administered as part of a face-to-face interview or an anonymous survey. By asking respondents direct questions, it is highly likely that the respondents will be forced to use the conscious part of their mind (Kahneman, 2011). There is, however, a large body of work that suggests that unconscious needs may provide more insight than explicit (articulated) needs due to the tendency of people to provide socially acceptable answers when expressing their conscious needs (Nevid, 2010). Despite this work, the majority of 'needs-based' segmentation work is still based on conscious needs (Pincus, 2004).

A systematic review of the literature reveals four main types of managerial imperatives for understanding customer needs: (1) understanding decision-making, (2) helping to develop new products or services, (3) developing more powerful advertising and communications, and (4) gaining a greater insight into a person's feeling or attitudes. Most customer segmentation studies tend to be conducted either to help understand a customer's decision-making process or to get a greater insight into a customer's feeling or attitudes (Wilkie and Cohen, 1977). The study conducted for this DBA is focused on understanding a customer's subconscious decision-making process. This is an important distinction to make: in general, the understanding of decision-making is focused upon identifying the relative importance of factors that guide a decision, rather than trying to find new factors that might influence a decision, but have not been considered (Saaty, 2008).

According to Gregg (2013a), subconscious decision-making may occur due to one of three distinct reasons: (1) the individual may be trying to deceive others; (2) the individual may be deceiving themselves, or (3) the individual may be (unwittingly) deceiving themselves and others. To understand needs that the individual neither (consciously) recognises and cannot or will not express, a combination of techniques was envisaged. The combination would first allow the individual to recognise the need in themselves (i.e. tap into their own subconscious decision-making process) and then let the individual express the need to others.

Recent work by Dijksterhuis and Nordgren (2006) on Unconscious Thought Theory (UTT) provides a potential method for understanding a person's unconscious decision-making process. The approach is very similar to the idea of sleeping on a decision or taking a break from trying to solve a difficult problem. It was recognised long ago by Wallas (1926) and involves distracting participants while they make a decision. The theory proposed by Dijksterhuis and Nordgren (2006) to explain this phenomenon is that by distracting the participant, their subconscious mind continues to work on the problem.

1.2.2 The Research Design Adopted

Indirect research methods are most suitable for understanding needs that a person may not want to or may be unable to express and some authors suggest that such methods represent an implicit route to understanding a person's needs (Merikle and Reingold, 1991). Choice-Based Conjoint (CBC) is one such technique and was deemed most suitable for this purpose (Green et al., 2001). A number of other current approaches were identified in the literature review, but they were rejected for a variety of reasons, ranging from the impracticality of the methodology for conducting the large number of interviews needed for a segmentation study (e.g. ethnography, or brain scanning techniques), or lack of published validity for other techniques (e.g. facial coding)- see section 2.3.10.8 for more details). CBC forces participants to choose between a number of different product options (Louviere et al., 2000). Each product is comprised of a number of different attributes and levels (Green and Srinivasan, 1978). By asking the participant to choose between a series of different choices, it is possible

to identify (indirectly) which attributes and levels are driving their selection (Orme, 2010). This indirect approach is one of the few known methods identified in the literature for understanding a person's needs in a way which goes beyond their conscious awareness.

As it transpires, the choices presented in a CBC exercise are structured in a very similar way (using attributes and levels) to the options presented by Dijksterhuis and Nordgren (2006) in their work on UTT. The research in this DBA merges these two approaches together so that the participants answer a CBC questionnaire, but engage in a distraction-task between being shown each choice-task and responding to it. This combination of techniques allows the individual to recognise the need in themselves (i.e. tap into their own subconscious decision-making process) and then lets the individual express the need to others.

In order to verify that this combination of approaches was able to access a person's hidden needs and preferences, it was important to compare the approach to an alternative method of understanding such needs. The research was conducted, therefore, as a test and control experiment, with one sample of respondents acting as a control group by completing a regular CBC exercise, while the test group completed the combined CBC/UTT exercise.

1.2.3 The Category Chosen

The author had been working with a UK multinational supermarket group ('the Retailer') which was very interested in participating in a study to understand a customer's unconscious needs, and so the Retailer agreed to support the author during this DBA process. The Retailer was particularly interested in understanding hidden needs regarding the nutritional claims made on a food product's packaging. They selected the snack bar category as their priority as they believed that it was a product type for which the nutritional content would be important to customers.

1.3 Specific Purpose of Research

Given this background, the purpose of this thesis is to understand if Unconscious Thought Theory can supplement and enrich a Choice-Based Conjoint interview to

produce a customer decision-making segmentation that more effectively reflects customers' unconscious motivations and actual customer behaviour when choosing snack bars and so is less likely to be deemed a "failure" (i.e. it generates a solution that can be implemented (Dibb, 1998)). The need for a methodology which could produce such a segmentation, and could be evaluated on its ability to reflect subconscious needs and perhaps link to behavioural data, was clearly articulated by Pincus (2004) a practitioner writing in the *Journal of Consumer Behaviour*. The resultant contribution of this DBA is the description and demonstration of a methodology which is able to create this novel segmentation.

1.4 Philosophical Positioning

In taking a philosophical position to address the research question, several options were considered, before finally selecting the Complexity Theory perspective. Historically, many segmentation studies have been conducted using modernist or positivist epistemologies. While these may be appropriate for some authors, the assumptions of rationality and measurability are contrary to the idea that consumers might make subconscious decisions that appear to be irrational in nature, by relying on instinct and habit. A post-modern or post-positivist approach was also evaluated but ultimately rejected due to the assumptions of fragmentation and loss of commitment (Firat and Shultz, 1997) which make it difficult to envisage the concept of discrete groups of loyal customers that can then be targeted by a marketing campaign. Also, the remark by Amine and Alexander Smith (2009: 72), that "post-modern segmentation is an oxymoron" makes it difficult to support such an epistemological approach.

A Critical Realism perspective was considered due to the need to understand both the observed and unobserved thought processes of customers. Critical Realism assumes that "reality consists of not only events that are experienced, but also events that occur whether experienced or not and of the structures and mechanisms that produce these events" (Blaikie, 2009: 101). The events that are experienced can be viewed as the explicit needs. The events that may or may not be experienced are the unconscious needs. The structures and mechanisms are the theoretical factors that explain how

needs are formed and articulated. Also, several of the Critical Realist research design characteristics, such as abductive and retroductive research strategies and mixed method approaches to data collection fit well with the research design envisaged for this work.

There is, however, a need within this research to apply a system's analysis approach to understanding which factors appear to reveal the most about a person's unconscious needs. System's analysis is a "problem-solving technique that decomposes a system into its component pieces for the purpose of studying how well those parts work and interact to accomplish their purpose (Bentley et al., 2007). CBC and its assumption of additive part-worths is based on this approach (Louviere et al., 2000). The system's analysis approach is core to the philosophical perspective of Complexity Theory (Blaikie, 2007) which tries to steer a course between modernism and post-modernism, rejecting the traditional view of science, but at the same time rejecting the anti-scientific doctrines of post-modernism. Complexity Theory also draws heavily on the ontological assumptions of Critical Realism (Blaikie, 2007), and as such, it is an ontologically founded framework of understanding (Byrne and Callaghan, 2013).

In applying a Complexity Theory philosophical positioning to this DBA, however, it is important to recognise that "Complexity Theory is a reconstruction rather than deconstruction of the classic science model" (Price, 1997). It is a scientific ontology (as is Critical Realism), and as such it is acceptable to use basic scientific frameworks (such as standard statistical analyses) to assess aspects such as the rigor and reliability of quantitative data.

In addition to this basic scientific underpinning, however, one key feature of Complexity Theory is the idea of non-linearity (Byrne and Callaghan, 2013). In conventional quantitative accounts of causality, a change in the value of an effect is proportionate to changes in causal elements – so as an example, a reduction in the price of an item would then cause a proportionate shift in a person's demand for that item. While this may occur at the aggregate level, it may not be true at the individual level (Monroe, 1973). Non-linear relationships are different as they allow for the possibility of a threshold effect, where a change in the effect is proportionate to the

change in causal element(s) until a particular point is reached where the change becomes disproportionate (Nicolis, 1995). Hence a person's demand for an item may be linear up to a certain point, but will then cease altogether if the price is too high. This concept fits closely with several commentators' beliefs on how needs influence behaviour and so form the basis of the philosophical position assumed (De Felice and Petrillo, 2011; Lee, 2005). It also fits with the assumptions behind CBC (Green et al., 2001). It is worth mentioning, however, that Complexity Theory does not insist that all relationships are non-linear. It simply embraces that possibility that non-linear relationships might exist.

A second key feature of Complexity Theory is the move from a population/analytic approach to a case/narrative approach. These cases (individuals) are regarded as fuzzy realities with autonomously defined complex properties which are engaged in perpetual dialogue with their environment, a dialogue of action and constraint referred to as "plot" (Abbott, 1992: 65). This case-based approach could be an important aspect of understanding a customer's unconscious needs since it reflects the reality of individuals who, due to their inability to know their own needs, cannot be assigned to specific segments with the absolute certainty required by traditional positivist approaches to segmentation (Hines and Quinn, 2005). This philosophy also matches the mathematics behind Latent Class Segmentation, which calculates the probability of each respondent belonging to each particular segment (Magidson and Vermunt, 2002).

A third relevant feature of Complexity Theory is its assumption about the micro-macro link between individuals and society (Sawyer, 2005). Sawyer suggests reality only exists at the individual (micro) level. Social or societal phenomenon (macro) is referred to as a constellation of entities and activities, typically actors and their activities, which behave in such a way as to regularly bring about the type of phenomenon we seek to explain (Hedström, 2005). Again, this philosophy fits with the approach taken with this research, where the individuals define the reality of their conscious and unconscious needs, but the collective grouping of such persons and their needs emerge as a consequence of the overall segmentation.

The adoption of a Complexity Theory epistemology suggests that the best way to explore a research question is by using a retroductive research strategy (Blaikie, 2009). Retroduction is a “mode of inference in which events are explained by postulating (identifying) mechanisms that are capable of producing them” (Sayer, 1992:107). The retroductive research strategy can be summarised as follows:

- I. To explain observable phenomena, and the events that occur between them, researchers must attempt to discover appropriate structures and mechanisms.
- II. Since these structures and mechanisms are often unobservable, a model is constructed such that, were it to represent these mechanisms and structures correctly, the phenomena would then be causally explained.
- III. The model is then tested as a hypothetical description of actual events and their relations. Further consequences of the model are identified so that they may be evaluated empirically.
- IV. If these tests are successful, this gives good reason to believe in the existence of these structures and mechanisms. It may be possible to obtain more direct confirmation of these existential claims by the development and use of suitable instruments.
- V. The whole process of model building is then repeated to explain the structures and mechanisms already discovered (Keat and Urry, 1975).

The complexity theory epistemology and scientific ontology, which is heavily linked to the critical realist ontology, and their shared associated retroductive research strategy has, therefore, been used to guide the study conducted in this DBA.

1.5 Conclusions

This chapter has set out the reasons for wishing to explore methodologies that might be used to segment people based on their subconscious decision-making when choosing snack bars. It has also set out the evaluation criteria for the study, and it has discussed the relevance of using a complexity theory epistemology as a framework to guide the work. The remainder of this document describes the process that identified UTT as a potential method for understanding an individual's subconscious thoughts and the empirical research that was conducted to demonstrate that it can be used to segment people based on their subconscious needs. This empirical research forms the basis for the methodological contribution that the researcher is claiming in this DBA. The final part of this document includes a discussion of additional qualitative research that was conducted to assess reaction to the empirical research among practitioners.

2 Literature Review

2.1 Introduction

The literature review was conducted in two stages: an initial scoping literature review followed by a systematic literature review. The initial literature review is used to gain an understanding of the main literature regarding segmentation and understanding hidden customer needs¹. The review also demonstrates a paucity of techniques for understanding hidden or unconscious customer needs. The systematic literature review is used to explore the definition of hidden or unconscious needs in more detail and to identify more potential methods for understanding these needs, beyond the limited number of methodologies identified in the initial review.

2.2 Initial Literature Review

The initial literature review defines the key concepts clearly and identifies the areas which require deeper investigation.

2.2.1 Definitions

Market segmentation is defined as “the process of splitting customers into different groups or segments within which customers have similar characteristics and similar needs; by doing this, each one can be targeted and reached with a distinct marketing mix” (McDonald et al., 1995: 10). The process makes it possible to develop a better understanding of customers’ needs and decision criteria (Wind and Douglas, 1972). This definition is most relevant because it explicitly discusses both the process of segmentation as well as the purpose for which it will be used and evaluated. Other definitions are discussed later in this thesis to illustrate the different schools of thought regarding segmentation.

Customer needs and motives can be split into two broad forms: (1) expressed (explicit/ conscious) and (2) hidden (implicit/ latent/ unconscious) (Slater and Narver, 1999; Schultheiss et al., 2009; Narver et al., 2004) as follows:

¹ The search term “hidden needs” was used in the initial literature review, but this was refined to become “unconscious needs” by the end of the Systematic Literature Review

- *Expressed needs* are defined as the “needs and solutions of a customer of which the customer is aware and, therefore, can express” (Narver et al., 2004: 336)
- *Hidden needs* are defined as needs that “customers cannot articulate and probably have not even recognised themselves” (Goffin et al., 2010: 3)

2.2.2 Market Segmentation

While the concept of market segmentation was originally postulated by Wendell Smith (1956), there are a number of examples of products being specifically targeted towards different groups of consumers prior to this paper. For example, the German book trade clearly targeted different types of buyers with different types of books as far back as the nineteenth century (Fullerton, 2012).

It was, however, Wendell Smith who first used the term market segmentation and viewed the issue from the perspective of “basic differences in user needs,” rather than different product offerings (Smith, 1956: 6). He defined market segmentation as “viewing a heterogeneous market as a number of smaller homogenous markets in response to differing product preferences among important market segments.” His definition is by no means, however, the only definition of segmentation. As the subject of segmentation has evolved, so has its purpose and the associated definitions.

2.2.2.1 Purpose of Segmentation

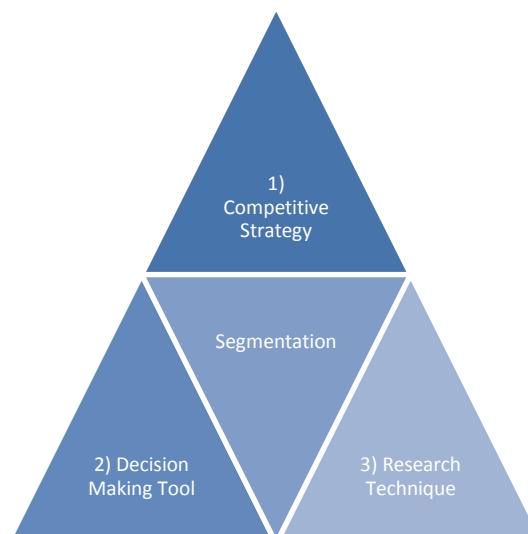


Figure 2-1 - The Three Purposes of Segmentation

Wilkie and Cohen (1977) suggested that there are three primary purposes of segmentation (Figure 2-1):

The first is Smith's (1956) overarching viewpoint that market segmentation is a competitive strategy: "Market segmentation is essentially a merchandising strategy." He goes on to describe it as a "more precise adjustment of product and marketing effort to consumer requirements." From his perspective, it describes the strategy where companies disaggregate their products and services to maximise profits. This perspective was heavily endorsed and developed by the work of Porter (1980), with his suggestion that companies can choose one of three generic strategies: 1) cost leadership, 2) differentiation, or 3) focus. Each strategy implies that the company serves a different customer base. The key criticism of using segmentation as a strategy is that it does not take the competition into account (Moorthy, 1984). In the context of this research, the major issue is that it focuses on the organisational benefit of segmentation, rather than ways to develop or understand the segments. Hence this perspective is not directly relevant to this thesis.

The second perspective on segmentation is that it is a decision-making tool. This view was first postulated by Plank (1985) and focuses on the way that segmentation research can be used to support marketing decision-making around the marketing mix (Reynolds, 2006; Frank and Massy, 1965) and campaign development (Venkatraman et al., 2012), as well as the selection and targeting of different customer types (Dolničar, 2004). A segmentation that is based on customers' hidden needs should provide new perspectives upon which to develop marketing decisions, but this will be a bi-product of this paper rather than the core contribution (which is a methodological one). It is difficult to use the outcome of a hidden needs-based segmentation as a decision-making tool as the majority of literature in this area is based on normative models (Poenaru, 2011). Hence this perspective is not an area of focus for this thesis.

The third and most substantial perspective within the literature views market segmentation as a research technique (Bonoma and Shapiro, 1984; Bock and Uncles, 2002), and this is supported by the fact that market research practitioners are frequent

contributors to the literature (Forsyth et al., 1999; Bond, 2003). The segmentation solution enables the user to understand the overall shape of a defined market, which customers offer the greatest or least potential, and how those customers may be reached most effectively: “The art of employing market segmentation, then, involves appropriate grouping of individual customers into a manageable and efficient (in a cost/benefit sense) number of market segments, for each of which a different marketing strategy is feasible and likely profitable” (Wind and Cardozo, 1974: 155). While this strand of literature has been criticised for creating data that is selected on an ad-hoc basis and does not necessarily provide a clear pathway from which to develop optimal marketing programmes, others have described how they have used ad-hoc data to create such marketing programmes (Greengrove, 2002).

Other literature in this area focuses on the schools of thought that drive the segmentation approach (Figure 2-2) what variables are to be used to develop the segmentation (Figure 2-3) and how the segmentation can be assessed in terms of its effectiveness and impact.

2.2.2.2 Schools of Thought on Segmentation

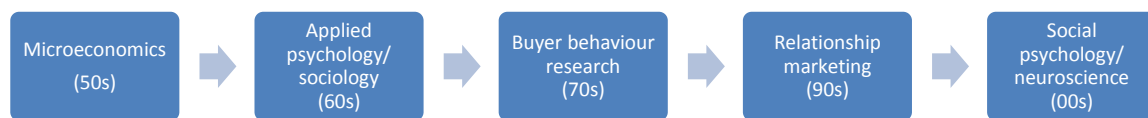


Figure 2-2 - Schools of Thought on Segmentation

The segmentation/ product differentiation theory discussed by Smith (1956), Kuenne (1967) and Alderson (1957), was rooted in microeconomics’ theory. Segmentation was viewed as a way of controlling supply and demand. After the publication of Smith’s paper, a number of people began to look at the issue of segmentation from the perspective of applied sociology and psychology (Hanan, 1968). Authors were particularly interested in segmentation from the perspective of motivation research (Haley, 1968).

In the 60s, segmentation was examined using buyer behaviour theory, and some researchers felt that segmentation should be considered as a branch of buyer

behaviour research (Sheth, 1967). While this idea sounded promising, researchers struggled to attach demographic variables (to make the segments more easily identifiable) to segmentation studies based on customer needs, and this limited the acceptance and use of this type of segmentation (Bonoma and Shapiro, 1984). As a result, interest in segmentation diminished in the 1980s – researchers knew that the methods were not satisfactory, but were unable to overcome the issues identified (Bonoma and Shapiro, 1984). In the 1990s, contributions from the field of relationship marketing changed the nature of the challenge and reinvigorated interest in the area (Wedel, 2001; Snellman, 2000; Marcus, 2001).

It is only in the last decade or so that the fields of social psychology and neuroscience have begun to add to the thinking around segmentation. Most of this thinking appears to be limited to understanding how neuroscience can help to understand reactions to brands (Venkatraman et al., 2012). Some researchers are, however, looking at this area with a view to developing new models about how the brain responds to survey questions (Holleman and Murre, 2007). This new approach to collecting data may make it possible to develop different approaches to questioning, and so lead to more insightful responses to questions that are used to segment customers – especially if linked to a new perspective on motivation and needs-based segmentation (Pincus, 2004).

2.2.2.3 Variables Used for Segmentation



Figure 2-3 - Variables Used for Segmentation

Initial attempts to segment markets tended to focus on demographic or geographic dimensions because they were easily identifiable (Wind, 1978). Practitioners realised, however, that these approaches rarely provided insight into what products people actually wanted to buy, hence the move to more needs-based or behavioural approaches (Greenberg and Schwartz McDonald, 1989). While these approaches

offered great hope, they rarely lived up to expectations since an individual's claimed needs rarely matched their actual behaviour (Kassarjian, 1971). As psychologists became more interested in the whole field, a number of psychographic approaches were also developed such as VALS (Values and Lifestyles), VALS2 (Values and Lifestyles 2) and LOV (List of Values) (Novak et al., 1990). While these techniques have provided much insight, the link between a consumer's behaviour and their psychographic profile is often uncertain (Wells, 1975).

Attempts began to be made to segment using a combination of approaches in the early 1980s (Bonoma and Shapiro, 1984), with the hope of identifying customers' needs/attitudes while also being able to provide distinct demographic criteria with which to target them (called the 'fortuitous overlap'). This approach has resurfaced in the 1990s as a result of better analytical software (Forsyth et al., 1999) but these attempts, by their very design, tend to result in both the needs segmentation and the demographic segmentation being sub-optimal.

The advent of store loyalty card data over the last 20 years has given segmentation a new lease of life (Snellman, 2000). This new data has highlighted the difference between what people might claim to do or need in a survey and what they actually buy in a store. While loyalty card based segmentations have proved to be very useful for retailers, they only explain what people buy rather than why they buy a specific product or service (Allaway et al., 2006).

In the last ten or so years, a number of companies have begun to use situation-specific segmentations (Amine & Smith, 2009). This approach aims to identify the specific moment surrounding purchase and consumption, e.g. time (day part, week part), goals, social factors and activities. These types of segmentation have often proved to be more actionable than traditional people based segmentation studies, but researchers have still found a conflict between claimed motivations and actual behaviour (Pincus, 2004). The problem remains that people struggle to articulate their true needs and motivations (McClelland et al., 1989). Nevertheless, since "needs-based" segmentation has "become the segmentation method of choice in contemporary market research" (Myers, 1996), there are considerable benefits to be

gained from improving the way that companies understand customer needs and segment their customers.

2.2.2.4 Methods for Segmentation

When developing the segmentation, one of the first decisions to be taken is whether to build an *a-priori* or *post hoc* segmentation (Kazbare et al., 2010). An *a-priori* segmentation requires the researcher to identify the segments before any data are collected. A *post hoc* segmentation is developed after the data are collected using statistical analysis tools. Most practitioners will tend to use a hybrid approach whereby they will identify the potential segmentation solution using generic variables *a-priori*, and then refine the solution using statistical tools once the data are available (Wind, 1978).

A market segmentation can be developed as either a quantitative or qualitative exercise. Most of the literature leans towards a quantitative approach. Nevertheless, there are some examples where a qualitative approach to segmentation has been used (Ehrman, 2010; Bond, 2003). In reality, however, a qualitative segmentation will usually be used to help generate the *a-priori* segmentation before the quantitative data collection exercise is conducted (Simmons and Lovejoy, 2003).

There are two statistical approaches to generating a quantitative segmentation: 1) descriptive and 2) predictive (Wedel, 2000). Descriptive approaches use algorithms such as K-means cluster analysis, latent class cluster analysis or Ward's hierarchical method (Wind, 1978; Dibb and Wensley, 2002; Bond, 2003). Predictive approaches, such as Cross Tabulation, Discriminant Analysis, and classification and regression trees (CART), require a dependent variable from which to generate the segmentation (Wedel, 2000; Balakrishnan, 2011).

2.2.2.5 Evaluating Segmentations

Regardless of which segmentation method and variables are chosen, a successful market segmentation must "produce depth of market position in the segments that are effectively defined and penetrated" (Smith, 1956: 5). While this evaluation works once a segmentation has been implemented for some time, marketers need a method

to evaluate potential segmentation solutions so that they may select one from a number that may be generated.

The marketing literature describes a number of criteria for evaluating segmentations to this end. Most include the five criteria suggested by Kotler (2009): (i) measurability, (ii) substantiality, (iii) accessibility, (iv) differentiability and (v) action-ability.

Measurability (also called identifiability) is the ease of identifying and measuring segments using specific segmentation variables; substantiality describes the size of the segments; accessibility the ease to which the targeted segments can be reached through marketing activity; differentiability (responsiveness) suggests whether the segments respond to marketing activity differently and are conceptually distinguishable, and actionability implies that the needs of the segments match the goals and core skills of a company (Wedel, 2000; Van Raaij and Verhallen, 1994; Kotler, 2009).

These five criteria are a core part of the evaluation of the segmentation solutions generated in the empirical phase of this DBA. All segmentation solutions generated based on hidden needs are compared to solutions based on explicit needs and evaluated in terms of Kotler's criteria to determine each segmentation's relative merits and insights provided.

2.2.3 Customer Needs

The study of human motivation begins with the work of William McDougall, a self-labelled anthropologist who sought to show that individuals are motivated by inherited instinct or "propensities" (Weiner, 2013). His works were supported and developed by a number of other psychologists (Freud, 1920; Jung, 1930) and behaviourists (Skinner, 1953). Maslow (1943) took this work much further with his theory of the universal sources of motivation, but increasingly researchers have sought to identify reasons for individual differences in motivation (Cohen et al., 1955). The focus of this section is to review different ways of understanding individual needs (both conscious and unconscious) and exploring ways of measuring these needs (McClelland et al., 1989).

2.2.3.1 Schools of Thought on Needs and Motivations

Discovering the wants and needs of its target customers is the first purpose of an organisation (Webster, 1994; Slater and Narver, 1998). According to a study by the Economist Intelligence Research Unit, only 16% of companies fully understand customer needs, despite spending nearly \$20 billion annually on market research (Fondiller, 2004).

In the first half of the twentieth century, the study of human motivation was dominated by the theories of psychology by Freud (1920) and the field of behaviourism led by Watson (1970) and Skinner (1953). Freud believed that people were primarily driven by primitive urges such as sex and aggression. The behaviourists believed that human beings are conditioned to behave in the way that they do by factors outside of their control. In both instances, these ideas imply that people have limited control over their own minds, with little or no free will of their own.

Abraham Maslow (1943) was the first psychologist to suggest that people are not animals and are driven by a variety of different needs and factors at different times. His approach, which he called humanistic psychology, led a number of psychologists to explore the area of motivation in more depth and in particular to look at the area of “goals.”

Behaviourists believe that a goal is an incentive to find stimuli that affect an organism’s behaviour (Bindra, 2003). This perspective is in contrast to the cognitive, social learning theorists who described goals as “internal and subjective processes” (Bandura, 1989: 730). This perspective has had a huge impact on the study of motivation since it raises questions regarding individual differences in motivations: how people set goals and how they then try to achieve them.

2.2.3.2 Individual Differences in Motivation

Maslow's theory of human motivation was explicitly developed to be universal in nature. Following the publication of his theory, a number of mini-theories were hypothesised to explain differences in motivation in specific situations:

- Need for achievement (McClelland, 1967)
- Need for cognition (Cohen et al., 1955)
- Need for affiliation (Atkinson, 1958)
- Need for power (Atkinson, 1958)

These theories encouraged researchers to segment people on the basis of their needs or personality traits using psychological theories of personality, e.g. the consumer self-actualisation test (Brooker, 1975), and the I-O social preference scale (Kassarjian, 1962).

While these types of segmentation were interesting from a psychological perspective, they were criticised within the marketing community as being non-actionable because they were “not specific to any brand, product or category, and because personality traits were unknowable in the general population” (Pincus, 2004: 380).

This criticism led to a shift in focus away from clustering individuals on general attitudes or traits, e.g. ‘I worry about having enough money’ and towards a product-specific psychographic segmentation, e.g. “The affordability of the car is the most important consideration.” This move towards specificity was fuelled by both the academic discovery that specific attitudes are better predictors of behaviour than general attitudes (Weigel and Newman, 1976; Davidson and Jaccard, 1979) as well as by the desire of marketers to match consumers with specific product features and advertising messages.

The idea of segmenting customers according to their need for specific product benefits ultimately led to the idea of needs-based segmentation. This approach to segmentation is viewed as being highly actionable as segments can be defined according to the elements of the marketing mix that are most motivating to particular groups of customers. According to Myers (1996), needs-based segmentation is the segmentation method of choice in contemporary marketing research.

More recently, motivational research (thinking around goal setting, striving and attainment), has highlighted the fact that satisfied needs are not motivating. The only motivating need is one which is both salient and unmet (Pincus, 2004). The definition of an unmet need has traditionally been based on the difference between the importance of the need and the actual brand or product performance (Myers, 1988). It has been observed, however, that when questioned directly, people tend to overstate the importance of functional benefits and understate abstract ideas such as brand personality or emotional attributes (Pincus, 2004). Hence, direct probing of customer needs is perceived to be ineffective, especially if the wrong questions are asked (Ulwick, 2005). It is this perception of ineffectiveness that has highlighted the importance of this area and the value to be gained from determining the most effective way of identifying, measuring and segmenting people according to their unmet needs.

2.2.3.3 Types of Customer Needs

Traditional motivation psychology views the individual as an active, conscious agent who explicitly sets goals based on their needs and motivations and strives to achieve them (Dweck, 1996; Bargh et al., 2001; Ajzen and Fishbein, 1969). Goals are generated and pursued by some form of central control system or “self” which is accessible by conscious awareness (Bandura, 1986). Conventional market research asks direct questions and, in doing so, seeks to understand these needs and goals (Tourangeau et al., 2000).

The alternative viewpoint suggests a dual process model, in which conscious mental activity is contrasted with automatic, implicit or unconscious activity (Posner and Snyder, 2004). This view of needs being split into two categories, expressed (explicit) and hidden (implicit/latent/unconscious), is supported by a number of researchers (Slater and Narver, 1999; Schultheiss et al., 2009; Narver et al., 2003).

Expressed needs are “needs and solutions of a customer of which the customer is aware and, therefore, can express” (Narver et al., 2003: 336) and are usually elicited via focus groups or survey research (Greenwald and Banaji, 1995). Typically, the consumer is shown or read a number of potential needs or motives they may have for buying a

product or service. He or she is then asked to indicate how important each attribute might be and how satisfied they are with the current level of performance that different products or services can deliver on each dimension. This type of approach is used to develop classic needs-based segmentation solutions (Greengrove, 2002; Greenberg and Schwartz McDonald, 1989).

It is questionable, however, if conscious needs can ever be a true representation of an individual's motivations. Work by Benjamin Libet (1993) has noted a phenomenon called the 'readiness potential'. This phenomenon suggests that people notice their intention to do something a fraction of a second after the non-conscious mind indicates brain activity and so implies that the non-conscious mind appears to tell the conscious mind what to do. This finding implies that surveys that seek to understand explicit conscious needs may be failing to get to the core decision-making process. We should be trying to understand the unconscious mind, or "hidden needs".

Research by Festinger (1962) throws the value of understanding conscious needs into further disarray. His work on cognitive dissonance suggests that people resolve any conflict between their beliefs and behaviour to match with their behaviour. So, for example, while most marketing practitioners build their marketing campaigns around the model of awareness, interest, desire and action (AIDA), Festinger believes that, to explain how people behave, this should be revised to become 'do, rethink, and believe'. His work implies that people post-rationalise their behaviour and often cannot explain reliably why they have behaved in the way they have. It highlights the importance of finding a method to help people express their real needs, rather than merely providing an answer that feels right.

Hidden/unconscious needs are defined as needs that "customers cannot articulate and probably have not even recognised themselves" (Goffin et al., 2010: 3). These types of needs are more emotional and so will often be more effective in encouraging people to buy products. Indeed, as Dichter famously said of selling shoes: "... to women, don't sell shoes—sell lovely feet!" (Packard, 1957: 53).

It should be noted that these hidden needs are particularly relevant in the context of product design. They are the details which "many customers recognise as being

important in the final product, but do not or are unable to articulate in advance” (Ulrich and Eppinger, 2008).

The extent that the “unconscious self” may, in certain instances, control and override the “conscious agentic self” is causing a fundamental rethink regarding the nature of cognitive and affective processes (Bargh et al., 2001). Through work based on priming, it has been shown that a person’s working memory has a motivation aspect: “it holds current goals active and biases concurrent cognitive processes in an attempt to maximise goal attainment” (Hassin et al., 2005: 213). This unconscious, active goal has been shown to be “so much in charge, that it is capable of temporarily rewiring the cognitive apparatus to better achieve its affect,” implying that hidden or unconscious needs are at least as important, if not more so, than explicit needs.

2.2.3.4 Measuring Customer Needs

While it is relatively easy to measure explicit customer needs by asking people direct questions (Greenberg and Schwartz McDonald, 1989), hidden needs are much more challenging to research, primarily because people have limited conscious knowledge of their needs (Sheehy, 1999). Indeed, a number of authors have made specific criticisms about the ability of research to deliver these needs (Leonard, 1995; Griffin and Hauser, 1993) and these criticisms have been borne out by this initial literature search: very few approaches have been identified, and none seem to be especially effective . Table 2-1 provides a summary of methodologies that claim to understand hidden customers’ needs based on an initial review of the literature. Of the approaches that have been identified, the majority are qualitative in nature (and so are incapable of assessing the market potential and size of individual segment clusters). These approaches are therefore unsuitable for use in this study. The only quantitative techniques that attempt to understand implicit rather than explicit behaviour are Conjoint Analysis (Green, 1983) and Means-end Chain Analysis (Gutman, 1982) and both of these approaches are biased towards measuring functional rather than emotional needs (Pincus, 2004). It is therefore clear that a different approach to measuring unconscious needs will need to be taken in this study.

Table 2-1 - Methods of Understanding Hidden Needs Identified from First Literature

Scan

Approaches to hidden needs	What is it?	Pros	Cons
Repertory Grids (Leonard, 1995; Griffin and Hauser, 1993; Fransella et al., 2004)	Approach that groups products/ services into triads and ask people to explain why two of the items are different/ similar from the third. The reasons given may highlight unmet needs	Can provide new insights	Difficult to use as part of a quantitative study
Picture Story Exercise (Schultheiss et al., 2009)	Respondents write stories in response to picture cues. The stories are coded to reveal a respondent's underlying motivations	Allows participants to express different views	Very time consuming to interpret – so not appropriate for quantitative segmentation
EEG analysis to understand cognitive processes (Lee et al., 2007)	Electrodes are connected to the skull to reveal brain activity in response to different stimuli. High activity may indicate an important stimulus that had not been elicited explicitly	Indirect method of understanding a person's thought processes	Stimulus will always be for known needs rather than hidden ones
Latent Needs Tool (Wagner and Hansen, 2004)	Series of explicit exercises designed to identify key needs of segments of respondents. Uses expert teams to develop solutions	Appears to generate interesting insights	Requires expert team for interpretation of data – not appropriate for quantitative segmentation
Implicit Associate Test (Gregg, 2013a)	Measures the strength of a person's automatic association between mental representations of objects by determining the lag in reaction times	Does appear to produce an indirect measure of a participant's preference	Can only be used for a binary segmentation which would be too simplistic
Pictorial Attitude Implicit Association Test (Slabbinck et al., 2012)	Uses pictorial representations of attitudes to measure the need for power, affiliation and achievement	Provides some new insights	Very time consuming to collect and interpret data- not appropriate for quantitative segmentation
Metaphor elicitation (Coulter and Zaitman, 1994)	Elicits both conscious and unconscious thoughts by exploring people's metaphoric expressions when describing pictures they have collected about a topic	Appears to generate interesting insights	Analysis approach is shrouded in mystery and so not viable for commercial usage
Storytelling (Stringfellow and Bowen, 2004)	Situations described using a story format. Allows needs to be indirectly elicited	Allows participants to express different views	Very time consuming to collect and interpret data - not appropriate for quantitative segmentation

Approaches to hidden needs	What is it?	Pros	Cons
Lead user research (Luthje and Herstatt, 2004)	Interview early adopters of a product to understand their needs – then test those needs with others	Provides some new insights	Not applicable as a quantitative approach
Means-end chain analysis (Gutman, 1982)	Quantitative approach which splits buying behaviour into values, situations and consequences	Provides an interesting perspective into buying behaviour	Difficult to determine if insights come from unconscious thinking
Conjoint analysis (Green, 1983)	Quantitative approach which asks people to trade-off attributes that are important to them	Provides indirect measure of customer preference	Difficult to determine if insights come from unconscious thinking
Ethnography (Hammersley and Atkinson, 2007)	Qualitative approach to understanding needs and wants via observation in natural environments	Can elicit unknown needs	Not suitable for quantitative segmentation

2.2.4 Initial Literature Review - Summary

Based on the initial literature review, the author decided to conduct a more formal systematic literature review to answer the following question:

RQ1: What does the literature say about how different research methods might be used to understand hidden customer needs for the purpose of customer segmentation?

There were three objectives for this systematic review:

1. To understand how hidden customer needs have been described in the literature
2. To identify the various methods that may be used to measure hidden customer needs
3. To recommend which methods may be used to segment customers using hidden needs.

The next chapter addresses the Systematic Literature Review question and these associated objectives.

2.3 Systematic Literature Review: Market Segmentation by Hidden Needs

2.3.1 Introduction

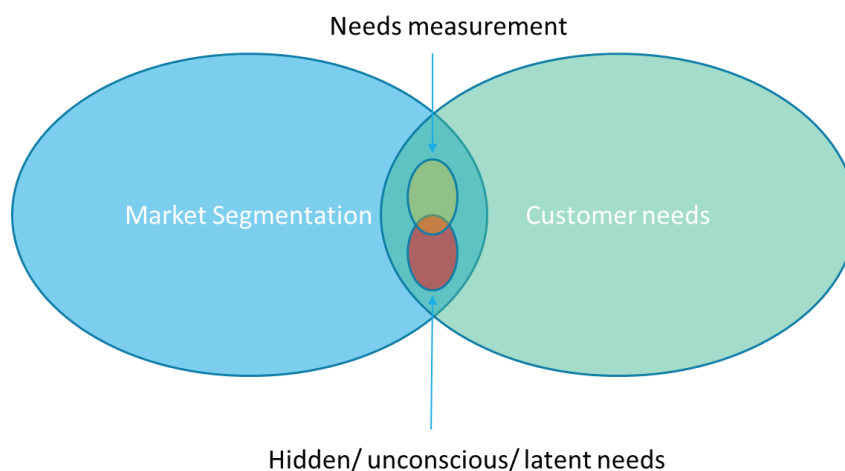
The Systematic Literature Review is used to explore the definition of hidden or unconscious needs in more detail and to identify more potential methods for understanding these needs, beyond the limited number of methodologies identified in the initial review.

2.3.2 Mapping the Field

The initial literature review undertaken in this study explored two areas: 1) market segmentation and 2) customer needs. Within these areas, the measurement of customers' hidden² needs is examined in more detail in this Systematic Literature Review.

Figure 2-4 shows these literature domains graphically:

Figure 2-4 – Areas Explored in the Systematic Review



² The search term “hidden needs” was used in the initial literature review and at the start of the systematic literature review, but this was refined to become “unconscious needs” by the end of the systematic review process.

2.3.3 Systematic Review Methodology

A Systematic Literature Review is “considered the best (‘gold standard’) way to synthesize the findings of several studies investigating the same questions” (Boland et al., 2013). The systematic review is different from a traditional literature review since a rigorous, comprehensive, scientific approach is applied to the review process based on the principles of ‘replicability’ and transparency. This approach was also undertaken because it is a highly recommended first stage in the DBA process at Cranfield University. The objective of the approach is to eliminate as much bias as is possible through the thorough examination of studies (both published and unpublished) and by providing an audit trail of the reviewer’s procedures, decisions and conclusions (Cook et al., 1997). In addition, the choice of review topics and search terms may be refined throughout the process by regular reviews and consultations with a review panel composed of subject matter expert academics.

Figure 2-5 shows the process used in this review. The process was adapted from the three-stage systematic review process defined by Cranfield University researchers, Tranfield et al. (2003), and was designed to ensure the approach could identify all relevant literature in a way that is comprehensive, unbiased and easy to replicate.

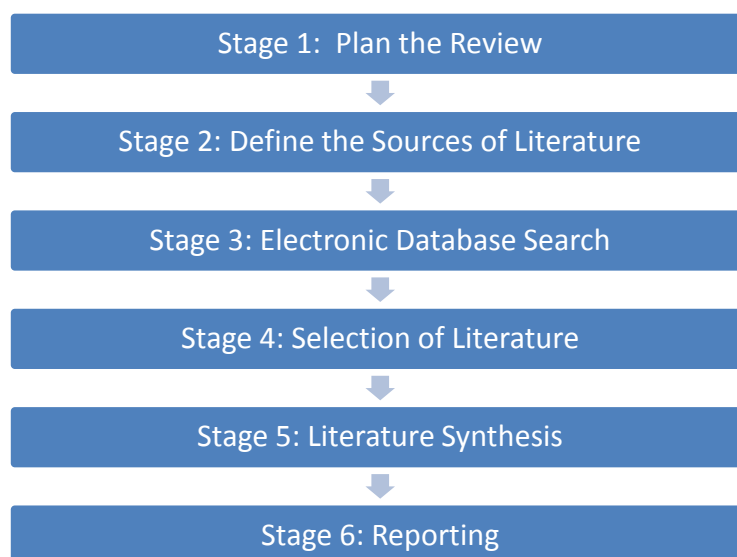


Figure 2-5 - Systematic Literature Review Process

Source: Bruce (2010)

2.3.4 Planning the Review

The initial planning stage of the systematic review process involved the formation of a panel of advisors who helped to ensure that the process was conducted correctly. The review panel provided expert guidance to the researcher on the protocol for this systematic review and the appropriateness of papers selected. Members were contacted via e-mail to provide input on the review protocol and during the study to provide input on the papers selected. This was considered an informal panel, and so it assisted when it was asked to do so by the researcher.

Table 2-2- Systematic Review Panel Members

Name	Role and Organisation
Prof. Paul Baines	DBA Supervisor, Cranfield School of Management
Prof. Keith Goffin	DBA Supervisor, Cranfield School of Management
Prof. Catarina Figueira	DBA panel member, Cranfield School of Management
Mary Betts-Gray	Information Specialist, Cranfield University Library

Prof. Paul Baines and Prof. Keith Goffin jointly supervised this DBA study at the time of the Systematic Literature Review and were consulted at regular intervals throughout the process. Their contribution consisted of the initial approval of the review question and the provision of advice in respect of literature sources. Prof. Catarina Figueira was a member of the review panel and was also consulted regarding the systematic review question.

Mary Betts-Gray assisted during the early stages of this project. Mary is an information specialist in Cranfield University library service and provided advice in respect of the development of the keywords and search strings for use in electronic database searches, ensuring that they reflected the various idiosyncrasies of the individual database search engines and identified the maximum number of literature items. She also assisted in sourcing the documents when they were difficult to access.

This review method was structured on well-established protocols for systematic literature reviews (Tranfield et al., 2003).

2.3.5 Sources of Literature

Table 2-3 describes the types of literature that were identified as being potentially relevant to the literature search. This list was developed during the process of scoping the literature search.

Table 2-3 - Sources of Literature

Type of Literature	Rationale for Inclusion
Academic and practitioner journals	These are peer-reviewed, and the star rating system (Wood and Peel, 2015) provides a proxy for the perceived quality of each paper.
Conference papers and proceedings	These are less rigorously reviewed, but they can often provide more recent research that may not be formally published for several years.
Working papers and theses from other universities	These are reviewed by the authors' supervisors and often provide additional references that can then be explored further.
Practitioner research reports (e.g. WPP)	Given the nature of the topic, this is an area where practitioners can provide much relevant information. These reports need to be treated carefully as they are not peer-reviewed.
Relevant books published	Although these may be slightly out of date compared to journal papers, books often provide a more comprehensive overview of a topic. These books often fail to appear in database searches.

Several online databases were used as sources of relevant literature (Table 2-4). These databases were searched individually. All online searches used a fixed set of search terms for each literature domain. The next section describes these search terms.

Table 2-4 - Electronic Databases used in the Systematic Review Database

Database	Description & Explanation
Scopus	A technical database that complements the management focused databases.
ABI/INFORM (ProQuest)	One of the most comprehensive sources for articles related to business and management, ABI can be searched by keyword, either in the full-text of the article, the Title and Abstract or in a subject indexing field, if a more precise search is needed. The database goes back to 1970, but it is possible to narrow or broaden the results by changing the period, or by selecting scholarly journals only.
Business Source Premier (EBSCO)	This major source for business and management. Used alongside Proquest for any management-related search. There is a degree of overlap between the two, but EBSCO sometimes contains complementary journals or articles not accessible through ProQuest.
PsycINFO	PsycINFO provides access to journal articles, books and book chapters within the fields of psychological and behavioural sciences.
Web of Science (Knowledge)	Web of (Science) Knowledge is a citation indexing service that provides access to a broad variety of publications across a multitude of academic disciplines. As a citation index, Web of Knowledge provides access to items of literature that cite pieces of particular interest.
Google Scholar	Unlike a conventional Google search, GS searches only academic papers, many of which may be held in institutional repositories, and so would not be included in conventional databases. Google Scholar is particularly useful for articles that are difficult to track down using other sources, or for non-journal formats such as working papers of conference proceedings.

2.3.6 Electronic Database Searches

The electronic databases in Table 2-4 were searched to identify the literature for inclusion in the systematic review. This search was achieved by:

- First, identifying the keywords and phrases to search
- Second, developing search strings to input into database search engines
- Third, developing filter criteria within databases to achieve a manageable number of articles.

2.3.6.1 Key Words and Phrases

To search the databases, a series of keywords and phrases were developed to identify the key areas of interest for the Systematic Literature Review. These key terms are shown in Table 2-5.

Table 2-5 - Key Search Terms Used to Build Search Strings

Topic	Key words	Rationale
Customer needs	“Market* research”, “customer* research”, “consumer* research”, “consumer behavior*research”, “customer behavior* research”	This ensured that the articles found described previous research into market or consumers
	Need*, Desire*, Want*, Goal*, Preference*, Demand*	The key words reflect the focus of understanding consumer needs
	Hidden, Subconscious, Subconscious, latent, unconscious, unarticulated, tacit, unrecognized, implicit	These words identified needs that are hidden in nature
	Measurement, evaluation, technique*, method*	These terms identified approaches for measuring hidden needs
	Insight, understanding, knowledge, findings	These terms identified papers that provide new levels of knowledge
	Ethnograph*, “means?end chain”, “means?end?analysis”, “means?end?chain?analysis”,	These terms identified specific areas that are known to be of interest
Segmentation	“customer segment*”, “consumer segment*”, “market segment*”	These terms will ensure that literature around segmentation will be identified
	Cluster*, group*, typolog*,	These terms cover other ways of discussing segmentation
	“K-means segmentation”, “Latent Class Segmentation”, “hierarchical segmentation”, “natural grouping*”, “dual stage segmentation”	These terms identify methods of segmentation

2.3.6.2 Search Strings and No. of Items Located

Table 2-6 lists the search strings formulated for ABI/Inform. These strings were used (or modified if appropriate) for use with the other databases listed. The scope of the search (Title, or Title and Abstract, Title and Abstract and Keywords, or All of the Database) is also shown. The number of items identified per search is shown, along with the final number of items identified, after all the duplicates were removed.

Table 2-6 - Search Strings Used

Search string	Database	No of items
1 (“Market* research” OR “customer* research” OR “consumer* research” OR “consumer behavio* research” OR “customer behavio* research” OR “Cognitive research” OR “Survey Research” OR “Cognitive Survey Research”) AND (Hidden OR Subconscious OR Subconscious OR latent OR unconscious OR unarticulated OR tacit OR unrecognized OR implicit)	Scopus (Title, ABS, Key)	355
	ABI inform (Proquest) ABS	318
	EBSCO - AB	220
	PsycINFO - AB	180
	Web of Science - All	310
2 (“Market* research” OR “customer* research” OR “consumer* research” OR “consumer behavio* research” OR “customer behavio* research” OR “Cognitive research” OR “Survey Research” OR “Cognitive Survey Research”) AND (Need* OR Desire* OR Want* OR Goal* OR Preference* OR Demand* OR Motivat*) AND (Measurement OR evaluation OR technique* OR method* OR Approach) AND (Insight* OR Finding* OR Knowledge OR Understanding)	Scopus (Title, ABS)	1011
	ABI inform (Proquest) ABS	1014
	EBSCO - AB	579
	PsycINFO - AB	523
	Web of Science - All	1100

Search string	Database	No of items
3 (Ethnograph* OR "means?end chain" OR "means?end?analysis" OR "means?end?chain?analysis") AND (Hidden OR Subconscious OR Subconscious OR latent OR unconscious OR unarticulated OR tacit OR unrecogni?ed OR implicit)	Scopus (Title, ABS, Key)	1092
	ABI inform (Proquest) ABS	154
	EBSCO - AB	112
	PsycINFO - AB	596
	Web of Science - All	779
("Market* research" OR "customer* research" OR "consumer* research" OR "consumer behavio* research" OR "customer behavio* research" OR "Cognitive research" OR "Survey Research" OR "Cognitive Survey Research") AND (Hidden OR Subconscious OR Subconscious OR latent OR unconscious OR unarticulated OR tacit OR unrecogni?ed OR implicit) AND ("customer segment*" OR "consumer segment*" OR "market segment*") AND (Cluster* OR group* OR typolog* OR "K-means segmentation" OR "Latent Class Segmentation" OR "hierarchical segmentation" OR "natural grouping*" OR "dual stage segmentation")	Scopus (Title, ABS, Key)	11
	ABI inform (Proquest)	86
	EBSCO - AB	26
	PsycINFO - AB	4
	Web of Science - All	6
Total		8941
Total excluding duplications		5835

2.3.6.3 Filtering Process

A methodical search process was conducted as follows.

1. The initial set of search terms described in Table 2-6 was entered to interrogate the electronic sources
2. The search was conducted on full-text where available or otherwise using Title and Abstract
3. If the search results exceeded 2000 hits using the whole text, then the search was revised to Title and Abstract only
4. If search results exceeded 2000 hits using Title and Abstract, then the search was revised to Title only
5. Relevant articles (abstracts) were downloaded or requested from the Cranfield University Library
6. If search results continued to exceed 2000 hits, alternative combinations of search terms were used to narrow the results.

2.3.7 Selection of Literature

2.3.7.1 Initial Screening

Once the full set of 5835 references was identified, each one was summarily evaluated for relevance. The criteria for inclusion in this first step of the selection process were: topic relevance, context relevance, and language (Table 2-7). This process reduced the total number of references from 5835 down to 201.

Table 2-7 - Inclusion Criteria

Inclusion Criteria	Description
Topic relevance	Only research dealing specifically with understanding a person's needs or attitudes or behaviour has been included.
Context relevance	The focus of the study is about the individual consumer, within the business-to-consumer context. Business-to-business studies were not, however, excluded.
Language	Searches limited to material published in English.
Journal rating	Any is acceptable. Many of the ideas discussed are suggested by practitioner journals that do not have a star rating yet may still make a valid contribution to this review.
Author	Both academic and practitioner authored papers have been included.

2.3.7.2 Review of Full Texts

Having reviewed the titles and abstracts following the criteria described in Section 2.3.7.1, a number of references were excluded. A total of 201 texts were reviewed for the second time. The full-text of all the papers was examined to identify which ones were not appropriate for inclusion in the systematic review. Three additional inclusion and exclusion criteria were applied to the full-text review (Table 2-8 and Table 2-9) resulting in a reduction of the total texts from 201 to 42.

Table 2-8 - Additional Inclusion Criteria

Criteria	Description
Describes theory about how the subconscious mind may function	The study describes relevant theory about how the mind makes decisions subconsciously.
Describes techniques or methodologies to understand the subconscious mind	The study describes specific psychological, cognitive or neuroscience-based methodologies that are used to understand how the mind makes decisions.
Approach to understanding the subconscious mind can be applied in the context of market research	The study provides full descriptions of case studies in which techniques to understand the subconscious mind have been used for the purpose of market research.

Table 2-9 - Additional Exclusion Criteria

Criteria	Description
Clarity of argument	Insufficient specific details to be of use, i.e. no case studies that can be replicated or no relevant theory.
Specific techniques explored	No specific data collection techniques explored.
Relevance to understanding hidden needs	The paper does not reveal any insights that relate to understanding the subconscious mind or hidden needs.
Time of publication	Customer selection, segmentation, and modelling have a long research tradition. However, given advancements in psychology, statistical methods and neuroscience, only studies published after 1970 were retained.

2.3.7.3 Snowballing

In addition to the literature found through the systematic search, sixteen further articles or books were identified for inclusion in the literature through the review of

an article already sourced or from the recommendation of others. These additional references were subjected to the same Quality Appraisal Criteria and increased the final number of articles to fifty-eight texts – See Appendix H for a full list of all the fifty-eight articles.

