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ABSTRACT

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Abstract

Consumer neuroscience (neuromarketing) is an emerging field of marketing research which uses brain imaging techniques to study neural conditions and processes that underlie consumption. The purpose of this study was to map this fairly new and growing field in Finland by studying the opinions of both Finnish consumers and marketing professionals towards it and comparing the opinions to the current consumer neuroscience literature, and based on that evaluate the usability of brain imaging techniques as a marketing research method.

Mixed methods research design was chosen for this study. Quantitative data was collected from 232 consumers and 28 marketing professionals by means of online surveys. Both respondent groups had either neutral opinions or lacked knowledge about the four themes chosen for this study: benefits, limitations and challenges, ethical issues and future prospects of consumer neuroscience. Qualitative interview data was collected from 2 individuals from Finnish neuromarketing companies to deepen insights gained from quantitative research. The four interview themes were the same as in the surveys and the interviewees' answers were mostly in line with the current literature, although more optimistic about the future of the field. The interviews also exposed a gap between academic consumer neuroscience research and practical level applications.

The results of this study suggest that there are still many unresolved challenges and relevant populations either have neutral opinions or lack information about consumer neuroscience. The practical level applications are, however, already being successfully used and this new field of marketing research is growing both globally and in Finland.

Key words	Consumer neuroscience, neuromarketing, marketing research, brain imaging
Further information	

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TIIVISTELMÄ

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	Lisensiaatintutkielma
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Ohjaaja(t)	KTT Ulla Hakala, KTM Mekhail Mustak		

Tiivistelmä

Neuromarkkinointi on markkinointitutkimuksen nouseva ala, missä aivokuvantamismenetelmiä käytetään kuluttamisen taustalla olevien hermostollisten prosessien tutkimiseen. Tämän tutkimuksen tarkoituksena oli kartoittaa neuromarkkinointia Suomessa tutkimalla sekä suomalaisten kuluttajien että markkinoinnin ammattilaisten mielipiteitä sitä kohtaan, ja arvioida aivokuvantamismenetelmien käyttökelpoisuutta markkinointitutkimuksessa vertaamalla tutkittavien mielipiteitä neuromarkkinoinnin kirjallisuuteen.

Tutkimus suoritettiin monimetodi-menetelmällä. Kvantitatiivinen data kerättiin 232 kuluttajalta ja 28 markkinoinnin ammattilaiselta sähköisillä kyselylomakkeilla. Molemmilla vastaajaryhmillä oli joko neutraali mielipide tai heillä ei ollut tietoa tutkimukseen valituista neljästä teemasta: hyödyt, rajoitteet ja haasteet, eettiset asiat ja tulevaisuuden näkymät. Kvalitatiivinen data kerättiin teemahaastatteluilla kahdelta Suomessa toimivan neuromarkkinointiyrityksen edustajalta, kvantitatiivisen tutkimuksen tulosten syventämiseksi ja laajentamiseksi. Haastattelujen teemat olivat samat kuin kyselytutkimuksissa. Haastateltavien vastaukset olivat pääasiassa linjassa neuromarkkinoinnin kirjallisuuden kanssa, vaikka he olivat yleisesti luottavaisempia alan tulevaisuuteen. Haastattelut paljastivat myös kuilun akateemisen neuromarkkinoinnin tutkimuksen ja käytännön tason sovellusten välillä.

Tämän tutkimuksen tulokset viittaavat siihen, että neuromarkkinoinnissa on vielä useita ratkaisemattomia haasteita ja asiaankuuluvilla ryhmillä on joko neutraali mielipide tai heillä ei ole lainkaan tietoa neuromarkkinoinnista. Käytännön tasolla neuromarkkinoinnin sovelluksia kuitenkin käytetään jo menestyksekkäästi ja ala kasvaa sekä maailmanlaajuisesti että Suomessa.

Asiasanat	Neuromarkkinointi, markkinointitutkimus, aivokuvaus
Muita tietoja	

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CONSUMER NEUROSCIENCE

Usability of brain imaging methods in marketing research

Master´s Thesis
in Marketing

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1 INTRODUCTION

During the last few decades, the human brain has been in the spotlight of both scientific communities and general public, mainly due to remarkable advances in brain imaging techniques. Neuroscience – a research field studying the structure and function of the human brain (Perrachione & Perrachione 2008, 303) – has fast grown into an established field of research and today its concepts can be regularly seen in popular media. Advancement of research on the human brain continues as for example the European Commission has granted *half-a-billion euros* to the Human Brain Project which attempts to recreate everything that is known of the human brain with the help of supercomputers (Abbott 2013). The interest in the brain has also led to the creation of multiple new research fields that are somehow related to brain research. This study addresses one of these new research fields, *consumer neuroscience* or *neuromarketing*. Consumer neuroscience is interested in consumption's underlying neural conditions and processes, and the behavioural implications (Reimann, Schilke, Weber, Neuhaus & Zaichkowsky 2011, 610). It is a fairly new and evolving field that is under both rigorous scientific debates and keen interest. Is consumer neuroscience just a fad or a legitimate field of research, offering practical implications to marketing in practice?

1.1 Background

In recent years, there has been a notable expansion in the use of various neuroscientific methods in order to better understand human behaviour in different contexts, and this has led to combining neuroscience with new scientific fields (Javor, Koller, Lee, Chamberlain & Ransmayr 2013, 2). Such fields include economics and marketing. The merging of neuroscience with economics has led to an interdisciplinary research of *neuroeconomics* and besides economics, also the field of marketing has started to integrate with neuroscience leading to a field called *consumer neuroscience.* Consumer neuroscience is defined as "*the study of the neural conditions and processes that underlie consumption, their psychological meaning, and their behavioural consequences*" (Reimann et al. (2011, 610). Other widely used term is *neuromarketing.* The differences between the terms and how they are applied in this study will be discussed in detail in chapter 3.1.

Commercial applications of brain imaging methods and companies providing them have increased notably in the recent years (Page 2011, 134). At the same time there is an ongoing scientific debate about the possible benefits and limitations of consumer neuroscience. Additionally, this new field of research already rises notable ethical issues that are debated not only in the scientific communities but also in the popular media (i.e. Etchells 2013; Singer 2010). The future of consumer neuroscience will not be determined only

by its ability to benefit marketing from an academic point of view. Besides that, the opinions of the public and marketing professionals about the use of neuroscientific methods in marketing might be crucial variables. If a public outcry ensues or marketing professionals do not see enough potential in it, consumer neuroscience – in its current form at least – might not flourish.

1.2 Purpose and structure of the study

There are at least two previous studies that have researched the opinions about consumer neuroscience or neuromarketing. In the first study, the public and neuroimaging experts were studied to find out whether differences in understanding of neuroimaging capabilities and limitations exist between them, and also to determine opinions on the need for regulation and acceptable uses of neuroimaging (Wardlaw et al. 2011). The neuroimaging experts in the study consisted of individuals who regularly used neuroimaging methods - most of them used neuroimaging for neuroscience research and clinical research. The findings of the study indicated that neuroimaging experts were more optimistic than the public about the applications of neuroimaging, and that the public disapproved the use of neuroimaging in non-scientific or medical settings such as in employment screening and marketing research. (Wardlaw et al. 2011, 6.) In the second study, the perceptions of marketing professionals, neurologists and marketing academics about neuromarketing were studied as they were thought to have a significant role in determining the future of neuromarketing studies. The results of the study revealed, for example, that none of the groups studied saw neuromarketing as a manipulative way of selling unnecessary goods and services, and that marketing professionals and neurologists had more positive perceptions about neuromarketing than marketing academics. (Eser, Isin & Tolon 2011, 865.)

Previous studies on the subject leave a research gap which this study attempts to address. First, the study of Wardlaw et al. (2011) researched the opinions of the public and experts about the use of neuroimaging in different context (e.g. legal), while this study is concerned solely with *consumer neuroscience* or *neuromarketing*. Second, although the focus was on neuromarketing, the study of Eser et al. (2011) studied only the perceptions of professionals and academics – excluding the public. This study focuses on the perceptions of both marketing professionals and consumers about consumer neuroscience specifically in Finland.

The purpose of this study is to map the fairly new and growing field of consumer neuroscience in Finland by studying the opinions of both Finnish consumers and marketing professionals towards it and comparing the opinions to the current consumer neuroscience literature, and based on that evaluate the usability of consumer neuroscience as a

marketing research method. The purpose of this study will be addressed by answering the following questions:

- What are the benefits of consumer neuroscience?
- What are the limitations and challenges of consumer neuroscience?
- What are the ethical issues of consumer neuroscience?
- What are the future prospects of consumer neuroscience in Finland?

This study offers an introduction to consumer neuroscience and the results of the empirical study shed light on the current situation and future of the field in Finland. The results might be of particular significance to Finnish marketing professionals and other decision makers who are concerned with such as product and package designing, advertisement designing and branding. Understanding the basics of consumer neuroscience and its methods, offers relevant audiences a platform for building a deeper understanding of the phenomenon. Further, in academic sense, this study can be seen as one of the first attempts to capture the phenomenon of consumer neuroscience in Finland in a general sense and used as a basis for further research.

The structure of this study is as follows. First marketing research is discussed to provide a context for consumer neuroscience, which is then covered in chapter 3. Research methodology will then be explained in chapter 4, followed by discussion of research findings. Finally conclusions are made and a summary presented.

2 MARKETING RESEARCH

In order to provide a wider context for consumer neuroscience, traditional marketing research methods are discussed first. These methods are defined in this study as *traditional* based on their established position in the marketing research literature. Consumer neuroscience on the other hand is seen as a new, non-established method of marketing research and as it will be discussed thoroughly in the following chapter, it will often be compared to these traditional methods.

The terms marketing research and market research are often mixed and used jointly. Kent (1993, 4) distinguishes between them and argues that researching specifically the immediate competitive environment of the marketplace that includes for example customers and competitors – as opposed to all areas of marketing activity – is often referred to as market research, and the term can also refer to activities of agents in the market research industry who buy and sell research services. In this study the wider term of marketing research is used and defined according to Kent (1993, 2): marketing research is concerned with collecting, analysing, interpreting and using of data both on the company and on its environment in a way that relevant information can be provided to diagnose, plan and control marketing strategies.

2.1 Traditional methods of marketing research

A commonly used classification of marketing research includes three broad designs: exploratory, descriptive and causal (Chisnall 1992, 23; Kent 1993, 5; Saunders & Lewis 2012, 110–113). *Exploratory research* is used to generate insights, hypotheses and ideas rather than actually measuring or testing them. In other words, exploratory research is seen as a preliminary phase of a larger or more detailed research and it does not include specific research methods that would be limited only to exploratory research, but qualitative methods such as interviews are commonly used in exploratory research. *Descriptive research* is typically concerned with estimating and measuring frequencies with which things occur, or correlations and associations between variables. Marketing research reports are often descriptive and they measure – for example – market structure, market size, market demand and attitudes and behaviour of consumers. *Causal (or experimental) research* attempts to establish cause-and-effect relationships and tries to explain why things happen. This type of research usually includes experimental procedures and experimental control in order to achieve causality, but these cause-and-effect relationships are difficult to deal with objectively and it is easy to jump to unjustified conclusions. Additionally, causative relationships are rarely relevant to marketing research problems. A combination of the mentioned different research types is commonly used in practice and

thus it is sometimes difficult to distinguish between them. (Chisnall 1992; 23–25; Kent 1993, 5–6; Saunders & Lewis 2012, 110–113.)

Perhaps the most common distinction of marketing research is based on the kind of data collected: *quantitative* or *qualitative. Quantitative research* primarily collects numerical, quantitative data and usually applies methods such as surveys. *Qualitative research* on the other hand collects qualitative data in forms of words, pictures etc. by means of interviews, for example (Kent 1993, 8). Although it is sometimes difficult to precisely distinguish between quantitative and qualitative research, Bradley (2010, 230) offers one scheme to (crudely) distinguish between the two and it is presented in Table 1.