2.3.7.4 Quality Appraisal Criteria for Full Texts

To ensure that the final list of texts contained papers of sufficient quality to be credible, a further quality filter was applied to the fifty-eight articles identified. Tranfield et al. (2003) suggest that it is often difficult to ensure the quality of data used for systematic reviews. Tranfield suggests that the findings can be subjective rather than based on “raw data”. All papers were therefore subjected to a full review using Huff’s (2000) generic assessment questions which evaluate each paper on a number of dimensions using a scale from 1 (the statement does not apply to the paper) through to 5 (the statement applies completely) – see Table 2-10.

Table 2-10 - Generic Research Questions

Generic Research Questions
Degree of relevance to the field of enquiry.
Research methodology – clarity of research objectives, assumptions, findings, limitations.
Quality of discussion.
Recommendations for conducting future research.
Number of citations (secondary measure).
Does the research link techniques to outcomes?
Does the study provide the reader with a sense of the relative effectiveness of techniques discussed?
Context specificity (How context specific are the research findings?)
How robust does the data set that is referred to seem?
What is the degree of expertise of the authors conducting the study?
What is the degree of managerial relevance of findings?
To what degree do the findings allow managers to determine which selection techniques they should use? Which is the most effective?

1=Not at all. 2=Only to a limited extent. 3=At an acceptable level. 4=To a significant level. 5=Completely

Source: Huff (2000: 158)

All quality criteria were judged to be equally important, so a perfect score on all 11 (main) criteria would give a score of 55 (the number of citations was a secondary measure). A cut-off level for articles to be excluded was determined after scoring the entire literature set, instead of using a predetermined cut-off level. Based on the scores shown, Table 2-11 (where the “Bin” represents the minimum score for the category, and the frequency is the number of papers which were scored at that level), a distinct difference existed between the quality of two of the papers which only scored twenty points and the remainder. Hence, two further papers were excluded from the final review – See Appendix H. This reduced the number of articles from fifty-eight to fifty-six.

Table 2-11 - Histogram of Assessment Scores Generated Using Huff's Assessment

<i>Bin</i>	<i>Frequency</i>
20	2
25	5
30	16
35	17
40	8
45	9
>45	1

2.3.8 Literature Synthesis

To address the Systematic Literature Review question, the literature identified through the processes described in sections 2.3.3 to 2.3.7 underwent a process of synthesis. The synthesis of a body of literature entails “summarising, integrating and, where possible, cumulating the findings of different studies on a topic or research question” (Tranfield et al., 2003: 11). Accordingly, within this systematic review, the process of synthesis involved two key stages:

1. Extracting the essential information from the literature identified
2. Reviewing, analysing and critiquing the information collected to develop key themes and conclusions.

2.3.8.1 Data Extraction

Once a piece of literature was deemed relevant based on the selection criteria, it was loaded into a reference management software system (EndNote). The fields outlined in Table 2-12 were used to capture data about the work contained within that reference/study.

Table 2-12 - Data Extraction Table

Category	Information
Citation Information	Author(s)
	Title
	Periodical Full
	Publication Year
	Authors, Primary
	Abstract
	RefWorks ID
	Reasons for Inclusion
	Journal Star Rating
	Number of citations
	Journal Type (Academic, Practitioner)
	Peer Reviewed
	Study Background
Type of Intellectual Project (knowledge for understanding, critical evaluation, action, instrumentalism, reflexive action)	
Study Methodology (empirical, theoretical)	
Research paradigm (positivist, realist, interpretivist)	
Thematic information	Key concepts, ideas, theories, approaches
Data Collection Methodology	Sample selection process
	Sample size
	Type of hidden needs technique applied
	Process of interpretation and analysis

Category	Information
Industry Context	B2B vs B2C
Evidential Contribution	Claims in respect of hidden needs identified
Claims made	Characteristics of research methods described as enabling the identification of hidden consumer needs
	Claims in respect of the superior effectiveness of a particular research method versus alternative approaches to hidden needs investigations

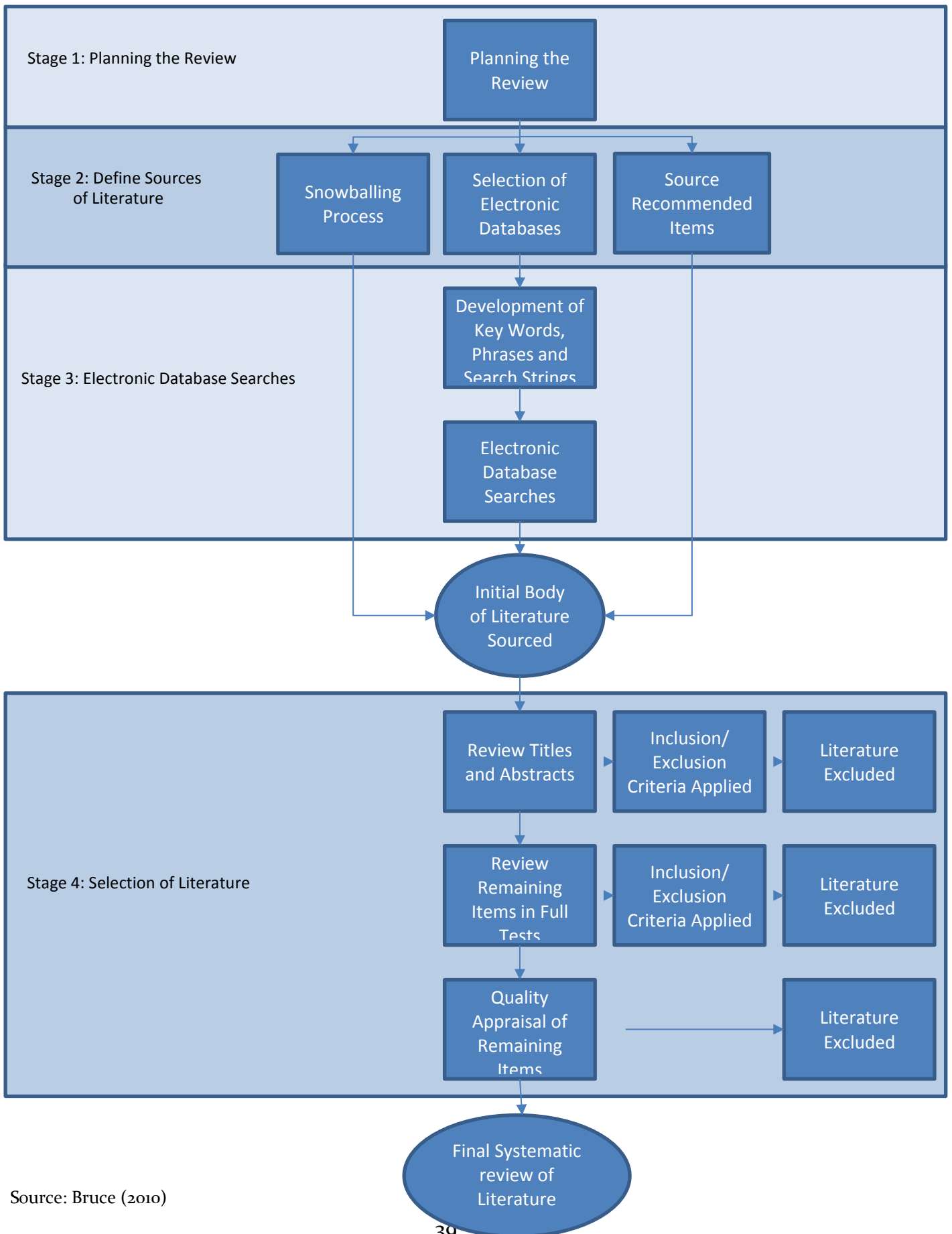
2.3.8.2 Development of Key Themes

To develop the key themes from the literature, an initial code frame was designed to allocate the information to specific categories of interest. This code frame was revised and developed as more papers were reviewed in depth. A critical evaluation of the claims within the literature was made to determine which evidence and conclusions could be supported.

2.3.9 Summary of Systematic Review Process and Outcomes

Figure 2-6 summarises the literature search, and review processes described and illustrates the stages used to identify the relevance of the literature. The dark blue sections illustrate the critical stages of the process.

Figure 2-6 - Summary of Systematic Review Process and Outcomes



Source: Bruce (2010)

Figure 2-7 shows the number of items of literature as they progressed through each stage of the process.

Figure 2-7 - No. of Literature Items Sourced, Appraised and Selected

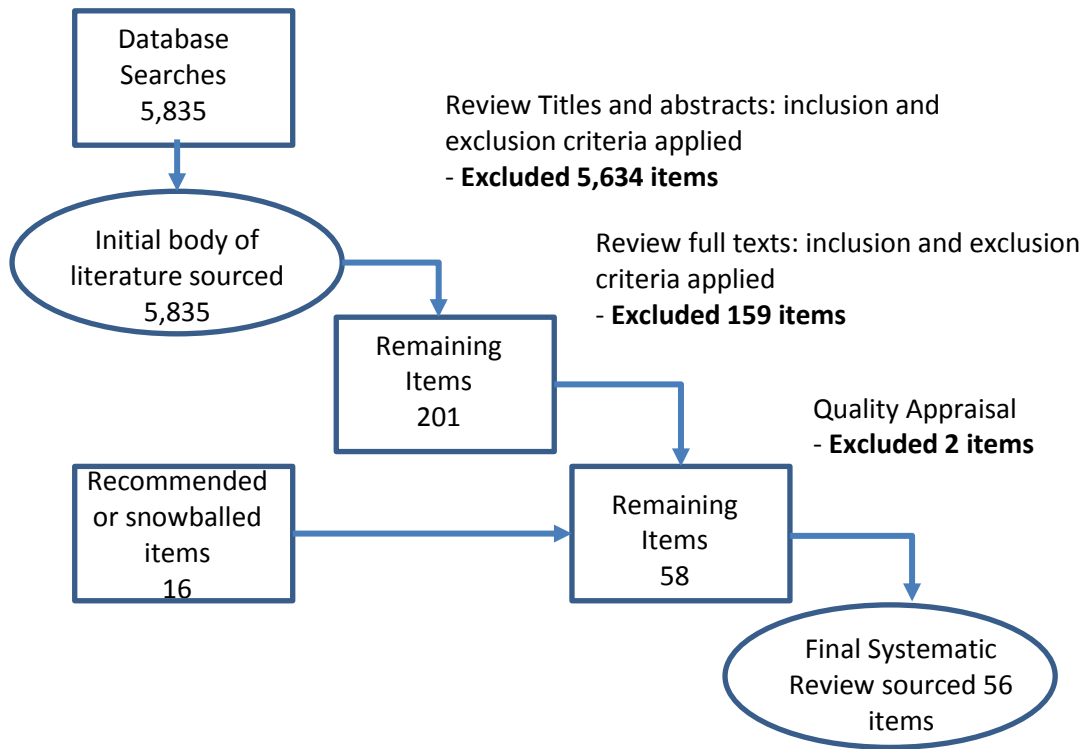


Figure 2-8 shows the source of articles identified in the search process. The importance of book articles and conference papers increased during the process, while academic and magazine articles decreased in relative size. The increase in books was due to the recent publication of books which provide an excellent overview of the latest thinking in the area. The relative increase in conference papers reflects the rapidly developing nature of the area.

Figure 2-8 - Source of Articles

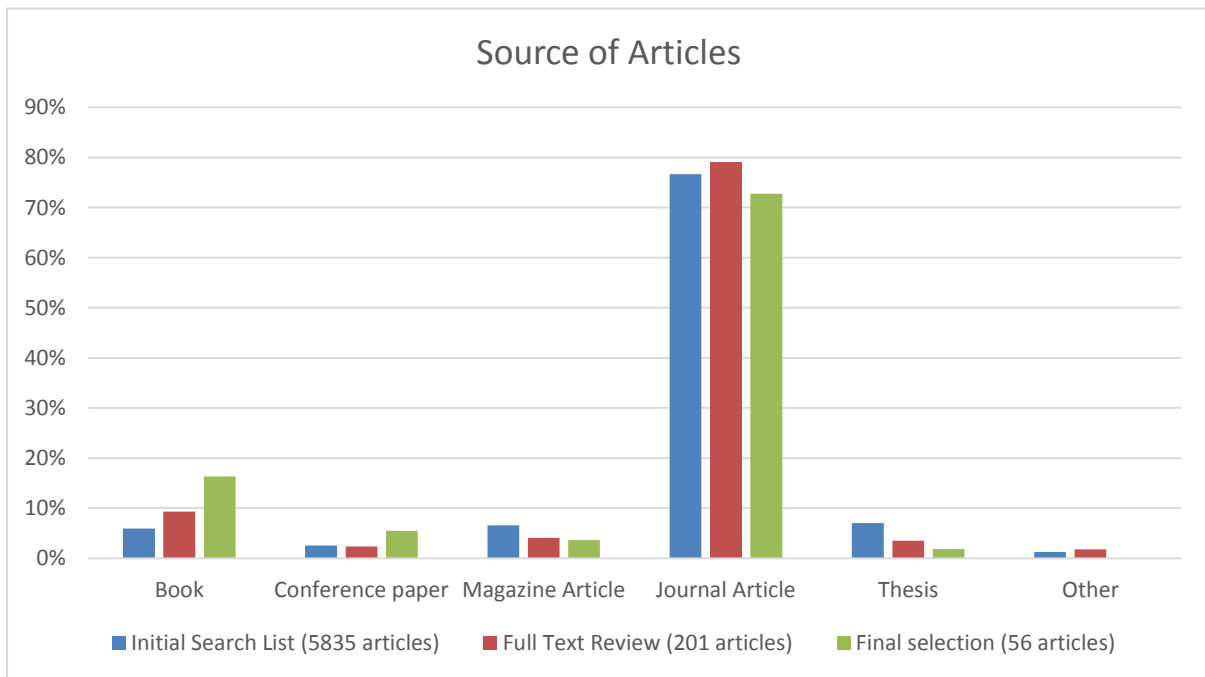
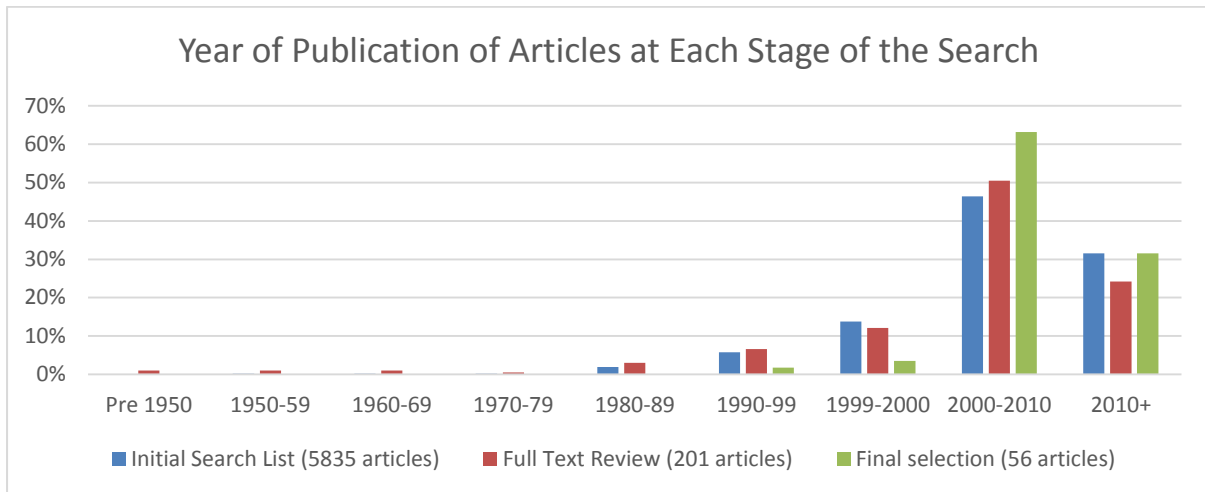


Figure 2-9 shows the date of publication of the articles during the process of the search. Unsurprisingly, the final selection of articles includes proportionally more recently published papers than the initial search.

Figure 2-9 - Year of Publication of Articles at Each Stage of the Search



A full breakdown of the selection process from two hundred and one to fifty-six items is shown in Appendix F. The quality evaluation of the fifty-six items is shown in Appendix H.

2.3.10 Systematic Literature Review Findings

As a reminder, the purpose of the systematic review was to answer the question “What does the literature say about how different research methods might be used to understand hidden customer needs for the purpose of customer segmentation?” By attempting to answer this question, it was hoped that specific methodologies could be identified (or created) that could be used for the purpose of creating customer segmentations based on hidden customer needs – this is the core contribution of this DBA. To answer this systematic review question (and so identify the potential methodologies), a number of sub-questions were developed, based on the findings from the initial literature review. This section is structured around answering these sub-questions:

1. What are hidden needs?
 - a. How are hidden needs described?
 - b. Why are they important?
 - c. Why do they occur?
2. What objectives are pursued by understanding hidden customer needs?
3. What types of research methods may be used to understand hidden customer needs?
 - a. How does each approach work?
 - b. What types of journals feature each methodology?
 - c. How have different approaches emerged over time?
 - d. How may these approaches be grouped according to different philosophical viewpoints?
 - e. What types of hidden needs are they used to understand?
4. What is the comparative effectiveness of each approach to understanding hidden customer needs?
5. What factors appear to influence the effectiveness of different techniques?
6. Which approaches appear to offer the most potential for segmenting people based on their hidden needs?
7. What approaches are being developed that could offer potential in the future?

2.3.10.1 What are Hidden Needs?

To explain what is meant by hidden needs, three questions are addressed:

1. How are hidden needs described?
2. Why are hidden needs important?
3. Why do hidden needs occur?

Each of these questions is considered in more detail in the following sections.

2.3.10.1.1 How are Hidden Needs Described?

The concept of “needs” can be described as “the crux of consumer behaviour” (Uprety, 2013: 2). Uprety goes on to suggest that understanding how these needs are formed and are converted into wants is critical to understanding this behaviour. The majority of the literature categorises customer needs and motives into two broad forms:

1. Expressed, conscious or explicit needs, i.e. the “needs and solutions of a customer of which the customer is aware and, therefore, can express” (Narver et al., 2004: 336)
2. Hidden or implicit or latent or unconscious needs, i.e. needs that “customers cannot articulate and probably have not even recognised themselves” (Goffin et al., 2010: 3).

This categorisation corresponds with the concept of “Dual Process Thinking” (Posner and Snyder, 2004; Kahneman, 2011; Searle, 1992). This model describes two types of thought processes as follows:

1. The first (System One, background thinking) being the fast, non-conscious, automatic thought processes
2. The second (System Two, foreground thinking) being the slower, reflective, conscious decisions.

The two systems are complementary: the foreground prioritises accuracy while the background prioritises efficiency. Nonetheless, the two systems can still operate somewhat independently. Accordingly, their outputs are sometimes in accord, sometimes at odds (Gregg, 2013a).

It should be mentioned that some authors, (Cleeremans and Jiménez, 2002; Zeddies, 2000) have suggested that this dichotomous view is overly simplistic or black and white. They argue that there may be a fluid boundary between the conscious and the unconscious, but they still support the concept that a subconscious exists. The only person to refute this idea was Munsterberg (1909) who stated: “The story of the subconscious mind can be told in three words: there is none.” It is fair to say that things have changed a lot in the last 100 years.

2.3.10.1.2 Why are Hidden Needs Important?

Hidden needs are deemed to be important because psychological research has shown that many attitudes that are 'hidden' from an individual can directly influence their behaviour (Brunel et al., 2004; Steinman, 2008; Wilson and Dunn, 2004). As Loewenstein (2012: 28) states “most of the brain is dominated by automatic processes, rather than deliberate thinking.” To understand an individual’s behaviour, therefore, it is crucial that these needs be understood. Indeed, Bargh et al. (2001) have demonstrated that non-conscious goal pursuits possess properties similar to those deemed fundamental to conscious motivation, specifically, vigorous action towards goal satisfaction, persistence, and resumption after a disruption. The term “the new unconscious” has been coined to describe this recent developmental trend (Hassin et al., 2005). Bargh (2002) believes that unconscious thinking is critical in all aspects of mental and social life. He comments that “just as Galileo removed the Earth from its privileged position at the centre of the universe,” so should we too banish consciousness from its privileged position” (Bargh, 2002: 280).

Libet (1993) has gone even further by suggesting that a phenomenon called the ‘readiness potential’ may indicate that conscious needs can never be an accurate representation of an individual’s motivations. This phenomenon suggests that people notice their intention to do something a fraction of a second after the non-conscious mind indicates brain activity and so implies that the non-conscious mind appears to tell the conscious mind what to do. It implies that surveys that seek to understand conscious needs may fail to access the core decision-making process.

This perspective on the relative merits of conscious versus unconscious motivations is particularly relevant when considering consumer behaviour: research suggests that the majority of choices made by consumers are based on minimal conscious thought; instead, such decisions may involve environmentally activated attitudes that occur unconsciously (Dimofte, 2010).

The extent that the “unconscious self” may, in certain instances, control and override the “conscious agentic self” is causing a fundamental rethink regarding the nature of cognitive and affective processes (Bargh et al., 2001). Through work based on priming, it has been shown that a person’s working memory has a motivation aspect that “holds current goals active and biases as concurrent cognitive processes in an attempt to maximise goal attainment” (Hassin et al., 2005: 213). This unconscious, active goal has been shown to be “so much in charge, that it is capable of temporarily rewiring the cognitive apparatus to better achieve its effect.” The work implies that hidden or unconscious needs are at least as important, if not more so, than explicit needs. There is also evidence to suggest that it is possible to link unconscious goals to actual behaviour (Bargh and Chartrand, 1999; Bargh and Morsella, 2010).

2.3.10.1.3 Why do Hidden Needs Occur?

When seeking to understand a customer’s needs, researchers will typically ask direct questions (Bradburn et al., 2004). These questions may be administered as part of a face-to-face interview or as part of an anonymous survey. The process works because human beings are verbal creatures who are willing and able to express themselves and share what they know (Pinker, 2007; Tallis, 1991). By asking respondents direct questions, however, it is highly likely that the respondents will be forced to use the conscious part of their mind (Kahneman, 2011). According to Gregg (2013a), the conscious mind may then be unable or unwilling to express their needs in typical market research surveys or focus groups due to one of three distinct reasons:

Firstly, respondents may be trying to deceive others because their needs could be things that they do not want to reveal or things (needs) that people are unaware of or things they do not realise have influenced them (OConnel, 2011). Alternatively, the

needs may be things that a respondent will not express openly and instead may actively try to hide from others. A frequent reason is wishing to please the researcher, known as 'social desirability bias' (Fisher, 1993; King and Bruner, 2000; Steenkamp et al., 2010).

Secondly, the respondents may be deceiving themselves. A common reason is wishing to flatter themselves, known as the 'self-enhancement bias' (Greenwald, 1980; Sedikides and Gregg, 2008). Also, customers may only become consciously aware of their buying decisions after they have made them, at which point they often seek to justify them, both to themselves and others, so distorting the true reason for their decisions (Lewis, 2013).

Thirdly, respondents may be out of touch with or not know their minds – they may be trying to deceive others and themselves. The needs may be ones that “customers cannot articulate and probably have not even recognised themselves” (Goffin et al., 2010: 3), or their needs may be expressed as non-conscious goal pursuits (Bargh et al., 2001). Another explanation might be that the respondents may simply be mistaken: they may unwittingly express needs they do not have. Alternatively, they may be out of touch with, or simply unable to know, their own mind, known as 'self-ignorance bias' (Wilson, 2012). As political psychologist Drew Westen, in his critique of focus groups, comments, “If you ask people conscious questions about unconscious processes they will be happy to offer you their theories. But most of the time those theories are wrong” (Westen, 2007: 329).

The three reasons described by Gregg (2013a) are neatly visualised (Figure 2-10 - Types of Subconscious Need) using the Johari Window (Luft and Ingham, 1961).

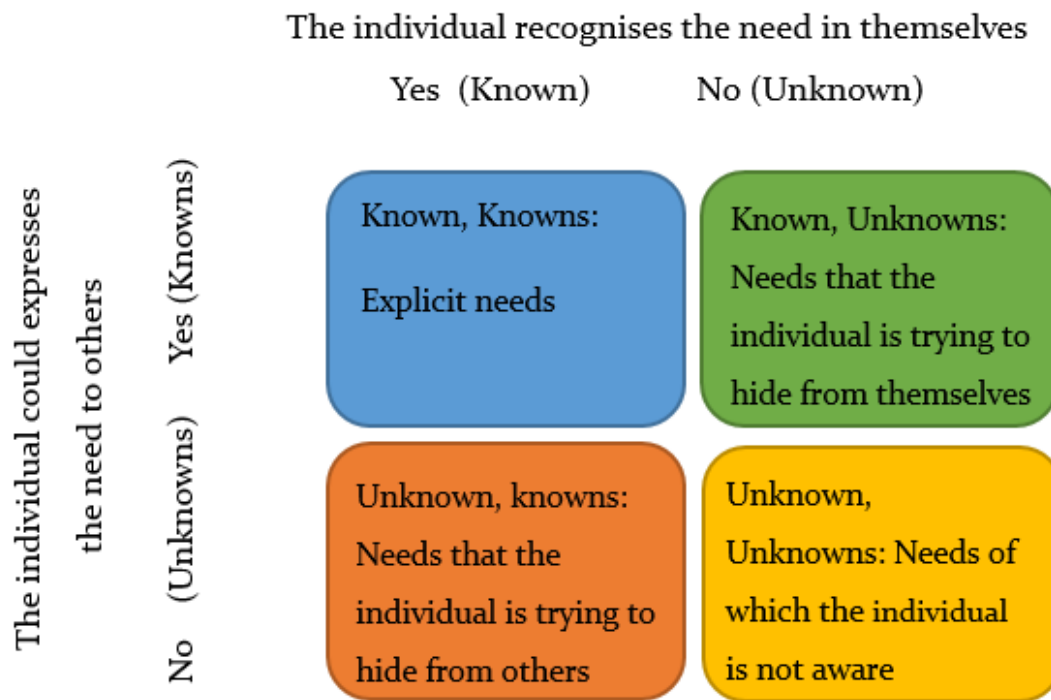


Figure 2-10 - Types of Subconscious Need

To overcome the limitations of the conscious mind to direct questioning, a methodology is required that attempts to measure or understand the thought processes of the unconscious mind. In doing so, it is highly likely that the responses collected via this methodology may often, but not always, differ from the responses generated from the conscious mind (Puccinelli, 2002).

2.3.10.2 What Objectives are Pursued by Understanding Hidden Customer Needs?

The systematic review process revealed four primary objectives for seeking to understand hidden customer or consumer needs:

1. To develop a deeper understanding of decision-making processes:
 - a. To understand decision-making when purchasing products or services, e.g. To enhance knowledge about how individuals process different stimuli and reach decisions (Bercea, 2011)
 - b. To gain a greater understanding of how hidden goals are selected and pursued (Chartrand, 2008)
2. To help to develop new products and services:
 - a. To develop new products and service that “thrill and amaze” customers (Robertson, 2002)
 - b. To gain deeper insights into consumers' perceptions of product attributes (Baxter et al., 2014)
3. To develop more powerful advertising and communications:
 - a. To understand media effectiveness at engaging with customers (Calvert, 2014)
 - b. To provide a foundation for models of advertising effectiveness (Perkins et al., 2008)
4. To understand more about an individual's feelings or attitudes:
 - a. To help to understand research participants when they have difficulty expressing opinions or feelings and researchers need some way of accessing these from the participants' minds (Boddy, 2005)
 - b. To provide knowledge about the things “you don't know, you don't know” (Berstell, 1999).

The analysis of the key articles from the review (Table 2-13) revealed that articles about decision-making (28 articles) and developing a deeper understanding of customer attitudes (28 articles) were most prevalent. Articles on media effectiveness (14 articles) and product development (10 articles) were less common.

Table 2-13 - Focus of Articles

Focus of Article	Number of articles in academic journals	Number of articles in practitioner journals	Number of articles in books	Number of articles from Conference Proceedings	Total
Decision-making	20		5	3	28
Product Development	6	3	1		10
Media Effectiveness	8	2	1	3	14
Deeper Understanding of Attitudes	19	1	5	3	28
Total	53	6	12	9	80 ³

In contrast, the results of the same search terms using Google Scholar are shown in Table 2-14.

Table 2-14 - Articles identified by Google Scholar

Decision-making	1,460,000
Product Development	1,200,000
Media Effectiveness	2,040
Customer Attitudes	7,250

The most striking difference between the two pieces of analysis is how few papers have been written about understanding unconscious needs for product development relative to the number of general papers that have been written about product development. This suggests that there may be a strong need for more work to be carried out in understanding unconscious needs for product development.

A second key difference is how many papers have been written about understanding customers' unconscious attitudes relative to how few general papers have been written about customers' general attitudes. This suggests that this topic is unusually "hot" within academic circles even if interest does not extend outside academia.

³ Some articles addressed more than one issue, hence total exceeds 56.

The third point of interest is how the number of papers regarding understanding unconscious decision-making appears to align with the general level of interest in decision-making. This may suggest that this area is ripe for further exploration.

Table 2-15 shows the breakdown of the different objectives of understanding hidden or unconscious needs by academic journal star ratings (Wood and Peel, 2015).

Table 2-15 - Breakdown of Hidden Needs Objectives by Academic Journal Star Rating

Hidden needs objective	Journal Star Rating	Number of articles ⁴
Decision-making	4*	4
	3*	3
	2*	6
	1*	4
	No rating	3
Product development	4*	0
	3*	1
	2*	3
	1*	2
	No rating	0
Media effectiveness	4*	1
	3*	2
	2*	4
	1*	0
	No rating	1
Deeper understanding of attitudes	4*	3
	3*	8
	2*	4
	1*	1
	No rating	3

As Table 2-15 shows, the literature on hidden needs is published in academic journals ranging from 4* in quality to unrated. The highest proportion of papers appears in 2* journals (17 out of 53). Of the four different objectives identified for understanding hidden needs, studies that focus on decision-making or gaining a deeper

⁴ Note, some articles mention more than one objective, hence the total number is greater than the actual number of articles.

understanding of consumer attitudes are more likely to appear in the journals with the highest star ratings than papers regarding product development or media effectiveness. This may reflect the more practitioner orientated focus of the latter types of papers.

2.3.10.3 What Types of Research Methods May Be Used to Understand Hidden Customer Needs?

As previously stated, to understand hidden customer needs, a methodology is required that bi-passes the conscious brain and taps into an individual's unconscious thought processes. There are three different groups of methodologies that offer promise in this area:

1. Methodologies that make a direct recording of activity in the brain
2. Methodologies that make an indirect recording of activity in the brain
3. Methodologies that do not measure brain activity.

2.3.10.3.1 Methodologies that Make a Direct Recording of Activity in the Brain

Table 2-16 describes the key approaches to understanding hidden customer needs via direct measurement of brain activity. This group of methodologies does not require any form of verbal response from the respondents but instead measures brain activity while the respondent is exposed to a range of stimulus (Bercea, 2011).

Table 2-16 - Methodologies that Make a Direct Recording of Brain Activity

Methodology	What is it?
Functional Magnetic Resonance Imaging (fMRI)	Imaging system that combines magnetic field and radio waves, producing a signal that allows the viewing of brain structures in detail. The subject lies on a bed, with the head surrounded by a large magnet that causes the atom particles (protons) inside the subject's head to align with the magnetic field. When a certain brain area is active, corresponding blood vessels dilate, and more blood rushes in, reducing the amount of oxygen-free haemoglobin and producing a change in the magnetic field in the active area. It allows brain activity to be measured while subjects perform certain tasks or experience marketing stimuli, searching for patterns. Can be used to measure memory encoding, sensory perception, valence of emotions, craving, trust, brand loyalty, brand preference, brand recall.
Positron emission tomography (PET)	Produces physiologic images with spatial resolution similar to fMRI by recording the radiation from the emission of positrons from the radioactive substance administered to the subject (the radioactive chemicals in the blood). A battery of detectors surrounds the subject's head and traces radiation pulse, without precisely identifying the location of the signal. Can be used to measure sensory perception and valence of emotions.
Electroencephalography (EEG)	Electrodes are connected to the skull to reveal brain activity in response to different stimuli. Variations in brainwaves and the amplitudes of the recorded brainwaves correspond to certain mental states. For the analysis, voltage and frequency are measured for each subject and compared to the data that was recorded without using marketing stimuli. Can be used to measure attention, engagement/boredom, excitement, emotional valence, cognition, memory encoding, recognition, approach/withdrawal.
Transcranial magnetic stimulation (TMS)	Uses magnetic induction to modulate the activity of certain brain areas that are located 1-2 centimetres inside, without reaching the neocortex. TMS follows the population neural activity in the brain, and new technology also allows the targeting of lower brain areas. TMS can highlight causal inferences by analysing the subject in front of marketing stimuli while certain brain areas are disabled, stimulated, or normal. Can be used to measure attention, cognition and changes in behaviour.
Steady State Topography (SST)	Records brain electrical activity (EEG) while a sinusoidal visual flicker is presented in the visual periphery, eliciting an oscillatory brain electrical response known as the Steady State Visually Evoked Potential (SSVEP). Task-related changes in brain activity are then determined from SSVEP. Can be used to measure consumer behaviour, video materials effectiveness, long-term memory encoding, engagement, emotional intensity, emotional valence, processed visual and olfactory input and attention.
Magnetoencephalography (MEG)	Uses magnetic potentials to record brain activity at the scalp level, having sensitive detectors in the helmet placed on the subject's head. The magnetic field is not influenced by the type of tissue (blood, brain matter, bones), unlike electrical field used in EEG, and can indicate the depth of the location in the brain with high spatial and temporal resolution. Can be used to measure perception, attention and memory.

Source: Adapted from Bercea (2011)

2.3.10.3.2 Methodologies that Make an Indirect Recording of Activity in the Brain

Table 2-17 describes the key approaches to understanding hidden customer needs via indirect measurement of brain activity. This group of methodologies still seeks to understand activity in the brain but does so by measuring physiological activity throughout the body, rather than measuring the electrical activity in the brain.

Table 2-17 - Methodologies that Make an Indirect Recording of Brain Activity

Methodology	What is it?
Facial coding	Identifies (using a video camera) and measures micro-expressions that code non-conscious reactions, based on the activity of the facial muscles. Facial expressions are spontaneous, they provide real-time data, but they are based on subjectivity in deciding when an action has occurred or when it meets the minimum requirements for coding. Can be used to measure six core emotions (anger, dislike, envy, fear, sadness, surprise, smile - that can be either genuine or social).
Implicit Association Test (IAT)	Measures the underlying attitudes (evaluations) of the subjects by assessing reaction times on two cognitive tasks. The speed with which they can associate two different concepts (stimuli such as advertisements, brands and concepts) with two different evaluative anchors (attributes) is computed. Measuring the amount of time between stimuli appearance and its response (response time or reaction time) can inform researchers on the complexity of the stimulus to an individual and how the subject relates to it. Can be used to measure underlying attitudes towards a subject.
Skin Conductance	Analysis of subtle changes in galvanic skin responses (GSR) when the autonomic nervous system (ANS) is activated measuring arousal.
Eye-Tracking	Measures where the subject is looking at, for how long he is looking, the path of the subject's view and changes in pupil dilation while the subjects look at stimuli. Can be used to measure visual fixation, search, eye movement patterns, spatial resolution, excitement, attention and pupil dilation.
Facial Electromyography	Measures and evaluates the physiological properties of facial muscles testing voluntary and involuntary facial muscle movements that reflect conscious and unconscious expressions of emotions as each emotion is characterized by a particular configuration of facial actions. Can be used to measure emotional expressions, social communication, mood state, emotional valence.
Measuring Physiological Responses	Measurement of heart rate, blood pressure, skin conductivity (affected by sweat, measuring arousal level), stress hormone from saliva, facial muscles contractions (for facial expressions of emotions) allows inference of emotional state for each moment. Can be used to measure emotional engagement during choice processes and emotions.

Source: Adapted from Bercea (2011)

2.3.10.3.3 Methodologies that do Not Measure Brain Activity

Table 2-18 lists methodologies that try to understand hidden customer needs via questioning or observational techniques. The key characteristic of this group of techniques is that they use indirect methods of questioning or observation so that the respondent is less likely to influence his or her responses. As a result, these approaches provide a more subjective (interpretive) measure of customer needs, rather than the positivist approach of the previously explained two groups of methodologies.

Table 2-18 - Methodologies that do Not Measure Brain Activity

Approaches to hidden needs	What is it?
Repertory Grids	Asks respondents to group products/ services into triads and then asks them why two of the items are different/ similar from the third. The reasons given allow individuals to construct meaning to explain their preferences. Can be used to identify hidden needs of customers by focusing on experiences of different products and services.
Lead user groups	Interview early adopters of a product to understand their needs – that are typically more extreme than the average users. Can be used to help develop a deeper understanding of how and why customers use a product.
Ethnography	Qualitative approach to understanding needs and wants via observation in natural environments. Can be used to identify new ideas and product needs.
Conjoint analysis	Quantitative approach that asks people to trade-off attributes that are important to them. Can be used to identify priorities between product features of which the customer may not be aware.
Means-end chain analysis	Mixed method approach that explains how product preference and choice is related to customer values. Can be used for early product or advertising development to identify new insights on which features or values are important.
Metaphor Elicitation (ZMET)	Consumers create collages, based on their feelings and experiences related to a specific problem; participants discuss the images selected and their associated experiences; preferences and specifications are represented in a mental model. Can be used to identify hidden needs.
Information acceleration	Participants are presented with the future product and usage scenarios in a virtual environment. Can be used to identify new ways of using a product or service.
Projective research techniques	A range of psychological approaches, (e.g. Thematic apperception test (TAT), Animal Metaphor Test, Word Association Test, Rorschach/ Holtzman Inkblot test) designed to let a person respond to ambiguous stimuli, presumably revealing hidden emotions and internal conflicts projected by the person in the test. Can be used to identify hidden attitudes, emotions or needs.
Unconscious Thought Theory	An approach which asks participants to consider a choice, but delays decision-making until after they have participated in a working memory distraction-task. By occupying the working memory, the individual then processes the initial problem in their subconscious mind.

Source: Adapted from Goffin et al. (2010), Janssen and Dankbaar (2008), Soley (2010), Dijksterhuis and Nordgren (2006)

2.3.10.4 What Types of Journals Feature Each Methodology?

Table 2-19 shows the analysis of journal articles by the dominant type of methodology discussed. Overall, more articles appear to have been written about methodologies that try to measure brain activity (either directly or indirectly) than have been written about ‘non-brain activity’ methodologies such as projective techniques and ethnography: 32 articles vs. 23 articles respectively. This reflects the direction that researchers have been interested in exploring recently and is discussed in the next section.

Table 2-19 - Type of Article by the Methodology

Focus of Article	Number of articles in academic journals	Number of articles in practitioner journals	Number of articles in books	Number of articles from Conference Proceedings	Total
Methodologies that make a direct recording of activity in the brain	10	1	3	2	16
Methodologies that make an indirect recording of activity in the brain	11	0	3	2	16
Methodologies that do not measure brain activity	18	2	2	2	24
Total	39	3	8	6	56

Table 2-20 shows the analysis of the journal articles ‘star rating’, based on the British Research Excellence Framework (REF) quality evaluation (Wood and Peel, 2015).

Table 2-20 - Analysis of Research Techniques by Journal Star Rating

Hidden needs objective	Journal Star Rating	Number of articles ⁵
Methodologies that make a direct recording of activity in the brain	4*	0
	3*	1
	2*	4
	1*	1
	No rating	4
Methodologies that make an indirect recording of activity in the brain	4*	3
	3*	4
	2*	3
	1*	0
	No rating	1
Methodologies that do not measure brain activity	4*	2
	3*	3
	2*	6
	1*	2
	No rating	4

Based on the journal quality ratings, research regarding indirect methods of measuring brain activity is of a higher quality than research about direct methods of measuring brain activity. This difference may be because these papers describe research using large samples of participants (particularly IAT tests), rather than small-scale case studies with just a few individuals. Research describing methodologies that do not measure brain activity appear in all types of journals, from the highest rated to non-rated publications. This may reflect both the range of methodologies included in this category, along with the issues associated with demonstrating that these approaches are academically rigorous (see Section 2.3.10.10.1).

⁵ Note, some articles mention more than one objective, hence the total number is greater than the actual number of articles.

2.3.10.5 How have Different Approaches Emerged Over Time?

The early attempts to understand unconscious needs and motivations were led by Freud, who tried to understand the subconscious and Jung who examined the unconscious as a resource for emotional and behavioural information. Freud used his concept of projection, upon which projective techniques are based (Abt and Bellak, 1959), while Jung (1953) developed the theory of archetypal objects which, independent of the participant's thoughts, may become conscious during the inquiry. Therapists have pursued the concept of luring unconscious information into the light of consciousness through such methods as hypnosis, dream recall, and free-association (Vallack, 2014).

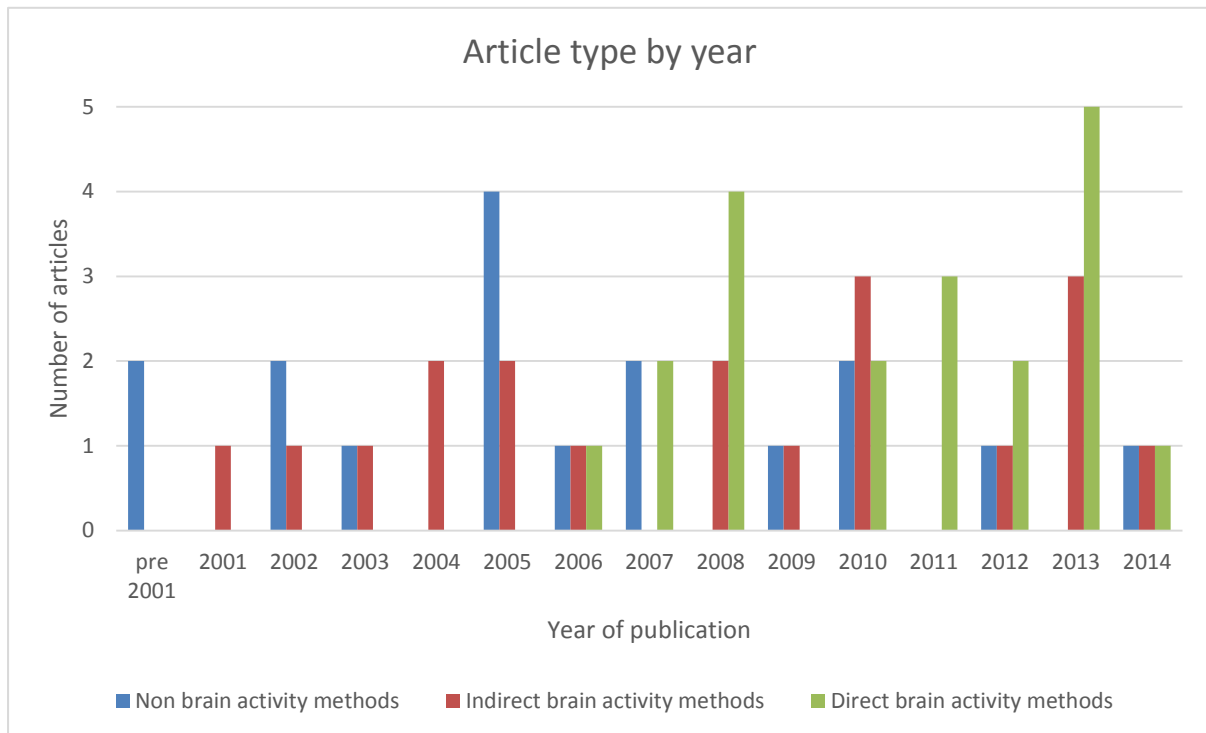
During the 70s, 80s and 90s, the behaviourists and experimental psychologists developed the majority of techniques which have subsequently been used to understand non-conscious behaviour without measuring brain activity (e.g. conjoint (Green and Srinivasan, 1978), repertory grids (Easterby-Smith, 1980), ethnography (Spradley, 1979)). During this period, Kahneman and Tversky (1977), along with Richard Thaler (1980), wrote several papers about consumer choice which led to the branch of economics known as behavioural economics.

The combination of the development of functional magnetic resonance imaging (fMRI) technology and the growing ability of scientists to study how different brain structures contribute to thoughts, feelings, and behaviour, has led to the three movements that followed behaviourism: social psychology, cognitive psychology and neuroscience. Social psychologists discovered they could test their psychological models by connecting them to their sources in the brain while cognitive psychologists discovered they could identify the origins of mental states. Neuroscientists, who study the physical brain, discovered they could explain its functioning by learning about the mental states and psychological processes the different structures produce. This created a new field of social cognitive neuroscience. "It is a ménage à trois, a 'household of three': social psychology, cognitive psychology, and neuroscience" (Mlodinow, 2013: kindle location 1730 of 4655).

This new field is reflected by the profile of articles reviewed. Despite excluding any pre-1970 papers as part of this review, only two of the fifty-six papers selected were published before 2000. Until this time, few authors explicitly discussed the measurement of the subconscious mind. Figure 2-11 shows the type of articles published by year. Three interesting points emerge from this analysis as follows:

- Firstly, the total number of articles that could be described as “neuroscientific” methodologies (using either direct or indirect measures of brain activity) is much greater than for social psychology approaches (38 articles versus 18), reflecting how the academic focus has changed over the last 20 years.
- Secondly, the number of articles which describe neuroscience is almost equally split between articles about techniques which attempt to measure brain activity directly (20) versus those which aim to measure brain activity indirectly (18) suggesting that both approaches are perceived to offer potential.
- Thirdly, papers about direct measures of brain activity have been more prominent in recent years, perhaps reflecting the development of technology. Articles do, however, continue to be published about the other approaches, suggesting that direct brain imaging techniques have not yet replaced these other approaches.

Figure 2-11 - Type of Articles Published by Year



2.3.10.6 How may these Approaches be Grouped According to Different Philosophical Viewpoints?

According to Soley (2010: 340), the quantitative researchers (i.e., logical empiricists) who carry out approaches such as conjoint and means-end chain analysis “would most probably have never thought about, and rationally rejected, the assumptions underlying dynamic psychology, they nevertheless methodologically – and even theoretically – assume that the unconscious does not exist and that people operate exclusively on the conscious level.” This philosophy is not helpful as it suggests that it is not possible to understand unconscious needs using a quantitative methodology and so, therefore, precludes the possibility of developing a quantitative approach to segmentation based on hidden or unconscious needs.

As it transpires, the fifty-six articles that have been identified are overwhelmingly empirical (55 out of 56). There is more variation between the articles in terms of those which seek to make a direct measure of brain activity (positivists) and those which do not rely on a rational, numerically measurable methodology (interprevists).

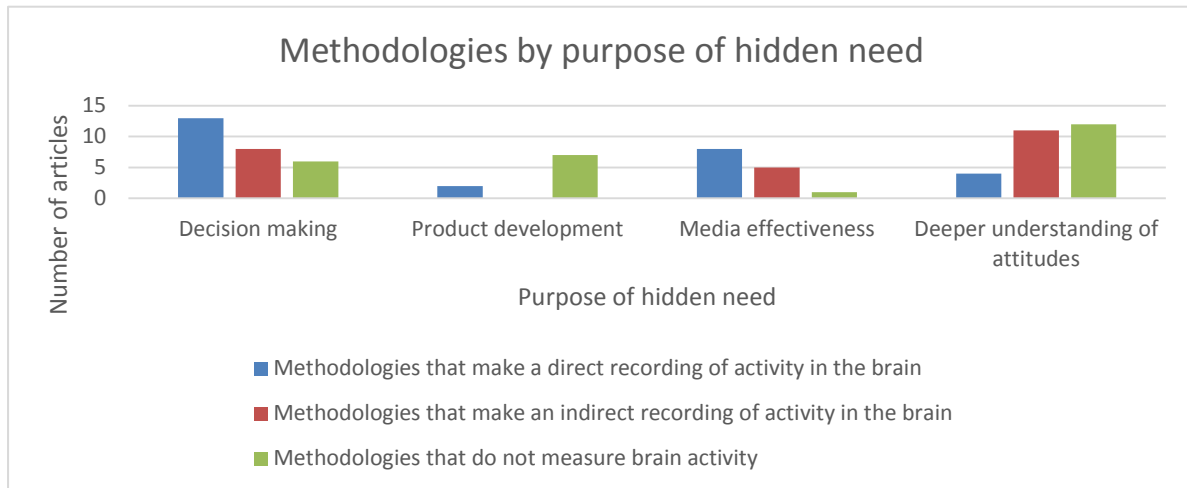
Interestingly, there is disagreement among some authors as to how to classify the Implicit Association Test (IAT). The test satisfies the requirements of a positivist's perspective, e.g. the observer is independent, it can demonstrate causality, the output can be generalised through statistical probability, etc. (Ramanathan, 2009). Yet Soley (2010: 334), suggests "IATs are an associational test in the tradition of word association" and so places it into the interpretivist camp.

Assuming the IAT is classified as a positivist methodology, twenty-four of fifty-six papers could be described as taking a positivist's perspective (primarily the papers related to brain measurement and IAT tests) while the majority of the social psychological approaches that do not directly or indirectly measure brain activity are interpretivist.

Since the main objective of this DBA is to develop a methodology that may be used to segment people by their hidden needs (and provide an indication of market potential by demonstrating the segment's applicability in the general population), it will be preferable if the final solution is quantitative in nature. The nature of the techniques currently available, however, suggests that a purely positivist approach may not be possible – almost all of the methods described earlier require a certain level of interpretation, and none can be described as perfect windows on the subconscious mind. It is likely, therefore, that a postpositivist epistemology may be a better line of inquiry as it asserts that reality exists, but can only be known imperfectly and probabilistically (Robson, 1993).

2.3.10.7 What Types of Hidden Needs are Different Approaches used to Understand?

Figure 2-12 -Methodologies by Purpose of Hidden Need



Analysis of the articles (Figure 2-12) reveals a large variation between the types of subconscious issue explored and the methodology utilised.

If the objective of the article is related to either decision-making or media effectiveness, then there is a bias towards using methodologies that rely on a direct recording of the brain. This is typically because neuro-imaging methods allow researchers to compare brain activity during a specific task and its activity during a control task (Bercea, 2011). This sort of approach is ideal for the assessment of media where the reaction to a specific advertisement is evaluated using a test and control methodology (Lucas and Britt, 1963). It also suits the assessment of decision-making, since decisions are made in response to a form of stimulus or information (Denstadli, 2007). By exposing customers to this information, it is then possible to identify changes in brain activity (Zurawicki, 2010).

Techniques that use either indirect methods to record brain activity or no measure of brain activity are more likely to be used if the objective is to gain a deeper understanding of consumer attitudes. This is because these types of methodologies do not necessarily require people to ‘test’ a specific predefined stimulus (e.g. TV ads), but instead allow the researcher to gauge reaction to more abstract concepts (e.g. factors that define ‘happiness’, or motivations for shopping at a store).

Identification of hidden needs for product development is more likely to involve non-brain-measurement related methodologies: particularly ethnographic or repertory grid methodologies that were mentioned in five of the seven articles identified. This focus on methodologies may be related to the limited number of authors writing about this subject: Professor Keith Goffin of Cranfield University co-authored four of the seven papers identified about this topic (Baxter et al., 2014; Goffin et al., 2010; Goffin, 2004; Goffin, 2012).

2.3.10.8 What is the Comparative Effectiveness of Each Approach at Understanding Hidden Customer Needs?

The key issue when attempting to measure the effectiveness of methodologies that measure hidden needs is that the needs are unknown, and so, by definition, it is difficult to be sure if the hidden needs that are identified are reliable (Griffin and Hauser, 1993; Leonard, 1995; Sheehy, 1999).

Some market researchers recommend an internal reliability checking mechanism to determine if the results are reliable (Boddy, 2005). Griggs (1987, p.29) mentions “a classical method of verifying findings is to show that independent measures of the same phenomenon give rise to the same conclusion.” This triangulation (cross-checking) is frequently undertaken in market research by comparing the results from one method with those from another (Zober, 1956). While this may provide a measure of reliability for typical research, it is not especially helpful for research into hidden needs, since the principal purpose of the research is to unearth insights that other methods have failed to identify.

The second method of validation is the test-retest method (Soley, 2009). This methodology asks the same people to complete the same data collection exercise several times to determine if the same results are produced (Hendrickson et al., 1993). This method overcomes issues with internal reliability checking, but Winter et al. (1977) demonstrated that issues with test-retest reliability measures could arise as a function of the instructions given to respondent during administration rather than an indication of the reliability of the test itself.

A more reliable method of validating findings is to link the results of the research to actual behaviour. This approach is deemed valid since it assumes that if a methodology can accurately predict the behaviour of which people are themselves unconscious “then it should also have the capacity to predict behaviours stemming from those attitudes that respondents themselves cannot predict” (Gregg, 2013b: 5). This approach has been used in the empirical study conducted for this DBA (see section 4.3.3).

The validity of each of the three main groups of techniques identified is discussed below. Specific reference to the validity of the methods is made, where relevant, for the four types of needs identified earlier.

2.3.10.9 The Validity of Methodologies That Make a Direct Recording of Brain Activity

Techniques such as fMRI scans and EEG monitors are making great strides in accurately measuring the mind. In 2008, neuroscientist Jack Gallant of the University of California, Berkeley, published results showing that he could accurately predict which of a gallery of 1,000 pictures a particular person was viewing: a huge step forward in the prediction of just two or three options that other researchers had demonstrated previously (Bor, 2010). At the Society for Neuroscience conference in 2009, he gave a presentation that took brain scanning to a new level. By scanning the activity in the visual cortex, he could demonstrate what images volunteers saw when they viewed a number of film trailers. For example, at the instant that a man in a white shirt appeared on screen, his scanners would show an outline of a white torso.

According to Ohme (2012), brain scanning techniques such as fMRI scanners mean that it is possible to:

1. Describe, based on brain activity, what is happening in an ad to an accuracy of within a fraction of a second.
2. Identify scenes that generate the highest levels of excitement, involvement and emotions.
3. Determine which version of an advertisement’s soundtrack, or type of packaging or type of narrator will appeal most to a subject.

Ohme (2012, p1) also goes on to claim that “as the majority of consumer mental processes occur below the level of conscious awareness, observations of brain reactions enable researchers to reach the very core (which is consciously inaccessible) foundations of consumer decisions, emotions, motivations, and preferences.”

On the other hand, Page (2006) and Solnais (2013) are sceptical about the potential power of brain imaging techniques in marketing research: “They have great power, but they are dependent on many assumptions and interpretation by users to yield their results. They do not, as is often claimed, offer an objective window into the unconscious mind, but rather they reveal the biological correlates of thought, which is influenced by both conscious and unconscious processes. They are also often highly expensive and unsuited for testing the large numbers of respondents that the research industry and clients typically look for in research. This is not to suggest that they have no place in the research industry – rather that they are unlikely to displace qualitative or quantitative survey research as the main tools” (Page, 2006: 23).

The most notable aspect of the literature surrounding the validity of direct brain activity related methodologies is that generally, due to the size and delicacy of the equipment required, the tests can only work in a laboratory environment. This means that they can only measure the activity of the mind in an artificial environment where respondents are asked to respond to a stimulus, rather than gather information in a natural setting. Even techniques that are slightly more mobile, such as EEG assessments, are affected by the experimental setting (Wang and Minor, 2008) and so are less effective outside of the laboratory. As such, these types of approaches are more suitable for understanding hidden needs for media assessment and decision-making, rather than for product development. It should be stressed, however, that this area is developing rapidly, and so this evaluation may need to be revised in due course.

2.3.10.10 The Validity of Methodologies that Make an Indirect Recording of Brain Activity

Far more is written about the potential validity of these techniques and, in particular, the Implicit Association Test, than any other approach (Dempsey, 2010; Perkins et al., 2008; Puccinelli, 2002; Steinman, 2008). Eighteen out of the fifty-six articles discuss

studies in which attempts have been made to validate IAT studies either by correlation with explicit attitudes (Hofmann et al., 2005), good internal consistency scores and high levels of reproducibility (Nosek et al., 2007), or the ability of IAT studies to predict actual behaviour (Arcuri et al., 2008).

A key feature of the IAT is not only its ability to detect the attitudes of which people are themselves unconscious but also its ability to predict behaviours stemming from those attitudes that respondents themselves cannot predict, e.g. IAT scores predicted for which two candidates in the Milanese election undecided voters would later go on to vote (Arcuri et al. 2008). This suggests that an IAT should be able to predict which product someone might purchase, even if he or she claims to be undecided. Indeed, a meta-analysis of 122 reports by Greenwald et al. (2009) shows that IAT scores correlate with explicit measures – particularly around brand preference and choice when respondents are forced to choose in less than 5 seconds (Plessner et al., 2004). This last point is not, necessarily, an endorsement of the IAT approach since the purpose of measuring hidden needs is to detect thoughts that do not match explicit measures. Nevertheless, this type of approach (i.e. one which measures response times to a stimulus) does offer a potentially innovative way to understand all three types of hidden needs discussed earlier (i.e. where respondents may be trying to deceive others, or deceive themselves, or where respondents do not know their minds).

The validity of other methodologies which make an indirect recording of brain activity (e.g. facial coding, skin conductance, eye-tracking) is discussed in a limited number of papers (e.g. Bercea, 2011; Suzuki et al., 2012), but while the authors make some claims regarding the validity of the methods, there is far less reliable evidence to support these claims. Again, these approaches do seem to offer some potential for understanding hidden needs, but the current published research is inconclusive in this area. Any supporting evidence is generally limited to a small number of case studies.

2.3.10.10.1 The Validity of Methodologies That Do Not Measure Brain Activity

This category contains a much broader number of techniques than the previous categories and the evidence related to validation is far more variable. A summary of the suitability of each approach for understanding subconscious needs, based on a

demonstration that the method can tap into a person's subconscious in a consistent, repeatable manner, is discussed below and shown in Table 2-21.

2.3.10.10.1.1 Projective Techniques

While projective techniques are recognised to be useful, according to Soley (2010), few researchers have provided evidence of their reliability and validity. Boddy (2005) believes that many market researchers use internal reliability to check that projective techniques produce findings for which they can be confident (based on a demonstration that subjects consistently express the same views) and cites Griggs (1987) and Zober (1956) to support this assertion. Winter and Stewart (1977) conducted a number of test-retest exercises using the Thematic Apperception Test (TAT) and demonstrated that reliability of the task was low, but suggested this was because the results were heavily influenced by the way the test was administered as much as the test itself.

Part of the problem with the reliability of projective techniques is that they rely upon a moderator to interpret the findings and each moderator has a different subjective style that they bring to the interpretation of the data (Hussey and Duncombe, 1999). This can result in different moderators producing different findings from the same data (Levy, 1985).

According to Boddy (2005), the evidence is insufficient, therefore, to support the assertion that projective techniques can tap into a consumer's subconscious. Boddy (2005, p14) believes that "there is arguably a need for market researchers to provide some research-based evidence for claims that they are projective other than the usual anecdotal evidence regarding the 'successful' use of the techniques over the past forty or so years". As such, this suggests that these techniques should still be considered for further investigation, but more research is needed to determine their true effectiveness.

2.3.10.10.1.2 Ethnography

Ethnography is mentioned in eight of the fifty-six papers, but all of the articles use case examples of the impact created by ethnography, rather than using one of the formal evaluation techniques described earlier. This is partly because the test-retest

approach would not be possible (ethnography is all about observation and description rather than testing) and partly because the purpose of ethnography is to identify hidden needs that other techniques will not identify.

It is clear from the case examples provided that ethnography has helped to provide real insight into product design and development (Cooper, 2010; Goffin, 2012), but it is hard to determine if this insight could be applied to help understand hidden needs for segmentation. More primary research is required to assess the potential of this approach.

2.3.10.10.1.3 Repertory Grid Technique

The Repertory Grid Technique is mentioned in several papers (Baxter et al., 2014; Goffin, 2004; Janssen and Dankbaar, 2008), but evidence of its ability to generate insights into hidden needs are limited to a small number of case studies. No rigorous statistical analysis of the approach using test-retest, triangulation or prediction against behaviour could be identified. Again, more primary research is needed to assess the potential of this approach.

2.3.10.10.1.4 Means-End Chain Analysis

Only Søndergaard (2005: 10) discusses this approach using a single case example, with no indication of its overall validity. Instead, it is said to have “shown clear advantages for market-orientated product development.” Once more, primary research is needed to assess the potential of this approach.

2.3.10.10.1.5 Conjoint Analysis

A large number of articles have been written about Conjoint Analysis (Green and Srinivasan, 1978; Gustafsson et al., 2007; Simmons and Esser, 2000). While none explicitly suggest that it is capable of identifying hidden needs, several suggest that it is a suitable methodology for indirectly understanding the weight of importance that people may place on key drivers (Denstadli, 2007). This makes it very applicable for understanding the importance of factors explored when making a decision (Louviere, 1988; Natter and Feurstein, 2002). It was for this reason that this approach was used in the empirical study in this DBA.

2.3.10.10.1.6 Metaphor Elicitation (ZMET)

ZMET is a proprietary test developed by Gerald Zaltman (2002). Some papers mention the approach, but only a limited amount of information is supplied to describe precisely how it works (Zaltman (2014)). No data, beyond anecdotal evidence, is provided in any of the papers to support its claims. Since it is a proprietary technique, it will be difficult to explore its full potential in subsequent research.

2.3.10.10.1.7 Unconscious Thought Theory

The premise of Unconscious Thought Theory is very similar to the idea of sleeping on a decision or taking a break from trying to solve a difficult problem and was recognised long ago by Wallas (1926). In research by Dijksterhuis and Nordgren (2006), participants were asked to choose between a number of apartments, each of which was described by different binary attributes (either positive or negative). One group of participants was invited to make an immediate choice between the apartments. A second group was given time to consider each choice carefully. The third was shown all of the apartments but then asked to complete the N-Back distraction-task (Yntema, 1963) before choosing their preferred apartment. Among the choices available, one apartment was deemed to be the best choice: 75% of the attributes were positive compared to only 50% for the other apartments. While it might be logical to assume that those who were given time to make their choice were more likely to identify the best option, it transpired that the distracted participants were most likely to identify this option. The theory proposed by Dijksterhuis and Nordgren (2006) to explain this phenomenon is that by distracting the participants, their subconscious minds continued to work on the problem. The subconscious mind is believed to have a much greater bandwidth than the conscious mind and so is thought to be more able to solve problems quickly⁶. Additional literature identified after the Systematic Literature Review has validated this research (McMahon et al.,

⁶ The subconscious brain is thought to be able to process 11 million bits per second compared to 40-60 bits per second for the conscious mind (William, D. 2006. The half-second delay: what follows? *Pedagogy, Culture & Society*, 14, 71-81.)

2011; Gao et al., 2012; Bargh, 2011). Indeed, over five hundred papers have been published regarding UTT (according to Google Scholar, June 2018), and this was felt to vindicate the decision to explore this approach further in the empirical study.

2.3.10.10.1.8 Other Methodologies That Do Not Measure Brain Activity

No information was found in the key articles, beyond anecdotal examples, about the success or otherwise of other methods of identifying hidden needs. They have therefore been excluded from the list of potential approaches to explore.

Table 2-21 - Summary of the suitability of research methods

	Methodology	Suitability for research purpose			
		Decision-making	Product development	Media effectiveness	Deeper understanding of attitudes
Methodologies that make a direct recording of brain activity	Functional Magnetic Resonance Imaging (fMRI)	***	**	****	**
	Positron emission tomography (PET)	**	***	****	***
	Electroencephalography (EEG)	****	***	****	***
	Transcranial magnetic stimulation (TMS)	**	***	***	**
	Steady State Topography (SST)	**	**	****	**
	Magnetoencephalography (MEG)	**	***	***	***
Methodologies that make an indirect recording of brain activity	Facial coding	*	*	***	*
	Implicit Association Test	****	**	*	****
	Skin Conductance	**	*	**	**
	Eye-Tracking	**	***	****	**
	Facial Electromyography	*	*	***	*
	Measuring Physiological Responses	**	*	**	*
Methodologies that do not measure brain activity	Repertory Grids	***	***	*	***
	Lead user groups	**	***	*	**
	Ethnography	*	****	*	**
	Conjoint analysis	***	**	*	*
	Means-end chain analysis	**	***	*	**
	Metaphor elicitation (ZMET)	***	**	*	***
	Information acceleration	**	***	*	**
	Projective research techniques	***	***	**	***
	Unconscious Thought Theory	****	***	***	***

*= Not suitable, *****= Very suitable

Source: Analysis of fifty-six research articles

2.4 Systematic Review: Analysis

Two key findings emerge from an analysis of the Systematic Literature Review. Firstly, there are several different purposes for conducting segmentation studies which include: decision-making, product development, media effectiveness and understanding of attitudes. The two areas which receive the most attention, based on the quality of journals in which the articles are published are decision-making and understanding of attitudes. It makes most sense, therefore, to explore one of these areas within the empirical research in this DBA.

Secondly, none of the methodologies can be shown to genuinely understand a person's hidden needs to the extent that the method could be used in its current form in order to segment people based on those needs:

- The methodologies that make a direct a recording of brain activity require medical level monitoring to be effective (which would preclude them from a quantitative research study) and none of them have been shown to identify hidden needs
- Some of the methodologies which produce an indirect recording of brain activity offer promise, but the literature does not support their usage due to reliability concerns (e.g. face coding, eye tracking, skin conductance). The Implicit Association Test is the only method that appears to offer some reliability and insight into a person's subconscious, but its output is binary and so does not lend itself to anything more than binary segmentations. Nevertheless, this is a method that the author would like to explore in more detail.
- The 'non-brain activity' methodologies are the most established approaches for understanding a person's unconscious needs. For the most part, these techniques offer potential, but lack rigorous supporting evidence, beyond a few case studies, to demonstrate their effectiveness (e.g. ethnography, ZMET, projective techniques), or they are too complex to administer quantitatively (e.g. ethnography, lead user groups, information acceleration, repertory grids). The techniques that attempt to offer an indirect measure of a person's needs (e.g. means-end chain analysis and conjoint analysis) are worthy of further

exploration: they can be administered quantitatively, and evidence exists to suggest that they can indirectly elicit a person's needs. Unconscious Thought Theory is the approach that seems to offer the most potential: it can be administered quantitatively, and the literature suggests that it engages a participant's unconscious thought process. The literature does not, however, suggest that it can identify a person's unconscious needs and so it may work best in conjunction with one of the other approaches.

A summary of the methodologies identified and their suitability to be used to understand different types of hidden needs is shown in Table 2-21.

By comparing all of the methodologies discussed, it is possible to identify the features of the methodologies that are most likely to help to understand a person's unconscious needs. These are as follows:

- Time pressure (used in the Implicit Association Test) – when people are put under pressure to make a decision it is more likely that their unconscious mind will make the decision (Plessner et al., 2004)
- Being distracted (used in UTT) – when people are asked to complete one task, but then engage their working memories with another task, their unconscious mind will take over the decision-making process (Dijksterhuis and Nordgren, 2006)
- Using an indirect approach – used in CBC, Repertory Grids, Means-end Chain analysis, IAT and conjoint. All these methods seek to understand a person's motivations and preferences by various forms of indirect questioning, and so provide an implicit understanding of a person's needs
- A natural environment (in-situ research) – most of the brain scanning techniques which make a direct recording of brain activity are limited to the laboratory, but most non-brain scanning techniques are carried out “in-situ” due to the belief that better results are obtained in natural environments (Vallack, 2014)
- Not using a moderator or interpreter – any technique that requires a moderator to interpret the results is very dependent on the skill of the moderator to

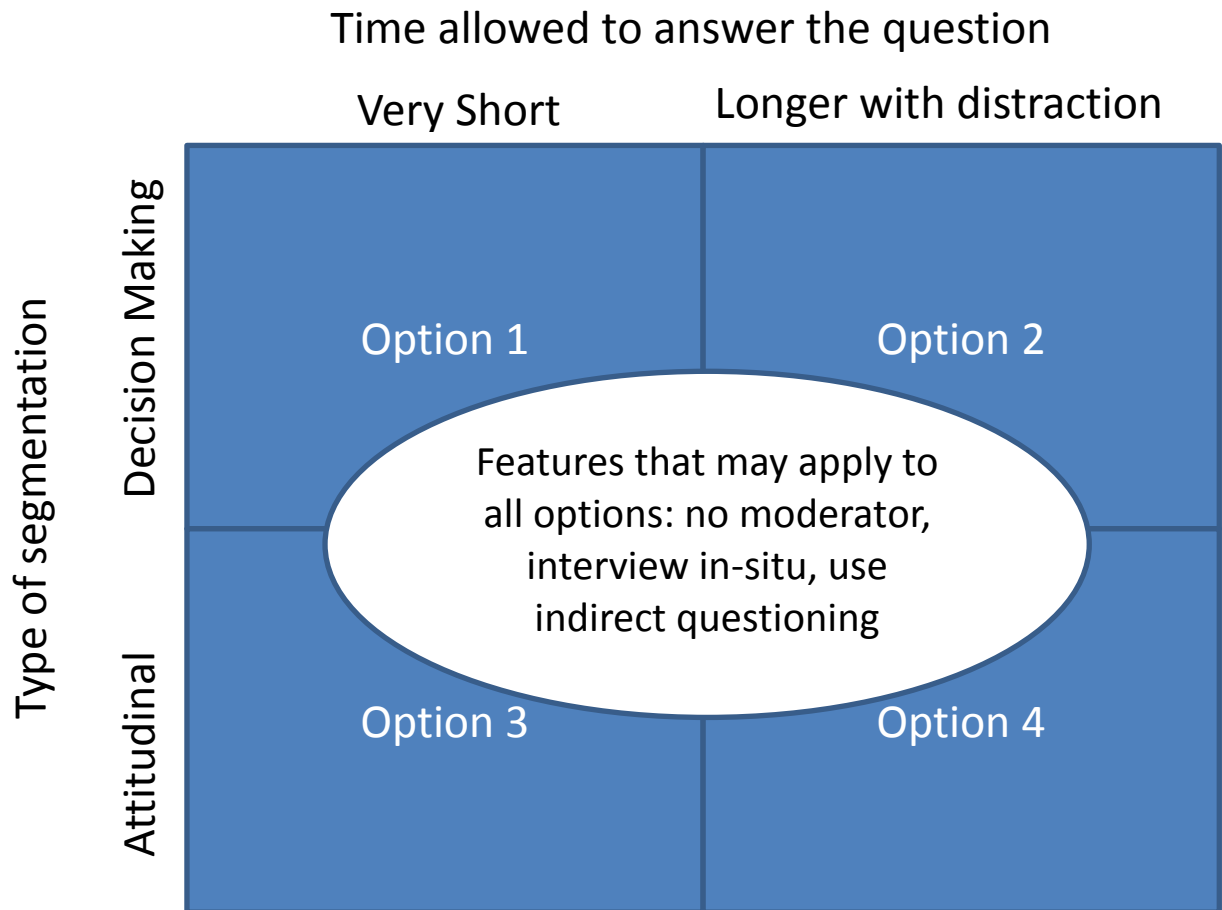
provide insights. The moderator can create big variations in the insights provided. Where possible, their influence should be avoided (Levy, 1985).

Since no single approach has been proven to understand a person's hidden or unconscious needs, the author concluded that a combination of approaches might provide some insight. This combination of approaches would, ideally, not require a moderator and would occur in-situ, using some form of indirect questioning technique with people who are either distracted and given a lot of time to think about their answers or alternatively are placed under time pressure. This combination of features and purposes is summarised in Figure 2-13 and suggests four potential areas that could be developed into a methodology to understand unconscious or hidden needs: two based around the Implicit Association Test and two based around Unconscious Thought Theory. A major supermarket retailer agreed to sponsor the DBA, and after much debate, they selected two areas for exploration:

1. Asking people to complete the OCEAN personality profile survey using an indirect method of data collection (Collis, 1997), and evaluating their answers based on the speed of response
2. Applying UTT to understand how people choose products in a supermarket using some form of indirect questioning

After further debate with the research sponsor, the decision was taken to focus on the UTT based methodology. This was deemed to be the most relevant to the retailer and offered the most promise in terms of its general applicability.

Figure 2-13 – Potential Areas and Methods to Explore to Develop Methodology to Understand Hidden or Unconscious Needs



2.5 Conclusion

This chapter has demonstrated that customer segmentation studies are most likely to be carried out to understand how customers might be clustered together on the basis of their needs and buying decisions. The literature has also highlighted the call for insight around both explicit and implicit/hidden/subconscious/unconscious customer needs – with many authors using these terms interchangeably. Although a number of different methodologies claim to offer an insight into a person’s subconscious needs and decision making, none of the methodologies has yet been able to prove that they can truly understand individual’s unconscious needs in a way that could be used for the purposes of customer segmentation. The development of such a methodology is the core contribution of this DBA and is discussed in the next chapter. It is important to note that the methodology is concerned with unconscious needs, rather than the more generic description of “hidden needs”. “Unconscious needs” is the term used for this DBA from this point forward to describe needs that have previously been referred to as hidden or implicit or subconscious.

3 Empirical Project: Methodological Approach

3.1 Introduction

From the outset of this DBA, the ambition of the author has been to identify or develop a methodology to segment customers based on their unconscious needs. This is the core contribution of this DBA. Since no existing methodology was identified in the literature review as being capable of understanding an individual's unconscious needs for the purpose of segmentation, the purpose of the empirical design has been to develop such a methodology.

This chapter describes how the methodological contribution evolved because of the Systematic Literature Review and input from the retailer who helped to sponsor the work. It describes the hypotheses that were developed and provides a clear description of the methodology and sample approach used. It lists the ethical concerns considered when conducting the research. It also explains, in detail, how the data was cleaned, and the tests conducted to ensure that the data is reliable

3.2 Project Overview

Based on the literature review and discussions with the retailer who sponsored the DBA, it was decided to focus this work on understanding customer decision-making. The Johari Window (Luft and Ingham, 1961) framework discussed in Section 2.3.10.1.3 helped to refine the definition of unconscious needs as those that the individual cannot recognise in themselves and cannot or will not express to others (Figure 2-10). This led to the conclusion that a combination of two approaches was required: the first would allow the individual to recognise the need in themselves (i.e. tap into their unconscious decision-making process); the second would let the individual express the need to others (i.e. understand the need via an indirect methodology).

As discussed in the literature review, research by Dijksterhuis and Nordgren (2006) on UTT provides a potential method for helping an individual to recognise a need in themselves. CBC was viewed as being the ideal indirect method for letting an individual express the relative importance of the need to others. As it transpires, the choices presented in a CBC exercise are structured in a very similar way (using

attributes and levels) to the options presented by Dijksterhuis and Nordgren (2006) in their work on UTT. It was proposed, therefore, to merge the ideas of UTT and CBC so that participants would answer a CBC questionnaire, but engage in a distraction-task between being shown each choice-task and responding to it. By combining these two approaches, it was hoped that it would be possible to identify unknown unknowns, i.e. needs that the individual cannot express to others and do not recognise in themselves (Figure 3-1). In addition, while over five hundred papers have been published regarding UTT (according to Google Scholar, June 2018), none have linked the approach to CBC, and none have been able to show any link between UTT and actual behaviour. By bringing these approaches together and demonstrating that they could link to actual behaviour it was hoped that the work would make a contribution to the literature.

This combination of approaches also meant that the research would satisfy three of the five key factors identified in the literature review: the respondents would be involved in an exercise that doesn't require a moderator but uses both distraction and indirect data collection. It was not possible to include the elements of time pressure and conducting the research in-situ, but these might be additional enhancements to consider in subsequent research.

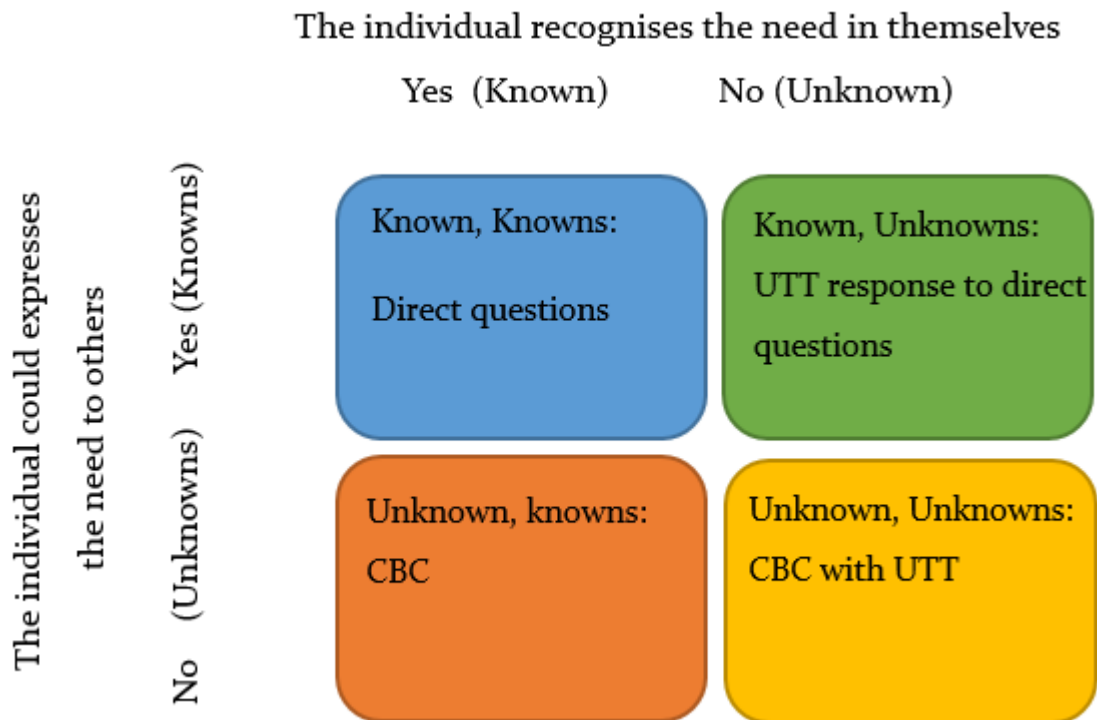


Figure 3-1 - How CBC and UTT can be Combined to Identify Unknown Unknowns

In order to evaluate the success (or otherwise) of this new methodology, it is important to be able to compare its effectiveness with other potential methods for understanding unconscious customer needs. As already stated, a systematic review of the literature did not reveal any other potential methods suitable for this purpose, apart from the Implicit Association Test. While it would have been interesting to attempt to devise a way to compare the Implicit Association Test to this new methodology to understand unconscious needs, this was not practical due to a lack of interest from the retailer who sponsored this research. Instead, the decision was taken to compare this new method with a more conventional CBC test, based on the same attributes and levels. This would then make it possible to understand if UTT, as described by Dijksterhuis and Nordgren (2006), really has an impact on how people make decisions. The CBC only sample was therefore designed to act as a control sample against which the CBC/UTT sample can be tested (Kothari, 2004). The output from both samples is the CBC attribute importance. Both samples were segmented on the basis of these attribute importance ratings, and the relative merits of each

segmentation was assessed using the criteria described by Kotler (2009) - see section 2.2.2.5.

The idea of being able to discover these new types of insights was very attractive to a UK based multinational supermarket group, with whom the author has worked previously. The company owns a database of over 15 million customers who shop in its stores and collect loyalty points in exchange for allowing access to their purchasing behaviour. The Retailer wanted to enhance its database by augmenting the database with survey data to create a deeper understanding of each customer. The company was very interested in enhancing the database with its customer's unconscious needs and so agreed to allow the author to use the database to recruit respondents so that their responses to the survey could be compared to their actual buying behaviour.

The conversations with the Retailer evolved to focus on how customers are unconsciously influenced by the nutritional claims made on a food product's packaging. The Retailer then selected the snack bar category as their priority as they believed that it is a product type for which the nutritional content is important to customers. Thus, the empirical study became a quantitative segmentation of the importance of nutritional claims when buying snack bars, using a test and control approach: the test cell uses a CBC/UTT approach whereby each CBC choice-task question includes a UTT distraction-task, while the control cell completes the same CBC but without the distraction-task. The respondent's responses are then linked and compared to their in-store buying behaviour.

3.3 Hypotheses Development

The literature review, combined with the needs of the retailer who has sponsored the work, has led to an empirical piece of research which is designed to understand if Unconscious Thought Theory can supplement and enrich a Choice-Based Conjoint interview to produce a customer decision-making segmentation that more effectively reflects customers' unconscious motivations and actual behaviour when choosing snack bars.

Unconscious Thought Theory was first described by Dijksterhuis (2006). It is the equivalent of taking a break from a problem or complex decision, only for the answer to the problem to occur a short while later. Taking a break from tasks like complex decision making has been shown to be productive to solving them by a number of authors (Bargh, 2011; Dijksterhuis and Strick, 2016; Gao et al., 2012), but a separate group of authors (Calvillo and Penaloza, 2009; González-Vallejo et al., 2008) claim to have failed to replicate this work. Indeed, in his first two experiments, Dijksterhuis (2004) reported no statistical differences between a group of respondents who were asked to consider a problem carefully and a group who were distracted. This work suggests that it is important to check that the distraction-tasks influence the conjoint choices respondents make. Hence the first hypothesis is as follows:

- H₁: The distraction-tasks affect the responses to the conjoint tasks.

The purpose of a distraction-task is to occupy a participant's working memory so that their subconscious is forced to take over the problem that needs to be solved (Dijksterhuis, 2004). It has been noted, however, that significant individual differences exist in working memory capacity (Daneman and Carpenter, 1980): this implies that some people are easily able to cope with a distraction-task while others may not fully engage with the task (Kane and Engle, 2003; Kirchner, 1958). If a person does not engage with a distraction-task, they cannot be said to be “deliberating without attention” (Dijksterhuis, 2004) and so (potentially) the distraction-task will not influence their choice-task. It is, therefore, important to test if this is true. A second hypothesis has been developed accordingly:

- H2: Participants who fully engage with the distraction-tasks respond to the choice-tasks differently to those who do not fully engage with the tasks.

Due to the nature of CBC, each participant in the CBC/UTT sample will need to be shown a number of choice-tasks. Since they will also be asked to complete a distraction-task before each choice-task, they will also need to complete a number of distraction-tasks during the interview. The original work by Dijksterhuis (2004) used an anagram as a distraction-task, while his paper in 2006 used the n-back task (Yntema, 1963) to distract participants. This suggests that there is no fixed distraction-task that may provoke unconscious thought. Indeed, McMahon et al. (2011) deliberately experimented with different distraction-tasks to determine if there is such a thing as the ‘optimal task’. McMahon et al. (2011) hypothesised that undemanding distraction-tasks would yield the best results and so used tasks such as listening to music to determine if this was the case. In this research, the distraction-tasks will be, for the most part, more rigorous psychological experiments that should be expected to be equally effective (e.g. n-back task, reading span task etc.). On this basis, the third hypothesis is as follows:

- H3: All distraction-tasks have an equal impact on the way participants respond to the choice-tasks.

According to Dijksterhuis (2006: 99), unconscious thought “naturally weights the relative importance of various attributes.” This implies that unconscious thought should create different importance weights compared to conscious thought. One of the key outputs of a CBC study is the relative importance of the attributes assessed (Green et al., 2001), and so this leads to the conclusion that a combined CBC/UTT approach should create different importance weights than a CBC only approach. Curiously, however, some of the work published by Dijksterhuis (2004), found no significant differences between the importance weights created by conscious thought versus unconscious thought: this area, therefore, needs to be explored in more detail. Hence, the fourth hypothesis is as follows:

- H4: The combination of CBC and UTT creates differences in the attribute importance weights compared to a CBC only approach.

Assuming that the combination of CBC and UTT does generate different importance weights compared to a CBC only approach, the difference may not be sufficient to allow the derivation of a different set of segments. In other words, the segments might be the same for both methodological approaches, but the within-segment attribute weightings might be somewhat different. The core of this DBA, as described in section 1.3, is to understand if Unconscious Thought Theory can supplement and enrich the Choice-Based Conjoint approach in order to produce a customer decision-making segmentation that more effectively reflects customers' unconscious motivations. It is, therefore, crucial that the segmentation produced from the CBC data is compared to the segmentation produced from the CBC/UTT data. This leads naturally to the fifth hypothesis:

- H5: The distraction-tasks cause different customer segments to emerge.

Even if the combined approach of using CBC with UTT creates different attribute weightings to the CBC only approach, and the attribute weightings are sufficiently different to generate new segments, it cannot be guaranteed that these attitudinal differences will relate to actual behaviour. As it transpires, a number of authors have suggested that unconscious thought should link more naturally to actual behaviour (Brunel et al., 2004; Steinman, 2008; Wilson and Dunn, 2004) and one of the huge benefits afforded to the author by the sponsorship of this DBA by the Retailer, is the ability to link the respondents' responses to the survey with their shopping behaviour based on store card data. In order to show that the new methodological approach has rigour in terms of being able to demonstrate a link between respondents' attitudes and actual behaviour, a final hypothesis is proposed:

- H6: The distraction-tasks improve the link between behaviour (from store card data) and claimed preferences (from the CBC data).

The rest of this chapter goes on to detail the research that was designed to answer these hypotheses.

3.4 Research Design

As stated previously, the purpose of the research is to segment buyers of snacks based on their unconscious attitudes towards the nutritional claims made on the packaging. Two approaches are employed to develop this methodological contribution: Choice-Based Conjoint, which seeks to understand, indirectly, the participants' attitudes towards nutritional claims; Unconscious Thought Theory, which seeks to tap into the participants' unconscious decision-making processes.

The key aspects of the research design are discussed as follows:

- The overall approach
- Questionnaire development
- The conjoint design
- The distraction-tasks used
- What was learned from the pilot study
- The sample design
- Interview structure
- Ethical considerations.

3.4.1 Overall Approach

The research was conducted as a series of monadic tests (Zikmund et al., 2013). A control sample (Sample A) was recruited to understand which factors are most important when choosing a snack bar. This sample completed a traditional CBC approach which consisted of twenty-one choice tasks. A test sample (Sample C) was recruited to understand the impact of using UTT distraction-tasks before answering each of the twenty-one conjoint choice-task. The addition of twenty-one distraction-tasks increased the length of the survey considerably to the point where it was unrealistic to expect people to complete the survey in one interview (Herzog and Bachman, 1981). Instead, a split questionnaire design (SQD) methodology was employed: the survey was split into three parts, each conducted within a day or so of each other. The main concern with this approach was that the responses to the survey might be affected by the split. Hence, an additional control sample was recruited. This sample (Sample B) completed the twenty-one conjoint choice-tasks without the

distraction-tasks, just like Sample A, but the survey was split into three parts, each completed within a day or so of each other like Sample C (Figure 3-2).

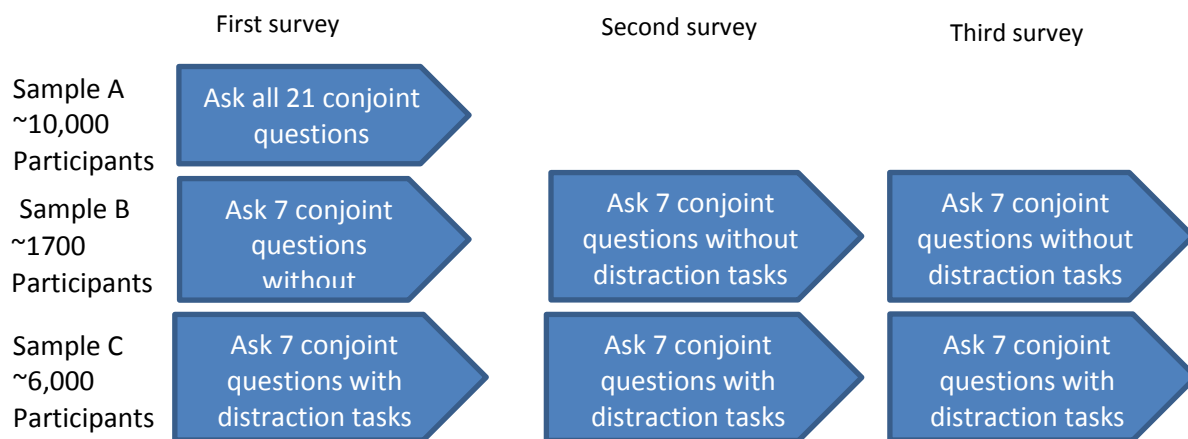


Figure 3-2 - Overall Approach

3.4.2 Questionnaire Development

To ensure construct validity, the conjoint design was originally based on the work of Annunziata and Vecchio (2013) who used a conjoint research methodology to assess customers' perception of different functional foods. Bech-Larsen and Grunert (2003) also used a conjoint methodology to assess the perceived healthiness of functional foods. In both instances, participants were shown descriptions of functional foods, each of which was described by 4-5 different features/ attributes e.g. brand, health claims, organic etc.. The participants were shown 3-4 of these foods and asked to choose their preferred option. This process was repeated 10-20 times and so demonstrated that a conjoint-based approach was applicable to this area. The questionnaire was then refined based on the work by Kraus (2015), who identified the key factors which influence the decision to buy and consume functional foods, including claims which are not approved by European Union (EU) legislation, about improving mental and physical health. After extensive conversations with the Retailer who sponsored the study, however, it was felt that it was inappropriate to ask people to trade-off claims that were not allowed to be made by manufacturers due to EU legislation. As a result, the attribute list was revised to focus on the nutritional content of snack bars (e.g. Fat, Saturates, Sugar, Salt), along with brand and other taste claims. Price was not included as an attribute as it was not felt to be appropriate for UTT

studies (Dijksterhuis and Strick, 2016). The full list of attributes and levels is shown in Table 3-1. The specific nutritional levels were set using the EU nutritional guidelines (European Commission, 2006). Copies of the questionnaires are provided in Appendix E.

Table 3-1 - Conjoint Attributes and Levels

Attributes	Individual Levels
Brand	A
	B
	C
Taste claims	Great tasting
	Tastes delicious
	Super Satisfying
Fat levels	High (17.5%)
	Medium (10%)
	Low (3%)
Saturate levels	High (5%)
	Medium (3%)
	Low (1%)
Salt levels	High (22.5%)
	Medium (14%)
	Low (5%)
Sugar levels	High (1.5%)
	Medium (1%)
	Low (0.3%)
Presentation of nutritional values	Words highlighted
	Words shaded
	traffic lights
Natural claims	100% Natural
	Organic
	A Fairtrade Product
Other health claims	Nothing artificial
	Gluten Free
	One of your Five-a-day

3.4.3 Conjoint Design

As already discussed in Section 2.3.10.10.1.5, Conjoint, or trade-off analysis, is a commonly used method of data collection designed to understand, indirectly, a consumer's preferences. Its purpose is to measure the "the structure of consumer evaluations using a set of product profiles consisting of predetermined combinations of product attributes" (Asioli et al., 2016: 2). Consumers are presented with a number of product profiles and are asked to either rank, rate or choose among them (Louviere et al., 2000a, Louviere et al., 2000b and Molteni and Troilo, 2007).

Annunziata and Vecchio (2013) used a conjoint research methodology to assess customers' perceptions of different functional foods, while Bech-Larsen and Grunert (2003) used a conjoint methodology to assess the perceived healthiness of functional foods. In both instances, participants were shown descriptions of functional foods, each of which was described by 4-5 different features (attributes). These examples were used as a basis from which to develop the conjoint exercise for this research.

There are two main types of Conjoint Analysis: (i) acceptance-based approaches, which require that consumers rate each alternative product according to their degree of liking or hypothetical purchase intention and (ii) preference-based approaches, where consumers are required to express their preferences either in terms of ranks or choices among several alternative products with varying levels of attributes (Green et al., 2001). In this study, a preference methodology (Choice Experiment) was adopted, since it is believed that choice-based methods provide a more realistic way to understand a participant's behaviour in a real purchase situation compared to a rating or ranking method (Carson et al., 1994, Louviere et al., 2000a and Louviere et al., 2000b).

According to Orme (2010), the design of a CBC can be fixed or randomised. A fixed model offers a single version of a questionnaire to all the respondents whereas a randomised design offers a different interview to each respondent. Randomised designs require the use of a computer platform and are slightly more efficient than fixed designs (Orme, 2010). The optimal number of questions to include in a CBC analysis was determined to be around twenty questions (Johnson and Orme, 1996).

According to Johnson and Orme (1996: 7) “the gain from respondents learning how to answer choice-tasks seems to outweigh the loss from fatigue and boredom, even for studies with up to twenty tasks.”

A CBC design was created using SSI Web (Sawtooth Software version 8.3.8). The attributes and levels used are presented in Table 3-1. The design was a traditional full-profile CBC. Twenty-one choice-tasks were created with three snack bar concepts per task. A “none of these” option was not included as all respondents were recruited on the basis that they claimed to buy snack bars. Each snack bar concept was a random combination of the levels for the nine attributes, with each attribute represented in every design. The study used a balanced overlap design, and four different fixed versions of the questionnaire were created. While it is typical for online interviews to produce more versions of the questionnaire using a randomised design, this was not practical in this instance due to the need to produce each choice-task by hand so that the attribute level for the “Presentation of the nutritional content” could be shown rather than described. One prohibition (Johnson and Orme, 2003) was created to ensure that a product could not be shown with a low overall fat level, but a high level of saturated fat as this would not be physically possible to produce. The strength of the model design is shown in Appendix C.

The SSI Web CBC software provides several guidelines for evaluating a CBC design, all of which are satisfied by this design:

- Standard errors within each attribute should be roughly equivalent
- Standard errors for the main effects should be no larger than about 0.05
- Standard errors for the interaction effects should be no larger than about 0.10.

The conjoint design information provided by the Sawtooth Software was used to design each choice-task in PowerPoint. This was done to allow the “Presentation of nutritional content” attribute to be presented visually rather than by describing each level. An example of the choice-tasks is shown in Figure 3-3.

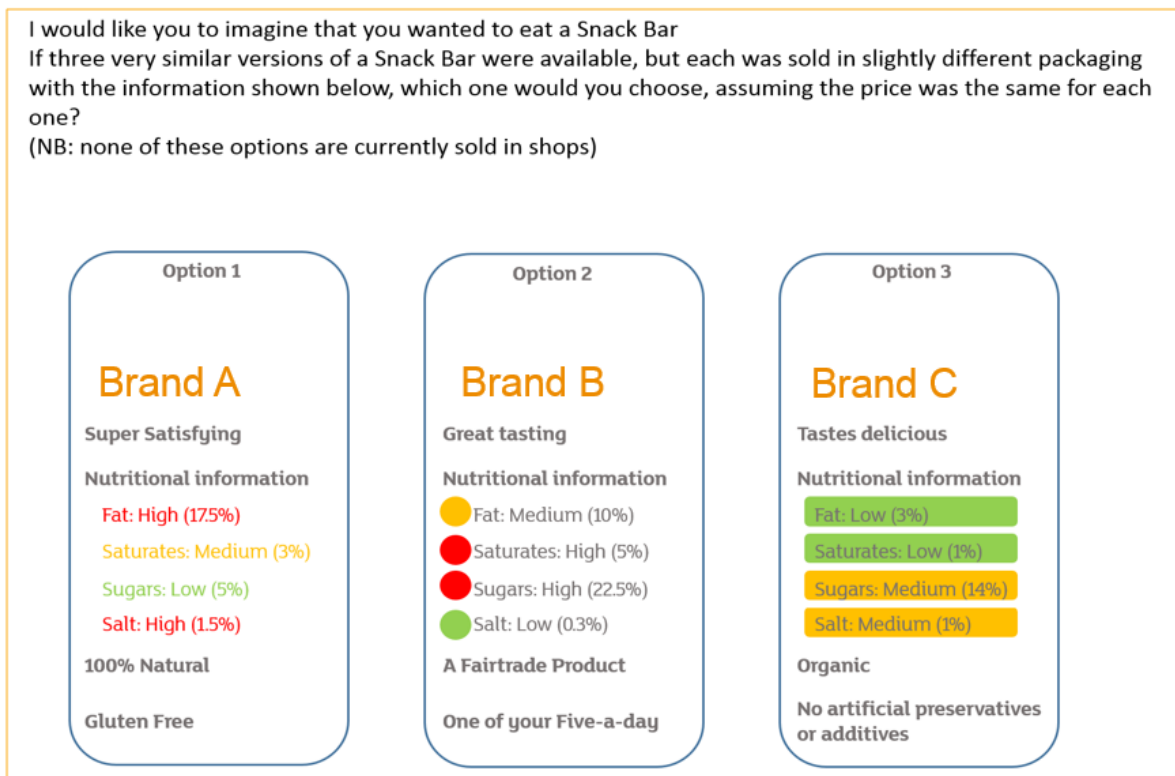


Figure 3-3 – Example Conjoint Task

The questionnaire was piloted (see Section 3.4.5) to ensure that the conjoint attributes were viewed as distinct and independent. At the analysis stage, a Cronbach’s Alpha coefficient of 0.863 was calculated, using the overall importance of each conjoint attribute, indicating that the attributes used could be considered as a “good” measure of scale reliability (Peterson, 1994). The correlation between the attributes was also assessed at the analysis stage to ensure that attributes such as “Brand” did not represent a “parent construct”. This did not transpire to be a problem. “Brand” did not correlate with any of the other attributes apart from “Taste Claims,” with a correlation coefficient of 0.537. Since “Taste Claims” transpired to represent only about 2% of the overall attribute importance (Table 4-8) this was not felt to be an issue.

3.4.4 Distraction-tasks Used

A core part of the research by Dijksterhuis and Nordgren (2006) involved distracting a participant by occupying their working memory with other information between asking them to consider a decision and actually making the decision. The Two-Back task, which requires participants to perform dual tasks of memorising and recalling a list of items, is a well-established complex span task that was used to this end (Jonides et al., 1997). In designing the research for this DBA, the work of Dijksterhuis and Nordgren (2006) was replicated as closely as possible. The Two-Back distraction-task was used to engage the working memory of the participants after they were shown the first conjoint choice-task. It was, however, felt to be inappropriate to show the same distraction-task for all twenty-one choice-tasks: participants would rapidly become bored and would not complete the interview. Also, the interview would become too long since each choice-task would take at least two minutes to complete, resulting in a highly repetitive interview that could potentially last for up to an hour in length: too long to be acceptable (Bansal et al., 2017).

In response to the concerns described, the interview was split into three parts, with each part being conducted one day after the previous interview to ensure that the participants did not become bored by the length of the interview (Adigüzel and Wedel, 2008). In addition, a range of different distraction-tasks was used to ensure that the interview was not viewed as too repetitive. To ensure consistency, the same distraction-tasks were repeated for all three stages of the interview (e.g. the Two-Back task was used as part of the first-choice question for each of the three interviews) and this approach was repeated for the second, third and fourth choice questions. Given the amount of data being collected, the opportunity was also taken to experiment with some “new” distraction-tasks that have not been used by other researchers. The distraction-tasks used at each stage of the interview are described in Appendix D.

3.4.5 Pilot Interviews

Cooper et al. (2003) state that it is important to conduct pilot interviews to ensure that the respondents understand the questions being asked. Based on the recommendations of Rowley (2012), a series of eight pilot interviews were conducted with friends and colleagues, before two final interviews were conducted with people recruited via the Retailer’s Loyalty Card customer database. The interviews revealed some issues which led to the changes to the methodological approach to overcome those issues described in detail in Table 3-2.

Table 3-2 - Outcome of Pilot Interviews

Issue	Resolution
Participants became bored with the request to look at the choice-tasks before and after the WM tasks. Some simply skipped passed the first-choice-task.	For choice-tasks 15-21, the participants were asked to answer three questions about the choice-tasks to check their comprehension of the task before completing the WM task. This was added to Samples B & C to help understand if the additional task affected the way people answered the CBC exercise.
The Word Generation task was the only task not to provide feedback, so the level of motivation to complete the task diminished when asked to complete it for a second and third occasion.	Participants were offered an additional competition-based incentive (in the form of Loyalty Card points) for the person who generated the most words for the third Word Generation task.
Participants became frustrated with the process and struggled to understand why they were being asked to complete so many “strange exercises” (as they called them).	The final exercise was changed to become a “comma counting” task so that the text could be used to explain more about the reasons for asking the participants to complete the exercise.
There was a lack of consistency about what people understood by the term “snack bars.”	An additional question was inserted to understand each individual’s interpretation of a “snack bar.”
The respondents who completed the distraction-task pilot interviews complained about the need to split the survey over several days.	The loyalty points incentive was revised to give more bonus points to the people who completed all three stages.
The overall reaction to the survey was highly variable. Some hated it, while others loved it.	Additional questions were added at the end of the survey to understand how popular or unpopular the survey transpired to be.

3.4.6 Sample Structure

The research was conducted among three separate samples of respondents, all of whom were over 18 years of age and claimed to eat snack bars. All respondents were recruited via the Loyalty Card database panel. The Loyalty Card Market Research team from the Retailer sent each participant an invitation to take part in the research (Appendix A). The mail-out populations were selected to ensure that the samples were representative of the Loyalty Card database regarding demographics, supermarket spend levels and Loyalty Card points earned.

Three separate groups of respondents were recruited:

1. Sample A consisted of 10,035 participants (95% confidence interval $\pm 1\%$), all of whom completed the conjoint survey in one interview without any distraction-tasks.
2. Sample B consisted of an initial sample of 1712 respondents (95% confidence interval of $\pm 2.4\%$), who completed the survey in three stages. The sample fell to 1,102 for the second stage of the interview, and 816 participants completed all three stages.
3. Sample C consisted of an initial sample of 6,142 (95% confidence interval of $\pm 1.3\%$), who completed the survey in three stages with distraction-tasks throughout the interview. This sample fell to 3,064 for the second stage of the survey and 2,415 for the final stage of the research.

The sample sizes for the three samples are shown in Table 3-3. The incentives offered to complete each stage of the survey (Table 3-4) were increased in line with the recommendations of Laurie and Lynn (2009).

Table 3-3 - Sample Sizes

	Sample A	Sample B	Sample C
Total number of invitations sent	213,334	50,000	200,000
Number of completed interviews at stage 1	10,035	1712	6,142
Number of completed interviews at stage 2	n/a	1,012	3,064
Number of completed interviews at stage 3	n/a	816	2,415

Table 3-4 - Incentives Offered to Complete the Surveys

	Sample A	Sample B	Sample C
Stage 1	150 Loyalty Card points	150 Loyalty Card points	150 Loyalty Card points
Stage 2	n/a	200 Loyalty Card points	200 Loyalty Card points
Stage 3	n/a	250 Loyalty Card points	250 Loyalty Card points

3.4.7 Interview Structure

Table 3.5 provides an outline of the structure of the surveys. For the full questionnaires, see Appendix E.

Table 3-5 - Part One of Questionnaires

Survey A	Survey B	Survey C
Consent to participate	Consent to participate	Consent to participate
Attitudes to Health	Attitudes to Health	Attitudes to Health
Factors that are considered to be important to health	Factors that are considered to be important to health	Factors that are considered to be important to health
Favourite snack or treat	Favourite snack or treat	Favourite snack or treat
Snacks that would never eat – reject people who mention snack bars	Snacks that would never eat – reject people who mention snack bars	Snacks that would never eat – reject people who mention snack bars
Food products considered when you hear the phrase ‘Snack Bars’	Food products considered when you hear the phrase ‘Snack Bars’	Food products considered when you hear the phrase ‘Snack Bars’
Frequency of eating snack bars	Frequency of eating snack bars	Frequency of eating snack bars
Twenty-one conjoint questions	Seven conjoint questions	Seven conjoint questions with distraction-tasks
Demographics	Demographics	Demographics

Table 3-6 - Part Two of Questionnaires

	Next seven conjoint questions	Next seven conjoint questions with distraction-tasks
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Table 3-7 - Part Three of Questionnaires

	Seven conjoint questions with comprehension questions	Seven conjoint questions with comprehension questions and distraction-tasks
		Feedback on survey

3.5 Ethical Concerns

The author of this research familiarized himself with the Cranfield Integrity Policy Statement and Cranfield University Ethics Policy and shares the Cranfield imperative approach to recognising personal responsibility for developing and maintaining sound and rigorous research practices. In addition, the author has been a member of the European Society for Market Research (ESOMAR) for the last 20 years and so is very familiar with all elements of data compliance, data security and ethical conduct when carrying out such research and complied with these protocols and its associated code of conduct accordingly. In addition, based on the recommendations of Bell and Bryman (2007) the following ten ethical principles were also followed:

1. The research participants were not subjected to harm in any way whatsoever, and all participated on a voluntary basis.
2. Respect for the dignity of research participants was prioritised.
3. Full consent was obtained from the participants prior to the study. Details are shown in the recruitment e-mails used -see Appendix A.
4. The protection of the privacy of research participants was ensured.
5. The confidentiality of the research data was ensured.
6. The anonymity of individuals and organisations participating in the research was ensured.
7. The research aims and objectives have not been exaggerated.
8. Affiliations in any forms, sources of funding, as well as any possible conflicts of interests have been declared.
9. All communication in relation to the research has been done with honesty and transparency.
10. All information, including the primary data, has been fairly represented. The highest level of objectivity in discussions and analyses have been applied throughout the research.