Table 1: Distinctions between qualitative and quantitative research (Bradley 2010, 230)

Qualitative	**Quantitative**
Words, narrative, images, concepts	Numbers
Analysis begins during data collection	Analysis begins after data collection
Analysis adapted to each project	Analysis guided by standard techniques
Original ways to communicate results	Standard ways to communicate results

Qualitative research is not as structured as quantitative, and in qualitative research there is an emphasis on understanding rather than measuring. Words, narrative, images and concepts are in the center of qualitative research whereas quantitative research is based on numerical values. There are also differences in analysing the data: in qualitative research the analysis begins during data collection and it is adapted to each project, while in quantitative research the analysis begins after the data collection and it follows standard techniques. Finally, qualitative research results can be communicated in original ways whereas quantitative research results are communicated in standard ways. (Bradley 2010, 230.)

This distinction of quantitative and qualitative marketing research will be used in this study and next the common quantitative and qualitative marketing research methods are discussed.

2.1.1 Quantitative research methods

In marketing research literature, perhaps the most common quantitative research methods mentioned are survey (questionnaire) research and experimental research (see for example Creswell 2009, 145; McDaniel & Gates 2010, 51–52; Malhotra & Birks 2006, 223–258), and thus these two methods are discussed more in detail next. Other quantitative marketing research methods include for example market tests and panels (Bradley 2010, 272–276).

Survey research provides a numeric or quantitative description of – for example – trends, attitudes or opinions of a certain population by studying a sample of that population (Creswell 2009, 12) and it is commonly used in business and management research (Saunders & Lewis 2012, 115). Surveys are well suited for asking questions such as *what, where* and *how many*, and they are a cost-effective manner of collecting data from a large number of people. Different sampling methods allow survey findings to be generalized into the whole population without the need to collect data from the whole population, lowering the research costs. Surveys are usually written questionnaires with standardized questions that are completed either by respondents themselves or by interviewers. Standardized questions allow comparison of results across time and locations. Survey questionnaires can be completed for example face-to-face, online or by telephone. (Saunders & Lewis 2012, 115–116.)

A survey research has several strengths. First, it has an ability to produce precise numerical estimates and this is important for many businesses relying on precision – especially in situations with high levels of uncertainty and risk. Second, survey research is based on objectivity and surpasses biases such as personal prejudices. Additionally, a wealth of standardized statistical techniques have been developed to enhance the rigor of the study and the depth analyses. Third, it is possible to determine whether (significant) differences exist between different groups and accurately describe these differences. Fourth, over time repeated survey researches offer several data points on which to base more reliable forecasting of future trends. (McQuarrie 1996, 93–95.)

There are – of course – also several weaknesses with survey research. First of all, a survey research answers the questions such as *what*, but not the question *why*. A related weakness is that a survey research usually cannot reveal what the researchers did not know they did not know. Furthermore, surveys rely on self-report data and thus if a respondent cannot or will not answer something, does not know something or cannot accurately describe something, a survey will not reveal it. Finally, surveys are only as good as the questions and sample used. The researcher needs to balance between minimizing the costs and maximizing the rewards. (McQuarrie 1996, 95–97.)

Experimental research methods on the other hand are commonly used to infer causal relationships. The scientific meaning of causality usually differs from the view commonly

held by general public and Malhotra and Birks (2006, 258) for example argue that "*causality can never be proved; in other words, it can never be demonstrated decisively. Inferences of cause-end-effect relationships are at the best that can be achieved*". For more detailed discussion of the concept of causality, see Malhotra and Birks (2006, 258–262). The basic idea of an experiment is to measure the impact of an intervention or treatment on an outcome while controlling all other factors that could influence that outcome. Researchers randomly assign test subjects to groups (a process called true experiment) and when one group receives an intervention while the other does not, the researcher can isolate whether it is the intervention and not some other factor that influence the outcome. (Creswell 2009, 145–146.) In other words, the researcher manipulates the independent variable to observe the effect on dependent variable. In marketing experimental research, independent variables are usually marketing mix variables such as changes in product features, price or amount or type of advertising; whereas dependent variables are frequently total sales, market share or similar. (McDaniel & Gates 2010, 215.)

The main advantage of experimental research design is that it is the only, or at least the most appropriate, for measuring and inferring cause-and-effect relationships. It also allows the researcher to control the timing of measurements and control other factors (variables) than those of interest. Examples of appropriate uses of experimental research design in the marketing context include selecting optimal price points, selecting the best advertisement or selecting the best product or package design (McQuarrie 1996, 115–116). On the other hand, experiments can be costly, time-consuming and difficult to administer – especially field experiments (Malhotra & Birks 2006, 280). Finally, conducting a field experiment in a test market exposes marketing plans or some key elements of them to competitors in the actual marketplace (McDaniel & Gates 2010, 223). These limitations need to be considered when deciding whether experiment is an appropriate research design for marketing research.

2.1.2 Qualitative research methods

There are many qualitative marketing research methods and in order to gain a grasp of the methods, a classification scheme will be presented according to Malhotra and Birks (2006, 158–159). They propose a following classification of qualitative research methods, presented in Figure 1.

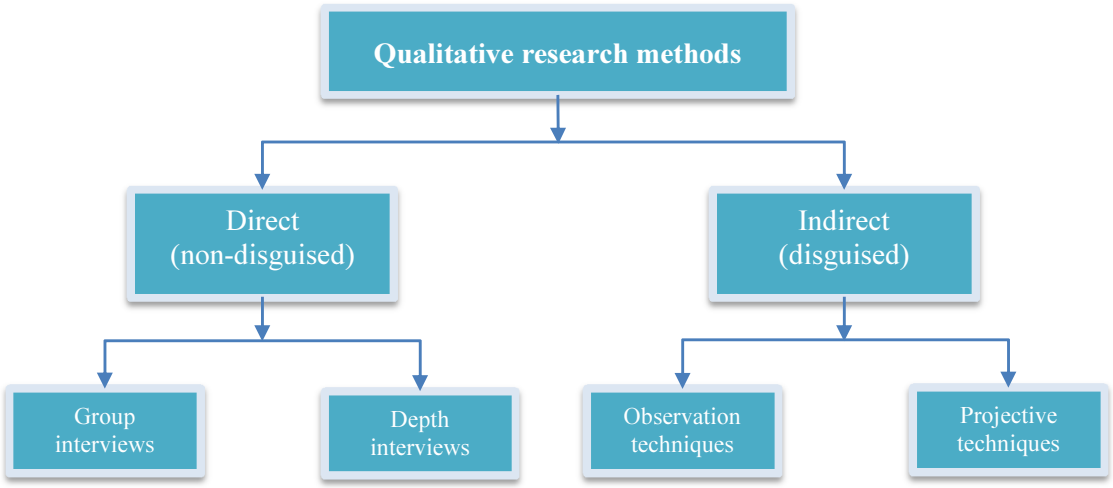

Figure 1: A classification of qualitative research techniques (adapted from Malhotra & Birks 2006, 158)

In their classification the research methods are divided based on whether they are *direct* (non-disguised) or *indirect* (disguised); whether the true purpose of the research project is known to the respondents. In a *direct* approach, the purpose of the research project is disclosed to research subjects or is otherwise obvious to them. Two major direct research methods are group interviews (focus groups) and depth interviews. These methods allow the researcher to control how much information about the research will be revealed at the beginning of discussions. *Indirect methods* disguise the purpose of research projects as the researcher wants the research subjects to behave as naturally as possible without any influence of research purposes. The research subjects may not even know that they are being observed, or if they do, may not know why. They are being observed in natural environments and in a natural manner. Indirect research methods include observation techniques and projective techniques. (Malhotra & Birks 2006, 158–159.) Next, three of these mentioned methods – focus groups, interviews and observation – will be discussed more in detail, as they are the most important methods used in marketing research (Malhotra & Birks 2006, 160; Carson, Gilmore, Perry & Gronhaug 2001, 73; Bradley 2010, 234–240). See for example Malhotra & Birks (2006, 187–192) for a detailed discussion of projective methods such as association (i.e. word association) and completion (i.e. sentence completion).

Focus group is a popular marketing research method (McDaniel & Gates 2010, 94; Bradley 2010, 235) and some authors argue that it is the most important qualitative marketing research method (Malhotra & Birks 2006, 160). A focus group usually "*consists of 8 to 12 participants who are led by a moderator in an in-depth discussion on one*

particular topic or concept" and it differs from mere question-and-answer interviews with an emphasis on group dynamics and interaction (McDaniel & Gates 2010, 94). Focus groups are commonly used in generating new ideas for product development and to learn causes of problems or failures in the marketplace. They can be used to explore the reasons for problems in-depth that is not easy to do in a survey research, for example. (Kolb 2008, 125.)

There are several reasons that justify the use of focus groups as a marketing research method. Focus groups seek to gain insights into meaningful constructs of different phenomena that will emerge out of discussing issues, sharing ideas, exchanging opinions, revising perceptions and highlighting commonalities as well as differences. They can be used in different ways according to research purposes. The depth of understanding of a specific phenomenon is a strength of focus groups as they can generate greater depth of information than for example survey answers. Group interaction – participants querying each other and explaining themselves to each other – will usually lead to situations where the information produced in discussions is greater than the sum of separate participant opinions. Finally, as the same number of individuals can contribute in same or less time in a group setting than in personal interviews, focus groups tend to save time and money. (Carson et al. 2001, 114–117.)

On the other hand, focus groups have limitations that need to be addressed. Group members affect each other and dominating individuals might intimidate others, suppressing their views. The moderators also have significant roles in the success of focus groups as they might unwittingly bias the results by emitting cues of favorable responses or otherwise affect the group dynamics. Finally, the results of focus group research cannot be generalized to the larger population as the participants might not be representative of it. (Carson et al. 2001, 128–129.)

In-depth or individual depth interviews are relatively unstructured one-on-one interviews in which an experienced interviewer uses tactics such as probing to uncover underlying motivations, attitudes, feelings and beliefs (Malhotra & Birks 2006, 179; McDaniel & Gates 2010, 107). Probing is important in obtaining meaningful responses and uncovering hidden issues (Malhotra & Birks 2006, 180) and it is a tactic in which the interviewer thoroughly probes each answer and uses the responses as a basis for further questioning (McDaniel & Gates 2010, 107). Applications of in-depth interviews in marketing include new product development, sensory evaluations and product packaging or usage research (McDaniel & Gates 2010, 108).

In-depth interviews have several advantages, especially when compared to focus groups. First, in-depth interviews can uncover greater depth of insights when developing issues with the interviewee for longer periods of time – revealing feelings and motivations underlying the statements. Additionally, a free exchange of information usually allows also sensitive issues to be addressed, and the closeness of the interviewer-interviewee

relationship allows the interviewer to become more sensitive to non-verbal communication. Furthermore, the lack of group pressure may encourage respondents to reveal more honest feelings. Finally, interviews can be easily arranged and conducted practically anywhere. (Malhotra & Birks 2006, 182–183; McDaniel & Gates 2010, 107–108.)

Limitations of in-depth interviews include lack of structure, interviewer skills requirements, length of interviews, total costs of the research and difficulty of analysing and interpreting the obtained data. Without a structure interviews are susceptible to the interviewer's influence and the completeness and quality of the research results depend strongly on the interviewer's skills. In-depth interviews tend to last long and have high costs and thus a research project commonly has only few interviews. Finally, based on the unstructured nature of the data, analysing and interpreting it may be difficult. (Malhotra & Birks 2006, 182–183; McDaniel & Gates 2010, 107–108.)

Observation research is conducted by "*watching what people do, looking at their behavioural patterns and actions and at objects, occurrences, events and interactions*". It can be used where actions, occurrences and interactions occur and can be accessed by the researcher – mainly in public. (Carson et al. 2001, 132.) Observation research can be structured or unstructured, it can be conducted in natural or artificial settings and it can be disguised or non-disguised. In natural settings, observation is also commonly disguised so that the people being observed are unaware of that; behaviour being recorded in this way is not affected by the process of observation and people being observed do not try to act differently (i.e. more rationally). (Kent 1993, 105.) In marketing research, observation has been used in trying to understand consumer buying behaviour, consumer's responses to different marketing stimuli, emotional reactions in different situations and especially in new product development – for example by observing children play with prototype toys (Carson et al. 2001, 132–133).

There are three conditions that must be met before observation can be successfully used as a tool for marketing research. First, the sought-after information needs to be either observable or inferable from behaviour that is observable. Second, the behaviour of interest needs to be repetitive, frequent or in some way predictable to constrain the costs of observation. Third, the behaviour of interest needs to be of relatively short duration. (McDaniel & Gates 2010, 186.) If these conditions are met, the key advantage of observation is that there is no reliance on people's memories, guesses or honesty – the ability or willingness of respondents to answer. In other words, the information is not subject to many of the biasing factors associated with for example survey approach. Additionally, some forms of data can be gathered more quickly and accurately by observation. (Kent 1993, 105–106; McDaniel & Gates 2010, 188–189.)

Major limitations of observation are the facts that often it is just not possible or feasible, and it can only be used to observe behaviour and physical personal characteristics – not the motives, intentions, opinions or attitudes of people. Observation is also labour-

intensive, time-consuming and can be costly if the observed behaviour occurs rather infrequently. Finally, it can normally be used only in public, leaving private behaviour beyond the reach of observation research. (Kent 1993, 105–106; McDaniel & Gates 2010, 188–189.)

2.2 Traditional marketing research vs. consumer neuroscience

Perhaps due to the fairly recent emergence of consumer neuroscience as a marketing research method, there is no consensus in the marketing literature as to what is the nature of the relationship between consumer neuroscience and traditional marketing research methods. Few authors have tried to shed light on this issue and Lindstrom (2008, 6), for one, argues that the relationship between traditional marketing research and consumer neuroscience can be illustrated as in Figure 2. Lindstrom uses the term neuromarketing whereas here it is replaced with the term consumer neuroscience.

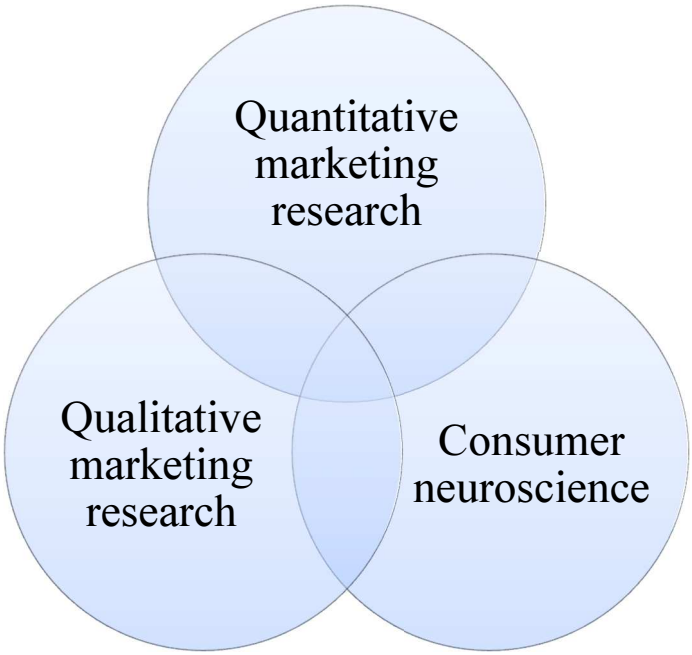

Figure 2: Relationship of consumer neuroscience and traditional marketing research (adapted from Lindstrom 2008, 6)

Quantitative and qualitative marketing research circles represent the traditional styles of marketing research, whereas the third circle represents a new style of consumer neuroscience. In the overlapping section lies the potential future of marketing: a possibility to comprehensively understand the needs, desires, thoughts, feelings and motivations of consumers. Although consumer neuroscience is not the answer to everything and as it is still developing within the boundaries of our current understanding of the human brain,

consumer neuroscience is already offering insights of our unconscious mind's role in our behaviour to the marketing research. (Lindstrom 2008, 6.)

In addition to the views of Lindstrom (2008), Georges, Bayle-Tourtoulou and Badoc (2014, 11) argue that marketing gives the company's decision makers a better understanding of their operational environment so that correct choices can be made. The authors' view of the role or space of consumer neuroscience in this process is illustrated in Figure 3. Again, the authors' original term neuromarketing is replaced by the term consumer neuroscience.

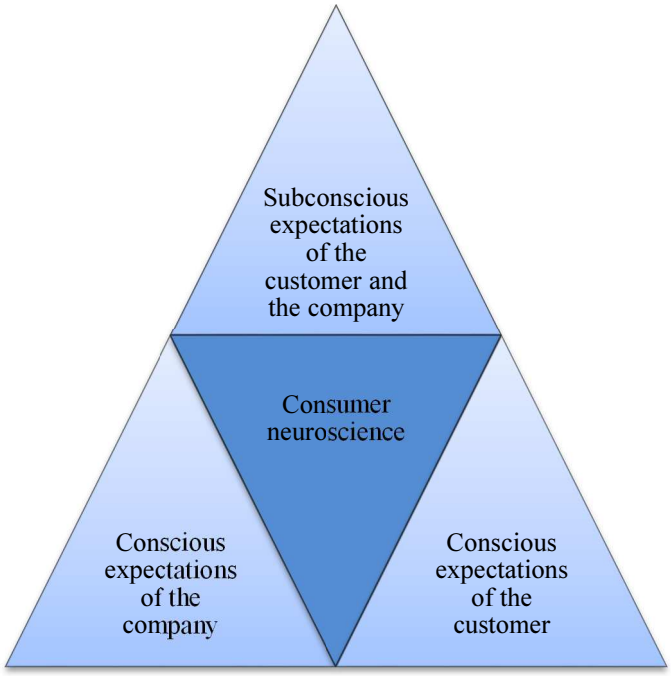

Figure 3: Consumer neuroscience space (adapted from Georges et al. 2014, 11)

In their view, marketing is about finding a certain space to make it possible to create value for both the company and the customer – and consumer neuroscience integrates the study of subconscious and conscious motivations into this space (Georges et al. 2014, 11). In other words, when traditional marketing methods can be used to study conscious expectations of customers (and companies), consumer neuroscience can be used to study also the subconscious expectations of both customers and companies and all of these elements are important in marketing decision making. However, the purpose of consumer neuroscience is not to replace traditional marketing studies but rather complete those (Georges et al. 2014, 2). Georges et al. (2014, 2) phrase that consumer neuroscience is "*destined to enhance today's marketing and play an increasingly important role in tomorrow's marketing*". This argument will be critically evaluated in the following chapters.

3 BRAIN IMAGING METHODS IN MARKETING

In order to get a better understanding of the phenomenon of consumer neuroscience, relevant concepts and currently relevant brain areas will be discussed first. Next, an overview of the field of consumer neuroscience is presented, followed by descriptions of each relevant neuroimaging technique and a comparison between the techniques. Benefits of using neuroimaging techniques in consumer research will follow and finally limitations, critique and ethics are discussed.

3.1 Key concepts

The merging of neuroscience with economics has led to an interdisciplinary research of *neuroeconomics*. Although the field has attracted a fair amount of attention in the scientific community, it has emerged not until during the last decade (McCabe 2008, 345). Kenning and Plassmann (2005, 343) define neuroeconomics as employment of neuroscientific methods to analyse brain processes that are economically relevant, while the definition of McCabe (2008, 345) sees neuroeconomics as an economic science that has a focus on how the human brain interacts with its social and institutional environment to make economic decisions. Perhaps the most optimistic definition comes from Glimcher (2004, 447) who argues that neuroeconomics is a unified discipline of economics, psychology and neuroscience, with an aim to provide a single theory of human behaviour. Fisher, Chin and Klitzman (2010, 231–232) argue that, despite its relatively young age, neuroeconomics has undergone comprehensive theoretical development and already produced plenty of evidence on real-world decision making.

Besides economics, also the field of marketing has started to integrate with neuroscience leading to a field called *consumer neuroscience*. Reimann et al. (2011, 610) argue that marketing as a discipline gives both theoretical and managerial research problems, and that neuroscience on the other hand illuminates the functions and anatomy of the brain with the help of neuroscientific methods. Hubert and Kenning (2008, 272) use consumer neuroscience and neuromarketing as synonyms and see it as a sub discipline of neuroeconomics that is interested in marketing related problems and utilizes methods of brain research. Although they use these terms synonymously, they distinguish difference between them: consumer neuroscience consists of scientific proceedings and neuromarketing is the application of the findings within managerial context (Hubert & Kenning 2008). Hubert (2010, 813) also prefers consumer neuroscience over neuromarketing and defines it as a field striving to understand neurophysiological foundations of consumer behaviour using neuroscientific methods. Plassmann, Ramsøy and Milosavljevic (2012, 18) emphasize the hybrid nature of consumer neuroscience in their definition. They argue

that consumer neuroscience adapts methods and theories from neuroscience, consumer psychology and also behavioural decision sciences in order to understand consumer behaviour on a neuropsychological level.

The terminology of consumer neuroscience is still evolving with the field itself. The following Table 2 will summarize the key concepts of this study and also closely related concepts.

Table 2: An overview of key concepts

Concept	Definition
Neuroscience (Perrachione & Perrachione 2008, 303)	The study of the structure and function of human brain
Neuroeconomics (Kenning & Plassmann 2005, 343)	Employment of neuroscientific methods to analyse brain processes that are economically relevant
Consumer neuroscience (Reimann et al. 2011, 610)	The study of the neural conditions and processes that underlie consumption, their psychological meaning, and their behavioral consequences (scientific proceedings)
Neuromarketing (Hubert & Kenning 2008, 272)	The application of consumer neuroscience findings within the scope of managerial practice (application and managerial tool)

In this thesis the term consumer neuroscience is defined according to Reimann et al. (2011, 610) as "*the study of the neural conditions and processes that underlie consumption, their psychological meaning, and their behavioural consequences*". Consumer neuroscience is seen as scientific proceedings, whereas neuromarketing is seen as an application and managerial tool (Hubert & Kenning 2008; Javor et al. 2013, 1). In order to avoid misunderstandings and following established style (e.g. Hubert & Kenning 2008, 274), both terms, consumer neuroscience and neuromarketing, are used in this thesis – keeping in mind the distinction between scientific proceedings and managerial applications. In the empirical studies, the term neuromarketing is used as it is thought to be more familiar to respondents.

3.2 Relevant brain areas

The brain areas that are currently relevant to consumer neuroscience studies include striatum, insula, anterior cingulate cortex (ACC), orbitofrontal cortex (OFC), ventromedial prefrontal cortex (VMPFC), medial prefrontal cortex (MPFC), ventral tegmental area (VTA), amygdala and hippocampus (Reimann et al. 2011, 619–621). Figure 4 shows where some of these relevant areas are, approximately, located in the brain.