3.6 Data Cleaning

Before conducting the data analysis, the data were cleaned to ensure that, as far as possible, all participants were engaged and attentive while they completed the survey. All research data, based on survey responses, requires cleansing to ensure that responses generated by careless or inattentive respondents are eliminated (Meade and Craig, 2012). This is particularly true of data created via internet-based surveys where there is little or no control over the environment or willingness of the participants to complete the survey accurately (Buchanan et al., 2005). CBC analysis makes it relatively easy to check if a respondent has been careless or inattentive since the respondents' answers need to be consistent throughout the conjoint interview. By applying Sawtooth Software Hierarchical Bayes analysis to the data set (Lenk et al., 1996), it is possible to generate individual utility scores for each respondent (Orme, 2009). These scores are then used to calculate the probability of each respondent choosing as she/he actually did on each task. A key statistic which measures this consistency is the RLH: short for "root likelihood" (Gustafsson et al., 2007). This is calculated by taking the n th root of the likelihood, where n is the total number of choices made by all respondents in all tasks – in this data set, there are twenty-one choice-tasks, hence $n= 21$. The RLH is, therefore, the geometric mean of the predicted probabilities across all twenty-one choice-tasks. Since three alternatives were presented for each choice-task, an RLH of 0.33 or more would indicate that the utilities are predicting the correct alternatives better than random selection. For this study, an RLH of 0.5 or more was chosen to indicate that the respondent was careful and attentive when completing the interview. This mirrors the approach taken by Jarvis et al. (2012) in their study on the importance of different coffee attributes. The editing process described resulted in the final sample sizes shown in Table 3-8.

Table 3-8 - Number of Usable Interviews

	Sample A	Sample B	Sample C
Number of completed interviews (all twenty-one conjoint-tasks answered)	10,035	816	2,415
Number of usable interviews	9003	721	2263
Percentage of usable interviews	90%	88%	94%

Two-tailed t-test analysis of the data indicated a significantly higher number of usable interviews (at the 95% level) occurred in Sample C compared to Samples A & B. This difference is almost certainly due to Sample C's higher level of respondent drop-out (Tijdens, 2014) from initial recruitment, i.e. the nature of the interview caused more of the sample to drop-out earlier on in the process, and so those who remained were keener to complete the interviews correctly. This is discussed in more detail in section 3.7.2.

The impact of splitting the sample into two groups based on their RLH scores is demonstrated in Table 3-9, which shows the Hierarchical Bayes attribute importance, split by sample and RLH score. Mann-Whitney U tests were conducted within each sample between the $RLH < 0.5$ sample and the $RLH \geq 0.5$ sample for each attribute. Each attribute was found to be significantly different at the 99.9% level for the deleted respondents versus the remaining participants for all three datasets (Table 3-9), and this was felt to vindicate the decision to eliminate the participants with an RLH score below 0.5.

Table 3-9 - Hierarchical Bayes Attribute Importance split by RLH levels

Attribute Importance	Sample A		Sample B		Sample C	
	RLH <0.5	RLH ≥0.5	RLH <0.5	RLH ≥0.5	RLH <0.5	RLH ≥0.5
Brand	17%	14%	16%	11%	14%	9%
Taste Claims	5%	2%	8%	4%	6%	3%
Fat levels	17%	25%	16%	24%	18%	26%
Saturate levels	10%	13%	10%	14%	10%	13%
Sugar levels	15%	23%	15%	21%	15%	23%
Salt levels	11%	12%	11%	12%	11%	12%
Traffic light system used	8%	4%	9%	5%	8%	4%
Natural claims	7%	3%	8%	4%	8%	4%
Artificial claims	9%	5%	8%	5%	10%	5%

One consequence of the data cleaning process is that not all the respondents were eliminated equally across the four different versions of the CBC questionnaire (see Section 3.4.3). The impact of RLH data cleaning on the cell balance across the three samples is shown in Table 3-10.

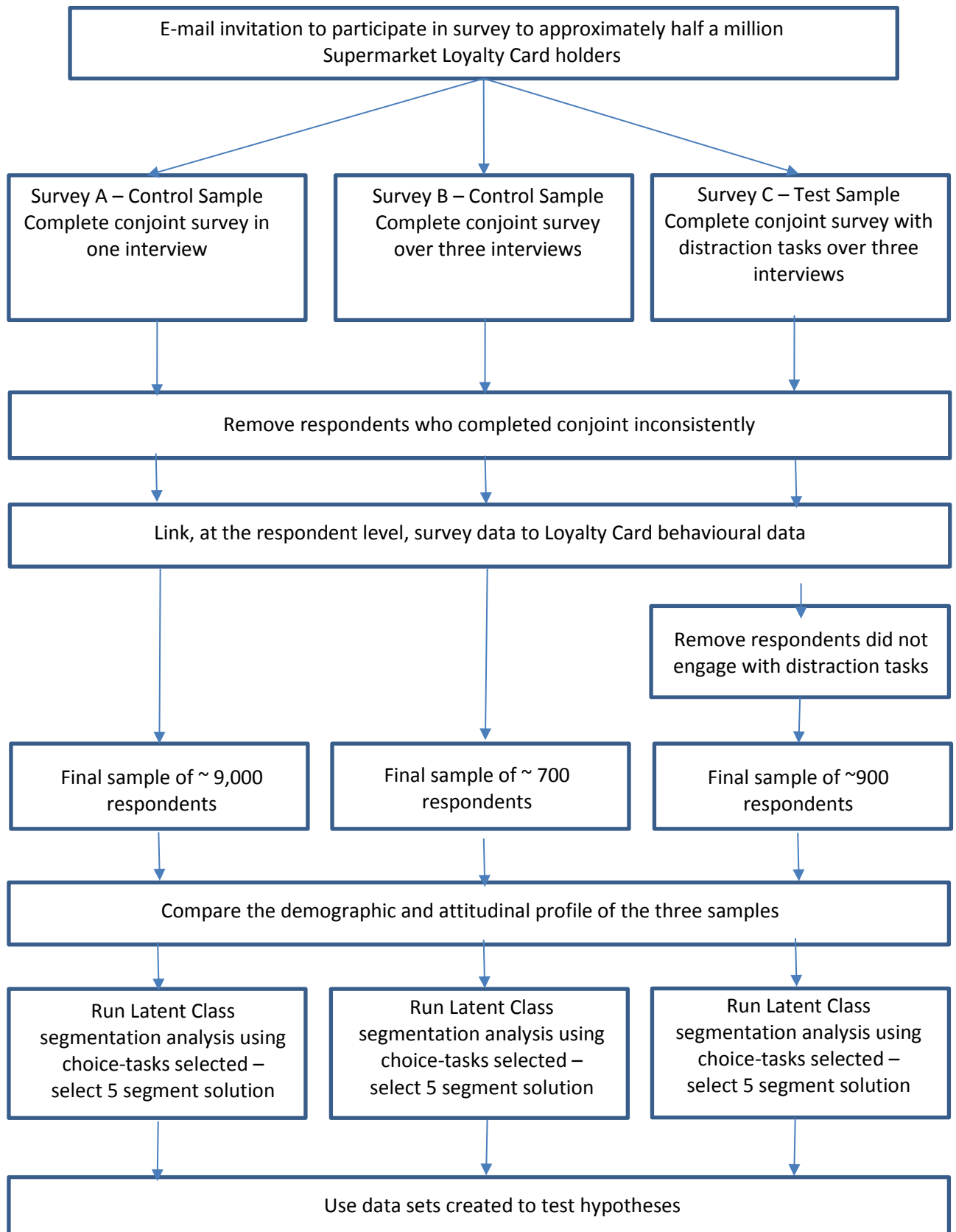
While slight imbalances across the cells should not affect the overall calculation of conjoint utilities (Chrzan and Orme, 2000), any subsequent analysis of the differences in choice-tasks chosen has been conducted for the four survey versions (see Section 3.4.3) to reduce any doubt about the analysis process.

Table 3-10 - CBC Version by Sample

	Sample A	Sample B	Sample C
Version 1	24%	27%	24%
Version 2	26%	26%	26%
Version 3	25%	22%	25%
Version 4	25%	24%	24%

Once the data had been cleaned, several additional treatments were applied to that data: the respondents in Sample C who did not engage with the distraction-tasks were removed, the survey information was linked with the store card data at an individual level to determine if the participants claimed preferences matched their actual purchasing behaviour. Finally, the data was segmented to understand if the CBC/UTT approach would create different segments from the conventional CBC approach. A summary of the data treatment is shown in Figure 3-4.

Figure 3-4 - Empirical Research Data Treatment



3.7 Basis for Establishing Rigour, Reliability and Robustness

The ultimate purpose of quantitative research is to understand if the conclusions drawn are valid given the research design and controls employed (Ryan et al., 2002: 141). Following the Ryan et al. (2002) classification, four different types of analyses were conducted to ensure the validity of this work:

1. Internal contextual validity
2. External validity - generalisability and transferability
3. Reliability
4. Segmentation robustness.

3.7.1 Internal contextual validity

The internal contextual reliability of a study confirms that “variations in the dependent variable result from variations in the independent variable(s) – not from other confounding factors” (Abernethy et al., 1999: 16). This is confirmation of the logic between a piece of research and existing theory (Eeva-Mari and Lili-Anne, 2011). A central question is how the theory has been built based on previous studies. The internal validity of quantitative work may be threatened throughout the research process. It is essential to ensure a good research design when aiming for high internal validity. It is also essential to ensure sample validity excellence during data collection, analysis and interpretation: a weakness in each stage can lead to studies with low internal validity. During data collection, for example, it is important to avoid measurement validity caused by poor question design, order bias (where the order of the questions affects later questions), and researcher bias (where the researcher has a personal bias in favour of one technique over another) in the use of techniques (Onwuegbuzie, 2000). Errors in statistical analysis, interpretation and illusory correlation and causal error are some examples of threats during data analysis and interpretation.

When analysing the data for this work, two aspects of internal contextual validity needed to be considered: Sample equivalence and measurement equivalence.

3.7.1.1 Internal contextual validity - Sample Equivalence

Sample Equivalence confirms two samples can be considered identical on relevant criteria such as demographics. Two definitions of demographic profiles were used in this research. The first is derived directly from the survey and includes age, gender, social class, region and responsibility for shopping. These questions were asked at the end of the first survey. There was, however, a large drop-off between people who started the first survey but did not complete that survey – particularly for Sample A (Table 3-11). While this is not unusual, given that none of the respondents had previously agreed to participate in any form of market research, it was felt important to understand the profile of the dropouts. It was possible to provide some basic profiling data using the Loyalty Card database. This information included age, gender and levels of spending at the Retailer.

Some basic demographics for the participants who started stage 1 of the survey are shown in Appendix F - Table 6-1. The information is generated from the Loyalty Card database information, rather than from direct questioning as part of the survey. It illustrates that while Samples B and C are very similar, Sample A does have a slightly older profile than Samples B and C: 41% of Sample A is 45 years of age or older compared to 36% for the other two samples. Therefore, more people in Sample A were also retired.

The demographic profile questions were also asked at the end of the first survey (Appendix F - Table 6-2). While the demographics of Sample A remain older than for Samples B and C, the overall profile of all three samples is older: 53%, 46% and 47% of Samples A, B and C respectively claim to be 45 years or older. This would suggest that younger respondents were likely to become bored with the survey more quickly than the older participants.

The analysis suggests that the initial contact samples for the three samples were not the same (demographically), despite the best intentions of the agency which organised the recruitment mail-out. The differences observed suggest that the idea of having to complete a three-stage survey deterred some older people from even looking at the survey while the younger group were more inquisitive.

The invitation to participate in the surveys was the same for each sample, apart from the communication of the need to complete the survey in three parts for Samples B and C. The drop-out rates (Tijdens, 2014) by sample are shown in Table 3-11. The data shows significant differences at all stages of the process. Overall, 50% of those in Sample A who started the survey completed the interview. This is significantly higher than the 20% and 14% who finished all parts of the survey for Samples B and C respectively. The difference between Samples B and C is also significant at the 99% level. This suggests that the drop-out rates are not the same and so more work was necessary to ensure that this difference has not affected the reliability of the data.

Table 3-11 – Drop-out Rates by Sample

	Sample A	Sample B	Sample C
Total number of invitations sent	213,334	50,000	200,000
Number of people who started stage 1 questionnaire	20,018	4,146	16,830
Conversion from invitation to starting the survey	9.4%	8.3%	8.4%
Number of completed interviews at stage 1	10,035	1712	6,142
Conversion from starting the first survey to completing the first survey	50%	41%	36%
Number of completed interviews at stage 2	n/a	1,012	3,064
Conversion from starting the first survey to completing the second survey	n/a	24%	18%
Number of completed interviews at stage 3	n/a	816	2,415
Conversion from completing the first survey to completing the third survey	n/a	20%	14%
Total number of usable interviews	9003	721	2263
Conversion from invitation to completed interview	4.2%	1.4%	1.1%

Table 3-12 shows the demographic profiles of the final three samples once the data has been cleaned, eliminating the respondents with low RLH values (Jervis et al., 2012). The results of a two-tailed pairwise comparison z-test are shown in the table. The significance tests indicate that no significant differences exist between the samples regarding age, gender, responsibility for shopping, pet ownership, and social class. A minor difference occurs regarding the region, with Sample B being slightly under-

represented in London, but over-represented in the South of the UK. These results are confirmed when the same data are analysed using Chi-squared tests (Table 3-13). Table 3-14 takes the analysis one stage further, showing the responses to six different attitudinal questions by the three samples. Again, the data are very similar, with only a few minor differences occurring. Hence, despite the differences between the samples which occurred as part of the recruitment process and the differences in drop out rates, the final samples are sufficiently alike to be able to provide confidence in the reliability of the subsequent data analysis.

This demographic and attitudinal consistency suggests that if any differences occur between the data collected for each sample, then these differences can be attributed to the data collection methodology, rather than being caused by a difference in the samples. Hence, it provides confidence in the subsequent data analysis.

Table 3-12 - Final Sample Profiles Once the Data has been Cleaned

	Sample		
	(A)	(B)	(C)
Sample size	9003	721	2263
Age			
Under 18	0.2%	0.0% ¹	0.1%
18-24	7.4%	7.1%	6.7%
25-34	19.1%	21.5%	18.1%
35-44	20.1%	20.8%	20.9%
45-54	21.1%	17.6%	20.9%
55-64	18.6%	19.0%	19.4%
65-74	11.5%	12.3%	11.5%
75+	2.0%	1.7%	2.3%
Gender			
Male	35.3%	36.6%	35.4%
Female	64.7%	63.4%	64.6%
Responsibility for shopping			
Yes - I am solely responsible for the household shopping	49.7%	50.5%	52.5%
Yes - I am jointly responsible for the household shopping	43.9%	43.4%	42.2%
No	6.4%	6.1%	5.3%
Social class			
Semi or unskilled manual work	7.7%	7.6%	8.2%
Skilled manual worker	12.4%	12.3%	12.7%
Supervisory or clerical/ junior managerial/ professional/	20.8%	21.6%	22.0%
Intermediate managerial/ professional/ administrative	20.0%	20.8%	20.8%
Higher managerial/ professional/ administrative	8.2%	6.1%	7.6%
Student	2.8%	3.1%	2.3%
Casual worker - not in permanent employment	0.7%	0.6%	0.7%
Housewife/ Homemaker	1.8%	2.2%	1.6%
Retired and living on state pension	9.1%	10.0%	8.4%
Unemployed or not working due to long-term sickness	2.3%	2.1%	2.4%
Full-time carer of other household member	1.0%	0.8%	0.8%
Prefer not to say	7.0%	6.0%	6.5%
Other	6.1%	6.8%	6.0%
Region			
North	22.0%	25.1%	23.6%
Midlands	16.6%	15.4%	17.8%
South	12.5%	14.7%	11.9%
Wales	2.9%	3.3%	3.3%
London	12.9%	8.9%	12.6%
NI	2.0%	1.4%	1.7%
Scotland	6.3%	6.7%	5.6%
Eastern	24.8%	24.5%	23.5%

Results are based on two-sided tests. For each significant pair, the key of the category with the smaller column proportion appears in the category with the larger column proportion.

Significance level for upper case letters (A, B, C): .05²

1. This category is not used in comparisons because its column proportion is equal to zero or one.

2. Tests are adjusted for all pairwise comparisons within a row of each innermost subtable using the Bonferroni correction.

Table 3-13 - Chi-Squared Test of the demographic difference of Samples A, B and C

Pearson Chi-Square Tests

Age	Chi-square	12.88316
	df	14
	Sig.	0.535744
Gender	Chi-square	0.516747
	df	2
	Sig.	0.772307
Responsibility for shopping	Chi-square	7.395881
	df	4
	Sig.	0.116389
Pet ownership	Chi-square	0.753213
	df	2
	Sig.	0.686186
Social Class	Chi-square	15.04703
	df	24
	Sig.	0.919375
Region	Chi-square	25.06147
	df	14
	Sig.	.034*

Results are based on nonempty rows and columns in each innermost subtable.

*. The Chi-square statistic is significant at the .05 level.

Table 3-14 - Attitudes to Health, Diet and Exercise by Sample

	Sample		
	(A)	(B)	(C)
My health is very important to me			
Strongly agree	42.1%	39.8%	40.9%
Agree	50.3%	50.8%	51.0%
Neither agree nor disagree	7.0%	8.6%	7.3%
Disagree	0.5%	0.8%	0.8%
Strongly disagree	0.2%	0.0% ¹	0.1%
I am generally very healthy			
Strongly agree	16.7%	16.9%	15.2%
Agree	55.0%	53.0%	53.8%
Neither agree nor disagree	19.0%	19.6%	19.9%
Disagree	8.3%	9.4%	9.7%
Strongly disagree	1.1%	1.1%	1.3%
I like to follow a balanced diet			
Strongly agree	18.0%	16.2%	16.1%
Agree	55.0%	55.5%	55.1%
Neither agree nor disagree	20.6%	21.6%	21.1%
Disagree	5.9%	6.4%	7.1%
Strongly disagree	0.5%	0.3%	0.6%
My diet affects my health			
Strongly agree	32.1%	29.5%	31.6%
Agree	48.3%	47.6%	49.1%
Neither agree nor disagree	14.4%	15.8%	15.0%
Disagree	4.2%	6.5%	3.7%
Strongly disagree	0.9%	0.6%	0.6%
What you eat is more important than how much you exercise			
Strongly agree	10.7%	9.6%	8.9%
Agree	38.3%	39.8%	37.5%
Neither agree nor disagree	37.7%	37.9%	40.7%
Disagree	12.4%	11.9%	12.3%
Strongly disagree	0.8%	0.8%	0.7%
I am healthier than most of the people I know			
Strongly agree	5.5%	5.1%	4.8%
Agree	28.6%	28.7%	29.5%
Neither agree nor disagree	46.3%	45.2%	43.8%
Disagree	17.1%	18.7%	19.2%
Strongly disagree	2.5%	2.2%	2.7%

3.7.1.2 Internal contextual validity – Measurement Validity

Due to the aforementioned need to split the test survey into three separate parts, it was important to check that this decision had not affected the measurement validity. This is especially important since this DBA is claiming a methodological contribution to the literature. There was a concern that splitting the surveys would create different response patterns and so make it impossible to understand if UTT has caused differences between Samples A and C. Instead, differences might have been detected because respondents in Sample C were refreshed at the start of each survey and so paid more attention to the first few questions of each section. Due to this concern, Sample B was recruited to complete the survey over three days, but not complete the distraction-tasks. This sample provided a comparison so that the effect of taking a break between each part of the conjoint could be understood.

There are two ways to evaluate the response patterns between the surveys: the first is to compare the individual responses to the conjoint tasks; the second is to compare the conjoint output after the importance of the attributes has been calculated.

The percentage of people who chose each option for each choice-task for Samples A and B for each of the four versions of the survey is shown in Appendix F- Table 6-4. Table 3-15 shows the Chi-square significance tests for each set of responses by questionnaire version, i.e. it indicates if the responses given to each choice-task, by questionnaire version, varied between Sample A and Sample B. As would be expected, the data for the first seven choice-tasks were more or less identical, due to the overall process being identical for both samples. The data for the second set of choice-tasks (8-14) was also more or less identical, suggesting minimal impact resulted from the decision to stop the interview for Sample B at choice-task 7 and restart the survey a day or so later. More differences have emerged, however, between the two samples for choice-tasks 15-21: four of the seven choice-tasks showed significant differences for one or more versions of the survey. Given, however, the participants for Sample B were also asked the “comprehension questions” (i.e. they were asked to recall three facts about the choice-tasks shown to them prior to making their decision: see Table 3-2 - Outcome of Pilot Interviews), it is reasonable to assume that the few differences that

did occur could be equally attributable to these comprehension questions as to splitting the survey.

By looking at attribute importance levels (calculated using the CBC Hierarchical Bayes analysis), it is possible to understand the combined impact of the small differences observed between the choice-tasks selected for Samples A and B. Analysis of the attribute importance (by questionnaire version) demonstrates that splitting the survey into three parts has had a small impact on the overall findings (Table 3-16). The Mann-Whitney U tests on these levels of attribute importance in Table 3-17 indicate that there are some significant differences, but it highlights that most of these differences occur for the less important attributes.

Taking both of these analyses into consideration, it is reasonable to conclude that splitting the survey into three parts has had little or no real impact on the overall interpretation of the data. It was, however, decided that all analysis of the effect of UTT, should be conducted by only comparing Samples B and C: while the differences between Samples A and C were small, the addition of Sample B meant there was no need to risk comparing Sample C with Sample A. The comparison of Sample B and Sample C was more straightforward as the methodologies were more closely aligned.

Table 3-15 - Chi-Square Test for All Twenty-One Choice-tasks by Questionnaire Version, Sample A Versus Sample B (df=2)

		Pearson Chi-Square Tests			
		Version 1	Version 2	Version 3	Version 4
Choice-task 1	Chi-square	1.798	0.318	3.510	1.532
	Sig.	0.407	0.853	0.173	0.465
Choice-task 2	Chi-square	3.113	0.368	1.018	0.625
	Sig.	0.211	0.832	0.601	0.732
Choice-task 3	Chi-square	6.743	0.663	0.268	4.153
	Sig.	.034*	0.718	0.875	0.125
Choice-task 4	Chi-square	2.041	1.780	1.163	3.751
	Sig.	0.360	0.411	0.559	0.153
Choice-task 5	Chi-square	1.714	0.710	0.632	1.965
	Sig.	0.424	0.701	0.729	0.374
Choice-task 6	Chi-square	2.942	2.869	3.558	3.690
	Sig.	0.230	0.238	0.169	0.158
Choice-task 7	Chi-square	1.637	0.909	1.291	0.592
	Sig.	0.441	0.635	0.524	0.744
Choice-task 8	Chi-square	4.583	1.173	0.201	2.054
	Sig.	0.101	0.556	0.904	0.358
Choice-task 9	Chi-square	4.514	5.416	0.303	11.867
	Sig.	0.105	0.067	0.860	.003*
Choice-task 10	Chi-square	3.866	3.757	0.735	3.901
	Sig.	0.145	0.153	0.692	0.142
Choice-task 11	Chi-square	4.356	0.908	0.514	0.672
	Sig.	0.113	0.635	0.774	0.715
Choice-task 12	Chi-square	1.243	0.387	0.475	2.788
	Sig.	0.537	0.824	0.789	0.248
Choice-task 13	Chi-square	1.094	0.204	2.781	5.041
	Sig.	0.579	0.903	0.249	0.080
Choice-task 14	Chi-square	1.387	1.739	2.995	0.402
	Sig.	0.500	0.419	0.224	0.818
Choice-task 15	Chi-square	4.859	0.823	0.423	1.501
	Sig.	0.088	0.663	0.809	0.472
Choice-task 16	Chi-square	1.565	3.002	1.428	6.136
	Sig.	0.457	0.223	0.490	.047*
Choice-task 17	Chi-square	5.765	0.776	2.075	2.384
	Sig.	0.056	0.678	0.354	0.304
Choice-task 18	Chi-square	5.303	5.481	8.164	0.311
	Sig.	0.071	0.065	.017*	0.856
Choice-task 19	Chi-square	0.742	7.754	6.825	1.086
	Sig.	0.690	.021*	.033*	0.581
Choice-task 20	Chi-square	2.737	1.893	0.655	1.049
	Sig.	0.255	0.388	0.721	0.592
Choice-task 21	Chi-square	7.191	1.303	0.264	1.213
	Sig.	.027*	0.521	0.876	0.545

Results are based on nonempty rows and columns in each innermost subtable.

*. The Chi-square statistic is significant at the .05 level.

Table 3-16 - Attribute Importance for Samples A & B

	Version 1		Version 2		Version 3		Version 4	
	Sample A	Sample B	Sample A	Sample B	Sample A	Sample B	Sample A	Sample B
	(A)	(B)	(A)	(B)	(A)	(B)	(A)	(B)
Brand	14%	11%	13%	11%	14%	12%	13%	11%
Taste Claims	2%	4%	2%	4%	2%	3%	2%	4%
Fat levels	23%	23%	25%	24%	25%	24%	26%	25%
Saturate levels	14%	14%	14%	14%	13%	14%	13%	14%
Sugar levels	23%	22%	22%	23%	22%	20%	23%	20%
Salt levels	12%	12%	12%	12%	11%	13%	12%	13%
Traffic light system used	4%	5%	4%	5%	4%	5%	4%	4%
Natural claims	3%	4%	3%	4%	3%	4%	3%	4%
Artificial claims	5%	5%	5%	4%	5%	4%	5%	6%

Table 3-17 - Mann-Whitney U test for Sample A Versus Sample B

	Version 1	Version 2	Version 3	Version 4
Brand	22%	14%	37%	64%
Taste Claims	0%	0%	0%	0%
Fat levels	76%	8%	11%	17%
Saturate levels	86%	37%	14%	30%
Sugar levels	16%	47%	8%	3%
Salt levels	8%	80%	0%	1%
Traffic light system used	0%	0%	0%	0%
Natural claims	0%	0%	0%	0%
Artificial claims	1%	5%	12%	1%

3.7.2 External validity - generalisability and transferability

External validity is a key consideration in quantitative research (Ryan et al., 2002: 123). It determines whether it is possible to generalise the conclusions derived from the model used and data collected and whether results may be used to understand other samples, time periods and settings. The following three issues may bring into question the external validity of a quantitative study: (i) population, (ii) time and (iii) environmental validity. “Population validity” refers to the confidence with which

inferences can be drawn from a study of a given population. Do, for example, relationships that exist between two variables in a sample also exist in the population? External validity is compromised if biases or other factors exist in the accessible population. If the sample size is too small or not random, the conclusions may be invalid, because the sample may not reflect the whole population (Howell, 2016). If so, the data cannot be used to assert generalisations to the target population. “Time validity” determines if the findings from a piece of research, conducted at a particular moment, can be generalised to other time periods. The time validity will be low if changes happen to the relationships between variables. “Environmental validity” indicates whether the results can be used outside of the immediate situation. International generalizability is a classic example of this validity test.

For this research, the key analysis was to ensure population validity: this is the extent to which the results of a study can be generalized to other situations and to other people (Mitchell and Jolley, 2012). As it transpires, the demographic profile of the final sample recruited (combining sample A,B and C) is incredibly close to the sample profile of all loyalty card holders on the database (+/-1%, within the margin of sampling error for a sample of this size) – see Table 3-18. This demonstrates that the samples are representative of the original population despite the low overall response levels noted earlier, therefore no concerns exist with population validity. This is an important finding. This thesis seeks to make a methodological contribution, so the actual results of the segmentation are of secondary importance (but not unimportance!). However, the findings from our samples can be extrapolated to the panel population given the similarities demonstrated between the panel sample and the panel population on certain characteristics. This indicates that our findings (i.e. the unearthing of an extra segment which closely links to respondent behaviour for the CBC/UTT treated group) are more likely to exist outside of the study and in the marketplace.

Table 3-18 - Comparison of Panel Profile and Final Sample

Age	Overall Panel Profile	Final Sample Profile (A,B,C combined)
18-24	6%	7%
25-34	18%	19%
35-44	19%	20%
45-54	22%	21%
55-64	19%	19%
65-74	13%	12%
75+	3%	2%
Gender		
Male	37%	36%
Female	63%	64%

3.7.3 Reliability

Reliability is the “degree to which measures are free from random error” (Peter and Churchill Jr, 1986: 4). If the measurements are not reliable, less confidence is generated towards the outcome of hypotheses testing or inferences about the relationship between variables in quantitative research (Kerlinger and Lee, 1999). The following issues may cause the data to be unreliable: lack of clear and standard instructions, ambiguous instructions, and failure to read instructions. Fink (2012) also cites other issues that may create unreliable data including incomplete lists of answers, no pretesting, the questions are illogically ordered, the questionnaire is difficult to read or too long, and the overall interview takes too long. “Random sources” of error, such as typographical errors and other errors in data collecting, saving and analysis (Neuman, 2014) may threaten reliability at every stage of the research process. These potential sources of error were all eliminated by thorough research design and piloting of the survey (Section 3.4.5).

Higher reliability will tend to result in higher correlations because “correlations depend on systematic variance” (Peter and Churchill Jr, 1986: 4). As a result, reliability is also related to convergent validity, discriminant validity and nomological validity estimates.

Convergent validity assesses the correlation between two or more measures which evaluate the same construct. In this work, it was important to measure convergent validity for the CBC questions, as these questions are attempting to measure the same overall construct. The overall RLH score for the conjoint provides a good proxy for convergent validity in this instant. This score of 76% indicates that the utilities calculated by combining the responses to all of the choice tasks are able to predict the actual choice task chosen on 76% of occasions. Hence convergent validity across the responses to the CBC can be said to be high.

Discriminant validity is the primary check for method variance: it checks the extent to which a measure is distinct and not just a consequence of other variables (e.g. this was considered in the design of the conjoint attributes in Section 3.4.3). Higher reliability will lead (empirically) to less favourable (higher) discriminant validity values.

Nomological validity is referred to as “lawlike validity” (Peter and Churchill Jr, 1986: 4) because it describes if a measure behaves as expected, i.e. do empirical patterns and magnitudes of relationships occur between variables as expected, e.g., if people want a low-fat product, do they also want a low saturates product? Hypothesis 6, which evaluates the correlation between preference for different products types and actual products bought in a store is an example of an evaluation of Nomological validity.

3.7.4 Segmentation robustness

In addition to the validity checks described above, which aim to eliminate errors in data collection and analysis, the segmentation data were also subjected to Kotler’s (2009) evaluation criteria: (i) measurability, (ii) substantiality, (iii) accessibility, (iv) differentiability and (v) action-ability. Measurability (also called identifiability) is the ease of identifying and measuring segments using specific segmentation variables; substantiality describes the size of the segments; accessibility the ease to which the targeted segments can be reached through marketing activity; differentiability (responsiveness) suggests whether the segments respond to marketing activity differently and are conceptually distinguishable; finally, actionability implies that the needs of the segments match the goals and core skills of a company (Wedel, 2000; Van Raaij and Verhallen, 1994; Kotler, 2009). These checks were used to establish which of

the segmentations produced could be considered to be the most robust and are discussed in more detail in section 4.3.2.

3.8 Conclusion

The project design used in this study was adopted to test if it is possible to segment people based on their unconscious needs. This project design is being claimed by the author as a methodological contribution to the literature and is, therefore, the key contribution of this DBA. The chapter outlines a distinct and novel method to combine Unconscious Thought Theory with Choice-Based Conjoint in order to elicit a person's unconscious needs when choosing a snack bar product. The research is designed to compare the effectiveness of this new methodology against a control sample. The control sample was asked to complete a conventional CBC approach – an implicit method of understanding a person's needs. The discussion around data validity and reliability demonstrates that the author has thoroughly evaluated the data so that the hypotheses generated may be assessed fairly.

The remainder of this thesis discusses these hypotheses and the insights gleaned from this research, as well as practitioners' reactions to the work.

4 Empirical Study: Results

4.1 Introduction

This chapter describes the analysis conducted to accept or reject the hypotheses described in Section 3.3. The findings are used to demonstrate how the methodology has allowed the distinct identification of unconscious needs that link directly to the respondents' purchasing behaviour and so indicates that the methodology used does indeed provide a contribution to the literature. As a reminder, six hypotheses were considered. These may be grouped into two broad areas: three of which aim to demonstrate that the distraction-tasks are effective and three of which demonstrate the impact of UTT on CBC data collection:

Demonstrate that the Distraction-tasks are Effective

- H1: The distraction-tasks affect the responses to the conjoint-tasks
- H2: Participants who fully engage with the distraction-tasks respond to the choice-tasks differently to those who do not fully engage with the tasks
- H3: All distraction-tasks have an equal impact on the way participants respond to the choice-tasks.

Demonstrate the Impact of UTT on CBC Data Collection

- H4: The combination of CBC and UTT creates differences in the attribute importance weights compared to a CBC only approach
- H5: The distraction-tasks cause different customer segments to emerge
- H6: The distraction-tasks improve the link between behaviour (from store card data) and claimed preferences (from the CBC data).

Each is discussed in turn below.

4.2 Demonstrate that the Distraction-tasks are Effective

While the literature contains many examples whereby distraction-tasks have been shown to help people make better choices (Bargh, 2011; Bos et al., 2011; Dijksterhuis, 2004), there have also been examples where this has not occurred (Calvillo and

Penaloza, 2009; Huizenga et al., 2012). It was important, therefore, to determine if the distraction-tasks had any impact on the choice-tasks.

In addition, some research has previously indicated that the level of distraction could impact the effect of the distraction-tasks (McMahon et al., 2011). Analysis was conducted to determine if the level of engagement with different distraction-tasks influenced the way participants responded to the choice-tasks.

The original paper on Unconscious Thought Theory by Dijksterhuis and Nordgren (2006) only uses the N-Back task (Kirchner, 1958) as a distraction exercise. This study required the respondents to complete twenty-one distraction-tasks. Due to the repetitious nature of asking participants to answer twenty-one conjoint tasks, there was felt to be a high chance of respondent fatigue if the same distraction-task was repeated before each conjoint choice-task. Instead, a range of different working memory distraction-tasks were used, but the types of tasks used were repeated in the same order for each of the three parts of the overall questionnaire. This approach made it possible to explore the impact and effectiveness of different distraction-tasks in overall terms and at an individual level. Although several authors (Waroquier et al., 2014; McMahon et al., 2011) have assessed the relative merits of different distraction-tasks, no research has ever been published whereby individuals have been asked to complete as many as the twenty-one distraction-tasks used in this work. A full description of the distraction-tasks is provided in Appendix D.

Because of the above issues, three hypotheses were developed from the work published by the authors cited above, to demonstrate that the distraction-tasks are effective:

- H1: The distraction-tasks used for Sample C do affect the responses to the conjoint-tasks compared to Sample B
- H2: Participants who fully engage with the distraction-tasks respond to the choice-tasks differently to those who did not fully engage with the tasks.
- H3: All distraction-tasks have an equal impact on the way participants respond to the choice-tasks.

The outcome of these three hypotheses tests are discussed below:

4.2.1 H1: The distraction-tasks used for Sample C do affect the responses to the conjoint-tasks compared to Sample B

Several authors (Newell and Shanks, 2014; González-Vallejo et al., 2008) dispute the claims of Dijksterhuis and Nordgren (2006) that the use of distraction-tasks can change the decisions that people might make. By comparing the way that Sample B and C responded to the choice-tasks, it is possible to understand if the distraction-tasks had a significant effect on the options chosen so that measurement validity (on this dimension) may be asserted. Table 4-1 shows the Chi-square significance tests for Sample B versus Sample C, split by questionnaire version. Any differences indicate that the choice-tasks were affected by the use of the distraction-tasks. There were seven significant differences out of eighty-four tests, i.e. 8%. This is higher than the expected number of errors (differences) at the 95% confidence level and so suggests that there has been a marginal effect. Hence the null hypothesis for H1 is accepted: the distraction-tasks used for Sample C do affect the responses to the conjoint-tasks compared to Sample B, although the impact appears to be small.

Table 4-1 - Comparison of Responses to Choice-tasks by Sample B and Sample C by Questionnaire Version (df=2)

		Pearson Chi-square tests			
		Version 1	Version 2	Version 3	Version 4
Choice-task 1	Chi-square	2.8	6.2	2.7	0.3
	Sig.	0.25	.046*	0.26	0.87
Choice-task 2	Chi-square	0.4	3.2	3.3	2.9
	Sig.	0.82	0.20	0.19	0.24
Choice-task 3	Chi-square	2.6	7.9	13.0	0.3
	Sig.	0.28	.019*	.001*	0.87
Choice-task 4	Chi-square	0.3	2.2	2.9	8.0
	Sig.	0.87	0.33	0.23	.018*
Choice-task 5	Chi-square	0.7	1.5	2.1	2.4
	Sig.	0.71	0.48	0.35	0.29
Choice-task 6	Chi-square	0.8	0.1	2.3	0.2
	Sig.	0.66	0.94	0.32	0.89
Choice-task 7	Chi-square	5.4	4.6	0.8	2.6
	Sig.	0.07	0.10	0.68	0.27
Choice-task 8	Chi-square	0.4	1.6	2.3	2.7
	Sig.	0.82	0.44	0.32	0.26
Choice-task 9	Chi-square	2.3	3.2	3.7	5.0
	Sig.	0.31	0.20	0.16	0.08
Choice-task 10	Chi-square	3.3	2.1	7.0	1.7
	Sig.	0.20	0.35	.031*	0.42
Choice-task 11	Chi-square	6.3	2.7	0.8	0.9
	Sig.	.043*	0.26	0.68	0.65
Choice-task 12	Chi-square	1.9	6.6	5.2	0.9
	Sig.	0.38	.037*	0.07	0.64
Choice-task 13	Chi-square	0.2	1.7	3.4	2.1
	Sig.	0.93	0.42	0.18	0.35
Choice-task 14	Chi-square	1.4	0.6	1.3	7.1
	Sig.	0.50	0.74	0.53	.028*
Choice-task 15	Chi-square	1.6	0.2	2.2	1.7
	Sig.	0.45	0.89	0.33	0.43
Choice-task 16	Chi-square	0.7	1.5	0.1	1.7
	Sig.	0.70	0.48	0.94	0.42
Choice-task 17	Chi-square	2.9	0.7	3.3	2.5
	Sig.	0.23	0.70	0.19	0.28
Choice-task 18	Chi-square	0.9	0.7	7.2	0.4
	Sig.	0.64	0.72	.028*	0.83
Choice-task 19	Chi-square	1.8	4.3	5.7	2.5
	Sig.	0.41	0.12	0.06	0.28
Choice-task 20	Chi-square	0.1	0.5	0.7	1.2
	Sig.	0.94	0.78	0.71	0.54
Choice-task 21	Chi-square	1.4	0.2	0.1	0.5
	Sig.	0.51	0.89	0.95	0.77

Results are based on nonempty rows and columns in each innermost subtable.

*. The Chi-square statistic is significant at the .05 level.

4.2.2 H2: Participants who fully engage with the distraction-tasks respond to the choice-tasks differently to those who did not fully engage with the tasks

The implicit assumption in much of the literature about UTT is that each distraction-task requires a participant’s active engagement in order to ensure that their working memory is fully occupied with the task (McMahon et al., 2011; Dijksterhuis and Strick, 2016; Bargh, 2011) - nearly all the research published on this topic has been carried out in laboratory conditions with researchers monitoring the participants’ progress. In these circumstances, there is no need to check if the participants have engaged with the task. In this research, the data collection has been conducted via an internet survey where it is entirely likely that some participants will not pay full attention to the survey (Meade and Craig, 2012). It is possible, therefore, that some participants did not engage fully with the tasks and so did not use their working memories. This could have led them to respond differently to the CBC tasks compared to those who engaged fully with the tasks and so creates an issue with measurement validity.

The level of engagement with a working memory task can be determined by the “score” assigned to each participant for each task (Conway et al., 2005). Table 4-2 shows the scoring method used for each task.

Table 4-2 – The Scoring Method Used for Each Working Memory Task

Working Memory task	Scoring method used	Reference
Two-Back	The average accuracy of letter recall	Schmiedek et al., 2014
Reading span task (RSPAN)	The percentage of words recalled correctly. The comprehension questions were added to the score	Engle et al., 1999
Counting Span task	Percentage of tasks correctly counted. Those with more than 15% errors eliminated	Conway et al., 2005
Word generation task	Percentile performance relative to the maximum score of fifteen words	Introduced by author
Forward Span dissimilar	Percentage of words recalled perfectly	Rosen and Engle, 1997
Forward Span similar	Percentage of words recalled perfectly	Rosen and Engle, 1997
Backward Span dissimilar	Percentage of words recalled perfectly	Rosen and Engle, 1997
Keeping track task	Percentage of words recalled perfectly	Yntema, 1963
Random word checker	Percentage of words recalled perfectly	Engle et al., 1999
Comma counter	Number of commas identified – any incorrectly identified were deducted from the score	Kahneman, 2011

The average score across the twenty-one completed tasks was 70% (Table 4-3). The range was towards the lower end of the 60% to 90% reliability found by other authors (Conway et al., 2005; Engle et al., 1999; Friedman and Miyake, 2005; Jaeggi et al., 2010).

Table 4-3 - Engagement Score by Working Memory Task

Stage	Task	Description	Overall Score
Stage 1	1	Two-Back	70%
	2	Reading span task	63%
	3	Counting Span task	75%
	4	Word generation task	66%
	5	Forward Span dissimilar	66%
	6	Keeping track task	58%
	7	Random word checker	73%
Stage 2	8	Two-Back	80%
	9	Reading span task	66%
	10	Counting Span task	80%
	11	Word generation task	56%
	12	Forward Span similar	65%
	13	Backward Span dissimilar	63%
	14	Random word checker	81%
Stage 3	15	Two-Back	83%
	16	Reading span task	61%
	17	Counting Span task	82%
	18	Word generation task	68%
	19	Forward Span dissimilar	62%
	20	Backward Span dissimilar	67%
	21	Comma counter	89%

Given the variable level of engagement by WM task, it is important to understand if this level of engagement has affected the options chosen by choice-task. A dichotomous split was implemented for each WM task, whereby a person was deemed to be engaged if their score for the task was higher than the overall mean score for the task (Cattell, 1943). The slight imbalance between four versions of the survey for data collection meant that it was necessary to understand the effect for each CBC task, split by survey version number (Table 4-4). The data show that those who showed above-average engagement with the WM task often chose significantly different options when answering the associated CBC question compared to the below average engagement group.

Table 4-4 - Chi-Square Test of The Impact Of High Versus Low Wm Engagement by CBC Version (df=2)

		Version 1	Version 2	Version 3	Version 4
Choice-task 1 Two-Back	Chi-square	4.1	7.8	0.7	1.2
	Sig.	0.1	.020*	0.7	0.5
Choice-task 2 Reading span	Chi-square	0.2	0.7	0.4	4.6
	Sig.	0.9	0.7	0.8	0.1
Choice-task 3 Counting Span	Chi-square	1.3	7.4	5.0	1.2
	Sig.	0.5	.025*	0.1	0.5
Choice-task 4 Word generation	Chi-square	1.2	0.4	6.9	0.1
	Sig.	0.6	0.8	.032*	1.0
Choice-task 5 Forward Span dissimilar	Chi-square	0.5	0.4	7.1	3.4
	Sig.	0.8	0.8	.028*	0.2
Choice-task 6 Keeping track	Chi-square	2.1	0.4	2.0	0.1
	Sig.	0.4	0.8	0.4	0.9
Choice-task 7 Random word checker	Chi-square	2.1	1.7	2.5	0.0
	Sig.	0.4	0.4	0.3	1.0
Choice-task 8 Two-Back	Chi-square	6.1	5.7	0.6	1.2
	Sig.	.046*	0.1	0.7	0.5
Choice-task 9 Reading span	Chi-square	0.4	0.9	0.2	11.7
	Sig.	0.8	0.6	0.9	.003*
Choice-task 10 Counting Span	Chi-square	6.7	1.1	3.7	3.2
	Sig.	.035*	0.6	0.2	0.2
Choice-task 11 Word generation	Chi-square	2.4	1.0	0.5	2.9
	Sig.	0.3	0.6	0.8	0.2
Choice-task 12 Forward Span similar	Chi-square	2.9	1.6	4.5	0.1
	Sig.	0.2	0.4	0.1	0.9
Choice-task 13 Backward Span dissimilar	Chi-square	0.4	3.1	1.9	9.6
	Sig.	0.8	0.2	0.4	.008*
Choice-task 14 Random word checker	Chi-square	2.7	2.0	2.4	3.2
	Sig.	0.3	0.4	0.3	0.2
Choice-task 15 Two-Back	Chi-square	0.2	14.5	7.1	3.2
	Sig.	0.9	.001*	.029*	0.2
Choice-task 16 Reading span	Chi-square	4.1	1.1	0.9	0.8
	Sig.	0.1	0.6	0.6	0.7
Choice-task 17 Counting Span	Chi-square	5.2	4.8	0.2	1.2
	Sig.	0.1	0.1	0.9	0.6
Choice-task 18 Word generation	Chi-square	5.8	3.5	7.6	2.8
	Sig.	0.1	0.2	.023*	0.2
Choice-task 19 Forward Span dissimilar	Chi-square	0.7	8.2	0.8	1.4
	Sig.	0.7	.017*	0.7	0.5
Choice-task 20 Backward Span dissimilar	Chi-square	2.3	3.6	2.3	0.5
	Sig.	0.3	0.2	0.3	0.8
Choice-task 21 Comma counter	Chi-square	7.2	2.9	6.3	2.6
	Sig.	.027*	0.2	.043*	0.3
Results are based on nonempty rows and columns in each innermost subtable.					
*. The Chi-square statistic is significant at the .05 level.					
b. More than 20% of cells in this subtable have expected cell counts less than 5. Chi-square results may be invalid.					

Ideally, those participants who have been identified as being engaged with the WM tasks would be the same people for each task – this would then make it possible to calculate the conjoint utility scores purely among those who engaged with all the choice-tasks versus those who did not. In reality, this is not possible. Not one of the participants was judged to have engaged with every single WM task. Indeed, there was a relatively low level of correlation between the reliability scores for each choice-task (Appendix F - Table 6-5). This corresponds to the findings of a number of authors (Engle et al., 1999; Friedman and Miyake, 2005; Jaeggi et al., 2010), and so questions the validity of a dichotomous split using all of the WM tasks to understand the responses to the choice-tasks among those who have generally engaged with the WM tasks and those who have not (Friedman and Miyake, 2005). MacCallum et al. (2002) argue against post hoc dichotomization of samples due to the loss of information about individual differences within the samples. Nevertheless, given the nature of the online data collection methodology, it was felt that the data needed to be split into two groups based on the overall level of engagement with the WM tasks. This split would make it possible to identify a group who were more engaged in the WM tasks and so understand if they responded to the conjoint questions differently. Several different approaches to splitting the data were considered (e.g. highest and lowest average reliability score (Cattell, 1943) including CHAID analysis using a choice-task as a dependent variable (Magidson, 1994) and K-means cluster analysis (Steinley, 2006). K-Means was selected since it uses all twenty-one dimensions of the data created by the WM tasks and does not bias the data to maximise the differences around a single conjoint task. This approach is also felt to allow for the possibility that participants who make some mistakes when completing the task may still be very engaged, but the task may have been overly complicated for them (McMahon et al., 2011).

The WM engagement levels for the resulting two cluster segmentation (labelled engaged and not engaged) are shown in Table 4-5. The K-means cluster analysis was implemented using Sawtooth CCEA Software (Orme, 2008). The individual WM engagement variables were standardized to ensure that each had a relatively equal influence on the two cluster outcome (Kaufman and Rousseeuw, 2009). The two

segmentation solution is 100% reproducible, indicating that it is a clean and stable segmentation (Orme, 2008).

Table 4-5 - WM Engagement Scores Two Cluster Split

Respondents	Cluster	
	Not engaged	Engaged
	1516	910
WM1	67%	78%
WM2	60%	70%
WM3	73%	81%
WM4	54%	91%
WM5	62%	74%
WM6	54%	67%
WM7	72%	75%
WM8	77%	88%
WM9	63%	74%
WM10	77%	86%
WM11	43%	80%
WM12	61%	73%
WM13	59%	73%
WM14	80%	84%
WM15	80%	90%
WM16	57%	70%
WM17	80%	89%
WM18	53%	95%
WM19	58%	69%
WM20	63%	78%
WM21	88%	93%

Table 4-6 shows the responses to the conjoint for each task, with the sample split into two groups based on their overall level of engagement with the WM tasks. Overall, participants who were identified as being engaged with the distraction-tasks were likely to respond to the conjoint-tasks in a significantly different manner to those were not engaged for six of the twenty-one tasks (using a Chi-squared significance test for each choice-task). The Counting Span and Forward Span Dissimilar tasks were most likely to cause an impact on the responses to the conjoint among those who were engaged with the tasks. The Two-Back task, favoured by Dijksterhuis and Nordgren (2006) in their work on UTT, did have an impact on the CBC options chosen on a task-by-task basis, but it was not a driver of the engaged versus not engaged sample split.

Table 4-6 - Responses to Choice-tasks Split by Working Memory Engagement

	Option chosen	Not Engaged with distraction-task	Engaged with Distraction-task	Chi-square Statistics	
Choice-task 1 Two-Back	1	40%	41%	Chi-square	1.6000872
	2	31%	31%	df	2
	3	29%	27%	Sig.	0.4493094
Choice-task 2 Reading span	1	18%	17%	Chi-square	1.0871344
	2	36%	38%	df	2
	3	46%	45%	Sig.	0.5806732
Choice-task 3 Counting Span	1	39%	44%	Chi-square	9.828156
	2	34%	29%	df	2
	3	26%	27%	Sig.	.007*
Choice-task 4 Word generation	1	10%	9%	Chi-square	4.0059182
	2	75%	78%	df	2
	3	15%	12%	Sig.	0.1349354
Choice-task 5 Forward Span dissimilar	1	30%	30%	Chi-square	7.0401934
	2	36%	41%	df	2
	3	34%	29%	Sig.	.030*
Choice-task 6 Keeping track	1	69%	73%	Chi-square	4.7434475
	2	10%	7%	df	2
	3	21%	20%	Sig.	0.0933197
Choice-task 7 Random word checker	1	51%	54%	Chi-square	4.5564348
	2	9%	7%	df	2
	3	40%	39%	Sig.	0.1024667
Choice-task 8 Two-Back	1	24%	25%	Chi-square	0.4709518
	2	36%	36%	df	2
	3	40%	39%	Sig.	0.7901947
Choice-task 9 Reading span	1	28%	27%	Chi-square	6.2633211
	2	36%	41%	df	2
	3	37%	33%	Sig.	.044*
Choice-task 10 Counting Span	1	30%	31%	Chi-square	0.5299526
	2	24%	24%	df	2
	3	46%	45%	Sig.	0.7672241
Choice-task 11 Word generation	1	13%	12%	Chi-square	1.6745106
	2	55%	58%	df	2
	3	32%	30%	Sig.	0.4328971
Choice-task 12 Forward Span similar	1	29%	28%	Chi-square	0.6549643
	2	40%	41%	df	2
	3	30%	31%	Sig.	0.7207362
Choice-task 13 Backward Span dissimilar	1	46%	46%	Chi-square	5.789565
	2	23%	27%	df	2
	3	30%	27%	Sig.	0.0553111
Choice-task 14 Random word checker	1	29%	26%	Chi-square	5.014777
	2	10%	12%	df	2
	3	61%	62%	Sig.	0.0814807
Choice-task 15 Two-Back	1	39%	39%	Chi-square	1.5348562
	2	43%	42%	df	2
	3	17%	20%	Sig.	0.4642054
Choice-task 16 Reading span	1	42%	40%	Chi-square	1.7206479
	2	46%	49%	df	2
	3	12%	12%	Sig.	0.423025
Choice-task 17 Counting Span	1	36%	39%	Chi-square	7.1103316
	2	19%	15%	df	2
	3	46%	46%	Sig.	.029*
Choice-task 18 Word generation	1	49%	50%	Chi-square	2.7228956
	2	24%	26%	df	2
	3	27%	24%	Sig.	0.2562894
Choice-task 19 Forward Span dissimilar	1	10%	8%	Chi-square	7.243106
	2	56%	61%	df	2
	3	35%	31%	Sig.	.027*
Choice-task 20 Backward Span dissimilar	1	15%	15%	Chi-square	0.0060502
	2	66%	66%	df	2
	3	19%	19%	Sig.	0.9969795
Choice-task 21 Comma counter	1	26%	27%	Chi-square	7.5483064
	2	53%	55%	df	2
	3	22%	17%	Sig.	.023*

The Hierarchical Bayes conjoint utility data has been recalculated for the two groups separately for Sample C (Table 4-7). The differences created by this WM engagement split are significant at the 99% level for all attributes using Mann-Whitney U tests, suggesting that the WM tasks have had a significant impact on about a third of the sample. The remainder of the sample have not engaged their working memories to the same level as the “engaged” sample while answering the survey and so the distraction-tasks have had less impact.