Figure 4: Relevant brain areas of consumer neuroscience (adapted from Reimann et al. 2011, 621; Head MRI)

The *striatum* and its subareas of putamen, caudate nucleus and nucleus accumbens, have been demonstrated to be important in goal-directed evaluation of affective stimuli, coding of deviations of actual rewards from expectations, the influence of social factors on reward processing and coding product preferences in purchase decisions. The *insula* has been linked to negative reinforcements such as social frustration, expected risk or losing money, and also higher prices have been related to higher activation of the insula. The *anterior cingulate cortex* (ACC) has been linked to brand preferences. The *orbitofrontal cortex* (OFC) and related *ventromedial prefrontal cortex* (VMPFC) have been suggested to be coding perceived values of different outcomes, and different parts of them have been associated with evaluations of punishing cues and rewarding outcomes. The *ventral tegmental area* (VTA) has been associated with novelty processing of advertisements or stimuli that is brand-related, and expected rewards. The *amygdala* has been shown to have a role in processing rewards and positive stimuli, and in evaluating and encoding marketing stimuli in long-term memory. Finally, the *hippocampus* has been associated with product and taste memory. (Reimann et al. 2011 619–620.)

In this study however, references to specific brain regions are not mentioned and research findings for example will not include the names of the brain regions. This is based on the purpose of this study which focuses on this fairly new phenomenon and its applications in general. An in-depth discussion of the whole brain and its functions would be required if details of the specific brain areas were to be handled in this study. For thorough discussions, see for example Kolb and Whishaw (2003).

3.3 Overview of the current field

Solnais, Andreu-Perez, Sánchez-Fernándes and Andréu-Abela (2013) have studied the current field of consumer neuroscience and offered a framework for classifying the existing research findings. They classify consumer neuroscience findings into four categories in order to specify the boundaries of the field at the moment and to relate findings between different studies, with the aim of helping discussion and comparison (Solnais et al. 2013, 75). This classification is presented in Figure 5.

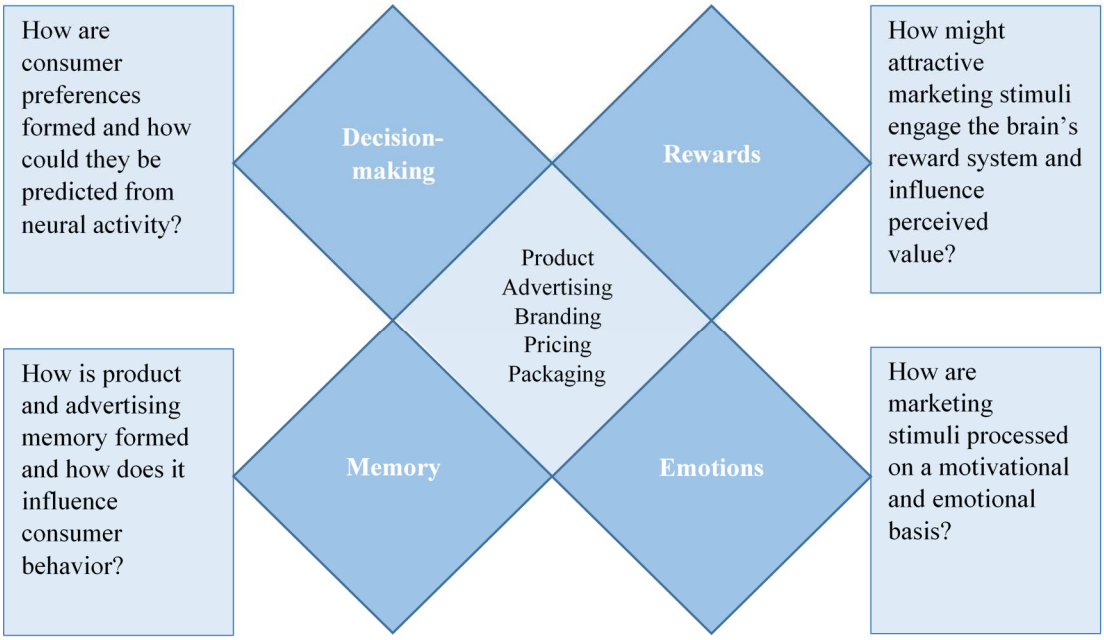

Figure 5: Framework for assessing the contribution of neuroscience to consumer research (modified from Solnais et al. 2013, 76).

The four categories of findings are:

- Decision making and formation of preferences
- Reward system
- Motivational and emotional responses
- Attention and memory

Studies addressing *decision making and formation of preferences* include findings of various brain regions being associated with decisions of willingness to pay, choices between similar brands, brand preference development, brand personality processing and

how the process of decision making is affected by emotional information. Another category of studies address the relationship between the *reward system* of the brain and attractiveness of different marketing stimuli. Findings in studies of this category include association of the brain's reward system with products subjectively perceived attractive, products perceived as symbolising social status and wealth, compulsive buying behaviour, packages that are perceived as aesthetic or attractive and premium prices of certain product types. However the authors argue that further research is needed in this area in order to expand the scope of product categories so far investigated (mainly luxury goods, fast food and soft drinks) and to confirm whether it could be possible to predict for example attractive packages, based on certain neural activation patterns in the reward system of the brain. (Solnais et al. 2013, 75–77.)

Studies of the third category are concerned with *motivational and emotional responses* to different marketing stimuli. This category of consumer neuroscience studies has come up with fewer findings than the two already mentioned, but there are for example reported associations between hemispheric asymmetry of the brain and advertisement's perceived pleasantness, although behavioural measures have not been used to verify these findings. Additionally, some studies have explored if there are different neural patterns underlying rational (in contrast to non-rational) processing of marketing stimuli, and while the findings suggest differing processing, identifying well-defined brain regions is still inconclusive. The last category of consumer neuroscience studies is that of *attention and memory*. There is a growing interest in this category and the findings so far include for example associations of brain regions that are involved in attention and visual stimuli, and attractive packages. Furthermore studies have focused on neural patterns underlying advertising memory; in other words remembering advertisement or advertising scenes. The results suggest associations between certain activation and remembering advertisements some time later – when compared to forgotten advertisement. Overall, the authors point out that so far these studies have used a variety of procedures and techniques and thus there is a need for confirmation of existing findings. The studies chosen for the classification were conducted with various research designs and methods and thus the findings should be considered as preliminary in order to avoid untimely conclusions based on them. (Solnais et al. 2013, 77–79.)

3.4 Techniques of consumer neuroscience

Current brain imaging techniques used in consumer neuroscience can be grouped into two main categories depending on the measured mechanism: electrical brain activity or neural metabolism processes (Kenning, Plassmann & Ahlert 2007, 137; Plassmann, Ambler,

Braeutigam & Kenning 2007, 154). *Electroencephalography* (EEG) and *magnetoencephalography* (MEG) belong to the first category and *positron emission tomography* (PET) and *functional magnetic resonance imaging* (fMRI) belong to the second category. EEG and MEG are similar methodologies as the main sources of signals are in essence the same (Lopes da Silva 2013, 1112; Malmivuo 2005, 72). In this thesis these four techniques are introduced and discussed as fMRI, EEG and MEG are used the most in consumer neuroscience research (Pop & Iorga 2012; Solnais et al. 2013, 72) and as PET is also commonly mentioned in the literature (e.g. Kenning et al. 2007). Additionally, Senior, Smyth, Cooke, Shaw and Peel (2007) argue that *transcranial magnetic stimulation* (TMS) can be useful in this context. TMS is not a brain imaging technique but a way of locally intervening with the normal brain functioning. Brief magnetic pulses of varying intensities are targeted at specific locations on the surface of the brain (cortex) and these magnetic pulses temporarily prevent the normal brain activity, so that the consequences of the interventions to behaviour can be observed. (Revonsuo 2010, 171.) As TMS is not a brain imaging technique and also rarely mentioned in the current neuroscience literature, it will be outlined from this study.

3.4.1 Electroencephalography (EEG)

EEG is one of the oldest and most used brain imaging techniques and it dates back to early 20th century, although it became common not until the 1960s (Degerman, Salmi, Alho & Rinne 2006, 105). Interest in using EEG in the market research dates back to the early 1970s and it has been used regularly in the studies since 1980s (Ohme, Reykowska, Wiener & Choromanska 2009, 22). With electrodes placed on the subject's scalp, EEG measures electric activity resulting from groups of neurons firing (Du Plessis 2011, 128). EEG is technically relatively simple and it is possible to measure electrical activity of the brain simultaneously with other brain imaging techniques (MEG and fMRI), or even while a subject is for example driving a car (Degerman et al. 2006, 105). As there are normally all kinds of spontaneous electrophysiological activities in the brain – besides the ones related to external stimuli used in studies – the EEG responses generated by the stimuli need to be averaged in order to cancel out all the activity not related to the stimuli. The resulting average response curve to a particular stimulus is called the event-related potential (ERP) and it shows only electrical brain events specifically related to the event of interest. (Revonsuo 2010, 170.)

The temporal resolution of EEG is very high at the millisecond level (Ariely & Berns, 2010, 288; Degerman et al. 2006, 105; Revonsuo 2010, 156). This is an advantage of EEG since it enables detection of changes in brain activity with fast changing stimuli, for example TV commercials (Ohme et al. 2009, 23). Another advantages of EEG include

the relatively low cost of equipment, portability and the fact that it does not cause claustrophobia that is experienced by some subjects with MEG, PET and fMRI. Finally, EEG does not measure the secondary responses of glucose and oxygen consumption that PET and fMRI (respectively) measure but the neural activity of the brain. (Mason, Ebersole, Fujiwara, Lowe & Bowyer 2013, 193.)

In contrast, spatial resolution is a considerable limitation of EEG as it is not possible to accurately locate the neuronal sources (Mason et al. 2013, 193; Du Plessis 2011, 128; Revonsuo 2010, 156) but this can be increased slightly by increasing the amount of electrodes placed on the subject's scalp (Ariely & Berns 2010, 288; Du Plessis 2011, 128). On the other hand Malmivuo (2005) argues against the notion of poor spatial resolution and compares EEG to MEG in this matter. Nevertheless, especially deep brain structures are still difficult to reach with EEG (Ariely & Berns 2010, 288; Ohme et al. 2009, 23). In addition, possible differences in the skull thickness can distort results (Mason et al. 2013, 193).

3.4.2 Magnetoencephalography (MEG)

MEG measures very weak but detectable changes in magnetic fields caused by electrical brain activity (Kenning et al. 2007, 137; Revonsuo 2010, 156) and around 4–6 cm^2 of active neuronal tissue is needed for a detectable signal (Mason et al. 2013, 191–192). During an experiment the subject's head is placed inside a housing which contains an array of sensors called superconducting quantum interference devices, SQUIDs (Senior et al. 2007, 159). MEG needs to be placed inside a magnetically shielded room in order to prevent electromagnetic fields in the environment to influence the collected data, and additionally the device needs to be placed as close as possible to the subject's head (Senior et al. 2007, 161).

Advantages of MEG include an excellent temporal resolution as it is possible to trace brain processes at the millisecond level (Pop & Iorga 2012, 638; Hari 2006, 111; Revonsuo 2010, 156). Additionally, MEG measures neural activity in comparison to PET and fMRI that detect secondary neuronal needs of glucose and oxygen consumption. Furthermore, differences in the thickness of the skull will not distort the magnetic fields and thus measurements as with EEG. (Mason et al. 2013, 193.)

There are of course also limitations with MEG. One of the limitations is the spatial resolution at least compared to fMRI (Senior et al. 2007, 159), although some authors argue that the spatial resolution at the millimeter level is decent (Mason et al. 2013, 193; Hari 2006, 111). Additionally, as the neuromagnetic signals are very weak, only activities of cortical areas (surface of the brain) can be detected with MEG (Revonsuo 2010, 156).

Other weaknesses include high costs of equipment and maintenance, requirement of magnetically shielded room and possible distortions in the signals by non-removable metal in the subject's body (Mason et al. 2013, 193).

3.4.3 Positron emission tomography (PET)

PET measures the neuronal metabolism of glucose which has been linked to brain activity (Plassmann et al. 2007, 155). The subject receives a small amount of radioactive pharmaceutical that mimics for example natural glucose, and gamma radiation from the decaying radioactive tracer within the pharmaceutical is captured by a PET scanner (Plassmann et al. 2007, 155). It is then possible to derive and visualize information on the metabolism from the detected distribution (Kenning et al. 2007, 138). Different types of molecules (i.e. water, glucose) can be used to study different brain activities or metabolism – such as blood flow, glucose metabolism or neurotransmitter binding (Revonsuo 2010, 155).

The spatial resolution of PET is quite good (3–6 mm) whereas the temporal resolution of minutes is a disadvantage of this technique (Kenning et al. 2007, 138). The applications of PET are limited since radioactive tracers are being used (Plassmann et al. 2007, 155; Kenning et al. 2007; 139) but as Aalto (2006, 123) argues, the radiation stress during an experiment is very low and thus pose no threat to healthy subjects. Still, as Du Plessis (2011, 130) concludes, based on the limitations of this technique, PET is not likely to be used in marketing research.

3.4.4 Functional magnetic resonance imaging (fMRI)

In this thesis the most recent neuroimaging technique – fMRI – is described more in detail as it is used in the majority of academic neuroimaging studies related to consumer neuroscience (Solnais et al. 2013, 72). Although fMRI is commonly referred to in consumer neuroscience literature, a distinction between the *structural* and *functional* MRI is not very often made. The *structural* MRI creates high-resolution and three-dimensional anatomical pictures of the brain, whereas the *functional* MRI (fMRI) additionally reflects changes in the amount of oxygenated blood flowing in the brain (Revonsuo 2010, 154), of which consumer neuroscience is interested in. The relevance of this will be discussed shortly, but first the basic principles of fMRI will be presented.

fMRI creates images of the brain with the help of strong, static magnetic fields that are measured in units of tesla. These strong magnetic fields are needed in order to stimulate hydrogen atoms in the human body. Normally these hydrogen atoms are spinning randomly in human bodies but inside the fMRI scanner's magnetic field, the atoms are forced

in the same direction. Images of the brain are created by sending radiofrequency pulses into the magnetic field of the fMRI scanner where the subject is placed. This pulse disrupts the aligned hydrogen atoms by forcing them back to moving randomly. Once the pulse is over, the atoms return to the uniform direction created by the magnetic field. These effects are then measured to distinguish between different tissue types. (Reimann et al. 2011, 613–614.)

Repeated identical radiofrequency pulses are referred as a pulse sequence that is formed by two factors: repetition time and echo time. The time interval between pulses, repetition time, is typically between 1.5 to 3 seconds while the time from pulse to acquiring data, echo time, is typically between 25 to 60 milliseconds. These two factors affect the results of the scans as higher repetition time produces better quality images but increases the experiment time, and as echo time affects the image quality. As a result of these variations, research reports should specify different variables used in the study such as magnetic field strength, repetition time and echo time. (Reimann et al. 2011, 614.)

Now, for consumer neuroscience the ability of fMRI to differentiate between oxygenated and deoxygenated blood by sending radiofrequency pulse sequences and observing the echoes, is of importance. In strong magnetic fields oxygenated blood is less magnetic. (Reimann et al. 2011, 615.) A strong correlation has been proved to exist between increases in brain activity and oxygenated blood (Logothetis & Wandell 2004, 760; Rinne, Salmi, Degerman & Alho 2006, 126; Senior et al. 2007, 155; Pop & Iorga 2012, 638) and by observing changes in blood oxygen levels after neural activity, brain areas of interest can be identified. The change is referred to as hemodynamic response and a functional contrast between active and non-active brain areas can be identified by comparing these hemodynamic responses. These changes are detectable in terms of space and time, and with fMRI the spatial resolution is good but the temporal resolution on the other hand is worse. (Reimann et al. 2011, 615.)

One important benefit of fMRI is the spatial resolution of 2–10mm which makes it possible to have higher resolution images and to measure changes occurring in deeper brain structures (Plassmann et al. 2007, 157). Additionally, Kenning et al. (2007, 139) argue that even though the temporal resolution is not as good as with EEG and MEG, fMRI balances the spatial and temporal resolutions allowing scans of whole brain in moderate time. They continue that it is also possible to increase one parameter at the expense of another parameter which leads to either improved temporal or spatial resolution. (Kenning et al. 2007, 139.) In comparison to PET, with fMRI it is possible to repeat experiments on the same subject as the technique does not require radioactive substances (Pop & Iorga 2012, 638; Kenning et al. 2007, 139). fMRI also allows researchers to locate and differentiate constructs that are subjectively perceived similar but are in reality processed differently and it is also possible to measure simultaneous activation of two opposing conditions and processes (Reimann et al. 2011, 612).

As a restriction, some authors argue that fMRI has a relatively poor temporal resolution of 5–10 seconds (Plassmann et al. 2007, 157; Revonsuo 2010, 154). Additionally, Kenning et al. (2007, 147) argue that fMRI limits the experimental designs when compared to traditional marketing research by requiring special environments, as the experiments are carried out in a restricting medical environment. The subject also needs to lie completely still in a narrow tube with loud noises and these factors further restrict the designs and executions of experiments with fMRI (Rinne et al. 2006, 127). Furthermore, in order to overcome the fact that fMRI signal contains noise, several repetitions of the same stimuli are required (Santos, Seixas, Brandão & Moutinho 2012, 755). Finally, high data acquisition costs and complexity of analysing the data are notable restrictions of this technique (Plassmann et al. 2007, 157; Kenning et al. 2007, 147).

3.4.5 Comparison of different techniques

The similarities and differences, as well as advantages and disadvantages of the four techniques presented above are discussed next. An overview of different brain imaging techniques is presented in Table 3. The table is based on the discussion above, as well as on the work of Solnais et al. (2013) and Plassmann et al. (2007).

Table 3: Overview of advantages and disadvantages of different neuroimaging techniques (adapted from Solnais et al. 2013, 72; Plassmann et al. 2007, 156).

Technique	What is measured	Advantages	Disadvantages
EEG	Changes in the electric current	Temporal resolution Costs	Spatial resolution
MEG	Changes in the magnetic field	Temporal resolution	Spatial resolution Costs
PET	Changes in metabolism	Spatial resolution	Invasive technique Temporal resolution Complexity and costs
fMRI	Changes in metabolism	Spatial resolution Covers deeper brain structures	Temporal resolution Limited experiment designs Complexity and costs

Every current neuroimaging technique has both strengths and limitations (Kenning et al. 2007, 139). Du Plessis (2011, 127) argues that the accuracy of spatial resolution in comparison to accuracy of temporal resolution is the most important difference when comparing brain imaging techniques. In this respect the four techniques can be grouped into two groups that are also true to the grouping based on what is measured (electrical

brain activity or neural metabolism processes): EEG and MEG have superior temporal resolution and PET and fMRI have superior spatial resolution.

One advantage of both EEG and MEG is that they measure signals that originate directly from the electrical activity of neurons, not the secondary responses that PET and fMRI measure (Mason et al. 2013, 193; Revonsuo 2010, 155). When comparing EEG and MEG, it should be noted that these two are only partly independent techniques and experiments utilizing both of them provide only some additional information of the brain and the more beneficial technique at a time depends on the certain application (Malmivuo 2012, 18). One of the most notable differences between the two is that EEG is notably cheaper than MEG (Perrachione & Perrachione 2008, 314).

When comparing techniques with superior spatial resolution, the invasive PET stands out because it requires radioactive tracers and thus the applications are limited (Plassmann et al. 2007, 156). Both fMRI and PET are expensive and complex techniques which might limit their use in the context of consumer neuroscience. During experiments the subjects lie in a confined space and might experience claustrophobia (Plassmann et al. 2007, 157). Because of the environmental restrictions of the machines, the experimental designs are limited (Kenning et al. 2007, 147).

Overall the choice of which technique to use should be based on the research question of the study (Plassmann et al. 2007, 157). Additionally, the combined use of different techniques is widely encouraged in the literature. For example, Hari (2006, 114) argues that it is important to combine data from MEG and fMRI in order to achieve both millisecond temporal accuracy and millimetre spatial accuracy. Lopes da Silva (2013, 1124) argues that the limited spatial resolution of EEG and MEG can be compensated, to some extent, by techniques with better spatial resolution and that these integrated methodologies are being actively developed. This will allow researchers to take into consideration both the advantages and limitations of each technique (Pop & Iorga 2012, 638). Yet, as Solnais et al. (2013, 72) found out in their review, none of the 34 consumer neuroscience studies collected from between 2001 and 2012 combined different neuroimaging techniques. Finally, Fugate (2007, 386–387) argues in a critical manner that none of these techniques are ideal for marketing research as they are unwieldy, expensive, disturbing to the subject and their results can be interpreted subjectively. Nonetheless he continues that these techniques "*offer the best physical evidence to date of how the brain processes the information behind purchase decisions*" (Fugate 2007, 387).

It should also be noted here that none of the techniques discussed automatically create the familiar colourful images of the brain, but that the pictures are formed by combining data from brain's resting state and a stimulated state, with the assumption that differences are created by the stimulation. Additionally the exact same areas of the subject's brain do not "light up" every time the stimuli are presented and to overcome this, the experiment

needs to be repeated on the same subject and also measure other subjects before averaging the results. (Du Plessis 2011, 131.)

3.5 Potential uses of consumer neuroscience

Plassmann et al. (2012, 30–32) divide the potential of consumer neuroscience into two: neuroscience as a tool and as basis for theory generation. According to them, *potential as a tool* is based on the possibility to predict behaviour more accurately than with traditional methods like self-reports, and on the possibility to establish meaningful brain-behaviour relationships by combining different neuroscientific methods. Better understanding of physiological, neural and behavioural predictors of for example in-store purchase or overspending would be beneficial for consumer neuroscience research. Combination of different neuroscientific methods could also provide a deeper understanding of the relationship between consumer behaviour and neuropsychological processes. This could advance the understanding of basic mechanisms as well as individual differences in terms of consumer decision making. The *potential as basis for theory generation* on the other hand refers to the possibility of integrating concepts and findings between consumer psychology and neuroscience. This interdisciplinary development could be mutually beneficial in terms of improving the understanding of decision making and preference formation. (Plassmann et al. 2012, 30–32.)

Perrachione and Perrachione (2008, 308–311) propose that the marketing mix (product, price, place and promotion) offers potential perspectives for studying the functional neural architectures – especially the concept of *value* which is an integral part of all the four components of the marketing mix. In relation to value, researching further the reward system of the brain could potentially explain the neural foundations of price perception or differential consumer responses to necessities, luxuries and fads. Also the effect of value-adding activities, such as promotions, to the reward systems could be researched; what effect features and activities like coupons, rebates and sales could have on the reward system? (Perrachione & Perrachione 2008, 308–309.)

Hubert and Kenning (2008, 275–283) also use the marketing mix as a base for consumer neuroscience studies. In terms of *product policy*, traditional marketing research methods like surveys usually do not provide desired information about consumer's opinions of products. Consumer neuroscience could provide a more objective and thorough understanding of the desires of consumers and thus help companies in adjusting their strategies. Asking consumers about *price policy* can be ineffective and even misleading as they might respond according to their own benefits when asked for example about price fairness. It has already been studied that more expensive wines were evaluated being bet-

ter and that there were also significant neural activation differences in the brain, in relation to price information. Additionally, there is an opportunity for individual pricing that would be based on consumers' valuation of a product or service. For this individual price adjustment, information of individual's willingness to pay would be needed and it is currently being studied within the field of consumer neuroscience. *Communication policy* (promotion) is a significant part of marketing mix and understanding for example how advertising stimuli are processed and stored is important. Currently advertisement processing, recalling and recognition are studied within the field. Finally, *distribution policy* (place) that is concerned with optimal distribution of goods and services, can benefit from consumer neuroscience studies. (Hubert & Kenning 2008, 275–283.)