Table 4-7 - Attribute Importance for Sample C Split by Level of Engagement with Working Memory Tasks

	Participants who engaged with WM tasks	Participants who did not engage with WM tasks
	% Importance	% Importance
Brand	7.7	10.6
Taste Claims	2.7	3.0
Fat levels	26.6	25.4
Saturate levels	14.7	12.9
Sugar levels	23.8	22.3
Salt levels	13.3	11.9
Traffic light system used	3.0	4.8
Natural claims	4.3	3.8
Artificial claims	4.0	5.3

Comparing the WM engaged participants from Sample C with Samples A and B shows an even more stark difference (Table 4-8). The effect of the WM distraction-tasks has been to reduce the importance of brand significantly, while all of the nutritional claims increase in importance - all differences are significant at the 99% level using Mann-Whitney U tests. The importance of the traffic light system used also falls significantly (albeit from a low base). This is especially interesting as this attribute was not an explicit feature but was encoded as part of the presentation of the conjoint options. This suggests that the WM tasks have diminished the importance of the presentation format for the nutritional ingredients: instead, the individuals have focussed on the details of the nutritional information rather than its presentation.

Table 4-8 - HB Attribute Importance by Samples A, B and C

	Sample A	Sample B	Sample C Participants who engaged with WM tasks
	% Importance	% Importance	% Importance
Brand	13.4	12.2	7.7
Taste Claims	2.0	2.1	2.7
Fat levels	24.5	24.9	26.6
Saturate levels	13.4	14.0	14.7
Sugar levels	22.4	22.3	23.8
Salt levels	11.8	12.3	13.3
Traffic light system used	4.1	4.1	3.0
Natural claims	3.3	3.2	4.3
Artificial claims	4.9	4.8	4.0

Further examination of Sample C does reveal some apparent differences in the sample profiles of those engaged with the WM tasks versus those who are less engaged or inconsistently engaged. The engaged group are more likely to be slightly younger, female and work in a skilled or semi-skilled office environment (Appendix F - Table 6-6). This age finding is consistent with the work of Salthouse and Babcock (1991) who found that working memory capacity diminishes with age. The gender and occupation differences are caused by an imbalance in the sample, whereby significantly more of the 18-34 age group are also female (Table 4-9).

Table 4-9 - Sample C Age by Gender (Those who Engaged with the WM tasks)

	Age							
	Under 18	18-24	25-34	35-44	45-54	55-64	65-74	75+
Male	0.2%	5.2%	15.1%	20.0%	23.3%	19.3%	13.8%	3.0%
Female	0.1%	7.5%	19.8%	21.4%	19.6%	19.5%	10.2%	1.9%

So, in conclusion, participants who fully engaged with the distraction-tasks are more likely to respond to the choice-tasks differently compared to those who did not complete the distraction-tasks correctly. The null hypothesis for H₂ is therefore accepted.

4.2.3 H3: All distraction-tasks have an equal impact on the way participants respond to the choice-tasks

A total of nine different working memory tasks were used. The frequency and order of use of the distraction-tasks are shown in Table 4-10.

Table 4-10 - Order and Frequency of Working Memory Tasks Used

Working Memory task	Number of occurrences	Which tasks
Two-Back	3	1,8,15
Reading span task	3	2,9,16
Counting Span task	3	3,10,17
Word generation task	2	4,11
Word generation task (incentivised)	1	18
Forward Span dissimilar	2	5,19
Forward Span similar	1	12
Backward Span dissimilar	2	13,20
Keeping track task	1	6
Random word checker	2	7,14
Comma counter	1	21

As H2 has demonstrated, the impact of the distraction-tasks is dependent on the level of task engagement. When examined on a task-by-task basis (Table 4-4), the following tasks had a clear impact in some circumstances: Two-back task (x4), Counting Span (x2), Word Generation (x2), Forward Span Dissimilar (x2), Reading Span, Backward Span Dissimilar, Comma Counter (x2). When examined just among those who were deemed to be engaged overall, versus those who were not, a slightly different pattern emerges (Table 4-6) with the most influential tasks being the Counting Span (x2), the Forward Span dissimilar (x2), the Reading Span and the Comma Counter.

Overall, no one distraction-task consistently impacted the choices made in the conjoint exercise. Nevertheless, it is reasonable to reject the null hypothesis for H3 – i.e. that all distraction-tasks have an equal impact on the conjoint options selected. The Counting Span task and the Forward Span tasks achieve the greatest impact. The Two-Back task appears to work well on its own, but people who engage with it do not seem to feature as much in the overall engaged group.

4.3 The Impact of UTT on CBC Data

Having examined the different types of distraction-task and confirmed that the data is reliable, it is now relevant to determine if the data satisfies the ‘Deliberation-Without-Attention’ hypotheses described by Dijksterhuis in his 2004 and 2006 papers: have differences occurred in the way that participants responded to the CBC/UTT survey compared to the CBC only survey because of the distraction-tasks? This analysis is critical because, according to some authors (Newell and Shanks, 2014; Nieuwenstein et al., 2015), UTT does not influence decision-making. In addition, a key aspiration of the research has been to determine if UTT can be used to access a respondent’s subconscious so that a different, more insightful, segmentation may be created. Hence it is important to understand if any differences in the data also translate into different segments which intuitively make sense.

Finally, the impact of the distraction-tasks on the data segmentation and its link with behavioural data is explored. The aim of this analysis is to demonstrate that the new methodology can identify customer segments not found in the conventional approach. It is also hoped that the superiority of the methodology can be proved by demonstrating a closer link between the participants’ preferences (expressed in the conjoint) and actual in-store behaviour (based on loyalty card data). Other researchers have found evidence to suggest that there is a link between unconscious needs and actual behaviour (Bargh and Chartrand, 1999; Bargh and Morsella, 2010). Hence, this area of investigation has been eagerly anticipated by the author. This analysis is therefore considered crucial to demonstrating that the methodology can be considered as a contribution to the literature. The following hypotheses were therefore examined:

- H4: The combination of CBC and UTT creates differences in the attribute importance weights compared to a CBC only approach
- H5: The distraction-tasks cause different customer segments to emerge
- H6: The distraction-tasks improve the link between behaviour (from store card data) and claimed preferences (from the CBC data).

Each of these hypotheses is discussed in turn below.

4.3.1 H4: The combination of CBC and UTT creates differences in the attribute importance weights compared to a CBC only approach

Table 4-11 shows the Hierarchical Bayes estimation of the attribute importance for Sample B and Sample C, with Sample C split by those who engaged with the WM tasks and those who did not. This shows that the distraction-tasks have had an impact. The distraction-tasks increase the importance of measurable features such as nutritional content and whether the product is natural while decreasing the importance of more “emotional” variables such as brand (Thomson et al., 2005). The differences observed are significant between Sample B and Sample C (engaged) at the 99% level for all attributes using Kruskal-Wallis (non-parametric) independent samples test. Hence, it can be asserted that the distraction-tasks have created differences in the way that participants have responded to the conjoint-tasks at the overall attribute importance level.

Table 4-11 - HB Attribute Importance by Samples B and C

	Sample B	Sample C Participants who engaged with WM tasks	Sample C Participants who were not engaged with WM tasks
	% Importance	% Importance	% Importance
Brand	12.2%	7.7%	10.6%
Taste Claims	2.1%	2.7%	3.0%
Fat levels	24.9%	26.6%	25.4%
Saturate levels	14.0%	14.7%	12.9%
Sugar levels	22.3%	23.8%	22.3%
Salt levels	12.3%	13.3%	11.8%
Traffic light system used	4.1%	3.0%	4.8%
Natural claims	3.2%	4.3%	3.8%
Artificial claims	4.8%	4.0%	5.3%

The conjoint data reported so far has been based on the overall importance of the attributes rather than the part-worth utilities (Green and Srinivasan, 1978). Table 4-12 shows the average part-worth utilities for each attribute (Green and Srinivasan, 1990),

calculated using Sawtooth Hierarchical Bayes Software (Orme, 2009) applied to all twenty-one choice-tasks. The numbers have been zero-centred to ease comparisons between the cells (Cattin and Wittink, 1982). Overall, the values are reasonably similar. There are, however, significant differences for the Taste Claims, Natural Claims, and Other Claims attributes, to the extent that the order of the importance of the individual levels varies between the two samples. Also, the values associated with some of the other levels (e.g. Brand, Fat levels, and Sugar Levels) vary significantly between the two samples.

Hence the null hypothesis for H₄ is accepted: The combination of CBC and UTT creates differences in the attribute importance weights compared to a CBC only approach at both the overall attribute level and the part-worth level.

Table 4-12- Part-Worth Utilities Based on Choice-tasks

	Sample B	Sample C participants who engage with WM tasks
Average Utilities (Zero-Centred Diffs)		
	A	B
Brand	Mean	Mean
A	-30.0	-13.3**
B	-1.3**	-5.7
C	31.8**	19.0
Taste claims		
Great tasting	-.6	3.9**
Tastes delicious	.7**	-2.3
Super Satisfying	-.1**	-1.6
Fat levels		
Fat: High (17.5%)	-122.2**	-131.6
Fat: Medium (10%)	26.1	30.6**
Fat: Low (3%)	96.1	101.1**
Saturate levels		
Saturates: High (5%)	-68.3**	-72.3
Saturates: Medium (3%)	16.0	17.5
Saturates: Low (1%)	52.3	54.8
Sugar levels		
Sugars: High (22.5%)	-110.9B	-117.2
Sugars: Medium (14%)	28.3	26.8
Sugars: Low (5%)	82.5	90.4**
Salt levels		
Salt: High (1.5%)	-60.9**	-66.8
Salt: Medium (1%)	15.4	15.8
Salt: Low (0.3%)	45.5	51.0**
Traffic lights system		
Words highlighted	-3.4	1.9**
Words shaded	-5.5	-4.9
traffic lights	8.9**	2.9
Natural claims		
100% Natural	-.0**	-3.0
Organic	-.7	4.2**
A Fairtrade Product	.7	-1.2
Other claims		
One of your Five-a-day	9.3	7.3
No artificial preservatives or additives	-3.9	-4.00
Gluten Free	-5.4	-3.3
Results are based on two-sided tests. For each significant pair, the key of the category with the smaller column proportion appears in the category with the larger column proportion		
Significance level for ** = 0.05 ¹		

4.3.2 H5: The distraction-tasks cause different customer segments to emerge

The conjoint data for each data set has been segmented using Latent Class Segmentation (LCS) analysis (Vermunt and Magidson, 2002) to reveal respondent segments with similar preference structures in the choice data (Orme, 2010; Ramaswamy and Cohen, 2000). LCS was chosen as the method of segmentation instead of other approaches such as K-means analysis as it “provides a more rigorous statistical footing than K-means” and “represents the next generation of tools and supersedes the less objective K-means” (Schreiber and Pekarik, 2014: 58), not least because it provides a more statistical basis for determining the number of clusters using the Bayesian Information Criterion (BIC) and other statistical measures. Sawtooth Software’s Latent Class Module was used to conduct the analysis and to reveal respondent segments with similar preference structures in the choice data (Orme, 2004).

It should be mentioned that LCS segment solutions “emerge” from the data rather than being forced to appear via the use of some form of dependent variable. The LCS software also uses non-linear, probability-based algorithms to generate the segmentation solutions. This methodology is therefore in keeping with the complexity theory ontology which was adopted for this DBA.

One of the oldest unsolved problems associated with segmentation analysis is how to choose the number of clusters (Thorndike, 1953). A meta-study by Dolnicar (2003) of 243 publications where data-driven segments were identified revealed that two-thirds of the studies conducted selected three, four or five segment solutions. The analysis also revealed that while no single approach to choosing the ideal number of segments existed across all of the studies, the most common approach was to generate multiple solutions within a reasonable range (normally between three and eight segments) and then choose, and seek to optimise somehow, between the options produced.

With this analysis in mind, the latent class approach was used to generate six different class solutions (from three classes to eight classes) for each of the three datasets. Sample C was filtered to use only the participants who engaged with the WM tasks.

This data is summarized in Table 4-13. To determine the best model fit, four main criteria were used; (i) Percent Certainty (Pct Cert), (ii) Consistent Akaike Information Criterion (CAIC), (iii) Chi-square and (iv) relative Chi-square (Tabi et al., 2014). Pct Cert is used to reveal how much better an identified solution is compared to the null solution (Orme, 2004). Although “Percent certainty” is useful for providing an idea of the extent to which a solution fits the data, it is not very useful for deciding how many segments to accept because it increases as more segments are included. CAIC is among the most widely used measure for deciding how many segments to accept: the smaller the CAIC score, the better the solution. CAIC was proposed by Bozdogan (1987). Unlike other measures, smaller values of CAIC are preferred. CAIC is decreased by larger log likelihoods and is increased by larger sample sizes and larger numbers of parameters being estimated (hence parsimony is rewarded). While CAIC is not very useful for assessing the absolute level of fit of a particular solution, it is sometimes useful when looking across alternative solutions with different numbers of groups: the smaller the value of CAIC, the better the solution (Tabi et al., 2014). The Chi-square statistic was obtained by doubling the log-likelihood for the solution and subtracting the log-likelihood for the null solution twice (Orme, 2004). It can be used to test whether a solution fits significantly better than the null solution, although that is almost always true. Chi-Square is not very useful for choosing the number of segments because it tends to increase as the number of solutions increases. “Relative Chi-square” is just Chi-square divided by the number of parameters (a measure of model goodness-of-fit given the parsimony of the solution). Monte Carlo analyses of many data sets have led Orme (2004) to believe that Relative Chi-square may be useful for choosing the number of segments with a bigger Relative Chi-square score being better.

Based on the guidance described and in particular the process followed by Tabi et al. (2014), the five class model was chosen from the data in Table 4-13. While the lowest CAIC varied for the three samples, the five-class model CAIC was lowest for Samples B and C, and its drop-off was greatest between the four and five class models for Sample A. The same number of segments was chosen for each sample to allow a fair comparison to be made between the groups.

Table 4-13 -Summary of Sawtooth Software LCS Output for Samples A, B & C

Summary of best replications - Sample A					
Groups	Log-likelihood	Pct Cert	CAIC	Chi-Square	Relative Chi-square
3	-88947.1	35.8	178608	99048.3	1768.7
4	-86088.2	37.8	173132.3	104766.1	1396.9
5	-84504.2	39	170206.4	107934.2	1148.2
6	-83322.4	39.8	168085	110297.7	976.1
7	-82142.4	40.7	165967	112657.8	853.5
8	-81324.6	41.3	164573.7	114293.3	756.9

Summary of best replications Sample B					
Groups	Log-likelihood	Pct Cert	CAIC	Chi-Square	Relative Chi-square
3	-7057	36.4	14686.2	8064.9	144
4	-6869.3	38.1	14505	8440.2	112.5
5	-6758.3	39.1	14477.3	8662.1	92.2
6	-6678.4	39.8	14511.6	8822	78.1
7	-6587.3	40.6	14523.5	9004.2	68.2
8	-6514.6	41.3	14572.5	9149.5	60.6

Summary of best replications - Sample C WM engaged only					
Groups	Log-likelihood	Pct Cert	CAIC	Chi-Square	Relative Chi-square
3	-7516	39.9	15611	9976.9	178.2
4	-7339.2	41.3	15453.8	10330.5	137.7
5	-7208.9	42.3	15389.7	10591.1	112.7
6	-7123.8	43	15416.1	10761.1	95.2
7	-7066.2	43.5	15497.3	10876.4	82.4
8	-6994.9	44.1	15551.2	11018.9	73

The profile of the five-segment solutions, based on the overall importance of the attributes for each segment, is shown in Table 4-15. According to the results of the Kruskal-Wallis independent sample tests, all clusters are statistically distinct on all attributes at the 99% level. Overall there is an 88% probability that each respondent belongs to the correct segment – most respondents are allocated to a segment with close to 100% probability, while a small number could be allocated to two or three segments with relatively equal probability. The analysis was repeated five times for the five-segment solution, using different (random) starting seeds on each occasion. Analysis of the respondent segment allocation across all five analyses revealed that

72% of the respondents were allocated to the same clusters on all five occasions. This demonstrates that the segmentation is stable and reproducible (Orme, 2008).

Analysis of the segmentation based on the three samples highlights four very similar groups: Cluster 1 is concerned about the brand chosen; Cluster 2 is most concerned about sugar levels (although Sample C is also concerned about fat levels); Cluster 3 is most concerned about fat and saturates levels; Cluster 4 is most concerned about the combination of sugar and fat levels. The last cluster, however, reveals diverse motivations by Sample. While Cluster 5 of Sample A and B tend to rate almost everything as being important, Cluster 5 of Sample C reveals a group for whom the level of salt and claims about naturalness (rather than organic) are very important. This group is very distinct from the groups found in Samples B and C (all differences are significant at the 99% level using Mann-Whitney U tests). Interestingly this group does not appear in Samples A and B when more clusters are examined (i.e. 6-8 segment solutions). Also, while the segment sizes for Samples A and B are very similar (Clusters 3 and 4 are slightly different, but both clusters are reasonably similar suggesting a certain amount of overlap between the groups), the segment sizes for Sample C, Clusters 1, 2 and 5 are very different

When considered as a whole, the segmentation for Sample C satisfies the segment quality evaluation criteria suggested by Kotler (2009) and described in Section 3.7.4. Firstly, the segments are measurable or identifiable based on the conjoint data – each cluster has a distinguishing need, such as a desire for low fat or low sugar or low salt products, and so can be easily envisaged; secondly, the segments are big enough to be considered substantial – two of the segments each represent over one third of the sample and two each represent more than 10% of the sample. Only one segment (the brand segment) could be considered small at just 3% of the sample; thirdly, the segments are differentiable in as much as they are conceptually distinct and would be expected to respond to marketing activity differently – for example, the sugar segment is more likely to respond to products that are low in sugar and the salt segment is more likely to buy products that are low in salt; fourthly, they are actionable for a snack bar company as a different snack bar formulation could be developed to satisfy each segment (see Table 4-15). The segments also pass the accessibility test: the ease

by which the targeted segments can be reached through marketing activity. The analysis shown in Section 4.3.3 demonstrates that the segments can (for the most part) be identified by their behavioural data and so can be targeted by direct mail campaigns.

Table 4-14 compares the segmentation for Samples A and B with the segmentation for Sample C in more detail using Kotler's (2009) five criteria for segmentation evaluation. This analysis demonstrates that the CBC/UTT segmentation generated for Sample C is superior to the CBC only segmentation (for Samples A and B) for four of the five Kotler criteria: the substantiality criteria is the only questionable aspect due to the small size of the brand segment. The CBC only segmentation fails to satisfy any of the five criteria.

It can, therefore, be asserted that the segments produced by the CBC/UTT approach for Sample C are distinct from that produced by a CBC approach for Samples A and B. The null hypothesis for H₅ is therefore accepted: the segments produced using the CBC/UTT approach do differ compared to the CBC only approach.

Table 4-14 - Evaluation of Segmentations Using Kotler's Criteria

Kotler (2009) segmentation criteria	Samples A and B	Sample C
Measurable (i.e. ease of identifying and measuring segments)	Four segments are clear, but fifth segment is an amalgamation of the needs of the other segments.	All five segments are measurable and easy to identify.
Substantiality (i.e. size of segments)	All segments are substantial apart from the low sugar segment which is only 5% of the sample.	All segments are substantial apart from the brand segment which is only 3% of the sample.
Accessibility (i.e., ease by which segments can be reached through marketing activity)	The segments do not link to behavioural data (see hypothesis 6 – Section 4.3.3), apart from the low-fat segment and so cannot be considered to be easy to reach.	All segments, including the new salt phobic segment are accessible as they link to behaviour data (see hypothesis 6– Section 4.3.3).
Differentiability (i.e., whether the segments respond to marketing activity differently and are conceptually distinguishable)	Conceptually all the segments could be considered to be differential apart from segment 5.	The salt phobic segment may be especially differentiable - probably via CRM and coupons for salt-less foods. Store merchandising and store layout could certainly be used to access this group (with a low salt corner in the store) – This could become increasingly important as heart attacks/strokes become increasingly common in an ageing society.
Actionability (i.e., do the needs of the segments match the goals and core skills of a company)	Overall the segments are not actionable because the claimed needs do not match the behaviour and no new segments emerge that could be considered to offer a new revenue stream.	The salt phobic segment is new and matches the goals and core skills of a snack bar manufacturing company. A retailer could also use this group to develop a whole new range and way of merchandising salt free products.

Table 4-15 - Importance of Attributes for 5 Segment Solution, Samples A, B and C

Sample A					
Segment sizes (% of sample)	9.2%	5.4%	36.2%	33.2%	16.1%
	Cluster 1: Brand Lovers	Cluster 2: Low Sugar	Cluster 3: Low Fat:	Cluster 4: Low Fat and Sugar	Cluster 5: Mixed needs
Brand	62.7	3.5	3.7	0.7	17.1
Taste Claims	1.5	0.3	0.6	0.3	3.4
Fat levels	12.6	14.1	35.1	27.5	16.0
Saturate levels	6.7	4.8	21.4	15.8	8.7
Sugar levels	6.7	59.3	17.4	36.0	15.9
Salt levels	3.7	6.5	15.1	13.4	19.5
Traffic light system used	1.0	1.9	2.2	2.5	9.4
Natural claims	2.3	2.5	1.1	1.1	1.0
Artificial claims	2.8	7.1	3.4	2.8	8.9
Sample B	Cluster 1: Brand Lovers	Cluster 2: Low Sugar	Cluster 3: Low Fat:	Cluster 4: Low Fat and Sugar	Cluster 5: Mixed needs
Segment sizes	8.7%	5.3%	24.5%	46.2%	15.3%
Brand	52.2	4.2	5.0	2.2	21.4
Taste Claims	3.6	2.8	2.8	1.5	5.6
Fat levels	16.3	13.8	31.4	27.7	12.5
Saturate levels	1.9	8.8	21.7	16.5	12.3
Sugar levels	7.5	46.6	14.0	29.8	15.5
Salt levels	7.2	10.9	15.1	15.3	11.4
Traffic light system used	1.7	3.3	3.8	3.1	8.8
Natural claims	3.4	3.8	3.2	1.4	2.8
Artificial claims	6.3	5.8	3.1	2.5	9.8
Sample C - WM engaged only	Cluster 1: Brand Lovers	Cluster 2: Low Sugar	Cluster 3: Low Fat:	Cluster 4: Low Fat and Sugar	Cluster 5: Low Salt
Segment sizes	3.2%	12.5%	35.1%	38.1%	11.0%
Brand	43.1	2.7	3.4	0.8	9.4
Taste Claims	4.2	3.3	0.9	1.1	6.1
Fat levels	7.6	26.2	35.2	26.8	10.3
Saturate levels	13.9	4.5	20.7	17.5	6.0
Sugar levels	7.1	48.5	17.2	31.8	14.6
Salt levels	7.6	8.6	13.7	16.2	32.8
Traffic light system used	5.7	0.6	1.4	2.3	7.6
Natural claims	3.1	1.9	1.4	2.2	11.8
Other health claims	7.6	3.7	6.0	1.4	1.5

4.3.3 H6: The distraction-tasks improve the link between behaviour (from store card data) and claimed preferences (from the CBC data)

All the respondents were recruited using the Retailer's store card database (Passingham, 1998). At the analysis stage, each participant's survey data were linked to their behavioural data. A list of the behavioural data available is shown in Appendix B. The key variables examined to see if there was a link between claimed behaviour and actual behaviour were as follows:

- purchase levels of Brands A, B and C
- purchasing of products with high or low levels of sugar, salt or fat.

No other data were available. Analysis of the segments shows some links between the survey data and actual behaviour, but the links are sporadic. The significant differences, in Table 4-16, are indicated as two-tailed t-tests. Differences highlighted in blue indicate a relationship that is consistent with expectations. For example, 86.7% of Sample A Cluster 1 buy Brand A products, and this segment rates "brand" as being important. This is significantly higher than the 78% of Sample A, Cluster 5 who also buy Brand A products, but do not rate "brand" as being important – hence Cluster 1 shows a stronger link (behaviourally) to "brand" than Cluster 5. This correspondence is not, however, mirrored by Clusters 2,3 and 4.

For Sample A, differences in the level of purchase of the key brands match the importance of brands for Cluster 1, but the differences are not as big as the CBC importance data would suggest. Cluster 2 is also significantly more likely to buy low sugar products, and this matches the key CBC characteristic of the cluster, but again the difference, while statistically significant, is still relatively small. Cluster 3 is more likely to purchase low-fat products. Clusters 4 and 5 do not feature any differences in the Loyalty Card data that match the importance ratings from the CBC analysis.

For Sample B, the CBC attribute importance for each cluster does not correspond with purchasing patterns apart from cluster 3 who are more likely to purchase low-fat products.

For Sample C, the importance of "Brand A" among Cluster 1 is significantly higher than for most of the other clusters, indicating that the segment's claimed preferences match

their in-store buying behaviour. Cluster 2, the sugar avoider cluster, are significantly less likely to buy products high in sugars than the rest of the sample, but they display no real difference in their willingness to buy low sugar products. Cluster 3 is significantly more likely to buy low-fat products, and this again matches their CBC preference. Cluster 4 preferences do not match the purchasing data. Cluster 5 is significantly less likely than most of the other segments to buy products that are low in sugar (which matches their attitude to sugar compared to all the other segments apart from segment 1), and they are significantly more likely to buy low salt products – which again matches their CBC preference.

So, in summary, the traditional approach to CBC and segmentation can produce interesting segments which (for Sample A) show some significant links to behavioural data. The combination of UTT and CBC produces equally interesting segments with the addition of a segment that was not identified by the CBC only approach. The segments identified for Sample C are also more likely to show significant links to in-store behaviour, including “new” unmet needs (low salt). Overall the null hypothesis for H6 can be accepted: with the caveat that while, for Sample C, the relationship between behavioural data and the CBC data is not perfect for every segment, it is significantly better than for the other two samples.

Table 4-16 - Loyalty Card Buying Behaviour by Segment

Shading indicates a difference that is consistent with expectation for the cluster

	Cluster 1 (A): Brand Lovers	Cluster 2(B): Low Sugar	Cluster 3(C): Low Fat:	Cluster 4 (D): Low Fat and Sugar	Cluster 5 (E): Mixed needs/ Low Salt
Percent who buy Brand A					
Sample A	86.7%E	83%	80%	81%	78%
Sample B	89%	76%	88%	82%	81%
Sample C (WM Engaged only)	92%C	87%	85%	85%	86%
Customers who buy Brand C					
Sample A	68%	72%	70%	71%	71%
Sample B	76%	69%	84%	76%	66%
Sample C (WM Engaged only)	80%	73%	74%	73%	69%
Customers who buy products high in sugar					
Sample A	96%	91%	93%	93%	91%
Sample B	90%	95%	97%	92%	94%
Sample C (WM Engaged only)	92%	89%E	94%	93%	95%
Customers who buy products high in salt					
Sample A	96%	92%	93%	93%	92%
Sample B	98%	95%	97%	94%	91%
Sample C (WM Engaged only)	96%	92%	95%	94%	96%
Customers who buy products low in sugar					
Sample A	42%	46%E	45%E	42%	38%
Sample B	44%	51%	53%A	44%	48%
Sample C (WM Engaged only)	46%	48%E	43%	47%E	29%
Customers who buy products low in salt					
Sample A	26%	30%	26%	28%	27%
Sample B	26%	31%	32%	29%	23%
Sample C (WM Engaged only)	27%	27%	29%	32%	38%C
Customers who buy products low in fat					
Sample A	29%	27%	37%	35%	28%
Sample B	28%	37%	42%	35%	32%
Sample C (WM Engaged only)	27%	33%	41%	33%	23%C

Results are based on two-tailed tests. For each significant pair, the key of the category with the smaller column proportion appears in the category with the larger column proportion.
Significance level for upper case letters (A, B, C): <.05¹

It is relevant to mention that some of the segments being examined are quite small (Table 4-17) so there is a possibility that false-positive results may emerge. This is supported by the work of Simmons et al. (2011) who reject the notion that “if an effect is significant with a small sample size, it would necessarily be significant with a larger one.” The argument applies the other way around: if a significant difference were to occur with a large sample, it would not necessarily happen with a smaller sample. Hence the lack of significant correlations between the segments and behavioural data observed for Samples B and C may be as a result of the relatively small sample sizes.

Table 4-17 - Sample Sizes by Segment

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
Sample A	828	472	3208	3088	1407
Sample B	63	37	170	345	106
Sample C - WM Engaged only	26	94	277	329	87

4.4 Data Analysis Summary

While the results of the empirical analysis focused on the hypotheses evaluated, the analysis to ensure data reliability also created some interesting outcomes and warrants further discussion. Both are therefore discussed below:

4.4.1 Demonstrate that the Data are Reliable

The most surprising aspect of the data collection is how little impact the different questionnaire lengths and data collection approaches have had on the final sample profiles. Among those who started the surveys, completion rates were 45%, 17% and 13% for Samples A, B and C respectively, yet the last demographic and attitudinal profiles for each sample are almost identical, thus demonstrating that the samples could be compared with confidence.

The levels of non-response observed are comparable to other published studies.

Tijdens (2014) achieved completion rates (the percentage who completed the study having started it) of between 32% and 25% for much simpler surveys. In an experiment on the length and quality of surveys, Vicente and Reis (2010) achieved completion levels of between 41% and 36%, while Deutskens et al. (2004) achieved response levels (percentage of completed surveys from those e-mailed) of between 17% and 24%. These percentages are higher than the levels achieved in this research, but the Deutskens work was based on a sample of people who had recently completed telephone surveys for the same company. Interestingly, Sheehan (2001) identified a number of studies with much higher levels of response rates (between 72% and 22%) from 1986 to 2000, but the trend over time indicates that people are becoming less likely to participate in such surveys.

The absolute level of response to the surveys does warrant further comment. Only 4.2% of Sample A Loyalty Card panel members who received an invitation to complete the interview actually completed it carefully enough to be included in the final Sample A, compared to 1.4% and 1.1% for Samples B and C respectively. This raises obvious questions about the validity of the samples, regardless of their comparability. High levels of non-response (Groves, 1989) have long been an issue in consumer research (Dillman et al., 2002). The response rates achieved in this survey do not come

close to the 50% response rate that was considered minimally adequate for research by Babbie (1990, 1992). Babbie's 50% figure does not seem realistic, however, given the much lower levels discussed in a meta-study by Manfreda et al. (2008) using data from 1998-2004: only six of forty-five studies reported a response rate of above 50%.

There are some obvious potential reasons for this low level of response. The text for invitations used (Appendix A- Survey Invitations) was somewhat bland and unclear, in as much as they did not inform recipients of the survey topic and there was no pre-notification or follow up reminder to encourage higher levels of response (Sheehan, 2001). In addition, while an incentive for completion was offered and will have provided some support for completion (Görizt, 2006), it was relatively low in absolute value: 150 points are worth 75 pence. Despite these issues, however, it is unlikely that the response levels would ever have reached the 50% levels suggest by Babbie (1990), and so raises some important concerns going forward about the reliability of e-mail recruitment for survey research.

For this study, however, the author would argue that the response rates are not relevant. The survey was conducted among the three samples to compare the impact of the distraction-tasks. Since the three samples used were all generated via the same overall population and the demographics and attitudes towards health and diet were the same for the three groups, it is felt that the data provides a valid understanding of the different approaches to CBC data collection and so data validity can be asserted.

Given the high level of sample drop out, it is reassuring that the final samples match the original database on all key variables that were available: age, gender, attitudes to health etc. and so this provides strong evidence that the sample is a valid representation of the population from which it was created.

The decision to split the survey into three parts to create a longitudinal approach (Lynn, 2009) was not taken lightly given the potential problems with drop-out rates and variations in data quality. It is reassuring, therefore, that the data (measurement) validity does not seem to have been affected by the split survey method. The inclusion of the distraction-tasks into the CBC survey means that such questionnaires will always take longer to complete than a standard survey and so

drop-outs will occur whether the survey is designed to be completed in one or several sittings (Vicente and Reis, 2010; Sheehan, 2001). The lack of impact of this split approach on the survey findings indicates that such an approach could be safely used in the future, without the need for a control sample against which to evaluate it.

4.4.2 Demonstrate that the Distraction-tasks are Effective

The fact that the distraction-tasks had a bearing on the choice-tasks is reassuring and confirms the work of several authors (Gao et al., 2012; Dijksterhuis and Nordgren, 2006; Acker, 2008). This confirmation was by no means assured given the findings of several authors who failed to replicate some of the original work conducted into UTT (Newell and Shanks, 2014; González-Vallejo et al., 2008; Nieuwenstein et al., 2015). One of the main criticisms of the successful work into this “Deliberation-Without-Attention” effect has been the extensive use of students who are asked to make “inconsequential, hypothetical choices about situations that they may not have much experience with – for example, buying cars” (Newell and Shanks, 2014 :10). This research does not fit into that category since all of the participants were regular supermarket shoppers (not students) who bought snack bar products and so were interested in the topic. It provides reassuring evidence that UTT does work with real people making decisions that are relevant to them. It also expands the range of product categories in which UTT could be effective. Previous work by Dijksterhuis and Strick (2016) indicated that UTT is only really suitable for understanding the role of unconscious thought when making major decisions, e.g. buying a car or choosing an apartment. This work supports this idea but redefines the definition of “major decision” to mean a decision that is important to the individual, no matter how trivial it may seem to an independent observer.

It should be recognised, however, that while the distraction-tasks had an impact on the CBC tasks, their impact varied and was strongest for people who engaged fully with the tasks. This variation in impact confirms the work of McMahon et al. (2011) who found that the ideal distraction-task was relatively undemanding. In an ideal world all of the distraction-tasks would have had an equal impact and so (perhaps) the overall effect of the distraction-tasks may have been greater.

The relative impact of the WM tasks provides useful information for future research. While the less taxing tasks (Counting Span and Forward Span Dissimilar) seem to have the greatest impact among those who were deemed to be engaged across all of the tasks, the more taxing tasks (such as the Two-Back task) have the greatest impact individually, but people who engage with this task seem unable to sustain their involvement with the other tasks. This suggests that more work needs to be conducted to identify both the ideal distraction-tasks and which combinations of tasks work together best.

The analysis of the impact of the distraction-tasks according to the level of engagement with the task appears to be an addition to the literature: the majority of documented studies have taken place in a controlled environment with a researcher watching the participants complete the interviews. Any failure to complete the distraction-tasks successfully has to be assumed to be a problem with a participant's WM capacity rather than as a result of inattention. These interviews demonstrate that this assumption regarding WM capacity may not be true – some people may not want to engage in the exercises. Future analysis of studies that include distraction-tasks should consider this issue.

4.4.3 Analysis to Demonstrate the Impact of UTT on CBC Data Collection

The differences in the ways that the samples responded to the choice-tasks were small and only significant in some instances. These differences represent a snapshot of each participant's thought process during each stage of the interview, but they do not provide a holistic understanding of their reaction to all the choice-tasks. The Hierarchical Bayes analysis provides this insight as it uses all the information from the participant's data, as well as *a-priori* information based on the way that other participants have responded to the survey. These factors are combined to calculate the overall importance of the attributes and levels. This approach allows the full, cumulative impact of the distraction-tasks to be understood in a way that has not been tried before within the literature. The analysis suggests that, ultimately, the UTT affect has been to increase the importance of the tangible benefits such as the nutritional

content of the products while decreasing the importance of emotional benefits such as brand. This provides strong face validity of the impact of the distraction-tasks.

The Latent Class Segmentation of the CBC data is the key to determining if the combination of CBC and UTT can identify hitherto unidentified customer needs. The link to behavioural data is a way of verifying if this need is real: it provides external validity for the data (Ryan et al., 2002). As it transpires, the outcome of the data analysis for all three samples is very similar: which is as would be expected. Serious questions would have been asked if the data had transpired to be completely different for each sample. The key difference, however, is that the combination of the CBC approach with the distraction-tasks has successfully identified a segment (those who want a low salt product) that does not feature in the other data sets and yet can be confirmed to exist by examining the respondents' behavioural data. Not only does this segment not appear in the five-segment solutions for Samples A and B, but it also cannot be found in the six, seven and eight clusters solutions.

This finding is very striking and provides clear confirmation of the "Deliberation-Without-Attention" hypotheses, but it is important to put the work into context. First, the segment's consumption of salt is not statistically significant from all the other segments, only some of them. Second, compared to the conventional CBC approach, only three of the remaining segments have been improved by the distraction-tasks in terms of their correlation to behavioural data. Third, despite a sample of 6142 completed interviews at stage 1 of the survey, one of the segments consists of only twenty-six people (and so fails Kotler's (2009) substantiality criterion). From a purely practical perspective, this is not an approach that can be embraced fully in its current form. Nevertheless, the original objective of the research "to segment customers according to their subconscious needs" does appear to have been achieved, based on the significant links to behavioural data.

4.5 Theoretical/ Empirical and Methodological Contributions

4.5.1 Main Contribution to the Literature

The main contribution to the literature of this DBA has been the development of a methodology to understand the weight of importance that an individual unconsciously attributes to different factors when making a buying decision. The research was carried out to understand the importance expressed for a snack bar's levels of fat, sugar and salt versus other attributes such as brand and packaging communication, but the same technique could be deployed for other higher involvement offerings such as cars, holidays and so on. The methodology combines Unconscious Thought Theory and Choice-Based Conjoint and has been tested against a control sample which completed a traditional CBC methodology. It has been possible to show that this new approach creates different weights of importance and different customer segments compared to the traditional approach using CBC alone. Supermarket loyalty card data (for one major retailer) for the respondents who completed the survey has also been analysed to prove that the new methodology combining CBC/UTT is more likely (than a traditional CBC only methodology) to produce preference data that links to actual in-store buying behaviour.

4.5.2 A Framework for Understanding Hidden or Unconscious Needs

A second interesting contribution to the literature has been to reframe the concept of hidden or unexpressed needs discussed by Gregg (2013b) using the Johari Window (Luft and Ingham, 1961). This reframing provides a mechanism by which to understand these different types of needs. It has allowed the development of a theory that suggests that it may be possible to understand unknown, unknown consumer needs by using a combination of techniques that both enable the individual to recognise a need in themselves *and* can help them to express the need to others. i.e. the combination of UTT and indirect questioning (Figure 4-1).

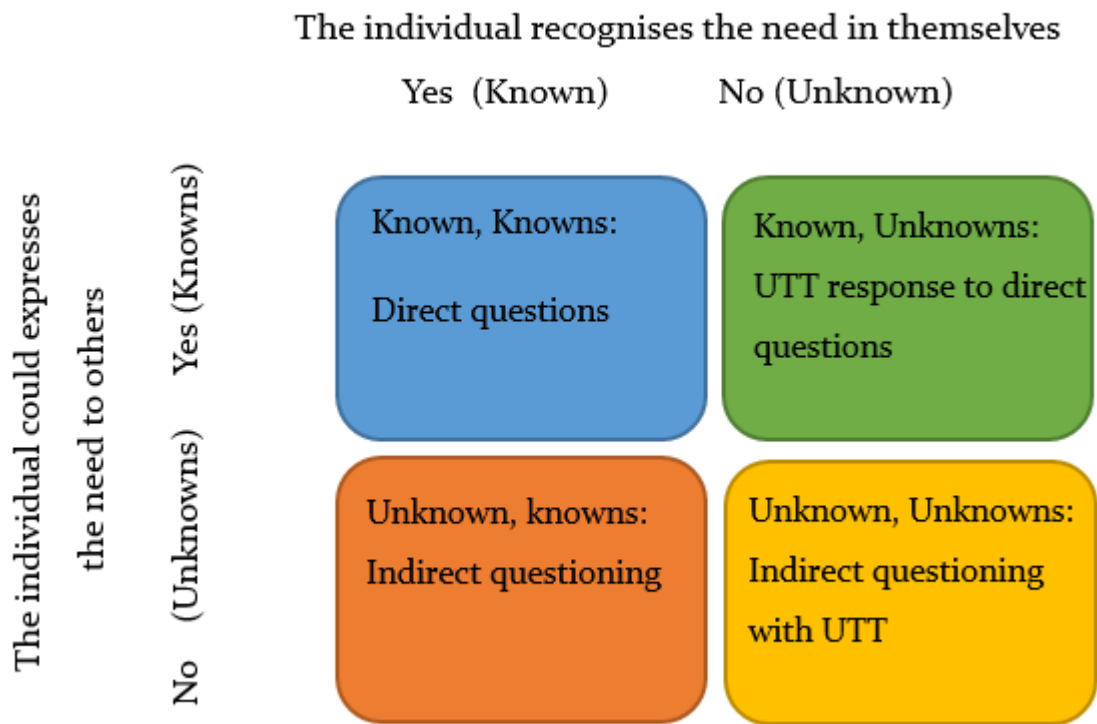


Figure 4-1 - How Indirect Questions and UTT Can Be Combined to Identify Unknown, Unknowns

Beyond this contribution, the research conducted can offer insight into two broad areas: how to conduct CBC type interviews and the theory behind the effectiveness of UTT.

4.5.3 How to Conduct CBC Type Interviews

Another key contribution that stands out in this research is how low the overall response levels were to the survey. In a meta-review by Sheehan (2001), response rates to e-mail surveys from 1986 to 2000 were observed dropping from over 60% to the low 20% level. The general decline in survey response levels was also noted by Callegaro et al. (2014). This research indicates that this trend has continued with only 9% of the Loyalty Card database being willing to click on the invitation and between 3% and 5% completing the first survey. This raises serious issues for the future of market research and so should be discussed further.

Splitting the conjoint survey into three parts and analysing the responses provides another useful contribution to the literature. A commonly recognised problem with CBC is that it can become somewhat boring and repetitive for respondents (Lenk et al., 1996). Based on an analysis of twenty-one commercial conjoint studies, Johnson and Orme (1996) concluded that this problem was real and could lead to potentially misleading results if the participants were asked to look at too many choice-tasks. They found that participants who were invited to evaluate more than twenty choice-tasks were potentially risking diminishing returns regarding the quality of data versus the comprehensiveness of information. The SQD approach used in this survey provides some interesting insights into ways of overcoming this problem. Splitting the survey from one long interview into three separate conjoint surveys had no meaningful effect on the data and did not change the overall interpretation of the information. The split did, however, significantly reduce the overall sample size: less than 50% of the sample who completed stage 1 of the survey also completed stage 3. Careful consideration would be needed before adopting this approach in the future.

4.5.4 The Theory Behind the Effectiveness of Unconscious Thought Theory

UTT is a relatively new area of research and as Dijksterhuis and Strick (2016) stated, “clearly demonstrating that UT takes place is not easy.” As it transpired, based on the survey data, not every choice-task in this research appeared to be affected by the UTT distraction-task. Nevertheless, the data does show that the distraction-tasks appear to influence the way that the choice-tasks were answered, especially among people who engaged with the distraction-tasks, and these differences had an impact on the CBC data (H3). This contribution will hopefully encourage future researchers to examine the impact of UTT on a more granular level.

The approach taken to test UTT in this research is, as far as the literature search can identify, very different from any UTT research carried out before. The use of UTT in conjunction with CBC has enabled a “cumulative effect” to develop by asking each participant multiple questions/ distraction-tasks. While the individual differences in the responses to the choice-tasks have been quite small, the analysis has been able to

demonstrate a collective impact on the importance of the individual attributes. This provides a new avenue for further exploration.

It should be noted that the domain chosen in which to test UTT is very different from the other Unconscious Thought Theory domains examined by a range of authors (Payne et al., 2008; Pachur and Forrer, 2013; Nordgren et al., 2011; Huizenga et al., 2012; Dijksterhuis and Nordgren, 2006; Acker, 2008). While most of the work into this area has tended to evaluate decision-making for major life events (e.g. buying/renting a home, buying a car, choosing a vacation), its application for something so relatively trivial as selecting a snack bar on the basis of its nutritional content is very different. Its traditional application is based on the assumption that people will continue to work on a problem or decision unconsciously, but only when it pertains to a matter of importance (Orlet, 2008). This research challenges this assumption and, indeed, refutes it for some of the distraction-tasks. Instead, the research suggests that, if encouraged, people will work unconsciously on a problem if an event is created that facilitates the opportunity to think unconsciously about it, almost regardless of whether the subject matter is genuinely important to the individual.

According to both Abadie et al. (2013) and Hasford (2014), UTT does not work very well with numerical data, with both authors finding that conscious decision-making was better than unconscious decision-making in this situation. For this research, it is not possible to suggest that the Sample B's decision-making was better or worse than Sample Cs, merely different. The key insight, however, is that the distraction-tasks appear to have reduced the importance of brand in place of a rational feature such as nutritional information. This insight is new, in as much as no other work has been identified which has demonstrated that UTT can affect the importance of attribute weightings in this way (Gao et al., 2012).

A further area of contribution to the literature relates to the type of distraction-task that leads to the best UTT results. Several authors (Nieuwenstein et al., 2015; Gao et al., 2012; Bos et al., 2011; Abadie et al., 2013) have noted that relatively easy distraction-tasks lead to better UTT results. This research confirms this finding in as much as the Counting Span and Forward Span Dissimilar tasks had the most impact among the

group who were deemed to be most engaged with the tasks, but the Two-Back task had the most impact when viewed in isolation. This suggests that the cumulative effect on the WM of multiple WM tasks needs to be considered when devising this type of research.

Finally, since the vast majority of research into UTT has been conducted using students in a controlled environment (Newell and Shanks, 2014), this research provides new insight into ways of conducting and analysing UTT research for large-scale studies, particularly using an online approach.

4.6 Conclusion

The hypotheses-based analysis of the data has demonstrated that the combination of Choice-Based Conjoint and Unconscious Thought Theory produces data, for the snack bar category, which differs from a control sample that only used a Choice-Based Conjoint approach. The data from this combined CBC/UTT approach is more insightful than the control sample (CBC only) approach as it can demonstrate significantly stronger links between the levels of importance expressed for a snack bar's levels of fat, sugar and salt, and the actual products purchased by the individual according to their supermarket loyalty card data. The CBC/UTT approach was also able to identify a customer segment that was not detected by the CBC only approach. This work can be seen, therefore, as a methodological contribution to the literature and is the key contribution of the DBA. The next section of this thesis discusses the reaction of the practitioner community to this new methodological approach.

5 Practitioner Input and Impact Assessment

5.1 Introduction

A new requirement of the DBA program at Cranfield University is to demonstrate that the work conducted has had an impact on the practitioner community and will be widely disseminated. Specifically, the program requires the Doctoral Student's final thesis should:

- Provide evidence of engagement with practitioners
- Identify learnings from the research and how this has affected the author's own consulting work
- Identify the (potential) impact of the research on the student's own organisation and wider community and the steps that will be taken to achieve impact
- Detail a plan for future dissemination and exploitation of the research
- Detail a plan to evaluate the impact of the research.

This chapter has been written to address these points. The core of this work is based on a series of qualitative interviews among practitioners to understand what impact the work might have on their organisations.

The definition of practitioner contribution has come from the RCUK's Pathway to Impact paper (Hughes and Kitson, 2012). The paper examined the knowledge exchange from universities to business communities. The results were based on two surveys: a survey of 22,000 UK academics and a survey of 2,500 businesses. It concluded that "the notion of an academic 'ivory tower' seems to be a myth as far as the UK is concerned." It did, however, stress the importance of "strengthening connections between academia and the rest of society." This section provides, for this study, clear evidence of collaboration between business and academia and the resulting impact that this has had on the quality of the work produced. The chapter describes a series of qualitative evaluations carried out throughout the DBA, in line with best practice approaches described by the RCUK's guidelines. It goes on to assess reaction to the work against a number of criteria established before the empirical work

was conducted and ends with some suggestions about how to measure the future impact of the work.

5.2 Engagement with Practitioners

Since this study was primarily about using segmentation as a research technique to provide customer insight (Wilkie and Cohen, 1977), the key audience for engagement has been practitioners who are involved in conducting segmentation studies. The author followed the recommendations of Rynes and colleagues (1999) to ensure that this engagement was successful. Rynes found that academics who worked closely with practitioners were more likely to believe that they had learnt more and were more likely to be cited by other researchers. On the downside, they found that the collaboration was liable to result in fewer citations by other researchers if the practitioner became too involved in formulating the research question. They concluded that academic/practitioner collaboration was most successful (i.e. generated the most citations) if the academic posed the research question, but then worked closely with practitioners to investigate the answer to the question. That model has been followed for this research, and the full details of the author's interactions with practitioners are described for each stage of the work conducted as follows:

1. Define the problem
2. Position the problem
3. Evaluate the literature
4. Discuss the potential impact of the research
5. Choose the empirical project
6. Design the empirical project
7. Analyse the findings
8. Share the findings.

The level and type of practitioner engagement is described below. Table 5-1 shows a diary of meetings undertaken with practitioners.

Table 5-1 - Journal of Engagement

Type of conversation	Individual	Company
Definition of the problem		
13/04/2013	Head of Insight	Capital One
28/05/2013	CEO	Added Value
29/05/2013	Head of Insight	Major Supermarket Retailer
30/05/2013	Director	Incite Marketing Planning
10/06/2013	Head of Insight	Warner Bros
20/06/2013	Head of Insight	McDonald's
21/06/2013	Head of Insight	British Gas
Type of conversation		
28/06/2013	Director	Tangible Branding
26/07/2013	Director	Incite Marketing
29/08/2013	Director	Independent Consultant
19/09/2013	Head of Insight	British Gas
26/09/2013	Head of Insight	Major Supermarket Retailer
08/10/2013	Consultant	Independent Consultant
09/10/2013	Head of Insight	Warner Bros
06/11/2013	Director	Incite Marketing
08/11/2013	CEO	Daylesford Organics
How to position the problem		
22/01/2014	Director	McKinsey
13/02/2014	Director	Bonamy Finch
27/03/2014	Managing Director	Jigsaw Research
19/04/2014	Head of Insight	Warner Bros
27/04/2014	Insight Specialist	McKinsey
Evaluation of discoveries in the literature		
12/06/2014	Head of Insight	Visa
13/06/2014	Head of Insight	GE Healthcare
20/08/2014	Head of Insight	Major Supermarket Retailer
17/09/2014	Head of Insight	Capital One
18/09/2014	Director	Incite Marketing Planning
29/10/2014	Director	McKinsey
20/11/2014	Head of Insight	Visa
05/12/2014	Head of Insight	British Gas
09/12/2014	Head of Insight	GE Healthcare
14/12/2014	Director	TNS
7/1/2015	CEO	ICM
13/01/2015	Consultant	Independent Consultant
02/03/2015	Head of Insight	Warner Bros

Type of conversation	Individual	Company
How to ensure that the work will have an impact		
20/03/2015	Director	Jigsaw Research
17/8/2015	Head of insights	Sony Ericson
21/9/2015	Head of insights	Capital One
29/9/2015	Head of Insight	Major Supermarket Retailer
2/10/2015	Head of Insight	Warner Bros
Choosing Empirical project		
3/10/2015	Head of insights	Capital One
4/11/2015	Head of insights	Sony Ericson
8/12/2015	Head of Insight	Major Supermarket Retailer
12/1/2016	President	Hughes Hall Cambridge
3/2/2016	Head of segmentation	Major Supermarket Retailer
Type of conversation	Individual	Company
1/3/2016	Head of segmentation	Major Supermarket Retailer
26/4/2016	Marketing director	Marketing Society
Design of the Empirical project		
27/4/2016	Head of brand insights	Major Supermarket Retailer
3/5/2016	Head of brand insights	Major Supermarket Retailer
6/5/2016	Head of brand insights	Major Supermarket Retailer
2/6/2016	Head of segmentation	Major Supermarket Retailer
23/6/2016	Head of Loyalty Card analytics	Major Supermarket Retailer
21/7/2016	Head of brand insights	Major Supermarket Retailer
27/7/2016	Head of brand insights	Major Supermarket Retailer
23/8/2013	Head of Insight	Major Supermarket Retailer
31/8/2016	Head of brand insights	Major Supermarket Retailer
1/9/2016	Head of brand insights	Major Supermarket Retailer
9/9/2016	Head of Loyalty Card analytics	Major Supermarket Retailer
15/9/2016	Head of Loyalty Card analytics	Major Supermarket Retailer
6/10/2016	Brand lawyers	Major Supermarket Retailer
7/11/2016	Head of Loyalty Card analytics	Major Supermarket Retailer
16/11/2016	Brand lawyers	Major Supermarket Retailer
21/11/2016	Head of brand insights	Major Supermarket Retailer
6/12/2016	Head of brand insights	Major Supermarket Retailer
Analysis of findings		
5/1/2017	Head of brand insights	Major Supermarket Retailer
9/1/2017	Head of Loyalty Card analytics	Major Supermarket Retailer
11/1/2017	Head of segmentation	Major Supermarket Retailer
9/2/2017	Head of brand insights	Major Supermarket Retailer

Type of conversation	Individual	Company
Disseminate findings		
17/8/2017	Head of Insight	Major Supermarket Retailer
21/8/2017	Head of Insight	British Gas
22/8/2017	Head of Insight	GE Healthcare
29/8/2017	Head of insights	Capital One
5/9/2017	Head of brand insights	Major Supermarket Retailer
22/9/2017	50 practitioners and academics	Sawtooth Software conference
11/10/2017	Insight team	Major Supermarket Retailer

5.2.1 Defining the Problem

The original impetus to research ways to understand unconscious customer needs and segmentation evolved over more than 20 years of conversations with practitioners. These practitioners consistently expressed frustration and doubt regarding the validity of many of the needs-based customer segmentation studies they had conducted. As well as expressing doubt about the approaches that they had used to segment customers, however, they were also able to provide several ideas and suggestions regarding potential solutions to the issue. These ideas focused mainly on the desire to understand a customer's *conscious* and *unconscious* needs.