Another interesting possibility lies in applying a well-documented effect of strong electrical responses to stimuli that are unexpected. It has been shown with EEG that electrical activity from situations requiring sudden re-evaluations can indicate the unexpectedness of the situation, which in turn could be used to research many market-oriented paradigms. Examples of this include findings of greater expected reward eliciting stronger electrical responses in a simulated game of blackjack. These results could be applied to compare consumers' expectation relationships between the price and perceived quality of a product, or to identify what kind of information is valued by customers in relation to different products. Furthermore, regarding the perceptual development of value, consumers find different products alluring but it is unclear how these preferences develop over time. The neural foundations for personal preferences thus offer an interesting opportunity for research: how consumer preferences of one product or brand over another are influenced by experience or exposure to advertisement, and how difficult the alteration of these preferences is? The questions raised here could possibly be answered by better understanding the underlying neural basis of reward, or value. (Perrachione & Perrachione 2008, 309.)

Kenning et al. (2007, 147–148) propose few practical examples of using neuroimaging techniques from marketing practitioner's perspective. First, as marketing managers are usually facing decision making situations between different advertising concepts, neuroimaging techniques such as fMRI could be used to compare neural correlates of different sequences of a TV advertisement. Second, decisions of advertisement environments must be made to determine for example which magazine is best for the advertisement. There is evidence suggesting a subconscious framing effect in which credibility judgments of headlines were linked to different magazine brands, so the impact of the media frame to advertisement could be researched. (Kenning et al. 2007, 147–148.)

Traditionally market segmentation has been based on consumer demographic variables or consumer attitudes, but there could also be a cognitive segmentation approach which would address individual differences in decision-making process (Venkatraman,

Clithero, Fitzsimons & Huettel 2012, 144). At the moment there is difficulty in understanding of both conscious and unconscious thought processes applied when consumers make decisions, but an understanding of the neural mechanisms that underlie decision making could create new market segmentation approaches – which would be another example how neuroscience could contribute to marketing and consumer research. (Venkatraman et al. 2012, 144–150.)

Consumer neuroscience can benefit consumers as well, for example in a way that desirable products and services are provided for them. They can also better understand their own behaviour as a result of research findings. Additionally, consumers can benefit from the research on neural correlates of shopping addiction; findings in this area could possibly help individuals control their buying habits. (Hubert & Kenning 2008, 288.) Lindstrom (2008, 4–5) also argues that it is beneficial for consumers to better understand their own purchase behaviours so that they are aware and can defend against advertisers' tricks and tactics. Furthermore, as companies better understand the needs and desires of consumers, they can bring more meaningful and useful products to the market (Lindstrom 2008, 5).

3.5.1 Consumer neuroscience compared to traditional methods

Companies are increasingly using private neuroimaging studies before launching new products in order to get more accurate responses from consumers compared to interviews and surveys (Georges et al. 2014, 47). When studying the processes and conditions behind consumer behaviour, fMRI is an attractive candidate because it allows measuring of underlying processes as they occur during information processing, which is not possible with self-reports that require participants to make judgments afterwards (Reimann et al. 2011, 611). Additionally, processes and conditions below the threshold of awareness (nonconscious processes and conditions) may be measured with fMRI – compared to self-assessment measures that require willingness and ability to report accurately (Hubert & Kenning 2008, 273; Reimann et al. 2011, 611; Georges et al. 2014, 14). This is seen as particularly promising for better understanding aspects of consumer behaviour because there is considerable evidence of nonconscious phenomena affecting information processing (Reimann et al. 2011, 611). Finally, neuroimaging techniques do not rely on verbal communications or declarative information in contrast to traditional methods (Pop & Iorga 2012, 638–639).

3.5.2 Example studies

Perhaps one of the most cited studies in the field of consumer neuroscience is that of McClure, Li, Tomlin, Cypert, Montague and Montague (2004) about neural correlates of behavioural preference for Coca-Cola and Pepsi. In their study the authors used taste tests and fMRI to find neural responses correlating with behavioural preference for Coca-Cola or Pepsi, and also studied how brand image influences behavioural choice and brain response. Coca-Cola and Pepsi were chosen for the study because they are both culturally familiar to test subjects and despite the similarity of chemical composition of the drinks, they tend to have a notable subjective preference among subjects. (McClure et al. 2004, 379–380.)

In the study 67 subjects were separated into four groups. All groups had both a taste test without the fMRI and a drink delivery paradigm inside the scanner. The groups were first asked whether they prefer Coca-Cola or Pepsi, or if they do not have any preference. In the next phase two of the groups had a forced-choice taste test with unmarked cups containing either Pepsi or Coca-Cola. The other two groups had a test taste with one marked cup (either Coca-Cola or Pepsi) and a clue that the other cup contains either of the drinks; both of the cups actually had the same drink. In the final phase all of the groups had experiments in the fMRI that were analogous to the taste tests. The experiments included a delivery of one of the drinks in relation with different visual stimuli, for example a picture of Coca-Cola can or just a certain color light. (McClure et al. 2004, 380.) For a more detailed description of the experiments, see McClure et al. (2004).

The results of the study were interesting. Without brand information the subjects were equal in preferences for either of the drinks in the taste tests and the fMRI results corroborated this. When testing the effects of brand knowledge, the authors found out that the Coca-Cola label had a significant effect on behavioural preference in the taste test, although all the cups contained Coca-Cola. This effect was reflected also in the fMRI experiments. There was significantly higher brain activity in certain brain areas when an image of Coca-Cola can was presented before delivery of the drink when compared to other stimuli (light) presented before delivery. With Pepsi, there were no significant differences on brain areas with and without brand knowledge before the delivery of the drink. The authors concluded that the subjects' expressed behavioural preferences were significantly influenced by brand information. (McClure et al. 2004, 384–385.) However, care should be taken with these interpretations and this issue will be discussed along with other limitations in the following chapter (3.6.1).

Another well-known study by Yoon, Gutchess, Feinberg and Polk (2006, 31) investigated "*whether semantic judgments about products and persons are processed similarly*". The study addresses the arguments that products can have humanlike traits as the concept of brand-personality has received competency among academics and practitioners. There

are also studies suggesting that the relationship between consumers and brands has similarity to social relationships, but studies like these have been controversial. Recent cognitive neuroscience studies propose that persons and objects are processed by different neural correlates and based on this the authors hypothesized that "*product-based judgments, such as brand-personality judgments, are processed differently from human-based ones, specifically, in different brain regions*". (Yoon et al. 2006, 31–32.)

The study began with a pretest where appropriate persons and brands were identified for the fMRI experiment. Both the brands and well-known individuals were selected if they had some familiarity and reasonable level of liking among participants. In the actual fMRI experiment 20 subjects were presented a trait adjective and a target cue (for example "Bill Clinton" or "Coca-Cola") and the task was to answer whether the adjective describes the cue. (Yoon et al. 2006, 33–35.) For a more detailed description of the experiment, see Yoon et al. (2006).

The results of the study confirmed the authors' hypotheses that person and brand judgments are modulated by different regions of the brain. The results suggest that separate processes are involved in judgments of persons and brands. In another words, the authors conclude that their findings, along with previous neuroimaging studies, suggest that brand personalities may not be processed similarly to human personalities but involve processes that are not extending to person trait processing. (Yoon et al. 2006, 36–38.)

Consumer neuroscience studies have also covered topics such as compulsive buying behaviour. Raab, Elger, Neuner and Weber (2011) for example studied neural correlates of compulsive buying behaviour with the help of fMRI. They studied compulsive and non-compulsive buyers and found significant differences in brain activation. The authors conclude that their findings could help explain why compulsive buyers lose control of their buying behaviour. (Raab et al. 2011.) In the following Table 4 more example studies of consumer neuroscience using fMRI are briefly presented, based on the work of Kenning et al. (2007).

Table 4: Overview of selected consumer neuroscience studies using fMRI (adapted from Kenning et al. 2007, 145–146).

Authors	Field	Question	Results
Erk et al. (2002)	Decisions between different products (automobile)	Is it possible to find neural correlates to evaluate the attractiveness of a product?	Products which symbolize wealth and status lead to a higher activity in areas which are responsible for rewards
Deppe et al. (2005a)	Choice between different brands	Which neural correlates form the basis of brand choice?	In a decision-making process, favorite brands reduce analytic processing and lead to increasing attractiveness in the fields associated with rewards
Deppe et al. (2005b)	Influence of brands on credibility judgments	Which neural correlates form the basis of brand information as a frame in decision processes connected?	In situations of doubtful credibility, brand information has an important influence on the decision-making process which results in higher attractiveness in the fields which include rewards in decision making
Klucharev et al. (2005)	Advertising effect of celebrities	How does the so-called "Expertise Hook" influence recollection?	The presumed expertise of celebrities leads to an increased activation in memory structure and a significant positive influence on purchase intention
Plassmann et al. (2006)	Choice between different store brands by loyal and disloyal customers	What is the neural mechanism behind brand loyalty?	Loyal retail store customers show significant neural activations in brain areas involved in reward processing when their preferred store brand is for choice as compared to disloyal customers

This is just a fraction of consumer neuroscience studies as for example Solnais et al. (2013, 72–73) collected and examined 34 studies from between 2001–2012 that were related to this field of study. The field of consumer neuroscience is also quite broad and not limited to only studying brands and advertising as the study of Raab et al. (2011) about compulsive buying behaviour illustrates – although brands and advertising seem to dominate the field to date.

3.6 Issues for debate for consumer neuroscience

While it seems that consumer neuroscience offers promising results, there are also notable limitations based on both the techniques itself and functioning of human brain. Consumer neuroscience has also received considerable amount of criticism and ethical aspects have been debated from the beginning. These issues are discussed next, starting from limitations and critique and after that the ethics of consumer neuroscience is covered.

3.6.1 Limitations and critique

One of the major limitations of current neuroeconomics research is that the validity and reliability of findings are uncertain as there is a lack of replicating studies, sample sizes are usually small and experimental settings are relatively simple (Hubert 2010, 813; Georges et al. 2014 50). Additionally, regardless of technical improvements of different

neuroimaging techniques, the limitations in spatial and temporal resolution lead to comparatively indirect measurements of changes in cortical activity (Hubert 2010, 813). Even though neuroeconomics is discussed here, these limitations can be associated with consumer neuroscience as well.

It is important to keep in mind that at the moment the research within consumer neuroscience is mainly unrelated studies concerning a variety of potentially relevant issues (Plassmann et al. 2007, 151). Consumer neuroscience has improved our understanding of the brain and neural mechanisms processing marketing stimuli, but still not much progress has been made to integrate and verify existing theories of consumer behaviour (Solnais et al. 2013, 79). Hubert also (2010, 813) addresses this issue and argues that a key challenge for consumer neuroscience and neuroeconomics is to validate the existing results and further expand them. Validating and replicating the obtained results, and also applying complementary and alternative techniques and methods, are needed "*for neuroeconomics to change from a context of discovery to a context of reasoning*" (Hubert 2010, 813–814). Unless these issues are addressed, that is mainly the heterogeneity of methods and experimental conditions, it is difficult for consumer neuroscience to propose generalizations that would be meaningful to consumer research (Solnais et al. 2013, 79).