The perception that practitioners may be able to contribute as much intellectual content as academics concurs with work conducted by Offermann and Spiros (2001) in the area of organisational practice. They, and others (Barley et al., 1988), reported a tendency for academics to follow, rather than lead, practitioners with respect to thinking and discourse about key issues.

As a result, the author spent over six months defining the problem for evaluation with over sixteen different practitioners from a range of industries, including retail, financial services, consulting, telecoms and media services, before finally deciding to focus on the area of customer segmentation and unconscious needs.

5.2.2 Positioning the Problem

Once the general scope of the DBA was agreed, further conversations with practitioners then focused on the positioning of the problem. Several practitioners were able to provide significant insight into ways of conducting needs-based customer segmentation studies, but none were able to describe any methods for understanding

unconscious customer needs. There was a strong consensus among the practitioners that this would be a fertile area for exploration were it to be developed.

5.2.3 Evaluating the Literature

While the practitioners struggled to suggest or recommend relevant literature regarding unconscious customer needs and customer segmentation, they were very receptive to discussing and debating the insights that emerged from the Systematic Literature Review. They were also able to provide clear guidance regarding the practical application of the different methodologies being explored. In particular, the practitioners asserted a strong aversion to any methodology which would significantly increase the cost of conducting research or the ease of recruiting respondents. For this reason, neuroscientific methodologies were rejected from the scope of the research.

5.2.4 Discuss the Potential Impact of the Research

The potential impact of the DBA was highly dependent on the significance of the findings discovered. While the practitioners could appreciate the academic perspective that all research is useful, even if it does not produce any new insights, they did not feel that the work would have an impact if it failed to produce a new perspective on how to segment customers using their unconscious needs. As a result of these discussions, several of the practitioners with whom the author had been in regular contact decided that they would be unable to support the DBA any further. For other practitioners, however, the conversations regarding impact were critical in helping them understand the scope and the potential of the work. Several of them were happy to provide quotes to this effect:

“I would be delighted to work with Sid to develop a method for segmenting our customers based on why they choose different types of credit cards. This has been a long-standing issue within our organisation, and I hope that the application of new techniques to understand customer's unconscious needs will provide the breakthrough that we are seeking” (Head of Insight - Capital One).

“I think this is a fascinating piece of work and I would be happy to work with Sid to explore the unconscious needs of our customers when purchasing products

from specific categories or sections of a store. We have access to behavioural data via our Loyalty Card, and we would hope that we can use this data in conjunction with primary research to develop a research technique that provides a new level of understanding of our customers' intentions and needs" (Head of Insight –Major Retailer).

"I am happy to provide any reasonable support that is necessary to allow Sid to test the impact of the methodologies he is developing to understand customers' unconscious needs" (Head of Insight - British Gas).

5.2.5 Choosing the Empirical Project

Due to the extensive conversations conducted with practitioners, a number of potential projects were discussed. While the practitioners were very keen to help, the somewhat slow and methodical nature of the DBA limited the types of projects that might be suitable. Also, several practitioners felt that it would be important to link any potential methodology for understanding unconscious needs-based segmentation with some form of metric that could demonstrate that this methodology would be superior to a more conventional "conscious" needs-based segmentation. While it was possible to achieve this aim to a limited extent with practitioners who worked for Capital One and British Gas, the opportunity afforded by a Major Retailer with access to their Loyalty Card database was much more compelling. As it transpired, the Retailer was just embarking upon a project to enhance how they segment their customers. They already had a segmentation methodology for their loyalty card holders based on their shopping behaviour. This was a powerful marketing tool, but the Retailer felt that it could be enhanced significantly by overlaying additional elements such as attitudes to pricing, attitudes to technology, personality profiles and attitudes towards health. This was a huge investment for the organisation, built around multiple pieces of analysis and data collection. The Retailer was particularly interested in identifying new questioning techniques to deepen their understanding of their customers and so were highly receptive to conducting a joint project to this end. The decision was taken, therefore, to work with the Retailer on this empirical project.

5.2.6 Designing the Empirical Project

The Retailer wished to gain a deeper understanding of a customer's attitudes to health and wellbeing. It was felt that people often deceived themselves when discussing their health and wellbeing. By understanding a customer's unconscious needs, the Retailer would be better placed to provide leadership in this area. Initial conversations focused on evaluating the potential health claims of food products using conjoint research like the work of Annunziata and Vecchio (2013). These conversations evolved to focus on the nutritional claims made on a food product's packaging. The Retailer then selected the snack bar category as their priority. The author designed the survey to incorporate a combination of Choice-Based Conjoint and Unconscious Thought Theory as explained in Chapter 3.2.

Research Now, a UK research agency, programmed the survey. They were selected by the Retailer due to their ability to program the relatively complicated online survey and their familiarity with the Retailer's research panel. The Retailer sent out the invitations to complete the survey to the Loyalty Card panel members. The Retailer was also responsible for rewarding the participants who completed the survey by crediting their Loyalty Card accounts with additional Loyalty Card points.

5.2.7 Analysing the Findings

The analysis of the findings was conducted by the author using SPSS. The data analysts at the Retailer did, however, link the survey data to the Loyalty Card panel information so that the survey data and behavioural data could be understood together on an individual basis. This collaboration made it possible to understand if the respondents' survey preferences matched their purchasing behaviour in stores.

5.2.8 Sharing the Findings

The findings from the empirical project have been shared extensively with the Retailer. Also, all the practitioners with whom the author discussed the DBA initially were informed of the findings and have been presented to or have requested a presentation of the findings at some future stage. The findings were also presented at the SKIM/Sawtooth Software conference in Barcelona, where they were discussed

extensively by a group of approximately fifty practitioners and academics. These discussions led to a series of revisions in the way that the information was presented as well as highlighting a number of additional insights and potential avenues for additional data analysis.

5.3 Impact of this Research

According to Denicolo (2013: 1), impact is “about making a difference, so there is action or activity that leads to change, but that change needs to be seen within a context that may be global, local or even individual.” This definition based on “making a difference” has been expanded to different academic institutions within the UK, as shown in Table 5-2.

Table 5-2 - Definitions of Impact

Institution	Definition
The Arts and Humanities Research Council (AHRC)	Impact is the “influence” of research or its “effect on” an individual, a community, the development of policy, or the creation of a new product or service. (AHRC, 2010: 1)
Research Councils UK (RCUK)	Impact is the demonstrable contribution that excellent research makes to society and the economy (RCUK, 2011: 2)
The Research Excellence Framework ‘REF2014’	An effect on, change or benefit to the economy, society, culture, public policy or services, health, the environment or quality of life, beyond academia (REF, 2011: 48)

The definitions shown in Table 5-2 demonstrate that impact means more than just knowledge creation within academia. While both PhDs and DBAs are expected to develop new knowledge that contributes to the development of professions and communities in some form or another (Malfroy and Yates, 2003), there is more emphasis within a DBA degree on showing the research conducted has “advanced practice” (Fink, 2006) – hence why this section is included in the thesis.

The definition of impact provided in the Cranfield DBA Program Handbook (2013 – 2017) takes these ideas and defines them more precisely as follows:

1. Instrumental: influencing the development of policy practice or service provision, shaping strategy/legislation, altering behaviour, etc.
2. Conceptual: contributing to the understanding of practice/policy issues reframing thinking/debates, consensus challenging, etc.
3. Capacity building: through technical personal skill development, etc.

The author is self-employed and has been since the start of this DBA. He works as a consultant for blue-chip organisations, helping them to improve their marketing and their understanding of their customers. Within this context, the author has revised the above definition of impact as follows:

1. Instrumental: influencing the development or shaping strategy in the area of customer understanding
2. Conceptual: reframing thinking/debates and challenging consensus etc., particularly within the context of understanding customer needs
3. Capacity building: through helping organisations to think of customer understanding and unconscious needs in a new and different manner.

It is within this definition of impact that the potential value of this research is discussed: both regarding the impact of the work on the author's consulting business and the potential impact of the research on broader practice/policy.

5.3.1 Impact of the Research on the Author's Consulting Business

Until now, most of the author's work has relied upon understanding clients' customers' conscious needs. Findings from this research demonstrate that a customer's unconscious needs may provide more insight for an organisation: the research indicates that unconscious needs make it possible to both identify new customer segments and improve the linkage between claimed behaviour within a survey and actual behaviour when the customer is shopping in supermarkets. These findings are very important. The author now intends to reposition and redefine the type and scope of his consulting work in three key ways as follows:

1. Firstly, at an instrumental level, the research has demonstrated a method of segmenting customers according to their unconscious needs. This approach is distinct from conventional research methods and provides a real point of difference upon which to build a consulting business. At present, no other market research company or consulting business has ever mentioned UTT, so there is a huge gap in the market. It has been very easy to share the idea behind UTT with clients, with a near universal level of resonance and agreement. Also, learnings developed around the impact and suitability of different distraction-tasks provide strong barriers to entry to protect against competitors trying to mimic the work. When conducting this research, much time was spent researching and exploring the different types of working memory task. Further time was invested in customising the tasks so that they could be administered online rather than in laboratory conditions and devising methods and thresholds for determining if someone had fully engaged with the tasks. While each of these aspects was very time consuming to complete, this investment in time has provided a strong basis upon which to claim real expertise and leadership in this area. Moreover, although the final methodology used in this research is somewhat impractical in its current form, it does provide a platform upon which to develop an approach which may be used on a regular basis. For example, many market research projects involve showing respondents new ideas and asking them to provide an immediate reaction. The findings from this research suggest that this approach may be flawed: the approach could be improved substantially by asking the respondents to complete a working memory distraction-task between being shown the new idea and offering their opinion. Another form of research that could be improved is based on a person's attitudes toward a brand or product. At the moment, most researchers ask a respondent to give their opinion without giving them time to think about it properly – often leaving a respondent with a feeling of: “Oh, I should have said that.” UTT potentially provides a way to overcome this problem so that marketers can develop a new and deeper understanding of their brands and products. The author will be offering this methodology, and the theory behind it, to as many organisations as possible.

2. Secondly, at the conceptual level, the Johari Window framework provides a new and exciting way of understanding a person's unconscious needs and preferences. Use of the Johari window allows researchers to explore an individual's unconscious needs by combining an indirect research questioning technique with the distraction-tasks used to explore UTT. The indirect research technique chosen in this research was CBC, but there are numerous other indirect research techniques that could also be employed in this way. For example, respondents could be asked to provide attribute ratings for a number of brands or products, along with an overall rating of the product. The indirect importance of each attribute could be calculated via regression analysis. By showing the respondent the attribute statements before being asked to complete a working memory distraction-task, the importance of the attributes may be altered to reflect a person's true thoughts rather than the version that they think they are expected to present. This is just one example where this framework could be applied. It has the potential to be developed into a new tool for solving or at least unpicking a number of complex marketing problems.
3. Thirdly, regarding skill development, the research demonstrates that the working memory distraction-tasks used in the research were highly engaging for many of the participants, as shown in Figure 5-1.

Figure 5-1 - Comments made about the survey by participants

"Brilliant loved doing these thank you."

"Enjoyed every minute despite the fact that I am extremely tired as its now after 12 pm."

"Certainly got me thinking about what info I check on packaging as well as my cognitive skills!!

"Excellent one; it has [a]wakened my mental alertness and ability to resist distraction from good choice-making. well done."

"Have really enjoyed doing the various challenges. "

"Great, full of suspense!"

These comments suggest there may be an opportunity to develop these types of questions into approaches which will provide better data than regular survey approaches. For example, the Random Word Checker working memory task could be developed into a brand association task. Respondents would be shown twelve, or so, brand attribute statements or images and then asked to indicate if they had seen the attributes or images when shown a list of statements which only includes some of the original attributes or statements. Since respondents will tend to remember the statements that they associate most with a brand, the exercise will identify which statements are most associated with the brand. By refining the questions used and developing additional questions of a similar type, it offers the opportunity to provide a real point of difference compared to other consulting firms. At present, while there is a strong move towards gamification of market research questioning, this move has tended to trivialise the interviews rather than improve the quality of the data collected (Cechanowicz et al., 2013). A method based on occupying the participant's Working Memory could utilise this gamification approach, but because it is using known psychological principles, it may be able to provide a deeper level of customer understanding.

5.3.2 Impact of the Research on Wider Policy/Practice

The author has already disseminated the research to a broader audience. This dissemination has focused on the impact of the distraction-tasks on the CBC questions and the resulting segmentation. Findings regarding the impact of the split questionnaire design approach and implications for respondent recruitment have not been discussed since these insights are outside of the original scope of the research. The process of sharing the findings has already provided a number of interesting discussions. The people interviewed are listed in Table 5-3. Some of these people were interviewed after a short presentation of the findings at the SKIM/ Sawtooth Software Conference in Barcelona, 22nd September 2017. The discussion guide is included in Appendix I.

Table 5-3 – Sample Profile of Practitioner Respondents for Impact Assessment

Respondent	Job title	Sector	Number of years of experience	Number of segmentation studies conducted
R1	Head of customer insights	UK supermarket	15	30
R2	Head of loyalty card analytics	UK supermarket	10	20
R3	Director of market research	Global payment system company	30	50
R4	UK head of market insight	UK Utility company	20	30
R5	Head of Dutch research agency	Research Agency	20	500
R6	Head of US software agency	Research Agency	25	1000
R7	Head of US research agency	Research Agency	35	200

This sample of interviews is obviously not representative of all those in the practitioner community. Nevertheless, it does provide a good cross-section of potential users of this type of methodological approach.

The findings from the research are organised in terms of the key themes that emerged, rather than by questions asked. This reflects the thematic analysis that was used to understand the data.

5.3.2.1 The Concept of Unconscious Thought Theory

The overall reaction to the idea of UTT was very positive. All the respondents were able to give examples of situations in which they had made decisions which reflected the process described in the Unconscious Thought Theory literature.

R3 “Unconscious Thought Theory describes the exact process I went through recently when trying to buy a house. I visited the house with my husband and made the decision to buy it based purely on my emotional feelings. Later that week, my husband and I sat down and made an extensive list of all of the positives and negatives of buying the house. We still agreed it was the right decision to make and so put in an offer to buy it. A week or so later, I woke up in the middle of the night in a cold sweat. I realised that we had made the wrong choice because the house was near an industrial estate. The proximity of industrial estates was not on the original list that my husband and I made, but I realised, having slept on the problem, that I could not face living in a house with such close proximity to this particular industrial estate and the associated trucks and lorries that would pass by our front door.”

R6 “We have all been in the situation where we cannot make a decision. It is only by taking a break, having a cup of coffee, going for a walk, or sleeping on the issue, that we are able to clear the impasse. This is exactly what Unconscious Thought Theory describes and so is highly believable and credible.”

R4 “The idea behind Unconscious Thought Theory could be critical to our business. We have repeatedly tried to understand why people do not switch their suppliers of gas and electricity, but the answers we get never make sense. This

theory could provide the breakthrough we need to understand a person's decision-making criteria for a topic which is important but has somehow slipped under their radar."

5.3.2.2 The Johari Window

Reactions to the Johari Window framework varied more than reactions to UTT. While some respondents felt it provided an interesting new way to understand an individual's unconscious thoughts, others were less convinced. In particular, some respondents struggled with the idea that a person could have a need that they do not recognise in themselves, and were unsure if UTT could really identify that need (if it did indeed exist).

R6 "I think this framework provides an interesting way of understanding a person's needs."

R2 "This approach certainly breaks down the issue of unconscious needs in a way that makes the problem feel more answerable. I have never seen a framework before that appears to offer a methodology for understanding a need that a person does not recognise and that they would not be willing to discuss with others. I am not sure if the approach described will actually work, but I think it provides a basis for further discussion."

R3 "I am not convinced by this framework. I cannot think of a need that someone would not recognise themselves and if they did, would not be prepared to share with other people. I am also not sure, based on the way you have described Unconscious Thought Theory, that it is fair to describe this approach as a method for understanding needs that an individual is unable to recognise in themselves."

5.3.2.3 The Methodology Used

Reaction to the methodology used tended to focus on two separate areas: the complexity and comprehensiveness of the approach; and the impracticality of the methodology in its current format.

R5 “This is a huge study by anyone’s standards. It has clearly been very carefully thought through and designed to ensure that nothing is missed. You should be congratulated on your work.”

R3 “This sounds like an amazing piece of research. I do not think I have ever heard of or been involved with something which has been so comprehensively designed to ensure that no stone is left unturned.”

R7 “It is important to try things that are impractical so that learnings can be applied to other areas. It is this type of research which breaks down barriers and opens up new areas and approaches. It is a real pity that more research of this type is not conducted.”

R1 “This research methodology has been a big experiment for us, and at times we were very unsure about what the outcome would be. While it is, in its current form, not exactly usable on a day-to-day basis, it has provided so many discussion points and insights that its value cannot be questioned.”

5.3.2.4 The Analysis of the Data

The practitioners were also very impressed with the quality of the analytics conducted on the data. There was a strong feeling that the work had been analysed thoroughly and so could be trusted as being both reliable and believable.

R5 “This is an excellent piece of work and has obviously been analysed very thoroughly.”

R3 “You really do seem to have thought of everything in the design and analysis of this research. It must have taken a lot of time and work to complete.”

5.3.3 The Findings from the Research

The findings from this research were a genuine surprise to a number of the practitioners. While most respondents expected the distraction-tasks to have an impact on the way respondents answered some of the conjoint choice-tasks, they did not expect the approach to generate a different segmentation outcome, nor did they expect the approach to link more closely with behavioural data.

R2 *“The link that you have shown between the segments and loyalty card data is remarkable. While we would always hope that survey data would link to actual purchasing, in reality, we know this does not happen often, but we do not know why it does not occur. This approach provides us with a whole new avenue for exploration. I look forward to developing these ideas further.”*

R4 *“This is exactly what conference papers should be about. I really feel as if I have learnt something new and important and you have challenged my thinking in the whole area of decision-making.”*

R7 *“Given the product category you chose, and the experimental nature of the research, I am amazed by the findings presented. I am not sure if you have genuinely been able to capture someone’s unconscious thoughts, but that does not matter given the segments you have identified and the link you have demonstrated with actual buying behaviour.”*

5.3.3.1 The Idea of System Three Thinking

The suggestion that UTT may reflect a new type of System Three decision-making was first made by Dijksterhuis et al. (2014). He suggests that this thought process is distinct from the System 1 and System 2 processes described by Kahneman (2011). Curiously, while the author has been hesitant to suggest the “System 3” label to the interviewees, the description was suggested spontaneously by two of the respondents. More work is needed in this area, but these interviews suggest that some practitioners may be open to this type of description.

R4 *“I think there is a big difference between conscious decision-making where you actively seek to solve a problem and indirect decision-making where you ponder a problem for a long time before finally coming to a conclusion. Given this difference, I think the Unconscious Thought Theory idea that you have described could easily be classified as a new System Three type of decision-making.”*

R3 *“The process you have described resonates very strongly with my own experiences where I have slept on a problem for a number of days. I would not*

classify those experiences as System Two decision-making, so I would be highly tempted to suggest a new label such as System Three decision-making.”

5.3.3.2 Overall Usefulness of the Research

While this research has provided a number of new insights into the way people make decisions, the impracticality of the approach in its current form obviously limits its potential. Nevertheless, the respondents were very positive about the possible impact of this research and most believed that the practical limitations of the approach could be overcome.

R1 “This is a genuinely interesting addition to our understanding of how customers make decisions. It has raised some questions in our organisation regarding the current approaches and methodologies that we use. While the conjoint itself is not a practical methodology, the Unconscious Thought Theory idea is certainly something that we will incorporate into future research. For example, we plan to experiment with giving respondents more pre-tasks before arriving at focus groups; we also intend to spend more time telling respondents about the purpose of a piece of market research, so they have time to digest the topic being discussed rather than always asking them to make snap judgements. We also hope to be able to modify some of the psychometric approaches used in the distraction-tasks to develop a more gamified approach to conducting research surveys.”

R4 “This research is very interesting and makes a lot of sense. It is rather sad that it has taken this long to realise that you can get a better response to a market research survey if you give the respondents more time to think about the problem. The link to behavioural data is really exciting, and the playful style of the interviews is clearly a direction in which we should move. I will now speak to my colleagues to see if we can identify ways of integrating this research into our approaches to understanding our customers.”

R5 “This is a fantastic piece of research and has been presented in a very entertaining way. I look forward to trying the ideas you have presented in my own business.”

5.4 Plan for Dissemination

Everett Roger's (2010) work on the Diffusion of Innovations summarises a plethora of papers showing that the spread of new ideas, or ways of doing things, follows an S-shaped diffusion curve. Only a small number of highly innovative individuals adopt a change in the beginning. Once, however, a small number of "opinion leaders" adopts the innovation and begin to persuade others, the adoption rate begins to surge. As more and more people embrace the change, more of those who have held back finally reach their "tipping point." At this stage, the adoption diffuses widely.

Gladwell (2002) builds on the work of Feick and Price (1987) to suggest that there are actually three types of opinion leaders: "mavens", people who obsessively accumulate knowledge and like to share it; "connectors", people who know everyone; and "salesmen", people who are unusually persuasive and draw others into their way of thinking. Alternatively, Watts and Dodds (2007) have argued that most change is driven, not by influentials, but by easily influenced individuals influencing other easily influenced individuals. Either way, the critical question remains the same: how do we start the process of influence?

Several studies have demonstrated that practitioners do not refer to academics or academic research findings when developing management strategies and practices (Abrahamson, 1996; Mowday, 1997; Porter and McKibbin, 1988). Equally, academics rarely involve practitioners when setting their research questions (Sackett and Larson Jr, 1990) or interpreting their results (Rynes and McNatt, 2001). It is, therefore, unsurprising to discover that most academic work is not well disseminated, and hence a gap exists between academic recommendations and practitioner approaches (Johns, 1993; Miller et al., 1997; Pfeffer, 1998).

Given the sheer number of academic journals published and the pressure on academics to publish, it is somewhat surprising to discover that journals and periodicals are not the best way to disseminate knowledge to practitioners (Rynes et al., 2007; Baines et al., 2009). As previous researchers (Offermann and Spiros, 2001; Terpstra and Rozell, 1997; Brennan, 2004) have found, even practitioners with a doctoral degree do not read academic journals once they enter the world of practice.

This is because practitioners only seek out academic evidence in response to a particular problem or need. In such situations, the evidence still needs to be found and synthesized so that the relevant pieces of evidence can be used – assuming that it is “all there” in the journals. This has led, Cohen (2007) and Rousseau (2007) to suggest that websites, including social media, are a more efficient method of providing evidence-based knowledge for practitioners.

From a practical perspective, however, the opportunity to share the findings from this research with the groups identified will be limited by the author’s ability to connect with these people. A four-stage strategy is therefore proposed based on the author’s proximity to each group (see Table 5-4)

Table 5-4 - Plan to Disseminate Findings

Audience	Accessibility	Actions needed to reach an audience
The group of practitioners who have helped with the design and execution of some of the fieldwork.	Easy	There are four companies who have assisted the author with this DBA. The main supporter is the Retailer with whom the author conducted the research. The initial findings have been presented to this Retailer on three occasions. Also, presentations have been given to the other three companies who helped to develop the research and the topic for exploration.
People within the marketing and market research community whom the author has met over the last ten years.	Easy	The author has been in constant communication with a number of these individuals, and he is now sharing the findings via a series of telephone conversations and face-to-face meetings.

Audience	Accessibility	Actions needed to reach an audience
<p>People who work in the marketing and market research sector, as well as academia, whom the author has not met.</p>	<p>Medium</p>	<p>The author will attempt to reach these people by speaking about the DBA at specific industry events such as conferences organised by the UK Market Research Society and ESOMAR. The author has already presented his findings to the SKIM/Sawtooth Software conference in Barcelona in September 2017, to the Insights-Intelligence conference in London in May 2018 and the Richmond Events Insight Event in London in June 2018. The work has been consistently well received and prompted a number of inquiries for more information. The author is currently submitting ideas for papers to several conferences organised by the UK market research society. He also intends to submit papers to ESOMAR during 2018.</p>
<p>People from around the world who have an active interest in marketing or market research but are not necessarily active at conferences.</p>	<p>Hard</p>	<p>The author intends to publish the findings and insights from the DBA in a range of academic and practitioner journals and magazines. The author has already published an article on segmentation in Admap with his supervisor (Poenaru et al., 2014). Future publications are planned in Admap and IJMR and once this DBA is completed.</p>

Given the compelling nature of the findings from the DBA, the author hopes to be engaged in a consulting capacity by some key clients to unearth new insights about their customers and their needs. The author also intends to develop a website (www.irrational.co) and blog which summarises the key findings from the DBA and makes it easy for interested parties to provide feedback and comments.

To fully exploit the findings from this research, the author intends to become a Thought Leader on this topic. The term “Thought Leader” was first termed by Kurtzman (1998) and was created to describe people who are leaders in the development of knowledge in their field. Gibbins-Klein (2009), has developed the idea further and defines thought leadership as containing four elements: (i) Reach, that is communicating with as many people as possible within the relevant community until you become a household name; (ii) Engagement, creating as many one-to-one conversations as possible so that you move beyond simple recognition; (iii) Authority, leading key conversations and defining the direction of the discussions regarding the topic; (iv) Longevity, ensuring that the ideas created remain in the recipient's minds.

According to Gibbins-Klein (2009) and Young (2014), the best way to achieve the status of “Thought Leader”, is to publish a book that is accessible to practitioners and can be used as a basis to build consultancy work. Hence, once the author has completed his DBA, he intends to write a book describing the key insights from the work. To ensure that the book is a success, it will need to satisfy the following three key criteria:

1. It should be interesting, in as much as it questions underlying assumptions and beliefs (Daft et al., 1987; Davis, 1971).
2. The claims of the research should be well supported by solid empirical evidence (Larwood et al., 1999; Lawler, 1999).
3. The claims of the research should be explained in an easy to understand, non-academic, language (Latham, 2007). The book will use case-based examples to illustrate how unconscious needs may be understood and what value can be added by segmenting customers using unconscious needs versus explicit needs. It is hoped that this book will then allow the author to build a successful consultancy business based on these insights.

5.5 Plan for Evaluating the Impact of the Research

In the impact plan (Deliverable V of the DBA process), the author described six questions that would be used to evaluate the impact of the research among practitioners. These were:

1. Overall, did the methodology identify any new or previously unidentified needs?
2. How insightful would you consider the final segmentation solution to be?
3. Why do you think the methodology has identified a new, previously unidentified need or new segmentation insight?
4. Do you believe the final segmentation solution will be used within your organisation?
5. Would you consider using this methodology again?
6. What, if any, are the barriers to using this approach in the future?

Each of these questions is answered in turn, based on the analysis conducted and conversations with practitioners:

5.5.1 Overall, Did the Methodology Identify Any New or Previously Unidentified Needs?

Yes, the methodology did identify a new, previously unidentified need: the segment who were seeking low salt products. Not only did the traditional methodology not identify this segment in the five-segment solution, but it also failed to identify any group of people who prioritise low salt products regardless of the number of segments generated.

5.5.2 How Insightful Would You Consider the Final Segmentation Solution to be?

The final segmentation solution was highly insightful. Not only did it identify a new segment, but it was also able to prove (tentatively) that the segments could be linked to behaviour – so the low-fat segment tended to buy low-fat products, the low sugar segment tended to avoid high sugar products, and the low salt segment tended to avoid high salt products: this demonstrates convergent and nomological validity. While the traditional approach to segmentation (using CBC) was able to show a weak

link to buying behaviour for the low-fat group, it was unable to show any other links. Hence the UTT approach can be considered much more insightful and actionable.

5.5.3 Why Do You Think the Methodology has Identified a New, Previously Unidentified Need or New Segmentation Insight?

The new methodology seemed to make the respondents more rational and logical. The distraction-tasks appeared to allow the respondents to consider all the elements of the trade-off more carefully, so they were less influenced by emotional factors such as brand and the presentation of the nutritional information: they were more motivated by the nutritional content of the snack bar. While it could be argued that this reflects the fact that the sample was pre-selected to be very rational in their behaviour (due to the segmentation of the sample into those who engaged with the distraction-tasks and those who did not), this rationality would not normally be expected to link to behaviour. The link to behaviour suggests that, instead of making the data more rational, it makes it more reflective of reality – a reality that occurs due to a person’s conscious and unconscious decision-making and the myriad of distractions they face when making consumption choices in real life.

5.5.4 Do You Believe the Final Segmentation Solution will be Used Within Your Organisation?

Some but not all elements of the findings will be used. For example, the understanding of the limited impact of the Own Label brands is likely to lead to a brand rationalisation exercise. Also, the support the data provided for the nutritional traffic light system is likely to increase its usage on certain products. The final segmentation is unlikely to be used by the client organisation, purely because it was conducted on an experimental basis, rather than in response to a real marketing issue. While the findings from the research are considered to be very interesting and actionable, there is no specific owner of the research within the client organisation who can commercialise the insights identified. The work would have been used if it had been conducted for a cereal bar manufacturer and there is still a chance that this might occur, but it is not a significant outcome of the work.

5.5.5 Would You Consider Using this Methodology Again?

The methodology used in this research is unlikely to be used again in its current format. This is primarily because, as it currently stands, the methodology is too time-consuming and complicated. The challenge, therefore, is to take the insights from the methodology used and to develop a simpler but equally, or more, effective approach.

5.5.6 What, if Any, are the Barriers to Using This Approach in the Future?

As already discussed, the main barriers to using this approach in the future are its complexity and time-consuming nature. The research seems to have demonstrated that UTT is valid and can be accessed by encouraging people to engage their working memory while still considering a problem. Since not all CBCs need to trade-off nine different attributes at the same time, it is possible that the survey may not need to be completed over several days. Hence, it is entirely conceivable that the same approach could be carried out using one interview if the decision task was slightly simpler. The challenge is to identify the right problem for which this approach could be employed.

5.6 How to Measure the Future Impact of the Research

The reaction to the questions discussed provides a snapshot of the initial impact of this research. To develop a full appreciation of its impact, however, it will be necessary to understand if the research is repeated by other commercial organisations and if it is discussed in practitioner journals and conferences. Heath et al. (2013) have suggested impact could be measured using metrics such as the following:

- The number of requests for information it receives related to an idea
- The number of downloads of whitepapers or the number of views of relevant pages or PDF files
- The number of comments to a blog
- The number of visits to a website.

These seem to be useful criteria for further evaluation, but other relevant metrics could include the number of articles published in both trade and academic journals,

the number of citations received for the articles, and the number of conferences at which the research has been presented. Alternatively, a more commercial evaluation might include the number of projects conducted by practitioners using the methodologies developed, or the number of meetings held with practitioners to explain the approaches to potential end beneficiaries. A social media evaluation would also include the number of tweets regarding the methodology, the number of Academia.Edu likes about the approach, the number of people who are willing to participate in web forums discussing the findings, and the number of mentions of the research registered by the likes of www.socialmention.com.

5.7 Conclusion

The impact assessment has been carried out as a qualitative evaluation. The reaction to the methodology and the insights that it has provided has been overwhelmingly and consistently positive – despite the complexity of the data collection approach. The assessment of the impact of the work, against criteria established before the data collection commenced, is encouraging. It is the author's view, therefore, that this work can be considered to be a methodological contribution to the literature.

6 General Conclusions, Implications, Limitations and Suggestions for Further Study

6.1 General Conclusions

The main conclusion of this thesis is that it has fulfilled the original ambition set out in section 1.3 (specific purpose of research) that Unconscious Thought Theory can supplement and enrich the Choice-Based Conjoint approach in order to produce a customer decision-making segmentation which more effectively reflects customers' unconscious motivations and actual customer behaviour when choosing snack bars. The need for such a methodology was clearly articulated by Pincus (2004), a practitioner writing in the *Journal of Consumer Behaviour*, and the contribution of this thesis addresses (to some extent) this need.

The data collected via the CBC/UTT approach was able to identify a segment of consumers (those who wanted low salt products) that did not emerge as a result of the traditional CBC approach. Also, the segmentation generated was more closely aligned to actual behavioural data (based on Loyalty Store Card information) than the standard CBC approach (without the distraction-tasks). The segmentation also satisfies Kotler's (2009) criteria for segment quality more effectively than the standard CBC approach. It is worth reiterating that while over five hundred papers have been published regarding UTT (according to Google Scholar, June 2018), none of the previous work has been able to show that the application of UTT tasks can improve the ability to predict behaviour.

The author believes that this research has provided a key methodological contribution to the literature, albeit one which needs further revisions given its experimental status, by demonstrating a methodology that has been able to both understand an individual's unconscious decision-making process and identify a previously hidden need. The methodology has been validated by the statistically significant links between claimed preference and actual behaviour for four of the five segments identified. By comparing this approach with the control sample "CBC only" implicit data collection approach, the research has shown that this new methodology offers real benefits to potential users.

The methodology has demonstrable advantages over the methodologies for understanding customer's hidden needs identified during the initial literature search (Table 2-1). The majority of these approaches were rejected since they were qualitative techniques that cannot be easily adapted for a quantitative segmentation. Conjoint and Means-End Chain Analysis were both identified in this list as potential methods for understanding unconscious needs, but they were perceived to be methods for understanding needs that someone may not instantly recognise, rather than unconscious needs. By combining CBC with UTT, this limitation has been rectified, and this combined approach has produced a better data outcome. The same approach might also work for Means-End Chain Analysis, but the design of such an approach is outside the scope of this DBA.

From a practical perspective, the work conducted has been well received by practitioners. The reception to both the theory and empirical research conducted has been very positive. The author has been asked to present the findings on numerous occasions, often to larger and larger audiences within the same organisations, with consistently positive feedback. Comments have focussed on how plausible UTT appears to be, and how most people can describe situations which mirror the ideas described.

Nevertheless, a key concern is the complexity of the data collection. The methodology is too complicated to administer in its present form on a commercial basis (i.e. a non-experimental basis) and so is unlikely to be widely used in its current format. Further time, therefore, needs to be invested in developing this methodology into a format that can be more easily utilised but is still able to link an individual's unconscious needs with their actual behaviour.

Hence, the key contribution of this DBA is that the methodology can be used to identify subconscious needs and use those needs for the purpose of segmentation, but its implementation requires further simplification to ensure that it is widely adopted in practice.

6.2 Implications

Seven managerial implications emerge from this research as follows:

1. The combination of Unconscious Thought Theory and Choice-Based Conjoint has demonstrated a new way to understand a person's unconscious thought process which has resulted in identifying a previously unrecognised customer need and has also improved the link between the participants' claimed behaviour and their actual behaviour (section 4.3.2).
2. The research has reframed the concept of hidden or unexpressed needs discussed by Gregg (2013b) using the Johari Window (Luft and Ingham, 1961). The combination has allowed the development of a theory that suggests that it may be possible to understand unknown, unknown consumer needs by using a combination of techniques that enable the individual to recognise a need in themselves *and* can help them to express that need to others (section 4.5.2).
3. It has highlighted, in section 4.4.1, the decline in the level of response rates to customer surveys to a point where the academic community needs to rethink the definition of "acceptable response levels" from the "over 50%" level defined by Babbie (1992).
4. Splitting the survey from one long interview into three separate conjoint surveys had no effect on the data collected, demonstrating the validity of the SQD methodology (section 3.4.1). The split methodology did, however, significantly reduce the overall sample size (as drop-outs inevitably occurred) and so careful consideration would be needed before adopting this approach in the future.
5. The online methodology used in this research is unlike any other published exploring the impact of distraction-tasks. The findings regarding the most impactful distraction-tasks and the level of engagement with the distraction-tasks will be very helpful when designing future research of this type.
6. This research was conducted in a very different category to other categories used for UTT experiments. The traditional assumption has been that people will continue to work on a problem or decision unconsciously, but only when it pertains to a matter of importance (Orlet, 2008). In our study, a snack bar could be argued to be a low-involvement product, requiring limited consumer thought, and is therefore of limited importance. This research challenges this assumption. Instead, the research suggests that, if encouraged, people will work

unconsciously on a problem if an event is created that facilitates the opportunity to think unconsciously about it, almost regardless of whether the subject matter is genuinely important to the individual.

7. Finally, unlike virtually every other study into UTT, this research has been conducted using participants who are not exclusively students. The research was conducted among adult respondents who claimed to eat snack bars. All respondents were recruited via the Retailer's Loyalty Card database panel. It provides new insight into ways of conducting and analysing UTT research for large-scale studies, particularly using an online approach.

6.3 Limitations

The principal limitation of the research is that it is based on a single category: snack bars. While this category was chosen as being of interest to the research sponsors, its relevance for the application of UTT is, as discussed previously, somewhat limited, given the low-involvement decision-making required of such a purchase. It would be interesting to replicate the study on a high involvement purchase situation, e.g. car purchase, holiday etc.

The second limitation relates to the quality and relevance of the store card data to which the survey was linked. Only weak links could be identified between a participant's preferences regarding nutritional information and the types of products they buy according to the loyalty card database. In many respects, this is not surprising given the potential gaps in the store card data: customers may fail to swipe their card on every shopping occasion; the store card only captures purchasing behaviour in one supermarket which accounts for 16% of total UK grocery spend (Kantar, 2017). In addition, the data collected in the survey relates to personal preferences, whereas store card data can often reflect the purchases of a household.

The third limitation is related to the online research methodology used. This approach facilitates much larger samples sizes than traditional face-to-face research, but it also creates some problems (Van Selm and Jankowski, 2006). The main issue in this instance has been the lack of attention paid to the distraction-tasks and a complete lack of knowledge of the environment in which the participant has conducted the

survey. A face-to-face survey would have provided a more controlled environment but would have lowered the statistical power of the results given the likely loss in sample size.

A fourth limitation lies in the lack of back up neuroimaging work. The most reliable way of confirming the theory described would be to conduct this research while imaging each participant's brain to identify which parts of the brain are activated while making the conjoint choices. This is possible using neuroimaging techniques, e.g. Functional Magnetic Resonance Imaging (fMRI) or Electroencephalography (EEG). Such techniques were, however, outside the scope of this DBA study, not least because the researcher did not have access to the necessary technology, nor the medical support required to mitigate the potential ethical issues that would arise if subjects were found to have certain diseases picked up by these technological devices.

The fifth limitation has been the need to balance the length of the survey with the desire to ask participants to become fully involved in the tasks to the extent that they could then be distracted by this involvement. In an ideal world, both Samples A and C would have conducted the survey in one sitting (thus eliminating the need for Sample B). However, the length of time required to complete the survey and the distraction-tasks made this impossible. As a result, many Sample C participants dropped out compared to Sample A. Nevertheless, despite this difference in sample drop-out, the final samples transpired to be identical in terms of demographics and attitudes to health.

The sixth limitation is the impractical nature of the methodology. The impact assessment (Section 5.5) highlights several concerns raised by practitioners about the complexity of the approach and these anxieties provide a major obstacle to the application of the methodology in its current format. These concerns are compounded by the fact that this approach can only be demonstrated to be effective if some form of dependent variable exists against which to assess its effectiveness versus conventional methodologies (e.g. such as the ability to predict actual customer behaviour). While this dependent variable may not be needed if the methodology has been proven to work in a number of categories, this is unlikely to be the case in the

early stages of its adoption. As a result, categories which would be most likely to benefit from this approach would ideally be relatively high involvement propositions against which behavioural data could be attached, e.g. holidays/ travel, financial services, cars, white goods and other large items.

The impractical nature of the approach also raises concerns about the cost versus return prospects of the methodology. Fortunately, online fieldwork is relatively cheap to administer compared to traditional face-to-face approaches. In addition, in the author's experience, the cost of data collection is relatively small compared to the cost of study design, analysis and interpretation. Nevertheless, the approach described will add some costs, due to the longer interview and the potential need to split the interview over several days – although, as mentioned in Section 5.5.6, this may not be necessary for every instance. Realistically, however, this methodology is unlikely to be utilised by practitioners unless the problem under consideration is pertinent to an organisation, or the organisation is simply curious.

6.4 Areas for Further Study

The findings highlighted by this research lead to several implications for further research. At the heart of these ideas is the need to understand how UTT can be used in a market research situation to enhance the understanding of a respondent's unconscious needs.

This research was limited to understanding the impact of UTT in a trade-off exercise for snack bars. Since these are relatively low involvement purchases, greater insight may emerge from applying the same technique to a topic which is more important to a person, e.g. credit cards, cars, holidays, etc. The framework used to develop this research (Figure 4-1) should also be explored more fully by combining other indirect research techniques with UTT. For example, techniques such as the Implicit Association Test, Means-End Chain analysis or attribute association tests could potentially be enhanced by showing the participants the attributes, explaining how the interview will require them to prioritise the important attributes and then to use a distraction technique to get their unconscious to engage with the problem before

conducting the interview. Hopefully, this will provide alternative ways of exploring needs consumers do not know they have.

The basic approach should also be developed into a methodology that could be conducted in one interview, rather than being spread over several days. This would make it far more practical and increase the chance of it being adopted as a standard approach to research. If, however, the interview does need to adopt an SQD approach, this research suggests that a control sample will not be needed to assess the impact of this split design: the data collected in this survey was not influenced by the SQD approach when comparing Samples A and B.

Finally, perhaps the most intriguing discovery of this research is that there may be three different approaches to decision making rather than the two approaches popularised by Kahneman (2011). The definitive way to prove or disprove this idea would be to conduct cognitive neuroimaging (Dehaene et al., 2006). This would, hopefully, both prove that distraction-tasks can induce a third type of thought process and also be able to show the parts of the brain in which this process is occurring. This could potentially lead to a very different approach to understanding decision-making in the future.

6.5 Final Conclusions

In conclusion, the combined CBC/UTT methodology has produced supplementary data on consumer requirements which links to actual shopping behaviour in a way that the control methodology was unable to achieve. The new approach was also able to identify a previously unidentified segment which did not emerge in the control sample using CBC alone. The new segment has been shown to satisfy all of Kotler's Criteria for segment evaluation. In addition, the segment's claimed preference for low salt products matches the instore behaviour of the segment members. Whilst the methodology is complex and requires simplification so that it can be used more widely, the reaction to the work among practitioners has been very positive and encouraging. The survey itself was also positively received by the respondents who completed the interview, despite its time-consuming nature.

While over five hundred papers have been published regarding UTT (according to Google Scholar, June 2018), none have linked the approach to Choice-Based Conjoint, and none have been able to show any link between UTT and actual behaviour. This work should, therefore, be considered as a methodological contribution to the literature.

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Appendix A - Survey Invitations

Survey A

Dear XXX

At XXXX we always strive to provide you with the most relevant offers.

We would like to ask you a few questions so that we can send you the most exciting and personalised offers for you and your home.

The survey we would like you to complete should take about 20 minutes to complete. As a thank you for taking part, 150 Loyalty Card points will be added to your account.

If you have any questions about the survey please contact

Thank you for your help.'

Surveys B & C

Dear XXX

At XXXX's we always strive to provide you with the most relevant offers.

We would like to ask you a few questions so that we can send you the most exciting and personalised offers for you and your home.

The survey we would like you to complete is quite long, so we have split it into three parts that should be completed over the next week. Each part should take about 10-15 minutes to complete. If you choose to complete this survey before the survey close date you will receive an invitation for the next section on Monday 5th December.

As a thank you for taking part, 150 Loyalty Card points will be added to your account for completing the first survey, an additional 200 points will be added for completing the second survey, and 250 more points will be added for completing the third survey. Hence, if you complete all three surveys a total of 600 Loyalty Card points will be added to your account.

If you wish to take part in the three surveys please complete this first survey by midnight on Sunday 4th December to ensure you are sent the second survey.

If you have any questions about the survey please contact

Thank you for your help.'

Survey 2

Dear XXX

Thank you for recently completing the first part of the survey. As we mentioned, due to the length of the survey we have split it into three parts that should be completed over the course of a week. Each part should take about 10-15 minutes to complete. Please complete this survey by midnight on Wednesday 7th December to ensure you are sent the 3rd and final survey on Thursday 8th December.

As a thank you for taking part, 150 Loyalty Card points will be added to your account for completing the first survey, an additional 200 points will be added for completing this survey, while 250 more points will be added for completing the third survey. Hence, if you complete all three surveys a total of 600 Loyalty Card points will be added to your account.

If you have any questions about the survey please contact

Thank you for your help.'

Survey 3

Dear XXX

Thank you for completing the first two parts of the survey. This is the third and final part and should take about 10-15 minutes to complete.

As a thank you for taking part, 150 Loyalty Card points will be added to your account for completing the first survey and an additional 200 points will be added for completing the second survey.

If you complete this third and final survey you will be awarded another 250 points making a total of 600 Loyalty Card points for completing all three surveys.

If you have any questions about the survey please contact

Thank you for your help.'

Appendix B - Loyalty Card Data Supplied

Age

Gender

Type of shopper

Lifestage

Loyalty to XXXX

Acorn group

Buyer of products with high sugar

Spend on products with high sugar

Buyer of products with low sugar

Spend on products with low sugar

Buyer of products with high salt

Spend on products with high salt

Buyer of products with low salt

Spend on products with low salt

Buyers of XXXX Basic products

Spend on XXXX Basic products

Buyers of XXXX Taste the Difference products

Spend on XXXX Taste the Difference products

Appendix C - Strength of Conjoint Design

Based on 4 version(s).
Includes 84 total choice-tasks (21 per version).
Each choice-task includes 3 concepts and 9 attributes.

A Priori Estimates of Standard Errors for Attribute Levels

	Effect	Std Err	t Ratio	Attribute Level
1	0.01200	0.00979	1.22573	1 1 Brand A
2	-0.00091	0.00983	-0.09223	1 2 Brand B
3	-0.01109	0.00983	-1.12843	1 3 Brand C
4	-0.00210	0.00982	-0.21356	2 1 Great tasting
5	0.00351	0.00980	0.35772	2 2 Tastes delicious
6	-0.00141	0.00981	-0.14349	2 3 Super Satisfying
7	-0.00794	0.01027	-0.77290	3 1 Fat: High (17.5%)
8	-0.00836	0.01015	-0.82354	3 2 Fat: Medium (10%)
9	0.01629	0.01153	1.41247	3 3 Fat: Low (3%)
10	0.01699	0.01142	1.48771	4 1 Saturates: High (5%)
11	-0.01349	0.01013	-1.33152	4 2 Saturates: Medium (3%)
12	-0.00350	0.01027	-0.34080	4 3 Saturates: Low (1%)
13	0.00096	0.00981	0.09793	5 1 Sugars: High (22.5%)
14	0.01569	0.00976	1.60783	5 2 Sugars: Medium (14%)
15	-0.01665	0.00988	-1.68631	5 3 Sugars: Low (5%)
16	0.00755	0.00978	0.77271	6 1 Salt: High (1.5%)
17	0.01219	0.00977	1.24769	6 2 Salt: Medium (1%)
18	-0.01974	0.00985	-2.00500	6 3 Salt: Low (0.3%)
19	0.00064	0.00981	0.06526	7 1 Words highlighted
20	0.00629	0.00978	0.64384	7 2 Words shaded
21	-0.00693	0.00981	-0.70652	7 3 traffic lights
22	-0.00688	0.00981	-0.70172	8 1 100% Natural
23	0.01090	0.00977	1.11573	8 2 Organic
24	-0.00402	0.00981	-0.41013	8 3 A Fairtrade Product
25	-0.00405	0.00982	-0.41183	9 1 One of your Five-a-day
26	0.01077	0.00977	1.10226	9 2 No artificial preservatives or additives
27	-0.00672	0.00981	-0.68521	9 3 Gluten Free

Appendix D –Distraction-tasks Used

Interview	Choice -task	Distraction-task	Description of exercise	Reference
Stage 1	1	Two-Back	Participants were shown a sequence of twelve letters, each letter is shown for two seconds. After the third letter, participants are asked to recall the first letter shown. After the fourth letter, the second letter is recalled. This sequence continues until the twelfth letter is shown, at which point letters ten, eleven and twelve are recalled. At the end of the exercise, participants were told how many letters they had managed to recall correctly	(Rac-Lubashevsky and Kessler, 2016)
	2	Reading span task	Participants were shown sequence of sentences. A random word was placed at the end of each sentence. After three sentences, participants were asked to answer a question based on the comprehension of one of the sentences. They were then asked to write down the random words at the end of the three sentences. This exercise was then repeated using four different sentences. At the end of each exercise, participants were told how many words they had managed to recall correctly	(Engle et al., 1999)
	3	Counting Span task	The participants were shown a sequence of images. Each image depicted a number of different squares and circles. For each image, participants were asked to indicate how many circles of a specific colour were shown. After three images, participants were asked to recall their previous three answers. This exercise was then repeated the sequence of four images. At the end of each exercise, participants were told how many shapes they had managed to recall correctly	(Conway et al., 2005)
	4	Word generation task	A random set of eleven letters was provided. Participants were asked to generate as many words as possible in two minutes using the letter shown. No feedback was provided at the end of the exercise	Introduced by author
	5	Forward Span dissimilar	Participants were shown a sequence of four unrelated random words. Each word was shown for one second. At the end of the	(Rosen and Engle, 1997)

			sequence, participants were asked to recall all four words in the order in which they saw them. This exercise is repeated using five and six random words. At the end of each exercise, participants were told how many words they had managed to recall correctly	
	6	Keeping track task	Participants were shown a series of fifteen random words and asked to keep track of words which related to two distinct categories. At the end of the exercise they were asked to recall the last words shown relating to each category. This exercise was repeated second time using a different set of fifteen words and different categories. At the end of each exercise, participants were told how many words they had managed to recall correctly	(Yntema, 1963)
	7	Random word checker	A collection of twelve random words shown on screen for fifteen seconds. Participants were asked to memorise many as many as they could. A series of twelve words were then shown, with only four of the words being the same as the ones in the original group. For each word, participants were asked to indicate if the same word had appeared in the original group. At the end of the exercise, participants were told how many words they had recalled correctly.	(Engle et al., 1999)
Stage 2	8	Two-Back	See above	
	9	Reading span task	See above	
	10	Counting Span task	See above	
	11	Word generation task	See above	
	12	Forward Span similar	Participants were shown a sequence of four similar sounding words (e.g. Dog, bog, log, jog). Each word was shown for one second. At the end of the sequence, participants were asked to recall all four words in the order in which they saw them. This exercise is repeated using five and six random words. At the end of each exercise, participants were told how many words they had managed to recall correctly	(Rosen and Engle, 1997)
	13	Backward Span dissimilar	Participants were shown a sequence of three similar sounding words (e.g. Dog, bog, log). Each word was shown for one second. At the end of the sequence, participants were asked to recall all three words the reverse order in which they were	(Rosen and Engle, 1997)

			shown This exercise is repeated using four and five random words. At the end of each exercise, participants were told how many words they had managed to recall correctly	
	14	Random word checker	See above	
Stage 3	15	Two-Back		
	16	Reading span task		
	17	Counting Span task		
	18	Word generation task	As above, but an additional incentive of 500 Loyalty Card points was offered as a prize to the person who could generate the most words in two minutes.	Introduced by author
	19	Forward Span dissimilar		
	20	Backward Span dissimilar		
	21	Comma counter	The purpose of the distraction-tasks that each respondent had experienced was described in this final exercise. This was done to provide feedback to the participants, who at this stage would have spent about an hour completing twenty different distraction-tasks. At the end of the paragraph, the participants were then asked to count the number of commas on the page.	(Kahneman, 2011)

Appendix E - Questionnaires

Health and Wellness Survey

The purpose of this research project is to understand your attitudes to supermarkets.

Your participation in this research study is voluntary. You may choose not to participate. If you decide to participate in this research survey, you may withdraw at any time.

The procedure involves filling an online survey that will take approximately 15 minutes.

ELECTRONIC CONSENT: Please select your choice below.

Clicking on the "agree" button below indicates that:

- you have read the above information
- you voluntarily agree to participate
- you are at least 18 years of age

If you do not wish to participate in this research study, please decline participation by clicking on the "disagree" button.

agree

disagree

Interview a nat rep sample of 10,000 UK XXXXX card holders 18+

Thank you for agreeing to take part in this interview. This survey is about your attitudes to health and wellness.

You will discover that some of the questions are slightly different to more traditional surveys. This is because we are working with Cranfield University to make customer surveys more enjoyable. We have included a box at the end of the survey which you can use to tell if we have succeeded in making the survey more fun and also use to give us any other thoughts you might have.

Q1a First of all, we would like to understand your attitudes to health and wellness

To what extent do you agree or disagree with the following statements?

Strongly agree

Agree

Neither agree nor disagree

Disagree

Strongly disagree

ROTATE ORDER SHOWN

My health is very important to me
I am generally very healthy
I like to follow a balanced diet
My diet affects my health
What you eat is more important than how much you exercise
I am healthier than most of the people I know

Q1b And which of these statements is most important to you when thinking about being

healthy?

And which next?

And which next?

ONLY RANK TOP 3

ROTATE ORDER SHOWN

Limiting the number of calories you consume
Reducing your salt intake
Reducing your sugar intake
Reducing your fat intake
Consuming the correct amount of vitamins and minerals
Eating a variety of fresh ingredients
Exercising so I don't need to think about what I eat
Cooking from scratch
Getting enough sleep every night
Maintaining a stable weight
Feeling happy about yourself
Having a good skin complexion
Being full of energy
Being the correct weight for your height

We would now like to understand some details about what you like to eat.

Q2a What is your favourite go-to treat to eat or drink?

ROTATE ORDER SHOWN

Single code

Alcohol	1
Cakes	2
Snack bars	3
Sweets	4
Other desserts	5
Pasta	6
Meat	7
Savoury Snacks	8
Soft Drinks	9
Cheese	10
Fruit	11
Other (write in)	12

Q2b And which do you never eat?

ROTATE ORDER SHOWN

Single code

Alcohol	1
---------	---

Cakes	2
Snack bars	3
Sweets	4
Other desserts	5
Pasta	6
Meat	7
Savoury Snacks	8
Soft Drinks	9
Cheese	10
Fruit	11
Other (write in)	12
None of these	13

Close if Snack bars mentioned at Q2b

Q3 What type of food products do you think about when you hear the phrase 'Snack Bars'.

Please write in box below

Q4 And how often would you say you eat any type of Snack Bars?

Everyday	1
5-6 times a week	2
2-4 times a week	3
Once a week	4
Once a fortnight	5
Once a month	6
Once every three months	7
Less often	8
Never	9

Close if never at Q4

Conjoint section

New page

I would now like you to imagine that you wanted to eat a Snack Bar.

Please look at the packaging details for these three very similar snack bars. Once you think you have understood the information shown for all three bars, please press next.

(NB: none of these options are currently sold in shops)

SHOW conjoint choice-task 1 (randomly shown from block 1,2, 3, 4)

New page

In a moment I will ask you to indicate which bar you would choose, but before you do, I would like to consider a different problem. Please press next to continue

New page

n-back task

I will now show you a series of twelve letters. Please try to remember each one as it appears on the screen, but do not write down the letters.

Show each letter for 1 second

New page

The first letter is: D

New page

The second letter is: A

New page

The third letter is: G

New page

Please enter the first letter that was shown

First letter:

New page

The fourth letter is H

New page

Please enter the second letter that was shown

Second letter:

New page

The fifth letter is S

New page

Please enter the third letter that was shown

Third letter:

New page

The sixth letter is I

New page

Please enter the fourth letter that was shown

Fourth letter:

New page

The seventh letter is Y

New page

Please enter the fifth letter that was shown

Fifth letter:

New page

The eighth letter is O

New page

Please enter the sixth letter that was shown

Sixth letter:

New page

The ninth letter is F

New page

Please enter the seventh letter that was shown

Seventh letter:

New page

The tenth letter is W

New page

Please enter the eighth letter that was shown

Eighth letter:

New page

The eleventh letter is M

New page

Please enter the ninth letter that was shown

Ninth letter:

New page

The twelfth letter is B

New page

Please enter the tenth, eleventh and twelfth letters that were shown

Tenth letter:

Eleventh letter:

Twelfth letter:

New page

Congratulations, you recalled x out 12 letters correctly. Don't worry, perfect recall is not

expected.

New page

Now, if the three Snack Bars that you were just shown were available, which one would you choose, assuming the price was the same for each one?

(NB: none of these options are currently sold in shops)

SHOW conjoint choice-task 1 – same as one just shown.

New page

Now imagine it is a different occasion and these three Snack Bars are available.

Again please look at the packaging details for these three very similar snack bars. Once you think you have understood the information shown for all three bars, please press next.

(NB: none of these options are currently sold in shops)

SHOW conjoint choice-task 2 (randomly shown from block 1,2, 3, 4)

New page

In a moment I will ask you to indicate which bar you would choose, but before you do, I would like to consider a different problem. Please press next to continue

Reading span task

We are now going to show you a series of three sentences, with an additional work written in capital letters at the end of the sentence. Each sentence will appear for 5 seconds before automatically moving on to the next sentence.

New page

For many years, my family and friends have been working on the farm. SPOT

New page

Because the room was stuffy, Bob went outside for some fresh air. TRAIL

New page

We were fifty miles out at sea before we lost sight of land. BAND

New page

Did Bob go outside? YES/ NO

New page

Please write down the three words that were written in capital letters at the end of the three sentences just shown

First word:

Second word

Third word:

New page

Well done, you recalled x words correctly. Don't worry, perfect recall is not expected.

New page

We are now going to show you a series of four sentences, with an additional word written in capital letters at the end of the sentence. Each sentence will appear for 5 seconds before automatically moving on to the next sentence

New page

Harry likes to go swimming in the sea no matter what the weather. MEAL

New page

Jane rushed to the shops because she had run out of flour. GOAL

New page

Anne waited for the train to arrive but it was 10 minutes late. STAIRS

New page

We had to abandon our tent because it was too windy. FILM

New page

How late was the train? Minutes

New page

Please write down the four words that were written in capital letters at the end of the four sentences just shown

New page

Well done, you recalled x words correctly. Don't worry, perfect recall is not expected.

New page

Now, if the three Snack Bars that you were just shown were available, which one would you choose, assuming the price was the same for each one?

(NB: none of these options are currently sold in shops)

SHOW conjoint choice-task 2 – same as one just shown.

New page

Now imagine it is a different occasion and these three Snack Bars are available.

Again please look at the packaging details for these three very similar snack bars. Once you think you have understood the information shown for all three bars, please press next.

(NB: none of these options are currently sold in shops)

SHOW conjoint choice-task 3 (randomly shown from block 1,2, 3, 4)

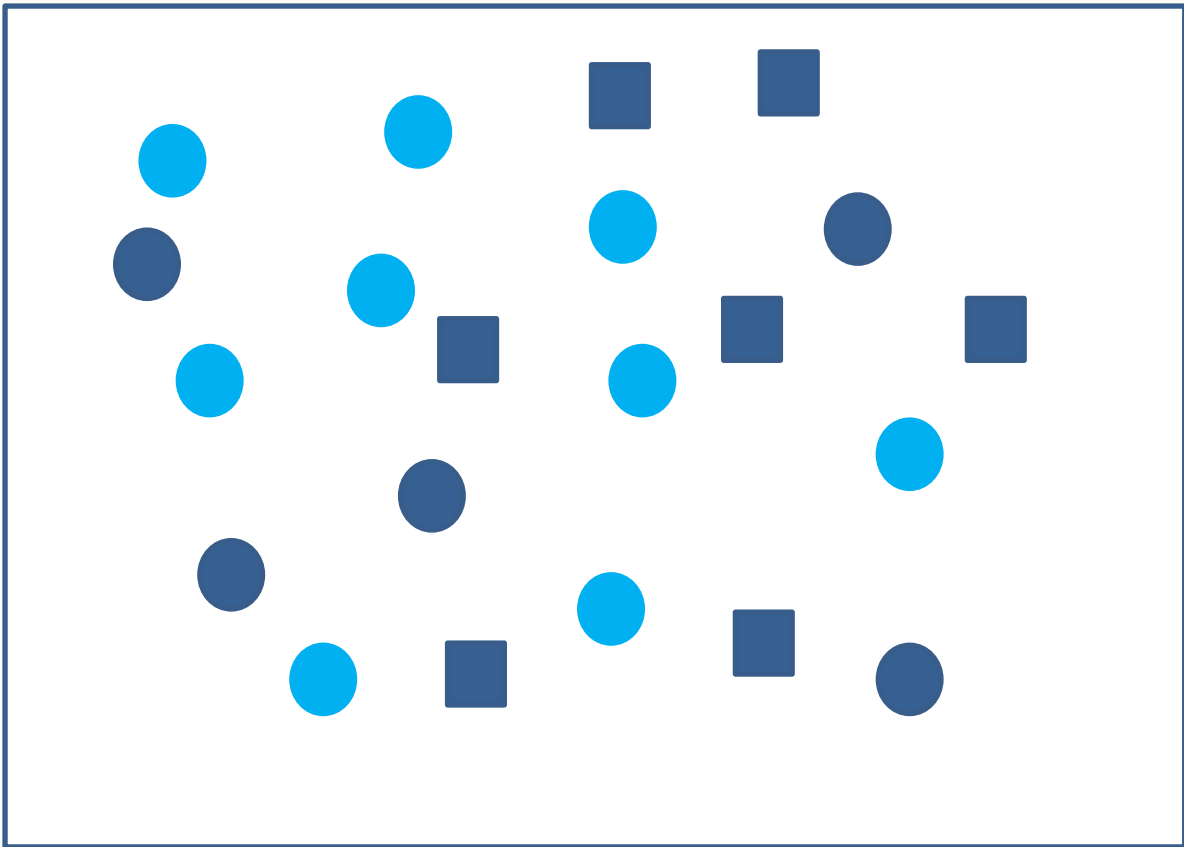
New page

Counting span

We are now going to show you three different images. Each will be shown . For each one, we would like you to count the number of dark blue circles.

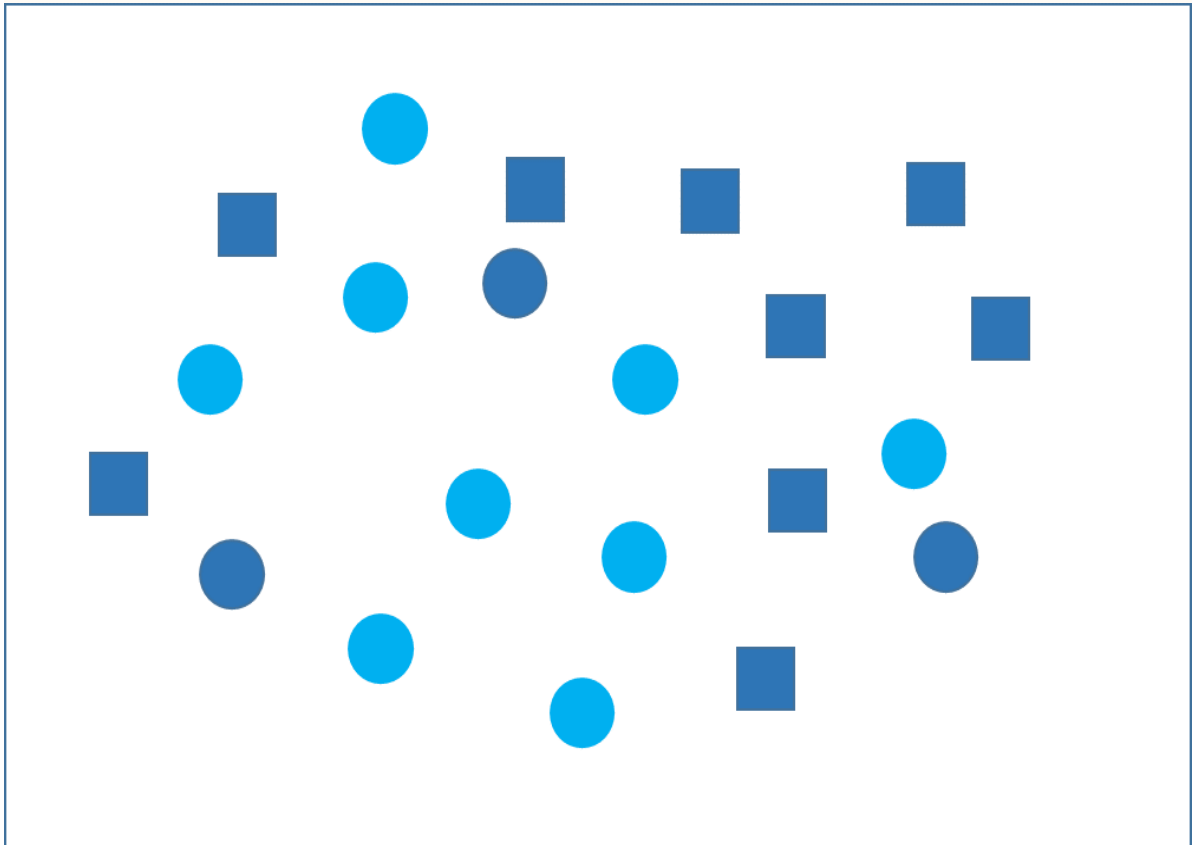
New page

Show image 1



Please enter the number of dark blue circles shown:

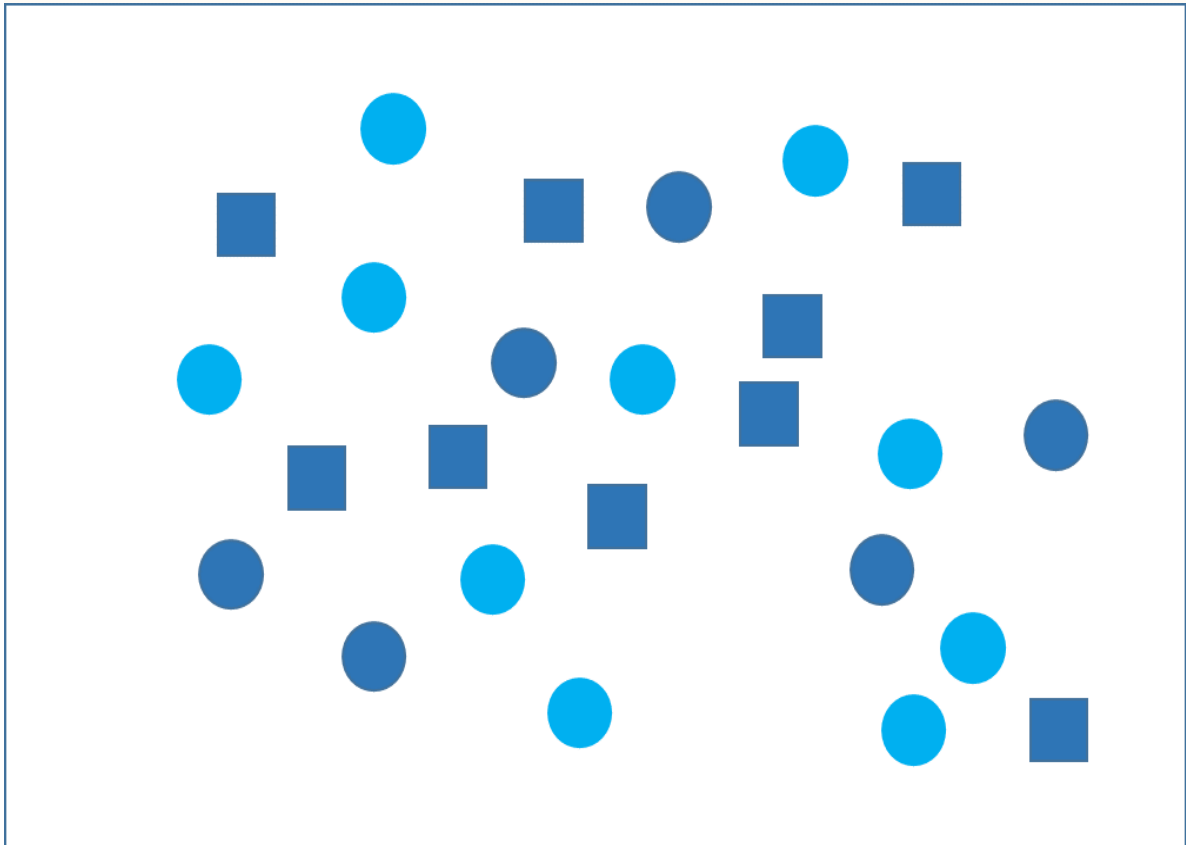
Show image 2



Please enter the number of dark blue circles

[New page](#)

[Show image 3](#)



Please enter the number of dark blue circles

[New page](#)

Now can you please re-enter the number of dark blue circles for each image in the order that you saw them

Image 1:

Image 2:

Image 3:

[New page](#)

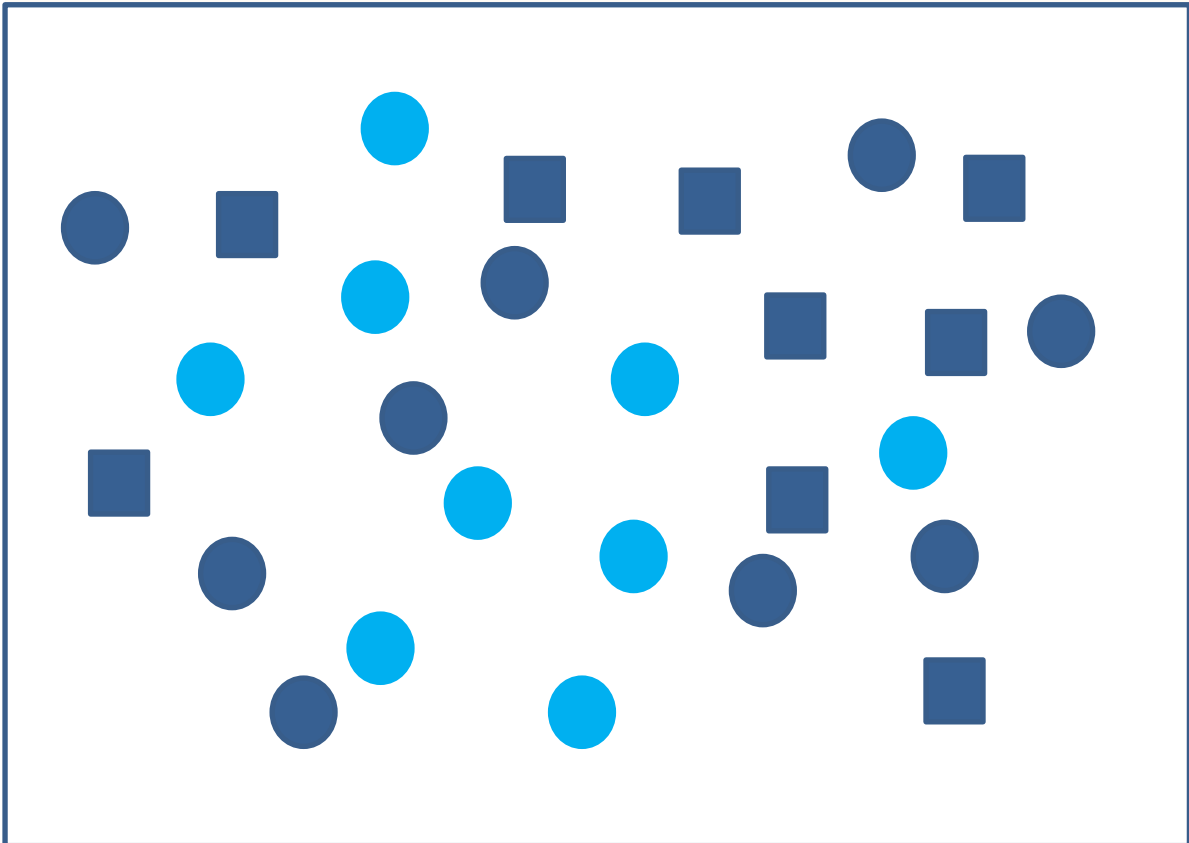
Well done, you counted and recalled the dark blue circles for x out of 3 images correctly

[New page](#)

We are now going to show you four different images. For each one, we would again like you to count the number of dark blue circles.

[New page](#)

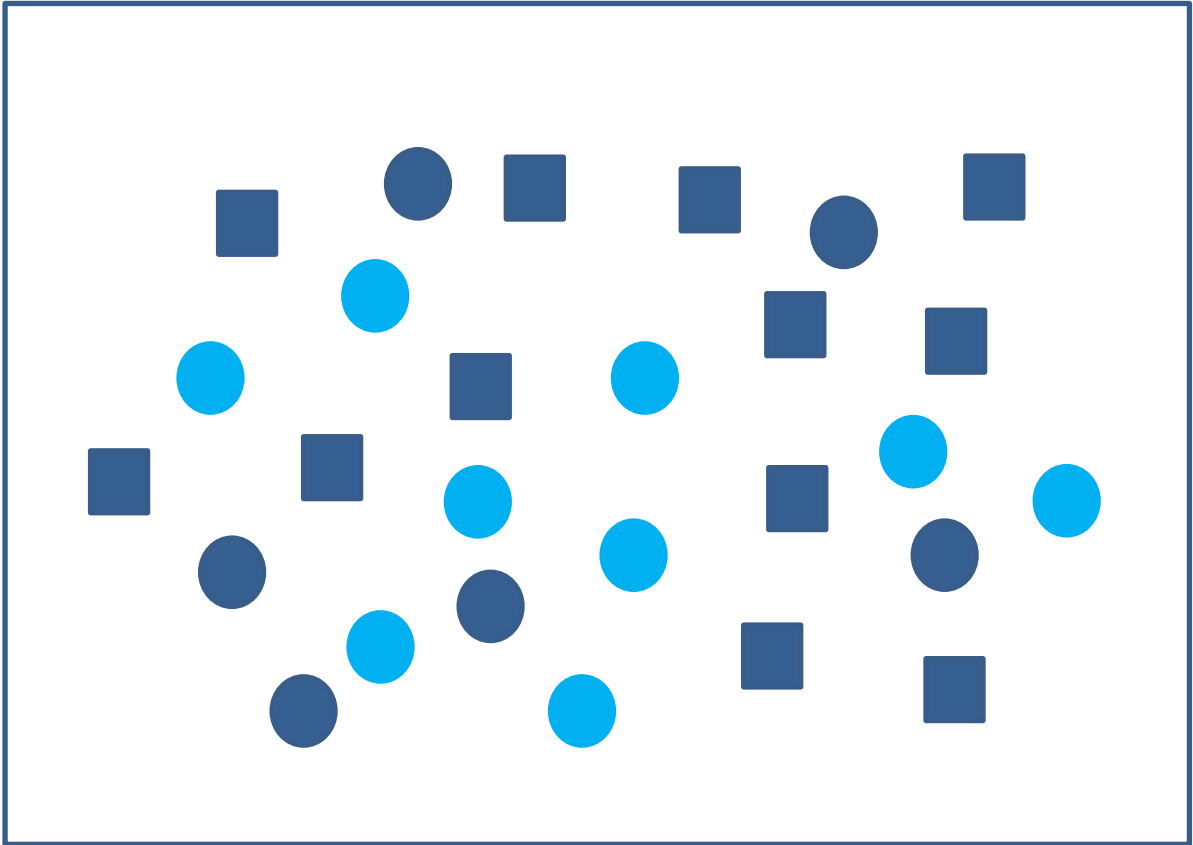
Show image 4



Please enter the number of dark blue circles:

[New page](#)

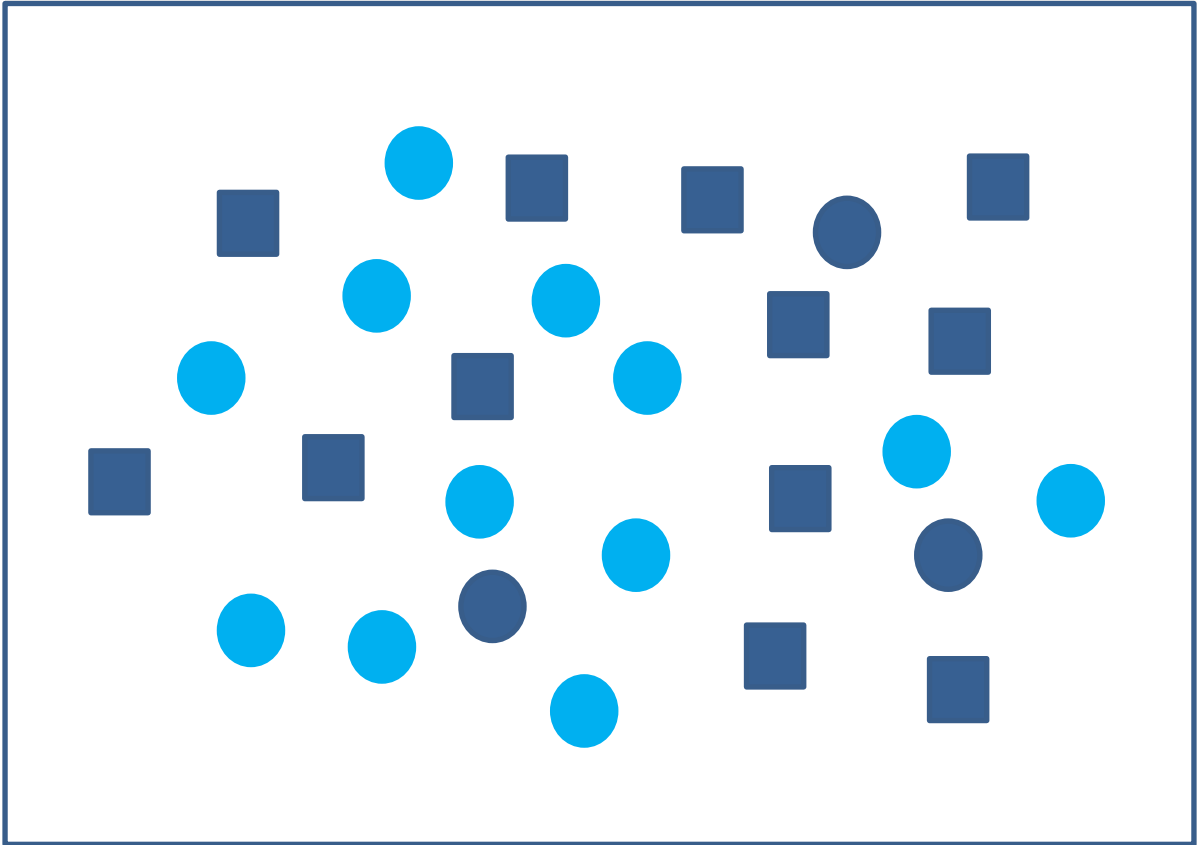
Show image 5



Please enter the number of dark blue circles:

[New page](#)

[Show image 6](#)



Please enter the number of dark blue circles:

[New page](#)

[Show image 7](#)



Please enter the number of dark blue circles:

[New page](#)

Now can you please re-enter the number of dark blue circles for each image in the order that you saw them

Image 1:

Image 2:

Image 3:

Image 4:

[New page](#)

Well done, you counted and recalled the dark blue circles for x out of 4 images correctly

Now, if the three Snack Bars that you were just shown were available, which one would you choose, assuming the price was the same for each one?

(NB: none of these options are currently sold in shops)

SHOW conjoint choice-task 3 – same as one just shown.

New page

Now imagine it is a different occasion and these three Snack Bars are available.

Again please look at the packaging details for these three very similar snack bars. Once you think you have understood the information shown for all three bars, please press next.

(NB: none of these options are currently sold in shops)

SHOW conjoint choice-task 4 (randomly shown from block 1,2, 3, 4)

New page

Word generation task

We would now like to see how quickly you can create different words. Please write down as many words as possible in the next two minutes using only the letters shown. Each letter may only be used once in each word.

ACDGSOUEMTH

Write words in box below:

Show clock counting down from 2 minutes

New page

Now, if the three Snack Bars that you were just shown were available, which one would you choose, assuming the price was the same for each one?

(NB: none of these options are currently sold in shops)

SHOW conjoint choice-task 4 – same as one just shown.

New page

Now imagine it is a different occasion and these three Snack Bars are available.

Again please look at the packaging details for these three very similar snack bars. Once you think you have understood the information shown for all three bars, please press next.

(NB: none of these options are currently sold in shops)

SHOW conjoint choice-task 5 (randomly shown from block 1,2, 3, 4)

New page

Forward Span dissimilar

We are now going to show you a series of words. Each word will appear on the screen for one second. At the end of the sequence, we would like you to tell us the words you have seen. Please do not make any notes to help you.

Show in the middle of the screen for one second

New page

RAIN

New page

SMELL

New page

LIFE

New page

WALK

New page

Now please write down the words in the order in which you saw them.

First word:

Second word:

Third word:

Fourth word:

New page

Well done, you recalled x words correctly

New page

We are now going to show you another series of words. Again, each word will appear on the screen for one second. At the end of the sequence, we would like you to write down the words that you have seen.

Show in the middle of the screen for one second

New page

YAWN

New page

ILL

New page

SMILE

New page

OUTSIDE

New page

DRAW

New page

Now, please write down the words in the order in which you saw them.

First word:

Second word:

Third word:

Fourth word:

Fifth word:

New page

Well done, you recalled x words correctly

New page

We are now going to show you another series of words. Again, each word will appear on the screen for one second. At the end of the sequence, we would like you to write down the words that you have seen.

New page

Show in the middle of the screen for one second

CAR

New page

SHOP

New page

TOOTH

New page

LINE

SPACE

New page

SHOW

New page

Now, please write down the words in the order in which you saw them.

First word:

Second word:

Third word:

Fourth word:

Fifth word:

Sixth word:

New page

Well done, you recalled x words correctly

New page

Now, if the three Snack Bars that you were just shown were available, which one would you choose, assuming the price was the same for each one?

(NB: none of these options are currently sold in shops)

SHOW conjoint choice-task 5 – same as one just shown.

New page

Now imagine it is a different occasion and these three Snack Bars are available.

Again please look at the packaging details for these three very similar snack bars. Once you think you have understood the information shown for all three bars, please press next.

(NB: none of these options are currently sold in shops)

SHOW conjoint choice-task 6 (randomly shown from block 1,2, 3, 4)

New page

Keeping track task

We are now going to show you a series of fifteen words. We would like you to try to keep track of words which are related to “distances” and “countries”. Each word will be shown for one second.

IRON

New page

DOG

New page

GOLD

New page

KILOMETER

New page

FRANCE

New page

INCH

New page

SILVER

New page

CAT

New page

UNCLE

New page

GERMANY

New page

BROTHER

New page

MILE

New page

SISTER

New page

BRONZE

New page

FISH

New page

Could you now write in the last “distance” and “country” words you saw?

Distance:

Country:

New page

Well done, you got x out of 2 right.

New page

We are now going to show you a new series of fifteen words. We would like you to try to keep track of words which are related to “animal” and “car manufacturers”. Each word will be shown for one second.

EGG

New page

FORD

New page

DOG

New page

GOLD

New page

SILVER

New page

AUDI

New page

CAT

New page

UNCLE

New page

GOAT

New page

BROTHER

New page

BMW

New page

SISTER

New page

BRONZE

New page

COW

New page

PENCIL

New page

Could you now write in the last “Animal” and “Car brand” words you saw?

Animal:

Car brand:

New page

Well done, you got x out 2 right.

Now, if the three Snack Bars that you were just shown were available, which one would you choose, assuming the price was the same for each one?

(NB: none of these options are currently sold in shops)

SHOW conjoint choice-task 6 – same as one just shown.

New page

Now imagine it is a different occasion and these three Snack Bars are available.

Again please look at the packaging details for these three very similar snack bars. Once you think you have understood the information shown for all three bars, please press next.

(NB: none of these options are currently sold in shops)

SHOW conjoint choice-task 7 (randomly shown from block 1,2, 3, 4)

New page

Random word checker.

We are now going to show you a collection of words for 15 seconds. Please try to memorise as many as you can.

Show the following words on the screen at the same time for 15 seconds

PET, LINE, GRASS, GATE, RADIO, PEN, MILK, ORANGE, EAR, SOUP, SHEEP, DAD.

New page

We are now going to show you a series of words. For each one, we would like you to indicate if the word was in the group of words you have just been asked to memorise.

New page

PEN Yes/ No

New page

DOG Yes/ No

New page

CUP Yes/ No

New page

MILK Yes/ No

New page

EAR Yes/ No

New page

AIR Yes/ No

New page

ROSE Yes/ No

New page

SOUP Yes/ No

New page

MUM Yes/ No

New page

GATE Yes/ No

New page

GREEN Yes/ No

New page

GOAT Yes/ No

New page

Well done, you correctly spotted x out 5 words .

New page

Now, if the three Snack Bars that you were just shown were available, which one would you choose, assuming the price was the same for each one?

(NB: none of these options are currently sold in shops)

SHOW conjoint choice-task 7 – same as one just shown.

New page

Finally we would like to understand a little more about you...

S1 First of all, how old are you?

RECORD ACTUAL AGE AND CODE INTO GROUPS 18-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75+

S2 Are you...?

SINGLE CODE

Male	1
Female	2

S3 Where do you live?

SINGLE CODE

East Midlands	1	Midlands
East of England	2	Eastern
London	3	London
North East	4	North
North West	5	North
Scotland	6	Scotland
South East	7	Eastern
South West	8	South
Wales/Cymru	9	Wales

West Midlands	10	Midlands
Yorkshire and the Humber	11	North
Northern Ireland	12	NI

S4a **Other than yourself, many people live in your household? ____**

S4b **What is your relationship with each of these members? (Drop down provided for each member)**

1. Spouse, Civil or Cohabiting partner
2. Son/daughter/other dependent (under 18)
3. Adult children/children in-law
4. Parent/guardian
5. Young sibling (under 18)
6. Adult sibling/ sibling in-law
7. Grand-child
8. Grand-parent
9. Other relative
10. Housemate / Co-habiting Friend
11. Other non-relative

S5. **How many children do you have? ____**

B How old are each of your children? (Provide number of boxes related to answer above).

S6 **Are you responsible for the food and grocery shopping in your household?**

SINGLE CODE

Yes – I am solely responsible for the household shopping	1
Yes – I am jointly responsible for the household shopping	2
No	3

S7 Please indicate below which occupational group the chief income earner in your household belongs to, or which group fits best.

This could be you: the Chief Income Earner is the person in your household with the largest income.

If the Chief Income Earner is retired and has an occupational pension please answer for their most recent occupation.

If the Chief Income Earner is not in paid employment but has been out of work for less than 6 months, please answer for their most recent occupation.

Please select one answer only

Semi or unskilled manual work (e.g. Manual workers, all apprentices to skilled trades, Caretaker, Park keeper, non-HGV driver, shop assistant)	1	
Skilled manual worker (e.g. Skilled Bricklayer, Carpenter, Plumber, Painter, Bus/ Ambulance Driver, HGV driver, AA patrolman, pub/bar worker, etc.)	2	
Supervisory or clerical/ junior managerial/ professional/ administrative (e.g. Office worker, Student Doctor, Foreman with 25+ employees, salesperson, etc.)	3	
Intermediate managerial/ professional/ administrative (e.g. Newly qualified (under 3 years) doctor, Solicitor, Board director small	4	

organisation, middle manager in large organisation, principal officer in civil service/local government)		
Higher managerial/ professional/ administrative (e.g. Established doctor, Solicitor, Board Director in a large organisation [200+ employees], top level civil servant/public service employee)	5	
Student	6	
Casual worker – not in permanent employment	7	
Housewife/ Homemaker	8	
Retired and living on state pension	9	
Unemployed or not working due to long-term sickness	10	
Full-time carer of other household member	11	
Other	12	
Prefer not to say	13	

S8 And do you own any pets?

SINGLE CODE

Yes	1
No	2

If no, skip to S10

S9 If yes, which pets do you own, please indicate how many of each?

Dogs	
Cats	
Rabbits, gerbils, hamsters, mice or other similar animals	
Other	

Skype	
Facebook	
YouTube	
Google	
Instagram	
Snapchat	
Flickr	
Tumblr	
Twitter	
Pinterest	
LinkedIn	
Other (please write)	

S10 What is your residential status of your household?

Owner-occupier
Privately renting
Tenancy of government-owned accommodation

S11 How many cars do you currently own and use in your household? ____

S12a Which, if any, of the following websites or applications do you use?

S12b From where do you get most of your information about health and wellness

Friends and family	
TV/ Radio	
YouTube	
Google	
Bloggers	
Other (please write)	

S13 Do you ever use your mobile phone for any of the following?

MULTI-CODE

Send or receive emails	1
Take pictures	2
Record video	3
Access the internet	4
Access a social networking site like Facebook, LinkedIn or Twitter	5
Don't have a mobile phone	7

S13 And finally what did you think of this survey?

Excellent

Very good

Good

Fair

Neither fair nor poor

Poor

Very poor

S14 And do you have any comments about the survey?

Write in

That's it for now!

Thank you for completing this part of the survey.

You will receive an e-mail containing a link for the next part of this survey within 24-48 hours of clicking the next button below. We hope you are able to continue to participate.

Stage 2

Thank you for continuing to participate. This is the shortest of the three surveys. You will notice that the questions are very similar to last time, but please answer them carefully.

Use conjoint-tasks 8-14.. Make the wording for the first question match the wording from first question of the original deck

Task8 N-back task

Letters: G, F, R, M, O , A, B, Y, L, C, Q, J

Task9: Reading span task

I often go for a walk on a Sunday afternoon. LOFT

The cricket team cheered when Sanjay scored the winning runs. NOSE

The band played on despite the rain. SONG

Did Sanjay win the cricket match? YES/ NO

Mike loved to fly his kite, especially when it was really windy. FOOD

Sue arrived 5 minutes early for her meeting. WHALE

It was hard work cycling up the hill, but easy on the way down. HEN

The traffic was stationary for over 15 minutes. CUP

Was Sue late for her meeting? Yes/ No

Task 10 : Counting span black shapes (see attached power point)

Task 11: Word generation task

JAOIKMSEUYFL

Task 12 Forward Span similar

DOG

BOG

LOG

JOG

WINE

PINE

MINE

SLIME

CHIME

GUN

RUN

FUN

SUN

PUN

BUN

Task 13 Backward Span dissimilar

We are now going to show you a series of words. Each word will appear on the screen for one second. At the end of the sequence, we would like you to tell us the words you have seen IN THE REVERSE ORDER IN WHICH THEY WERE PRESENTED. So if you were shown ROOM, MOAT and POLE, you would write POLE, MOAT and ROOM.

Please do not make any notes to help you.

Show in the middle of the screen for one second

New page

PILL

New page

RAIN

New page

PEN

New page

Now please write down the words in the order in the reverse order in which they were presented.

Third word:

Second word:

First word:

Well done, you got x out 3 right.

New page

We are now going to show you another series of words. Each word will appear on the screen for one second. At the end of the sequence, we would like you to tell us the words you have seen in the reverse order in which they were presented. Please do not make any notes to help you.

Show in the middle of the screen for one second

New page

BIKE

New page

GYM

New page

OIL

New page

SOCK

New page

Now please write down the words in the order in the reverse order in which they were presented.

Fourth word:

Third word:

Second word:

First word:

Well done, you got x out 4 right.

We are now going to show you another series of words. Each word will appear on the screen for one second. At the end of the sequence, we would like you to tell us the words you have seen in the reverse order in which they were presented. Please do not make any notes to help you.

Show in the middle of the screen for one second

New page

BOAT

New page

BALL

New page

SNAIL

New page

TOY

New page

MUG

New page

Now please write down the words in the order in the reverse order in which they were presented.

Fifth word:

Fourth word:

Third word:

Second word:

First word:

Task 14 Random word checker.

KNIFE, BALL, FINGER, ANT, NEST, PAINT, WORM, LIME, BRUSH, FISH, OCEAN, SALT

FORK

GRASS

WORM

CHAIR

OCEAN

TOE

NEST

PAINT

BUS

SUN

ANT

THUMB

S13 And finally what did you think of this survey?

Excellent

Very good

Good

Fair

Neither fair nor poor

Poor

Very poor

S14 And do you have any comments about the survey?

Write in

That's it for now!

Thank you for completing this part of the survey.

You will receive an e-mail containing a link for the next part of this survey within 24-48 hours of clicking the next button below. We hope you are able to continue to participate.

Stage 3

Thank you for continuing to participate. This is the last of the three surveys. You will again notice that the questions are very similar to last time, but please answer them carefully.

Use conjoint-tasks 15-21.. Make the wording for the first question match the wording from first question of the original deck

Task15 N-back task

Letters: S,O,I,M,Z,X,B,A,J,Q,P,U,N

Task16: Reading span task

The sun shone brightly on the sea as the tide went out. HAIR

Jo scored the winning goal just before the referee blew his whistle. LAMP

The children laughed they walked to school. SOCK

Was the tide coming in or going out? IN/ OUT

Once the airplane took off, William was able to relax. PEG

The flower's petals swayed in the breeze as the bee approached. SALT

Leah had to wait in the queue for nearly forty-five minutes before she could enter the stadium. PILL

The concert could be heard from over a mile away. TIE

How long did Leah have to wait in the queue? Minutes

Task 17 : Counting span purple shapes (see attached power point)

Task 18: Word generation task

AKLVOUSCTIPE

Task 19 Forward Span similar

PEACH

BEACH

REACH

TEACH

CAR

FAR

BAR

JAR

TAR

TOP

POP

MOP

FLOP

CHOP

HOP

Task 20 Backward Span dissimilar

SWEET

SPADE

SLIME

VAN

FOX

BAG

FROG

HILL

SHOE

TEA

ICE

FOG

Task 21 – Comma counter

Thank you for getting this far. We hope you have enjoyed the various exercises that we have asked you to complete.

You may, by this stage, be wondering what we have been trying to achieve, so we think it is only fair that we explain a little more about the purpose of the research. The research has been designed to understand two things:

- What nutritional information is most important to you when choosing a snack bar?
- How your choices are affected when you mind is given a few minutes to consider the options available.

We will be able to understand the first question by analysing the way you have answered the twenty questions about snack bars. We hope that the “games” that you have answered will, as well as making the survey more entertaining, have given you mind an opportunity think about your choices.

The final game we would like you to complete, is simply to count the number of full stops we have used on this page.

Number of full stops on this page:

S13 And finally what did you think of this survey?

Excellent

Very good

Good

Fair

Neither fair nor poor

Poor

Very poor

S14 And do you have any comments about the survey?

Write in

That's it! You have finished!

Thank you for your help.

Your 600 XXXXX points will appear in your account asap. We are very grateful for your help and support. Please click "next" to submit your answers.

Appendix F – Additional Analysis

Table 6-1 - Demographics of people who started survey based on panel information

	Sample A	Sample B	Sample C
	20016	4141	16828
Age			
18-24	6.10%	7.5%A	7.4%A
25-34	15.90%	17.9%A	17.9%A
35-44	17.70%	18.90%	19%A
45-54	19.80%	19.20%	19.70%
55-64	20.3%A	19.60%	19.00%
65-74	15.1%BC	12.90%	13.10%
75+	4.3%BC	2.90%	3.00%
N/A	0.90%	1.10%	0.90%
Gender			
Female	63.60%	62.60%	63.80%
Male	36.40%	37.40%	36.20%
Lifestage			
Not Parents	58.40%	58.90%	58.50%
Parents	26.10%	28.7%A	28.5%A
Retirees	15.5%BC	12.40%	13.10%
Acorn Classification			
A	1.00%	1.00%	1.00%
B	13.3%B	11.80%	12.90%
C	10.00%	10.90%	9.90%
D	3.70%	3.40%	3.80%
E	7.20%	7.60%	7.50%
F	6.00%	5.30%	5.80%
G	6.80%	6.90%	7.10%
H	8.90%	9.00%	8.40%
I	2.90%	2.80%	2.80%
J	4.70%	5.00%	4.90%

K	2.50%	2.70%	2.9%A
L	6.80%	6.70%	6.80%
M	6.80%	7.50%	7.00%
N	3.90%	3.40%	3.60%
O	5.00%	5.20%	4.90%
P	5.50%	5.30%	5.80%
Q	3.50%	3.10%	3.40%
U	1.80%	2.20%	1.80%

Results are based on two-sided tests. For each significant pair, the key of the category with the smaller column proportion appears in the category with the larger column proportion.

Significance level for upper case letters (A, B, C): .052

1. This category is not used in comparisons because its column proportion is equal to zero or one.
2. Tests are adjusted for all pairwise comparisons within a row of each innermost subtable using the Bonferroni correction.

Table 6-2 - Profile of initial samples recruited

	Sample A 10,035	Sample B 1,712	Sample C 6,142
Sample Size			
Age			
Under 18	0.2%	0.1%	0.2%
18-24	7.6%	9.8%A	9.5%A
25-34	19.1%	21.8%A	21.2%A
35-44	20.1%	22.2%	21.6%
45-54	20.9%B	18.3%	20.2%
55-64	18.5%C	16.8%	16.6%
65-74	11.4%C	9.8%	8.9%
75+	2.1%B	1.2%	1.8%
Gender			
Male	36.8%C	36.3%	33.3%
Female	63.2%	63.7%	66.7%A
Region			
North	22.2%	23.2%	21.7%
Midlands	16.6%	15.3%	17.3%
South	12.4%	12.4%	12.2%
Wales	3.0%	3.4%	3.1%
London	13.1%	11.9%	14.3%B
NI	2.0%	1.3%	1.9%
Scotland	6.2%	7.1%	5.8%
Eastern	24.4%	25.3%	23.7%
Shopping responsibility			
Yes - I am solely responsible for the household shopping	49.9%	50.4%	50.5%
Yes - I am jointly responsible for the household shopping	43.4%	42.5%	43.7%
No	6.7%	7.1%	5.8%
Social Class			
Semi or unskilled manual work	8.3%	6.9%	8.0%
Intermediate managerial/ professional/ administrative	19.4%	20.7%	19.9%
Higher managerial/ professional/ administrative	8.2%	8.1%	8.2%
Student	2.8%	4.4%A	3.6%A
Casual worker - not in permanent employment	0.7%	0.6%	0.8%
Housewife/ Homemaker	2.0%	1.9%	2.2%
Retired and living on state pension	9.2%C	7.7%	6.7%
Unemployed or not working due to long-term sickness	2.3%	2.0%	1.8%
Full-time carer of other household member	1.0%	1.1%	0.9%
Prefer not to say	7.3%	6.5%	7.5%
Other	6.0%	6.4%	6.2%

Results are based on two-sided tests. For each significant pair, the key of the category with the smaller column proportion appears in the category with the larger column proportion.

Significance level for upper case letters (A, B, C): .05²

1. This category is not used in comparisons because its column proportion is equal to zero or one.

2. Tests are adjusted for all pairwise comparisons within a row of each innermost subtable using the Bonferroni correction.