Conducting neuroscientific research is expensive, apart from EEG (Perrachione & Perrachione 2008, 314; Plassmann et al. 2007, 156; Hubert & Kenning 2008, 288). Neuroimaging techniques also require special, medical and technical environments and apply quite simple experimental designs, which is both unrealistic in marketing context and could distort the results (Plassmann et al. 2007, 169). As a general example, if conducting a study on *love* for example, a simple abstract task must be designed and carried out repeatedly while the participant is lying still and quiet, and these constraints inevitably distance the study from real life experience of the phenomenon (Whiteley 2012, 246). In addition, as the underlying neurophysiological processes are complex, a deep understanding of the neuroimaging techniques is needed to conduct sound research. This is important to keep in mind because the general public and advertisers can easily wave aside technical and neurophysiological restrictions and treat initial results as truth, so it is crucial to discuss the results carefully in order to avoid misusing of neuroimaging techniques in marketing research. (Plassmann et al. 2007, 170.) As Whiteley (2012, 263) puts it, a functional brain scan is a complex process "*from idea to experiment, from data to analysis, from statistics to scan image, from experiment to real world phenomenon and from image back to inferences about the persons it implicates – each stage of which is contested ground*".

All four neuroimaging techniques discussed are complex and require more expertise and longer time periods for acquiring data compared to methods traditionally used in marketing research (Plassmann et al. 2007, 156). In line with this, Solnais et al. (2013, 79) argue that it is unlikely that the modern neuroimaging techniques would replace self-report measures and other traditional methods of behavioural science. Rather they believe

that different methods should be used jointly in order to gain more thorough and precise understanding of various components of consumer behaviour (Solnais et al. 2013, 79).

Senior et al. (2007) have studied participants' perspectives about different brain imaging techniques. They found out that both fMRI and MEG procedures had a slightly negative reputation among participants before experiments and while, in general, the experiments were reported to be positive and even fascinating, some participants still felt anxious about these techniques after experiments. Additionally, MEG was reported to be tiring and uncomfortable mainly due to head restrictions. These issues can have an impact on willingness to participate in marketing research studies even though the techniques are non-invasive and mainly perceived to be positive and interesting. The authors conclude that after all, participants' positive experiences allow an optimistic endorsement for use of these techniques in neuromarketing research. (Senior et al. 2007, 157–162.)

Neuroscientists have been considerably sceptical toward neuromarketing (Lee, Broderick & Chamberlain 2007, 199; Perrachione & Perrachione 2008, 313). Reasons for the scepticism may include normal scientific criticism toward claims of new research field and also the lack of communication of what marketing involves in terms of research. If neuromarketing is seen by neuroscientist as a tool of manipulating consumers, it is likely that the discussion between neuroscience and marketing will revolve mainly around ethical issues, despite potential for research programs that could be mutually informative (Perrachione & Perrachione 2008, 313). It should be kept in mind though that despite the doubts of possible unethical, immoral and dangerous applications (Grimes 2006, 452), it is not possible to manipulate consumer behaviour with current technology in a way that they could not detect it (Fisher et al. 2010, 235).

Another important factor to keep in mind is the neuroscience effect in which solely an appeal to neural explanation make claims more believable (Perrachione & Perrachione 2008, 314). It has been studied that in presence of brain images or simply a neural context, even poor explanations of psychological phenomena will become more believable, raising significant ethical issues. Researchers and practitioners need to avoid over-interpreting their results and to be sure of truthfulness of their claims. (Perrachione & Perrachione 2008, 314.) Whiteley (2012, 264) studied how neuroscience studies were presented in popular media and found out that overall there was a tendency of defining mental phenomena with neuroscientific language that "*could lend a stamp of authority to a range of political and disciplinary vocabularies*" but in a sample of almost 250 texts (news stories, articles, blogs etc.), many reports of fMRI studies used some kind of photographic illustration instead of the criticized scan images. Related to this is the issue of reverse inference which is increasingly used in consumer neuroscience studies (Reimann et al. 2011, 612; Plassmann et al. 2012, 29). Data of local brain activity is acquired as a response to different cognitive tasks during fMRI scans and this data permits researchers to infer something about the role of certain regions of brain in certain cognitive functions. Yet the

opposite inference is increasingly used; inference of engagement of certain cognitive functions based on activation in certain regions of brain. Even though such inferences may provide some information, they are not deductively valid. (Poldrack 2006, 59.) Reverse inference can lead to over-simplifications when assumptions are made that activation of a certain brain region is associated with a particular psychological process (Solnais et al. 2013, 75). As Harrison (2008, 339) puts it, there is a fear that neuroscience's important and impressive machines will make it harder for anyone to distinguish between scientific knowledge and great story-telling.

Finally, it should be critically evaluated if there is an actual need for brain imaging research, in a way that it would add something new to conclusions, or whether traditional and less expensive methods such as behavioural tasks could be enough to reach the marketing project's goals (Perrachione & Perrachione 2008, 315). It needs to be kept in mind that the brain is an intricate organism and studies attempting to increase our understanding are still in early stages (Georges et al. 2014, 18). Another important aspect is that neuromarketing raises a range of issues for users, legislators, marketers and consumers which need to be addressed.

3.6.2 Ethical concerns

There are several ethical concerns regarding the use of brain imaging techniques in marketing. One of these concerns is incidental findings. Illes et al. (2006, 783) define incidental findings as "*observations of potential clinical significance unexpectedly discovered in healthy subjects or in patients recruited to brain imaging research studies and unrelated to the purpose or variables of the study*". Morris et al. (2009, 6) estimated in their meta-analysis that the prevalence of incidental findings in brain scans is 2.7%, in other words one in 37 neurologically asymptomatic people. It is thus important to introduce procedures of handling such incidental findings (Illes et al. 2006, 783; Nelson 2008, 319).

Georges et al. (2014, 46) argue that even though neuromarketing techniques can be used in a misleading and manipulative manner, research should not be intercepted. They continue that neuroscience knowledge itself is not unethical but using it unethically or for criminal purposes should be limited and banned, and that censorship should not intervene at the neuroscience level (consumer neuroscience) but at the marketing application level (neuromarketing). Additionally they distinguish between motivating and manipulating consumers: the former referring to mutual benefits for both the company and consumer, and the latter referring to one-sided benefit for the company. Finally, marketing has already been applying manipulative means in advertisement such as photographing the insides of cars with wide-angle lenses, so ethical issues are not new and only related to this

emerging field. Ethical issues should be addressed by all marketing professionals in everyday decisions. (Georges et al. 2014, 46–47.)

Javor et al. (2013, 7–8) argue that it is necessary to initiate an elaborate ethical discussion of both marketing research and practice with marketing practitioners and researchers, ethicists and neurologists, who could contribute to the discussion with firsthand experience in ethics of clinical research and methodological knowledge. Especially the experience and knowledge of neurologists is needed to clarify what kind of information it is possible to acquire with current neuroimaging techniques and methodologies and what might be the effects on society (Javor et al. 2013, 7). They continue that unfounded claims made mainly by commercial neuromarketing companies have led to a situation where media coverage of consumer neuroscience and neuromarketing has mostly dealt with generally feared mind reading and locating a "buy-button" in human brain – even though there are no evidence of such things and it is unlikely that there ever will be, in scientific sense (Javor et al. 2013, 7). This argument is common among researchers (i.e. Yoon et al. 2012, 484).

Similar concerns are shared by Murphy, Illes and Reiner (2008, 295) who argue that it is important to adopt a code of ethics based on the moral grounds but also in order to prevent consumer neuroscience being accused of irresponsibility. They continue that there is a risk that exaggerated claims of consumer neuroscience could create mistrust, fear or anxiety in the general public and could also damage the public's trust of neuroscientists conducting "normal" neuroimaging research or even science in general. This trust is possible to earn with "*forthright communication and full disclosure of risks, benefits, and limitations of research findings*". (Murphy et al. 2008, 297.)

Based on these ethical concerns, Murphy et al. (2008, 298–299) have created a five-part code of ethics that they recommend to be acquired in the field of consumer neuroscience and especially in the practical level of neuromarketing:

- Protection of research subjects
- Protection of vulnerable populations
- Full disclosure of goals, risks and benefits
- Accurate media and marketing representation
- Internal and external validity

Protection of research subjects contains established methods in brain research such as informing the subjects and reminding them of their right to end the study at any point and for any reason, managing the findings responsibly and procedures for handling findings that are incidental (pathological findings). *Protection of vulnerable populations* refers to protecting potentially vulnerable populations that can be easily influenced, such as chil-

dren or people with psychological disorders, by incorporating supplementary ethics review for research with subjects of these populations. *Full disclosure of goals, risks and benefits* includes both verbal and written communication of all parts of the research, including the ethics principles. *Accurate media and marketing representation* requires neuromarketing companies to market themselves and their scientific methods and measures of validity accurately in business-to-business materials and mass media. Finally, *internal and external validity* refers to ensuring comprehensive research data to offer meaningful results to consumers and aligning methods and neuromarketing products with expanding knowledge of neuroscience and developing technologies. (Murphy et al. 2008, 298–299.)

In contrast to ethics discussion above, Lee et al. (2007, 203) point out that instead of only negative ways, there are also positive ways of how neuroimaging can contribute to marketing ethics. For example studying advertising effectiveness by means of neuroimaging – which has caused negative reactions among neuroscience researchers – could reduce, not increase, reliance on currently used controversial tactics such as sexual imagery by studying which elements of advertisement are critical in creating awareness or evaluating products. Additionally, it could be possible to discover if negative effects like overconsumption are caused by marketing activities. (Lee et al. 2007, 203.)

As the ethical issues of consumer neuroscience and neuromarketing practices are significant and under rigorous scrutiny by the scientific community and perhaps at least in the near future also by legislative bodies, it might be easy to agree with Georges et al. (2014, 262): "i*f neuromarketing becomes manipulative, it is on the road to ruin*".

3.7 Future of consumer neuroscience

Even though there is no consensus regarding the benefits of consumer neuroscience – or even the limitations – one argument seems to arise time and time again from the current literature, regardless of the authors' views: traditional marketing research methods are not going to disappear. For example, Page (2011, 135) argues that even though a clear and significant value can be seen in some neuroscience methods, it is only when used along with existing research methods and only when carefully interpreted by individuals with experience from the field. Traditional marketing research methods will not be replaced by consumer neuroscience and neuroimaging techniques, rather they can bring an additional point of view and provide complementary information (Georges et al. 2014, 47; Venkatraman et al. 2012, 149; Page 2011, 140–141).

Although researchers commonly argue that there are many unresolved issues concerning the future of consumer neuroscience – many of which have been presented in chapter 3.6 – majority of authors seem to be cautiously optimistic about the future. A marriage of marketing and neuroscience is seen likely to yield important discoveries into the function

of the brain and how it is adapted to the complex, commercial environment, but still it will require adoption of scientific mindset to avoid the pitfalls of over-interpretation, which is common in commercial activities and communication (Perrachione & Perrachione 2008, 315). Lee et al. (2007, 203) argue that this field should be considered as legitimate and important area of future research which would allow better understanding of human behaviour in an important context by improving our understanding of what happens in response to marketing stimuli and in marketing-relevant situations. Additionally, regardless of limitations related to current, limited understanding of functioning of the human brain, for practical level marketing applications it may be more important to be able to predict future behaviour rather than to understand the 'why' of behaviour (Ariely & Berns 2010, 287). Finally, as Fugate (2007, 391) phrases: "*it is strategically risky to ignore a promising new science, even worse to accept it without question*".

4 EMPIRICAL RESEARCH

Next the methodology of the empirical research is discussed. After this the construct of measurements of the quantitative study is explained and data collection and analysis methods discussed, followed by similar discussions of the qualitative study. Finally, reliability and validity of the empirical research will be addressed.