Table 6-3 - Demographic profile of Samples By stage completed

	Sample A		Sample B		Sample C		
	wave	Stages completed	Stages completed	Stages completed	Stages completed	Stages completed	Stages completed
	1	1,2,3	1,2	1	1,2,3	1,2	1
	10035	816	196	700	2415	649	3078
	A	A	B	C	A	B	C
Age							
Under 18	0.2%	0.0% ¹	0.0% ¹	0.3%	0.2%	0.2%	0.3%
18-24	7.6%	7.4%	9.7%	12.6%A	6.6%	10.5%A	11.6%A
25-34	19.1%	21.6%	18.4%	23.1%	18.6%	18.5%	23.8%A B
35-44	20.1%	20.8%	22.4%	23.7%	20.8%	25.0%	21.4%
45-54	20.9%	17.8%	25.0%C	17.0%	20.9%	20.5%	19.7%
55-64	18.5%	19.1%C	16.3%	14.1%	19.2%C	15.6%	14.8%
65-74	11.4%	11.8%	6.6%	8.4%	11.3%C	8.3%	7.1%
75+	2.1%	1.6%	1.5%	0.7%	2.3%C	1.5%	1.4%
Gender							
Male	36.8%	38.6%	32.7%	34.7%	36.7%B C	30.0%	31.3%
Female	63.2%	61.4%	67.3%	65.3%	63.3%	70.0%A	68.7%A
Region							
North	22.2%	24.9%	20.9%	22.0%	23.3%C	21.7%	20.4%
Midlands	16.6%	15.7%	13.8%	15.3%	17.8%	18.3%	16.7%
South	12.4%	13.8%	11.2%	11.1%	11.9%	13.1%	12.3%
Wales	3.0%	3.4%	4.1%	3.3%	3.4%	2.5%	3.1%
London	13.1%	9.7%	17.3%A	12.9%	12.9%	11.7%	15.9%A B
NI	2.0%	1.2%	3.1%	0.9%	1.6%	2.3%	1.9%
Scotland	6.2%	7.0%	4.1%	8.1%	5.7%	8.0%C	5.5%
Eastern	24.4%	24.3%	25.5%	26.4%	23.4%	22.3%	24.3%
Shopping							
Yes - I am solely responsible for the household shopping	49.9%	51.0%	48.0%	50.3%	52.8%C	49.2%	49.0%
Yes - I am jointly responsible for the household shopping	43.4%	42.5%	45.9%	41.6%	41.7%	46.5%	44.6%
No	6.7%	6.5%	6.1%	8.1%	5.5%	4.3%	6.4%
Working status							
Semi or unskilled manual work	8.3%	8.1%	7.1%	5.4%	8.4%	7.6%	7.8%
Skilled manual worker	12.4%	12.4%	11.2%	14.7%	12.6%	14.3%	12.0%
Supervisory or clerical/ junior managerial/ professional/ administrative	20.4%	20.7%	24.0%	19.3%	21.7%	24.2%	21.2%
Intermediate managerial/ professional/ administrative (19.4%	20.1%	19.4%	21.9%	20.6%	16.9%	20.0%
Higher managerial/ professional/ administrative	8.2%	6.5%	10.7%	9.1%	7.7%	10.5%	8.2%
Student	2.8%	3.3%	4.6%	5.6%	2.3%	3.9%	4.5%A
Casual worker - not in permanent employment	0.7%	0.6%	1.0%	0.6%	0.8%	0.5%	0.8%
Housewife/ Homemaker	2.0%	2.2%	2.0%	1.6%	1.8%	1.5%	2.6%
Retired and living on state pension	9.2%	9.4%C	6.1%	6.0%	8.5%C	6.0%	5.5%
Unemployed or not working due to long-term sickness	2.3%	2.1%	1.5%	2.1%	2.3%	1.2%	1.6%
Full-time carer	1.0%	0.9%	3.1%A C	0.7%	0.8%	1.1%	1.0%
Prefer not to say	7.3%	7.1%	4.6%	6.4%	6.6%	6.3%	8.4%A
Other	6.0%	6.6%	4.6%	6.6%	6.0%	6.0%	6.5%

Results are based on two-sided tests. For each significant pair, the key of the category with the smaller column

1. This category is not used in comparisons because its column proportion is equal to zero or one.

2. Tests are adjusted for all pairwise comparisons within a row of each innermost subtable using the Bonferroni

Table 6-4 - Choice-tasks chosen, split by questionnaire version

		Questionnaire version							
		Version 1		Version 2		Version 3		Version 4	
		Sample A	Sample B	Sample A	Sample B	Sample A	Sample B	Sample A	Sample B
Choice-task 1	1	45.1%	42.6%	38.2%	38.8%	56.0%	61.3%	19.0%	15.3%
	2	43.7%	48.2%	36.5%	34.6%	35.0%	33.8%	8.6%	9.7%
	3	11.2%	9.1%	25.2%	26.6%	9.0%	5.0%	72.4%	75.0%
Choice-task 2	1	9.2%	5.6%	40.6%	38.8%	9.6%	11.9%	14.3%	12.5%
	2	69.4%	71.1%	40.3%	42.6%	16.0%	14.4%	18.2%	19.9%
	3	21.4%	23.4%	19.0%	18.6%	74.3%	73.8%	67.6%	67.6%
Choice-task 3	1	33.2%	24.4%	55.8%	58.0%	27.1%	26.9%	53.7%	46.0%
	2	41.9%	49.2%	27.1%	27.1%	17.2%	18.8%	43.1%	49.4%
	3	25.0%	26.4%	17.1%	14.9%	55.7%	54.4%	3.2%	4.5%
Choice-task 4	1	15.4%	12.7%	4.8%	2.7%	14.2%	11.9%	5.7%	2.3%
	2	68.7%	73.6%	88.8%	91.0%	70.4%	74.4%	69.4%	71.6%
	3	15.8%	13.7%	6.4%	6.4%	15.3%	13.8%	24.9%	26.1%
Choice-task 5	1	55.9%	59.9%	18.6%	18.1%	4.2%	3.8%	38.2%	33.5%
	2	16.4%	13.2%	5.6%	4.3%	83.9%	86.3%	51.9%	57.4%
	3	27.7%	26.9%	75.8%	77.7%	11.9%	10.0%	9.8%	9.1%
Choice-task 6	1	78.8%	83.2%	81.5%	83.0%	64.6%	69.4%	51.7%	57.4%
	2	3.2%	3.6%	7.4%	4.3%	10.1%	5.6%	19.2%	13.6%
	3	18.0%	13.2%	11.1%	12.8%	25.3%	25.0%	29.1%	29.0%
Choice-task 7	1	40.3%	40.6%	23.6%	26.1%	63.0%	63.1%	75.3%	74.4%
	2	9.1%	11.7%	9.2%	10.1%	7.3%	5.0%	7.8%	6.8%
	3	50.6%	47.7%	67.2%	63.8%	29.8%	31.9%	16.8%	18.8%
Choice-task 8	1	5.1%	4.6%	15.1%	18.1%	76.5%	75.0%	3.2%	2.8%
	2	50.0%	42.6%	47.9%	46.3%	17.1%	18.1%	41.0%	35.8%
	3	44.9%	52.8%	37.0%	35.6%	6.4%	6.9%	55.8%	61.4%
Choice-task 9	1	45.4%	49.2%	34.4%	26.1%	3.3%	2.5%	23.1%	13.1%
	2	46.4%	46.7%	32.5%	37.2%	22.5%	23.1%	58.8%	71.0%
	3	8.2%	4.1%	33.2%	36.7%	74.2%	74.4%	18.1%	15.9%
Choice-task 10	1	5.0%	2.0%	28.0%	34.6%	10.5%	12.5%	81.0%	83.5%
	2	77.1%	81.2%	3.2%	3.2%	11.3%	11.9%	2.3%	4.0%
	3	17.9%	16.8%	68.8%	62.2%	78.2%	75.6%	16.7%	12.5%
Choice-task 11	1	12.1%	9.1%	9.1%	7.4%	15.6%	13.8%	15.1%	13.6%
	2	82.8%	88.3%	5.1%	4.3%	70.6%	73.1%	70.4%	73.3%
	3	5.0%	2.5%	85.8%	88.3%	13.8%	13.1%	14.5%	13.1%
Choice-task 12	1	15.1%	13.2%	53.2%	53.7%	27.5%	30.0%	9.7%	8.0%
	2	5.1%	6.6%	22.6%	20.7%	58.9%	56.9%	77.0%	82.4%
	3	79.8%	80.2%	24.2%	25.5%	13.6%	13.1%	13.3%	9.7%
Choice-task 13	1	75.7%	75.1%	71.6%	70.2%	29.6%	33.8%	2.6%	3.4%
	2	20.5%	22.3%	2.8%	2.7%	4.9%	2.5%	74.3%	80.7%
	3	3.8%	2.5%	25.6%	27.1%	65.5%	63.8%	23.1%	15.9%
Choice-task 14	1	46.1%	49.7%	14.8%	11.7%	37.0%	36.9%	24.9%	24.4%
	2	6.7%	5.1%	4.0%	3.2%	11.8%	7.5%	25.7%	27.8%
	3	47.2%	45.2%	81.2%	85.1%	51.2%	55.6%	49.4%	47.7%
Choice-task 15	1	50.4%	45.7%	15.8%	14.9%	76.4%	77.5%	14.9%	18.2%
	2	17.6%	14.7%	70.5%	73.4%	6.3%	5.0%	77.6%	73.9%
	3	32.0%	39.6%	13.7%	11.7%	17.3%	17.5%	7.4%	8.0%
Choice-task 16	1	3.3%	2.0%	90.5%	94.1%	13.1%	10.0%	60.4%	58.0%
	2	70.1%	68.5%	2.7%	2.1%	82.7%	86.3%	28.8%	35.8%
	3	26.6%	29.4%	6.8%	3.7%	4.2%	3.8%	10.8%	6.3%
Choice-task 17	1	61.1%	66.5%	4.6%	3.2%	37.8%	40.0%	42.2%	43.2%
	2	31.1%	23.4%	17.0%	17.0%	18.3%	13.8%	2.3%	0.6%
	3	7.7%	10.2%	78.4%	79.8%	43.9%	46.3%	55.4%	56.3%
Choice-task 18	1	84.8%	90.4%	83.6%	89.9%	12.1%	9.4%	2.6%	2.8%
	2	4.5%	4.1%	3.2%	2.7%	4.0%	0.0%	91.9%	92.6%
	3	10.7%	5.6%	13.2%	7.4%	83.9%	90.6%	5.5%	4.5%
Choice-task 19	1	2.8%	2.0%	5.6%	2.7%	13.4%	9.4%	11.7%	9.1%
	2	92.3%	93.9%	65.5%	75.0%	3.7%	0.6%	69.6%	71.6%
	3	4.9%	4.1%	28.9%	22.3%	82.9%	90.0%	18.7%	19.3%
Choice-task 20	1	24.9%	26.4%	3.1%	2.1%	8.2%	7.5%	23.3%	21.6%
	2	50.5%	44.7%	81.1%	85.1%	70.0%	68.1%	73.9%	76.7%
	3	24.6%	28.9%	15.7%	12.8%	21.7%	24.4%	2.7%	1.7%
Choice-task 21	1	29.3%	35.0%	11.2%	8.5%	49.6%	51.3%	14.1%	11.4%
	2	59.6%	59.4%	59.6%	61.7%	38.5%	38.1%	63.6%	67.0%
	3	11.1%	5.6%	29.2%	29.8%	11.8%	10.6%	22.3%	21.6%

Table 6-5 - Correlations between WM tasks

		Correlations																				
		Reliability_w m1	Reliability_w m2	Reliability_w m3	Reliability_w m4	Reliability_w m5	Reliability_w m6	Reliability_w m7	Reliability_w m8	Reliability_w m9	Reliability_w m10	Reliability_w m11	Reliability_w m12	Reliability_w m13	Reliability_w m14	Reliability_w m15	Reliability_w m16	Reliability_w m17	Reliability_w m18	Reliability_w m19	Reliability_w m20	Reliability_w m21
Reliability_wm1	Pearson Correlation	1	.251 [*]	.223 [*]	.221 [*]	.326 [*]	.188 [*]	.046	.401 [*]	.217 [*]	.225 [*]	.212 [*]	.254 [*]	.313 [*]	.071 [*]	.386 [*]	.216 [*]	.221 [*]	.239 [*]	.239 [*]	.297 [*]	.159 [*]
	Sig. (2-tailed)		0.000	0.000	0.000	0.000	0.000	0.023	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416
Reliability_wm2	Pearson Correlation	.251 [*]	1	.177 [*]	.161 [*]	.299 [*]	.173 [*]	.063 [*]	.222 [*]	.359 [*]	.183 [*]	.161 [*]	.244 [*]	.286 [*]	.115 [*]	.184 [*]	.379 [*]	.183 [*]	.214 [*]	.244 [*]	.319 [*]	.134 [*]
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416
Reliability_wm3	Pearson Correlation	.223 [*]	.177 [*]	1	.172 [*]	.225 [*]	.181 [*]	.073 [*]	.221 [*]	.148 [*]	.328 [*]	.157 [*]	.167 [*]	.246 [*]	.095 [*]	.226 [*]	.176 [*]	.309 [*]	.182 [*]	.169 [*]	.232 [*]	.173 [*]
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416
Reliability_wm4	Pearson Correlation	.221 [*]	.161 [*]	.172 [*]	1	.306 [*]	.170 [*]	.062 [*]	.185 [*]	.151 [*]	.180 [*]	.653 [*]	.216 [*]	.251 [*]	.090 [*]	.194 [*]	.179 [*]	.174 [*]	.637 [*]	.174 [*]	.238 [*]	.170 [*]
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416
Reliability_wm5	Pearson Correlation	.326 [*]	.299 [*]	.225 [*]	.306 [*]	1	.224 [*]	.111 [*]	.293 [*]	.275 [*]	.229 [*]	.264 [*]	.392 [*]	.443 [*]	.153 [*]	.299 [*]	.278 [*]	.233 [*]	.285 [*]	.321 [*]	.442 [*]	.191 [*]
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416
Reliability_wm6	Pearson Correlation	.188 [*]	.173 [*]	.181 [*]	.170 [*]	.224 [*]	1	.103 [*]	.151 [*]	.147 [*]	.153 [*]	.167 [*]	.174 [*]	.216 [*]	.089 [*]	.161 [*]	.168 [*]	.185 [*]	.170 [*]	.168 [*]	.215 [*]	.110 [*]
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416
Reliability_wm7	Pearson Correlation	.046	.063 [*]	.073 [*]	.062 [*]	.111 [*]	.103 [*]	1	0.008	.063 [*]	.098 [*]	.060 [*]	.072 [*]	.063 [*]	.221 [*]	0.039	0.038	.072 [*]	.061 [*]	.078 [*]	.062 [*]	0.027
	Sig. (2-tailed)	0.023	0.002	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.003	0.000	0.002	0.055	0.063	0.000	0.003	0.000	0.002	0.187
	N	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416
Reliability_wm8	Pearson Correlation	.401 [*]	.222 [*]	.221 [*]	.185 [*]	.293 [*]	.151 [*]	0.008	1	.262 [*]	.236 [*]	.215 [*]	.286 [*]	.323 [*]	.073 [*]	.454 [*]	.252 [*]	.236 [*]	.216 [*]	.238 [*]	.281 [*]	.129 [*]
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.686	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416
Reliability_wm9	Pearson Correlation	.217 [*]	.359 [*]	.148 [*]	.151 [*]	.275 [*]	.147 [*]	.063 [*]	.262 [*]	1	.215 [*]	.176 [*]	.320 [*]	.314 [*]	.092 [*]	.237 [*]	.447 [*]	.210 [*]	.198 [*]	.298 [*]	.290 [*]	.130 [*]
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416
Reliability_wm10	Pearson Correlation	.225 [*]	.183 [*]	.326 [*]	.180 [*]	.229 [*]	.153 [*]	.098 [*]	.236 [*]	.215 [*]	1	.194 [*]	.258 [*]	.281 [*]	.129 [*]	.235 [*]	.232 [*]	.373 [*]	.186 [*]	.242 [*]	.274 [*]	.159 [*]
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416
Reliability_wm11	Pearson Correlation	.212 [*]	.161 [*]	.157 [*]	.653 [*]	.264 [*]	.167 [*]	.060 [*]	.215 [*]	.176 [*]	.194 [*]	1	.252 [*]	.262 [*]	.102 [*]	.205 [*]	.203 [*]	.169 [*]	.668 [*]	.209 [*]	.258 [*]	.151 [*]
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416
Reliability_wm12	Pearson Correlation	.254 [*]	.244 [*]	.167 [*]	.216 [*]	.392 [*]	.174 [*]	.072 [*]	.286 [*]	.320 [*]	.258 [*]	.252 [*]	1	.452 [*]	.163 [*]	.287 [*]	.317 [*]	.234 [*]	.254 [*]	.418 [*]	.403 [*]	.164 [*]
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416
Reliability_wm13	Pearson Correlation	.313 [*]	.298 [*]	.246 [*]	.251 [*]	.443 [*]	.216 [*]	.063 [*]	.323 [*]	.314 [*]	.291 [*]	.262 [*]	.452 [*]	1	.169 [*]	.337 [*]	.314 [*]	.297 [*]	.277 [*]	.350 [*]	.485 [*]	.217 [*]
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416
Reliability_wm14	Pearson Correlation	.071 [*]	.115 [*]	.095 [*]	.090 [*]	.153 [*]	.089 [*]	.221 [*]	.073 [*]	.092 [*]	.129 [*]	.102 [*]	.163 [*]	.169 [*]	1	.124 [*]	.111 [*]	.158 [*]	.118 [*]	.150 [*]	.140 [*]	.069 [*]
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
	N	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416
Reliability_wm15	Pearson Correlation	.386 [*]	.184 [*]	.226 [*]	.194 [*]	.299 [*]	.161 [*]	0.039	.454 [*]	.237 [*]	.235 [*]	.205 [*]	.287 [*]	.337 [*]	.124 [*]	1	.309 [*]	.318 [*]	.223 [*]	.322 [*]	.357 [*]	.178 [*]
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416	2416
Reliability_wm16	Pearson Correlation	.216 [*]	.379 [*]	.176 [*]	.179 [*]	.278 [*]	.168 [*]	0.038	.252 [*]	.447 [*]	.232 [*]	.203 [*]	.317 [*]	.314 [*]	.111 [*]	.309 [*]	1	.278 [*]	.270 [*]	.405 [*]	.410 ^{*</}	

Table 6-6 - Sample C Demographic profile of Engaged with WM versus non-Engaged

	Participants who engaged with WM tasks	Participants who did not engaged with WM tasks
	% Importance	% Importance
Age		
Under 18	0.1%	0.1%
18-24	9.7%B	5.0%
25-34	20.4%B	16.8%
35-44	19.6%	21.6%
45-54	20.9%	21.0%
55-64	19.6%	19.4%
65-74	8.6%	13.1%A
75+	1.1%	3.0%A
Gender		
Male	30.0%	38.5%A
Female	70.0%B	61.5%
Region		
North	22.9%	24.1%
Midlands	16.4%	18.6%
South	12.7%	11.4%
Wales	3.4%	3.2%
London	11.8%	13.0%
NI	2.1%	1.4%
Scotland	6.5%	5.1%
Eastern	24.2%	23.0%
Responsibility for Shopping		
Yes - I am solely responsible for the household shopping	51.7%	53.0%
Yes - I am jointly responsible for the household shopping	43.9%	41.2%
No	4.4%	5.8%
Occupation		
Semi or unskilled manual worker	6.2%	9.3%A
Skilled manual worker	10.2%	14.1%A
Supervisory or clerical/ junior managerial/ professional/ administrative	25.0%B	20.3%
Intermediate managerial/ professional/ administrative (e.g. Newly qualified (under 3 years) doctor, Solicitor, Board director)	25.6%B	18.1%
Higher managerial/ professional/ administrative	8.9%	7.0%
Student	3.0%	1.9%
Casual worker - not in permanent employment	0.9%	0.6%
Housewife/ Homemaker	0.6%	2.2%A
Retired and living on state pension	5.4%	10.1%A
Unemployed or not working due to long-term sickness	2.0%	2.6%
Full-time carer of other household member	0.5%	1.0%
creation Prefer not to say	6.0%	6.7%
Other	5.9%	6.1%

Appendix G –Inclusion/ Exclusion Criteria Of 200 Papers Selected Based on Abstracts and Titles

Author	Year	Title	Reasons for inclusion					Reasons for exclusion			
			Describes theory about how the subconscious mind may function	Describes techniques or methodologies to understand the subconscious mind or latent needs	Approach to understanding the subconscious mind can be applied in the context of market research	Describes method to identify unmet needs	Describes new ways to interpret market research data	insufficient specific details to be of use	No specific data collection technique explored	Insights not relevant to understanding hidden needs	Too old
J. L. Aaker	1997	The Effect of Cultural Orientation on Persuasion							x		
J. Abernethy, T. Evgeniou, O. Toubia and J.-P. Vert	2008	Eliciting consumer preferences using robust adaptive choice questionnaires								x	
I. Addie	2011	Is neuroscience facilitating a new era of the hidden persuader?								x	
F. H. Alpert and M. A. Kamins	1995	An empirical investigation of consumer memory, attitude, and perceptions toward pioneer								x	
D. F. Alwin and J. A. Krosnick	1985	The measurement of values in surveys: A comparison of ratings and rankings								x	
K. Anderson	2009	Ethnographic Research: A Key to Strategy						x			
R. P. Bagozzi, M. Gopinath and P. U. Nyer	1999	The role of emotions in marketing								x	
J. D. Bailey	2007	Turning tacit knowledge into explicit knowledge: An ethnographic study of explicitation in an it setting						x			
J. F. M. H. Bairrão and J. F. Miguel Henriques	2011	About the Other, ethnographic and in psychoanalysis						x			

Author	Year	Title	Reasons for inclusion					Reasons for exclusion				
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Bairrão												
N. M. Balchin	1933	A psychological approach to market research										x
S. Ballesteros, L.-G. G. L.-G. Nilsson and P. Lemaire	2009	Ageing, cognition, and neuroscience: An introduction								x		
H. Barrett	1996	Ultimate goal is to anticipate the needs of market							X			
F. Bassi	2011	Latent class analysis for marketing scale development							x			
H. M. Baum	1990	You Need To 'Press The Flesh' To Get Close To Consumers							X			
D. I. Baxter, K. Goffin and M. Szejcowski	2014	The Repertory Grid Technique as a Customer Insight Method		X					X			
S. Beckhaus, S. L. Brugger, K.	2012	Collect and map it all: The artifact map, a tool for complex context analysis							x			
B. C. Beliveau	1984	Theoretical and Empirical Aspects of Implicit Information in the Market for Life Insurance									x	
R. P. Bentall	1996	At the centre of a science of psychopathology? Characteristics and limitations of cognitive research							x	x		
G. Berstell and D. Nitterhouse	1999	Tell me a story: Using case studies to discover unmet needs		x					x			

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F. Böcker	1988	Scale Forms and Their Impact on Ratings' Reliability and Validity								x	
J. Bond and L. Morris	2003	A class of its own : Latent Class Segmentation and its implications for qualitative segmentation r		x							
D. A. Booth and R. P. J. Freeman	2014	Mind-reading versus neuromarketing: How does a product make an impact on the consumer?			x						
P. A. Boozer	2010	A social, cognitive, neuroscience observation of racial prejudice						x		x	
R. L. Boring	2005	Cognition and psychological scaling: Model, method, and application of constrained scaling								x	
J. C. Bove, J. Tumolo and I.	2012	Market research: A key component in developing products that meet customer's needs								x	
L. A. Brannon and S. Kannan	2004	Review of How Customers Think: Essential Insights into the Mind of the Market						x			
K. A. Braun-LaTour, G. M. Zinkhan	2007	Using childhood memories to gain insight into brand meaning					x				
S. H. Britt	1950	The strategy of consumer motivation									x
S. Brown	2005	I can read you like a book! Novel thoughts on consumer behaviour							x	x	
S. Brown	2007	Model behavior						x		x	

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F. Byrne	2005	Make it snappy The best decisions are often made on gut instinct - or using "rapid cognition", as the author of The Tipping Point identifies it in his new book. Just don't call it intuition								x	
B. J. Calder	1975	THE COGNITIVE FOUNDATIONS OF ATTITUDES: SOME IMPLICATIONS FOR MULTI-ATTRIBUTE MODELS								x	
M. Callingham and T. Baker	2002	We know what they think, but do we know what they do?								x	
G. Calvert, E. Fulcher, G. Fulcher, P. Foster and H. Rose	2014	Using implicit methods to develop an objective measure of media brand engagement	x	x							
T. E. Caruso	1986	'Hypothesis-Free Research' Needed to Avoid Marketing to Stereotypes						x			
P. Cattin and D. R. Wittink	1982	Commercial Use of Conjoint Analysis: A Survey								x	
P. Chandon, J. W. Hutchinson, E. T. Bradlow and S. H. Young	2008	Measuring the value of point-of-purchase marketing with commercial eye-tracking data			x						
P. Chandon, V. G. Morwitz and W. J. Reinartz	2005	Do intentions really predict behavior? Self-generated validity effects in survey research								x	
H. H. Chang and M. T. Pham	2013	Affect as a decision-making system of the present								x	

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A. Clegg	2001	Talk among yourselves								x	
L. G. Cooper	1983	A review of multidimensional scaling in marketing research								x	
R. G. Cooper and A. Dreher	2010	voice-of-customer Methods		x	x						
M. Crabbe, B. Jones and M. Vandebroek	2013	Comparing Two Stage Segmentation Methods for Choice Data with a One Stage Latent Class Choice Analysis							x		
R. Croft	1992	How to Minimise the Problem of Untruthful Response								x	
M. Davern, T. Shaft and D. Te'eni	2012	Cognition Matters: Enduring Questions in Cognitive IS Research								x	
H. L. Davis, S. P. Douglas and A. J. Silk	1981	Measure Unreliability - a Hidden Threat to Cross-National Marketing Research								x	
J. Dawes and B. Reva Berman	2000	Post-modern marketing: research issues for retail financial services						x			
G. De Young	1997	Listen, then design						x			
K. Deal	2000	Latent Class Analysis: Latent GOLD 2.0 vs. GLIMMIX 2.0								x	
K. Deal	2004	Show It in a Graph								x	

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M. A. Dempsey and A. A. Mitchell	2010	The influence of implicit attitudes on choice when consumers are confronted with conflicting attribute information		x							
A. S. DeNisi and R. D. Pritchard	1978	Implicit theories of performance as artifacts in survey research: A replication and extension								x	
J. M. Denstadli and R. Lines	2007	Conjoint respondents as adaptive decision makers					x				
W. S. DeSarbo, S. J. Blanchard and S. Atalay	2009	A new spatial classification methodology for simultaneous segmentation, targeting, and positioning (stp analysis) for marketing research						x			
S. J. Devlin	2003	The Science of Scale Interpretation						x			
U. M. Dholakia	2014	Three Senses of Desire in Consumer Research								x	
C. V. Dimofte	2010	Implicit measures of consumer cognition: A review	x								
N. Djokic, S. Salai, R. Kovac-Znidarsic, I. Djokic and G. Tomic	2013	The Use of Conjoint and Cluster Analysis For Preference-Based Market Segmentation								x	
D. W. Dove and E. L. Bachelder	1990	Matching Product Features With Customer Needs						x		x	
C. Driesener and J. Romaniuk	2006	Comparing methods of brand image measurement								x	

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L. Dumenci	2011	The Psychometric Latent Agreement Model (PLAM) for Discrete Latent Variables Measured by Multiple Items									x		
L. Dunn and J. Hoegg	2014	The impact of fear on emotional brand attachment										x	
J. F. Durgee and I. E. M. Society	2001	Qualitative methods for identifying latent needs for new consumer technologies							x				
C. S. Dweck	2007	Implicit Theories: Implications for Consumer Behavior							x				
H. Edwards	2013	Observe, understand, disrupt - how to reap the strategic rewards of ethnography for your brand							x				
Y. D. Edwards and G. M. Allenby	2003	Multivariate analysis of multiple response data										x	
D. M. Ennis and J. Bi	1999	The Dirichlet-Multinomial model: Accounting for inter-trial variation in replicated ratings										x	
S. Feiereisen, V. Wong and A. J. Broderick	2013	Is a Picture Always Worth a Thousand Words? The Impact of Presentation Formats in Consumers' Early Evaluations of Really New Products (RNPs)										x	
D. Florin, B. Gallen, M. Pratzel,	2007	Harnessing the power of consumer insight						x					
M. R. Forehand and A. Perkins	2005	Implicit assimilation and explicit contrast: A set/reset model of response to celebrity voice-overs		x									
D. Formosa	2010	Why marketing research makes us cringe									x	x	

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J. L. Fosshage	2005	The explicit and implicit domains in psychoanalytic change	x	x								
G. R. Foxall and V. K. Wells	2012	Developments in consumer behaviour							x			
M. Friese, W. Hofmann and M. Wänke	2009	The impulsive consumer: Predicting consumer behavior with implicit reaction time measures		x								
W. A. K. Frost and R. L. Braine	1967	THE APPLICATION OF THE REPERTORY GRID TECHNIQUE TO PROBLEMS IN MARKET RESEARCH										x
R. Furlan and G. Turner	2014	Maximum difference scaling Exploring the impact of design elements on results									x	
G. L. Geissler	2014	Bringing marketing research to life via secret shopping						x				
R. Gillett	1991	The Top-Box Paradox									x	
K. Goffin and F. Lemke	2004	Uncovering your customer's hidden needs		x								
K. Goffin, C. J. Varnes, C. van der Floven, U. Koners, C. Van Der Hoven and U. Koners	2012	Beyond the Voice of the Customer: Ethnographic Market Research		x								
A. Goode	2007	The implicit and explicit role of ad memory in ad persuasion: Rethinking the hidden persuaders									x	
P. E. Green, F. J. Carmone and D.	1976	Consumer Segmentation Via Latent Class Analysis									x	

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P. Wachspress											
K. Greengrove	2002	Needs-based segmentation : principles and practice									x
E. A. Greenleaf	1992	Improving Rating-Scale Measures by Detecting and Correcting Bias Components in Some Response Styles									x
A. P. Gregg and J. Klymowsky	2013	The Implicit Association Test in Market Research: Potentials and Pitfalls		x							
A. P. Gregg, J. Klymowsky, D. Owens and A. Perryman	2013	Let their fingers do the talking? Using the Implicit Association Test in market research		x							
T. Gurley, S. Lin and S. Ballou	2005	Consumer decision process modeling: How leaders can better understand buyers' choices									x
A.-W. Harzing, J. Baldeza,	2009	Rating versus ranking: What is the best way to reduce response and language bias in cross-national research?									x
R. P. Heath	1995	Fuzzy results, fuzzy logic						x			
J. Heinonen	2014	Companied conjoint analysis and fMRI technique		x							
J. W. Hicks and R. L. Kohls	1955	MEMOMOTION STUDY AS A METHOD OF MEASURING CONSUMER BEHAVIOR									x
D. Hill	2003	To connect with lies: Using science to connect with consumers	x								

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S. E. Hoeffler and J. R. L. J. G. Bettman Jr	2000	Measuring preferences and positioning really new products									x	
H. Hruschka	1988	Estimation of Structural Equation Models with Qualitative Manifest Variables in Marketing Research by Using Latent Structure-Analysis									x	
M. Hubert, M. Hubert, J. Sommer and P. H. Kenning	2009	Consumer neuroscience the effect of retail brands on the perception of product packaging									x	
M. Hubert and P. Kenning	2008	A current overview of consumer neuroscience						x			x	
L. A. Hudson and J. L. Ozanne	1988	Alternative Ways of Seeking Knowledge in Consumer Research									x	
E. J. Johnson, M. T. Pham and G. V. Johar	2007	Consumer behavior and marketing										
W. A. Kamakura and R. K. Srivastava	2004	ADAPTING LATENT TRAIT THEORY FOR ATTITUDE SCALING									x	
F. R. Kardes, P. M. Herr and J. Nantel	2005	Applying social cognition to consumer-focused strategy									x	
P. H. Kenning and H. Plassmann	2008	How neuroscience can inform consumer research			x							
N. D. Kieruj and G. Moors	2013	Response style behavior: question format dependent or personal style?									x	

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K. Kim and R. S. Wyer Jr	2004	The Role of Unconscious Processes in Consumer Choice and Decision Making						x			
M. Koller, T. Salzberger and C. Himmer	2010	Eye-tracking analysis as a complementary technique to psychometric scale analysis - The case of evaluating different answer formats								x	
A. J. Kover	1995	Copywriters Implicit Theories of Communication - an Exploration								x	
A. La Rocca, A. Mandelli, I. Snehota, A. L.	2014	Netnography approach as a tool for marketing research: the case of Dash-P&G/TTV								x	
D.-H. Lee and 최순화	2005	Qualitative Research Methods based on a Classification of Consumer Needs								x	
J. L. Leon and E. Olabbari	1993	The validity of consumer predicting variables used in marketing research								x	
S. J. Levy and C. H. Kellstadt	2012	Integrating: A multi-method approach to situational analysis							x	x	
M. Light and W. Greiff	2002	Statistical models for the induction and use of selectional preferences							x		
G. A. B. Lima and K. S. Raghavan	2004	Information retrieval and cognitive research							x		
A. Litt, D. M. Pirouz and B. Shiv	2012	Neuroscience and addictive consumption							x		

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D. Littler and C. Tynan	2005	Where are we and where are we going? The status and future of research in marketing								x	
J. Macht	1998	The new market research						x			
S. B. MacKenzie	2001	Opportunities for improving consumer research through latent variable structural equation modeling								x	
S. Madhavaram and R. Appan	2010	The potential implications of web-based marketing communications for consumers' implicit and explicit brand attitudes: A call for research							x		
B. Mangan	1993	Taking Phenomenology Seriously: The "Fringe" and Its Implications for Cognitive Research								x	
A. S. R. Manstead	2008	Research methods in social psychology								x	
C. Marie-Cecile, L. Dube, B. Knauper,	2003	Implicit and Explicit Influences on Spontaneous and Deliberate Food Choices								x	
M. Mas-Machuca, M. Sainz and C. Martinez-Costa	2014	A review of forecasting models for new products								x	
V. Matthews	2003	How to dig deeper into the consumer mind: Increasingly sophisticated techniques are being used to go beyond the usual questionnaire and find out what people really think, says Virginia Matthews						x			

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C. G. McCusker	2001	Cognitive biases and addiction: An evolution in theory and method									x	
W. S. McDowell and S. J. Dick	2013	The marketing of neuromarketing: Brand differentiation strategies employed by prominent neuromarketing firms to attract media clients									x	
D. McGregor	1940	'MOTIVES' AS A TOOL OF MARKET RESEARCH										
S. Mennell	1979	THEORETICAL CONSIDERATIONS ON THE STUDY OF CULTURAL 'NEEDS'									x	
A. P. Mew	1982	Don't ignore unconscious mind when conducting research. (cover story)							x			
E. Michaels Hollander	2003	Expanding consciousness through speech and spoken language: A study in human communication theory									x	
D. G. Mick	1986	Consumer research and semiotics: Exploring the morphology of signs, symbols, and significance						x				
J. Mimica	2009	Phenomenological psychoanalysis: The epistemology of ethnographic field research									x	
A. Mitchell	2007	Recent Research on Implicit Motivation									x	
A. A. Mitchell	2004	Implicit Measures of Consumer Judgements and Choice									x	
B. Mittal	1993	Testing Consumer Behavior Theories - Lisrel Is Not a Panacea									x	

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G. Moors	2008	Exploring the effect of a middle response category on response style in attitude measurement									x	
G. Moors	2010	Ranking the ratings: A latent class regression model to control for overall agreement in opinion research									x	
G. Morse	2002	Hidden Minds					x					
G. B. Moskowitz and S. Kai	2007	Unconscious Goals and Creativity: Activating Creativity Goals Breaks Established Associations and Leads to the Generation of Original Ideas							x			
H. Moskowitz, A. Gofman and J. Beckley	2006	Using high-level consumer research methods to create a tool-driven guidebook and database for product development and marketing									x	
H. R. Moskowitz	2005	Thoughts on subjective measurement, sensory metrics and usefulness of outcomes									x	
H. R. Moskowitz, A. Gofman, J. Beckley and H. Ashman	2006	Founding a new science: Mind genomics									x	
G. Mouzakitis		Since everybody needs needs analysis why do we fail to investigate?									x	
S. Mueller and C. Rungie	2009	Is there more information in best-worst choice data?									x	

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J. S. Nevid	2010	Introduction to the Special Issue: Implicit Measures of Consumer Response-The Search for the Holy Grail of Marketing Research		x								
T. M. Newcomb and W. W. Charters Jr	1950	The Measurement of Attitudes										x
E. Norman	2010	The unconscious in current psychology	x									
M. R. E. Normile	1979	The State of New Product Market Research in the USA Compared with Europe									x	
R. Ohme and M. Matukin	2012	A Small Frog That Makes a Big Difference Brain Wave Testing of TV Advertisements		x								
S. Oliver, R. Milne, J. Bradburn, P.	2001	Involving consumers in a needs-led research programme: a pilot project									x	
M. L. Oliveras and V. Albanese	2012	Ethnomathematics in braiding crafts: A methodological model for research									x	
S. Oskamp and P. W. Schultz	2004	Attitudes and opinions: Third edition									x	
G. Page	2012	Scientific realism: what 'neuromarketing' can and can't tell us about consumers		x								
A. L. Penenberg	2011	THEY HAVE HACKED YOUR BRAIN							x			
L. Peng and A. Finn	2008	Concept testing: The state of contemporary practice									x	
D. Penn	2006	Looking for the emotional unconscious in							x			

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		advertising										
C. A. Perfetti, Y. Liu and L. H. Tan	2002	How the mind can meet the brain in reading: A comparative writing systems approach									x	
A. Perkins, M. Forehand, A. Greenwald and D. Maison	2008	Measuring the non-conscious: Implicit social cognition in consumer behavior		x								
A. W. Perkins and M. R. Forehand	2012	Implicit Self-Referencing: The Effect of Nonvolitional Self-Association on Brand and Product Attitude									x	
T. K. Perrachione and J. R. Perrachione	2008	Brains and brands: Developing mutually informative research in neuroscience and marketing									x	
K. Peter, P. Hilke, A. Dieter, P.	2007	Applications of functional magnetic resonance imaging for market research		x								
J. Pincus	2004	The consequences of unmet needs: The evolving role of motivation in consumer research		x								
N. A. Pop, A. M. Iorga and C. Pelau	2013	Using Neuromarketing Studies to Explore Emotional Intelligence - as a key to the Buying Decision Process									x	
N. M. Puccinelli	2002	Implicit measures as effective market research tools		x								
L. L. Putnam	1994	Productive conflict: Negotiation as implicit coordination									x	

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T. Raykov and R. J. Calantone	2014	The utility of item response modeling in marketing research								x	
M. Reimann, O. Schilke, B. Weber, C. Neuhaus and J. Zaichkowsky	2011	Functional magnetic resonance imaging in consumer research: A review and application		x							
R. Reynolds	1980	Survey Design						x		x	
P. Riefler and A. Diamantopoulos	2007	Consumer animosity: a literature review and a reconsideration of its measurement								x	
B. C. Robertson and F. R. Kardes	2001	The impact of unexpected advertising tactics on source versus product evaluations: A conceptual model and empirical test								x	
L. S. Rohani, M. Aung and K. Rohani	2014	One step closer to the field: Visual methods in marketing and consumer research								x	
T. Rose	2011	Selling to the subconscious? Neuromarketing's NeuroFocus springs to mind									
P. E. Rossi, Z. Gilula and G. M. Allenby	2001	Overcoming Scale Usage Heterogeneity: A Bayesian Hierarchical Approach								x	
M. Rotte and E. Duzel	2000	New developments in cognitive research using functional MRI						x			
C. Ruangguttamanun	2014	Neuromarketing: I put myself into a fMRI scanner and realised that I love Louis Vuitton ads						x			

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L. Ryals and H. Wilson	2005	Experimental methods in market research - From information to insight								x	
H. Salamon	2002	Between conscious and subconscious: Depth-to-depth communication in the ethnographic space								x	
T. Salzberger and M. Koller	2013	Towards a new paradigm of measurement in marketing								x	
S. Schneider, J. A. Bubeev, A. Choukèr, B.	2012	Imaging of neuro-cognitive performance in extreme Environments - A (p)review								x	
D. O. Sears	2004	A perspective on implicit prejudice from survey research						x			
C. Senior, H. Smyth, R. Cooke, R. L. Shaw, E. Peel, S. Carl, S. Hannah, C. Richard, L. S. Rachel and P. Elizabeth	2007	Mapping the mind for the modern market researcher	x								
I. Simonson	2005	In Defense of Consciousness: The Role of Conscious and Unconscious Inputs in Consumer Choice							x		
L. Soley	2009	REASSESSING PROJECTIVE TECHNIQUES					x				
L. Soley	2010	Projective techniques in US marketing and management research: The influence of The Achievement Motive		x							

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C. Solnais, J. Andreu-Perez, J. Sanchez-Fernandez and J. Andreu-Abela	2013	The contribution of neuroscience to consumer research: A conceptual framework and empirical review		x							
H. A. Søndergaard	2005	Market-orientated new product development: How can a means-end chain approach affect the process?					x				
A. W. Stacy, S. L. Ames and J. L. Grenard	2006	Word Association Tests of Associative Memory and Implicit Processes: Theoretical and Assessment Issues					x				
D. Starch	1955	What is new about motivation research?									x
L. S. Steinberg	1991	Heard Any Good Stories Lately?						x			
R. B. Steinman and A. Karpinski	2008	The single category implicit association test (SC-IAT) as a measure of implicit consumer attitudes		x							
S. Steinmann, G. Mau, H. Schramm-Klein, G. Wagner and D. Morschett	2011	PATHWAYS AND SEQUENCES IN CONSUMER DECISION MAKING: ANALYSING MULTIDIMENSIONAL CUSTOMER CONTACT SEQUENCES WITH A MULTI-STATE MARKOV-MODEL: RESULTS OF AN EMPIRICAL STUDY IN RETAILING								x	
N. Teodorescu, A.-F. Stancioiu and S. C. Caescu	2006	The Use of Pair Comparison Scale in Marketing Research								x	
K. T. Tian, W. O. Bearden and G. L. Hunter	2001	Consumers' Need for Uniqueness : Scale Development and Validation								x	
N. Uprety and B. Singh	2013	NEUROMARKETING - A TOOL OF SELLING TO THE BRAIN		x							

Author	Year	Title	Reasons for inclusion					Reasons for exclusion			
			Describes theory about how the subconscious mind may function	Describes techniques or methodologies to understand the subconscious mind or latent needs	Approach to understanding the subconscious mind can be applied in the context of market research	Describes method to identify unmet needs	Describes new ways to interpret market research data	insufficient specific details to be of use	No specific data collection technique explored	Insights not relevant to understanding hidden needs	Too old
M. Valentine	2009	MARKET RESEARCH: It's all in the mind						x			
J. Vallack	2012	Soliloquy: A Methodology for First-Person Research								x	
T. Wilson	2012	What can phenomenology offer the consumer?								x	
B. Wu and H. T. Nguyen	2014	New statistical analysis on the marketing research and efficiency evaluation with fuzzy data								x	
J. Yeager	1993	Linguistics adds persuasive appeal to market research								x	
E. Yorkston, J. Nunes and S. Mutta	2007	The Role of Implicit Theories in Brand Extendibility								x	
G. Zaltman	2002	Hidden minds		x							
G. Zaltman	2003	How Customers Think: Essential Insights into the Mind of the Market		x							
G. Zaltman	2014	Are You Mistaking Facts for Insights?								x	
L. Zurawicki	2010	Neuromarketing: Exploring the brain of the consumer		x							

Appendix H – Quality Appraisal Of Fifty-eight Selected Papers

Author	Title	Year	Total	Degree of relevance to field of enquiry	Research methodology – clarity of research objectives, assumptions, findings, limitations	Quality of discussion	Recommendations for future research	Number of citations (secondary measure)	Does the research link techniques to outcomes?	Does the study provide the reader with a sense of the relative effectiveness of techniques discussed?	Context specificity (How context specific are the research findings?)	How robust does the data set that is referred to seem?	What is the degree of expertise of the authors conducting the study?	What is the degree of managerial relevance of findings?	To what degree do the findings allow managers to determine which selection techniques they should use?
D. G. Florin ,	Harnessing the power of consumer insight	2007	20	4	1	1	1	9	1	1	1	1	3	3	3
R. G. D. Cooper, Angelika	voice-of-customer Methods	2010	20	4	1	1	1	10	1	1	2	1	2	3	3
G. N. Berstell, Denise	Tell me a story: Using case studies to discover unmet needs	1999	21	3	2	2	2	0	3	2	2	1	2	1	1
Y. S. Suzuki, K.;Kosaka, Michitaka;Maki, A.	A new marketing methodology by integrating brain measurement, eye-tracking, and questionnaire analysis	2012	22	4	3	2	2	0	1	1	1	2	2	2	2
N. S. Uprety, Barinder	NEUROMARKETING - A TOOL OF SELLING TO THE BRAIN	2013	23	4	2	3	3	0	1	1	1	2	2	2	2
C. S. Senior,	Mapping the mind for the modern market researcher	2007	24	4	2	2	1	27	2	2	2	2	3	2	2
J. S. Nevid	Introduction to the Special Issue: Implicit Measures of Consumer Response-The Search for the Holy Grail of Marketing Research	2010	26	4	2	2	2	13	2	1	2	1	3	3	4
G. Morse	Hidden Minds	2002	26	4	1	1	1	32	2	1	2	2	4	4	4
A. W. A. Stacy, Susan L.;Grenard, Jerry L.	Word Association Tests of Associative Memory and Implicit Processes: Theoretical and Assessment Issues	2006	26	3	3	3	2	42	2	2	2	2	3	2	2
E. Norman	The unconscious in current psychology	2010	26	4	1	3	1	19	1	1	3	2	3	3	4

Author	Title	Year	Total	Degree of relevance to field of enquiry	Research methodology – clarity of research objectives, assumptions, findings, limitations	Quality of discussion	Recommendations for future research	Number of citations (secondary measure)	Does the research link techniques to outcomes?	Does the study provide the reader with a sense of the relative effectiveness of techniques discussed?	Context specificity (How context specific are the research findings?)	How robust does the data set that is referred to seem?	What is the degree of expertise of the authors conducting the study?	What is the degree of managerial relevance of findings?	To what degree do the findings allow managers to determine which selection techniques they should use?
R. M. Ohme, Michal	A Small Frog That Makes a Big Difference Brain Wave Testing of TV Advertisements	2012	26	4	2	2	1	2	3	2	2	2	2	3	3
J. Vallack	Soliloquy: A Methodology for First-Person Research	2013	26	4	3	3	2	0	2	1	2	1	2	3	3
G. Page	Scientific realism: what 'neuromarketing' can and can't tell us about consumers	2012	27	4	2	2	1	5	2	2	2	3	3	3	3
D. A. F. Booth, Richard P. J.	Mind-reading versus neuromarketing: How does a product make an impact on the consumer?	2014	27	4	1	3	1	0	2	3	2	2	3	3	3
L. Soley	REASSESSING PROJECTIVE TECHNIQUES	2009	28	3	2	3	2	2	3	2	3	2	3	2	3
L. Soley	Projective techniques in US marketing and management research: The influence of The Achievement Motive	2010	28	3	2	3	2	8	3	2	3	2	3	2	3
D. G. Mick	Consumer research and semiotics: Exploring the morphology of signs, symbols, and significance	1986	29	3	3	3	2	745	2	2	3	2	3	3	3
R. P. Heath	Fuzzy results, fuzzy logic	1995	29	3	2	3	2	8	2	3	3	2	3	3	3
G. Zaltman	Hidden minds	2002	29	4	2	3	2	32	2	3	2	2	3	3	3
N. S. Lee, John;Gouldin g, Christina	Grounded theory, ethnography and phenomenology: A comparative analysis of three qualitative strategies for marketing research	2005	29	3	3	3	2	444	2	2	3	2	3	3	3
F. Bassi	Latent class analysis for marketing scale development	2011	29	2	4	2	1	3	2	2	2	4	4	3	3
J. U. R. Garbas, T.;Unfried,	Towards Robust Real-Time Valence Recognition from Facial Expressions	2013	30	3	2	2	2	4	3	3	3	2	3	3	4

Author	Title	Year	Total	Degree of relevance to field of enquiry	Research methodology – clarity of research objectives, assumptions, findings, limitations	Quality of discussion	Recommendations for future research	Number of citations (secondary measure)	Does the research link techniques to outcomes?	Does the study provide the reader with a sense of the relative effectiveness of techniques discussed?	Context specificity (How context specific are the research findings?)	How robust does the data set that is referred to seem?	What is the degree of expertise of the authors conducting the study?	What is the degree of managerial relevance of findings?	To what degree do the findings allow managers to determine which selection techniques they should use?	
M.;Dieckman n, A.	for Market Research Applications															
P. H. P. Kenning, Hilke	How neuroscience can inform consumer research	2008	31	4	2	2	3	28	3	2	3	3	3	3	3	3
L. Zurawicki	Neuromarketing: Exploring the brain of the consumer	2010	31	3	3	2	2	33	3	3	3	3	3	3	3	3
M. S. Reimann, Oliver;Weber, Bernd;Neuhaus, Carolin;Zaichkowsky, Judith	Functional magnetic resonance imaging in consumer research: A review and application	2011	31	4	2	3	2	26	3	3	2	3	4	2	2	3
K. L. Goffin, Fred	Uncovering your customer's hidden needs	2004	32	4	3	2	2	8	2	3	3	2	4	4	4	3
D. Hill	TELL ME NO h lies: Using science to connect with consumers	2003	33	4	3	2	2	15	3	4	3	3	3	3	3	3
H. A. Søndergaard	Market-orientated new product development: How can a means-end chain approach affect the process?	2005	33	4	3	2	2	35	3	2	3	3	3	4	4	4
R. B. Zajonc	Mere exposure: A gateway to the subliminal	2001	34	3	2	3	2	612	3	2	4	3	4	4	4	4
J. Pincus	The consequences of unmet needs: The evolving role of motivation in consumer research	2004	34	4	2	3	3	54	3	3	2	2	4	4	4	4
K. A. L. Braun-LaTour, Michael S.;Zinkhan, George M.	Using childhood memories to gain insight into brand meaning	2007	34	3	4	4	3	82	3	2	3	2	4	3	3	3

Author	Title	Year	Total	Degree of relevance to field of enquiry	Research methodology – clarity of research objectives, assumptions, findings, limitations	Quality of discussion	Recommendations for future research	Number of citations (secondary measure)	Does the research link techniques to outcomes?	Does the study provide the reader with a sense of the relative effectiveness of techniques discussed?	Context specificity (How context specific are the research findings?)	How robust does the data set that is referred to seem?	What is the degree of expertise of the authors conducting the study?	What is the degree of managerial relevance of findings?	To what degree do the findings allow managers to determine which selection techniques they should use?
C. A.-P. Solnais, J.;Sanchez-Fernandez, J.;Andreu-Abela, J.	The contribution of neuroscience to consumer research: A conceptual framework and empirical review	2013	34	4	2	3	2	7	3	2	3	4	4	3	4
M. R. P. Forehand, Andrew	Implicit assimilation and explicit contrast: A set/reset model of response to celebrity voice-overs	2005	35	4	4	2	2	61	3	4	4	3	3	3	3
J. L. Fosshage	The explicit and implicit domains in psychoanalytic change	2005	35	3	2	4	2	100	3	4	4	2	5	3	3
J. M. L. Denstadli, R.	Conjoint respondents as adaptive decision makers	2007	35	2	4	3	4	14	3	3	3	4	3	3	3
K. V. Goffin, Claus J.;van der Floven, Chris;Koners, Ursula;Van Der Hoven, Chris;Koners, Ursula	Beyond the Voice of the Customer: Ethnographic Market Research	2012	35	4	3	3	2	9	3	3	3	3	4	4	3
J. M. Bond, Leigh	A class of its own : Latent Class Segmentation and its implications for qualitative segmentation	2003	36	3	3	2	2	14	3	4	4	4	3	4	4
C. Boddy	Projective techniques in market research: valueless subjectivity or insightful reality	2005	36	4	2	4	3	73	3	3	4	3	3	3	4
G. R. Page, Jane E	Cognitive neuroscience, marketing and research	2006	36	4	3	4	2	4	3	3	3	3	3	4	4
D. I. G. Baxter, Keith;Szejewski, Marek	The Repertory Grid Technique as a Customer Insight Method	2014	36	4	3	3	2	0	2	3	4	4	4	4	3

Author	Title	Year	Total	Degree of relevance to field of enquiry	Research methodology – clarity of research objectives, assumptions, findings, limitations	Quality of discussion	Recommendations for future research	Number of citations (secondary measure)	Does the research link techniques to outcomes?	Does the study provide the reader with a sense of the relative effectiveness of techniques discussed?	Context specificity (How context specific are the research findings?)	How robust does the data set that is referred to seem?	What is the degree of expertise of the authors conducting the study?	What is the degree of managerial relevance of findings?	To what degree do the findings allow managers to determine which selection techniques they should use?
N. M. Puccinelli	Implicit measures as effective market research tools	2002	38	4	2	3	3	1	3	3	4	4	4	4	4
G. F. Calvert, Eamon; Fulcher, Geraldine; Foster, Pauline; Rose, Helen	Using implicit methods to develop an objective measure of media brand engagement	2014	38	4	4	3	4	1	3	3	4	4	3	3	3
K. H. Peter, Plassmann; Dieter, Ahlert; Kenning, Peter; Plassmann, Hilke; Ahlert, Dieter	Applications of functional magnetic resonance imaging for market research	2007	39	4	3	3	3	70	3	3	4	4	4	4	4
A. F. Perkins, Mark; Greenwald, Anthony; Mason, Dominika	Measuring the non-conscious: Implicit social cognition in consumer behavior	2008	39	4	3	3	3	37	3	3	4	4	4	4	4
P. H. Chandon, J. Wesley; Bradlow, Eric T.; Young, Scott H.	Measuring the value of point-of-purchase marketing with commercial eye-tracking data	2008	41	3	4	4	4	0	4	3	4	4	4	3	4
M. H. Friese, Wilhelm; Wänke, Michaela	The impulsive consumer: Predicting consumer behavior with implicit reaction time measures	2009	42	4	4	4	4	17	4	4	4	4	3	4	3
M. A. M. Dempsey, Andrew A.	The influence of implicit attitudes on choice when consumers are confronted with conflicting attribute information	2010	43	4	4	4	4	22	4	4	4	3	4	4	4

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C. V. Dimofte	Implicit measures of consumer cognition: A review	2010	43	5	4	4	4	31	4	4	4	3	4	4	3
R. B. K. Steinman, A.	The single category implicit association test (SC-IAT) as a measure of implicit consumer attitudes	2008	44	5	4	4	4	18	3	4	4	4	4	4	4
A. P. K. Gregg, James	The Implicit Association Test in Market Research: Potentials and Pitfalls	2013	44	5	4	4	4	5	3	4	4	4	4	4	4
A. P. K. Gregg, James;Owens, Dominic;Perryman, Alex	Let their fingers do the talking? Using the Implicit Association Test in market research	2013	44	5	4	4	4	1	3	4	4	4	4	4	4
T. L. H. Chartrand, Joel;Shiv, Baba;Tanner, Robin J.	Non-conscious goals and consumer choice	2008	45	4	4	5	4	201	4	4	3	4	5	4	4
M. D. Bercea	Anatomy of methodologies for measuring consumer behavior in neuromarketing research	2011	49	5	5	4	3	4	5	5	5	5	3	5	4
F. S. Visser, P. J. Stappers, R. van der Lugt and E. B. N. Sanders	Contextmapping: experiences from practice	2005	31	3	3	2	2	343	3	3	3	3	3	3	3
K. L. Janssen and B. E. N. Dankbaar	PROACTIVE INVOLVEMENT OF CONSUMERS IN INNOVATION:: SELECTING APPROPRIATE TECHNIQUES	2008	40	3	3	4	3	41	4	4	3	4	4	4	4
scientific america	secrets of consciousness	2013	41	5	3	4	2	0	3	4	4	4	4	4	4

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authors															
P.Haugtvedt	handbook human psychology	2012	34	4	3	3	3	65	3	3	3	3	3	3	3
Ap Dijksterhuis and Loran F. Nordgren	A Theory of Unconscious Thought	2006	45	5	4	4	5	989	5	4	4	3	3	4	4

Appendix I – Impact Assessment Discussion Guide

Explanation of the key findings from the DBA

Overall, what is your reaction to this research?

What aspect do you find most or least surprising?

How applicable could this research be to your own work?

Do you feel that the research has identified a new way to understand subconscious thinking?

What do you think you will do differently now that you understand the findings from this research?