4.1 Methodology

Commonly used classification of research designs is qualitative, quantitative and mixed methods (Creswell 2009, 3–4). Mixed methods design was chosen for this study in order to utilize the strengths of each method while avoiding the weaknesses. The chosen research method should be based on the purpose of the study or research question (Kananen 2008, 118) and as the phenomenon of consumer neuroscience is fairly new and complex, a mixed methods approach was chosen to gain a deeper understanding. In quantitative research relationships among variables is measured for testing objective theories (Creswell 2009, 4). Variables can be measured and resulting numerical data can be analysed by means of statistical procedures (Creswell 2009, 4). Qualitative research can be used to deepen the understanding of quantitative research findings, which is a form of triangulation – methods triangulation. The phenomenon is approached with multiple methods and thus the interpretations can be strengthened and the reliability of the study increased. (Kananen 2008, 26.)

A research methodology, or research strategy, is a type of quantitative, qualitative or mixed methods designs that "*provide specific direction for procedures in a research design*" (Creswell 2009, 11). The research methodologies chosen for this study are survey and interview. Survey is chosen as quantitative research methodology because it provides a quantitative description of opinions, trends or attitudes of a population by studying a small sample of that particular population. Generalizations or claims about the population can be made from sample results. (Creswell 2009, 145.) This decision is based on the purpose of the study. In other words, in order to study the perceptions of both consumers and marketing professionals, a survey is used because it provides an economical way to measure quantitatively the attitudes of a small sample and then generalize the findings to a population (Creswell 2009, 146). Interview is chosen as the qualitative research methodology because qualitative descriptions can deepen and strengthen the interpretations from quantitative survey findings (Kananen 2008, 24).

4.2 Quantitative study

There are different attitude scales that apply standardized questionnaires, and participant's agreement or disagreement with a variety of statements relevant to attitude objects allow them to be positioned on a dimension that indicates his or her favorability towards the attitude objects (Burns 2000, 555). Attitudes are "*evaluated beliefs which predispose the individual to respond in a preferential way. That is […] predispositions to react positively or negatively to some social object*" (Burns 2000, 555). The Likert scale is applied in the survey as it is commonly used in similar studies. It involves a selection of attitude statements and each statement has a scale of usually 5 points, ranging from "strongly disagree" to "strongly agree". Participants then indicate their disagreement or agreement with the statements on these scales. (Burns 2000, 559.) Eser et al. (2011) also used a survey with five-point Likert scale in their study of perceptions of marketing professionals, neurologists and marketing academics about neuromarketing.

4.2.1 Construct of measurement

In order to empirically study and measure concepts, they need to be operationalized (Hirsjärvi, Remes & Sajavaara 2000, 144). Successful operationalization requires extensive and deep familiarization with existing literature and it can be understood as transforming abstract, theoretical concepts into tangible indicators that can be measured (Jokivuori & Hietala 2007, 10). Operationalization of key concepts in the survey utilize the overall structure of the study, which in turn is based on the four research sub-questions. The survey is thus divided in four distinct parts: (1) Benefits of consumer neuroscience, (2) Limitations and challenges of consumer neuroscience, (3) Ethical issues of consumer neuroscience and (4) Future prospects of consumer neuroscience in Finland. Both surveys have the same structure but some individual statements differ. The majority of statements are based on current literature but few items of interest, that are relevant to the current study, have been added. The construct of measurements of the consumer survey is presented in the following Table 5. Some of the questions in the surveys are based on the study of Eser et al. (2011) and are marked with an asterisk (*). The rest are developed by the author, based on existing literature on the subject, as there are to the knowledge of the author no similar studies that could be used in this study.

Table 5: Construct of measurements of consumer survey

Sub-questions	Theory chapter	Survey statement
What are the benefits of consumer neuroscience?	3.5	1 - It is not possible to find out which elements of advertisements viewers attend the most with brain imaging methods
	3.5	2 - It is not possible to find out what kind of products or services consumers want with neuromarketing
	3.5	3 - It is not possible to study compulsive buying behaviour with brain imaging methdos
	3.5	4 - It is not possible to develop better products or services with the help of brain imaging methods
	3.5	5 - Neuromarketing is not a more objective way of studying consumer preferences than surveys
	3.5	6 - It is not possible for consumers to better understand their own buying behaviour with the help of neuromarketing
	3.5	8 - Findings of brain imaging studies do not increase trustworthiness of marketing
What are the limitations and challenges of consumer neuroscience?	3.6	9 - It is possible to read people's minds with brain imaging methods
	3.6	10 - It is possible to unconsciously affect consumers with neuromarketing
	3.6	11 - Neuromarketing studies usually need to be conducted in specific enrvironments
	3.6	12 - There is a scientific consensus regarding findings of neuromarketing studies
	3.6	14 - It is possible to infer from brain imaging studies that decision-making processes are located in a specific area of the brain
	3.6	15 - Neuromarketing is expensive
	3.6	16a* - I could participate neuromarketing study as a research subject
What are the ethical issues of consumer neuroscience?	3.6	17 - Brain imaging methods should not be used in marketing
	3.6	18* - Neuromarketing is not manipulative
	3.6	19 - Neuromarketing does not expose young and otherwise vulnerable people to be exploited
	3.6	20* - Brain imaging methods do not cause side effects to research subjects
	3.6	21 - Brain imaging methods are not unpleasant to research subjects
	3.6	22 - Neuromarketing is not a way of selling unnecessary products and services
	3.6	23 - Use of neuromarketing should not be restricted by laws and regulations
What are the future prospects of consumer neuroscience in Finland?	3.7	24 - Use of neuromarketing will increase in the future
	3.7	25 - Use of neuromarketing will increase in Finland during next 5 years
	3.7	29 - Increase of use of neuromarketing is a good thing
	3.7	30a - Knowledge of use of neuromarketing in conjunction with a certain product or service affects my purchase intentions negatively
	3.7	31 - Use of neuromarketing affects the company's image negatively
	3.7	32 - I would like to know more about neuromarketing
	3.7	34 - I will follow advancements of neuromarketing

* = Eser et al. 2011

In total there are 28 statements in the consumer survey, 7 in each part of the survey. The statement "*increase of use of neuromarketing is a good thing"* (29) is only for consumers, and statements "*I could participate neuromarketing studies as a research subject*" (16) and "*knowledge of use of neuromarketing in conjunction with a certain product or service affects my purchase intention negatively*" (30) differ from those of professional survey but are still parallel to them – the phrasing being adapted to each respondent group. Otherwise the statements are the same for both groups and thus allow comparison between them. The construct of measurements of the professional survey is presented in Table 6.

Table 6: Construct of measurements of professional survey

Sub-questions	Theory chapter	Survey statement
What are the benefits of consumer neuroscience?	3.5	1 - It is not possible to find out which elements of advertisements viewers attend the most with brain imaging methods
	3.5	2 - It is not possible to find out what kind of products or services consumers want with neuromarketing
	3.5	3 - It is not possible to study compulsive buying behaviour with brain imaging methdos
	3.5	4 - It is not possible to develop better products or services with the help of brain imaging methods
	3.5	5 - Neuromarketing is not a more objective way of studying consumer preferences than surveys
	3.5	6 - It is not possible for consumers to better understand their own buying behaviour with the help of neuromarketing
	3.5	7 - It is not possible to study success of branding with neuromarketing
	3.5	8 - Findings of brain imaging studies do not increase trustworthiness of marketing
What are the limitations and challenges of consumer neuroscience?	3.6	9 - It is possible to read people's minds with brain imaging methods
	3.6	10 - It is possible to unconsciously affect consumers with neuromarketing
	3.6	11 - Neuromarketing studies usually need to be conducted in specific enrvironments
	3.6	12 - There is a scientific consensus regarding findings of neuromarketing studies
	3.6	13 - Findings of neuromarketing studies can be generalized
	3.6	14 - It is possible to infer from brain imaging studies that decision-making processes are located in a specific area of the brain
	3.6	15 - Neuromarketing is expensive
	3.6	16b* - It is easy to find research subjects for neuromarketing studies
What are the ethical issues of consumer neuroscience?	3.6	17 - Brain imaging methods should not be used in marketing
	3.6	18* - Neuromarketing is not manipulative
	3.6	19 - Neuromarketing does not expose young and otherwise vulnerable people to be exploited
	3.6	20* - Brain imaging methods do not cause side effects to research subjects
	3.6	21 - Brain imaging methods are not unpleasant to research subjects
	3.6	22 - Neuromarketing is not a way of selling unnecessary products and services
	3.6	23 - Use of neuromarketing should not be restricted by laws and regulations
What are the future prospects of consumer neuroscience in Finland?	3.7	24 - Use of neuromarketing will increase in the future
	3.7	25 - Use of neuromarketing will increase in Finland during next 5 years
	3.7	26 - Neuromarketing will replace current marketing research methods
	3.7	27 - Neuromarketing will become a cost-efficient tool for marketing as the techniques improve
	3.7	28 - Our company will use neuromarketing in the future
	3.7	30b - Consumer's knowledge of use of neuromarketing in conjunction with a certain product or service affects his/her purchase intentions negatively
	3.7	31 - Use of neuromarketing affects the company's image negatively
	3.7	32 - I would like to know more about neuromarketing
	3.7	33 - I am interested in using neuromarketing
	3.7	34 - I will follow advancements of neuromarketing

* = Eser et al. 2011

In total there are 33 statements in the professional survey and the following statements are only for professionals:

- it is not possible to study the success of branding with neuromarketing (7)
- findings of neuromarketing studies can be generalized (13)
- neuromarketing will replace current marketing research methods (26)
- neuromarketing will become a cost-efficient tool for marketing as the techniques improve (27)
- our company will use neuromarketing in the future (28)

- I am interested in using neuromarketing (33)

Statements "*it is easy to find research subjects for neuromarketing studies*" (16) and "*consumer's knowledge of use of neuromarketing in conjunction with a certain product or service affects his/her purchase intention negatively*" (30) differ from those of consumer survey but are still parallel to them – the phrasing being adapted to each respondent group. Otherwise the statements are the same as in consumer survey and thus allow comparison between the groups.

All the questions in both surveys have the following response alternatives: *1 = strongly agree, 2 = partly/somewhat agree, 3 = neither agree nor disagree, 4 = partly/somewhat disagree, 5 = strongly disagree* and *6 = I don't know*. The response option for "*I don't know*" was introduced because respondents could otherwise choose the neutral option (*neither agree nor disagree*) if they do not have any knowledge of a specific question, and this in turn may distort the results. The possibility to distinct between neutral perceptions and lack of knowledge could offer valuable insights. The response option for "*I don't know*" was coded in SPSS as a missing value and these responses will be discussed separately with the research findings. It should also be noted that the statements in each four parts of the surveys are all either positively or negatively phrased – the direction changing between parts to ensure respondents' attention and avoid hastily made answers. Both surveys are presented altogether in Appendix 1 and Appendix 2.

4.2.2 Data collection

In a survey research, sample statistics are calculated and used to estimate the unknown population parameters which are usually the objects of interest for researchers. A population is an entire group of objects, people, events or anything of research interest which all have one or more common characteristics and have to be defined unambiguously and specifically (Burns 2000, 83; Schofield 2006, 27). A sample is a group of elements that has been selected from a population in some way; it is a quicker, cheaper and less invasive of the community than a census, which would include all the elements in a population in the research. (Schofield 2006, 26–27.) In this study, there are two separate populations in the survey. The first population consists of Finnish consumers, who are represented by the students of the University of Turku, and the second population consists of Finnish marketing professionals.

The idea of sampling is to acquire unbiased and consistent estimates of a population but also to save effort and time (Schofield 2006, 27). A representative sample should be selected from the defined population in order to make generalizations from the sample (Burns 2000, 83). There are different sampling methods and they can be divided into two

main categories: probability and non-probability sampling. The former includes simple random sampling, systematic sampling, stratified sampling and cluster sampling. (Salkind 2009, 90–98.) The latter includes quota sampling, purposive sampling and convenience sampling (Saunders & Lewis 2012, 137–140). In probability sampling strategies participant selection is based on chance and for example in simple random sampling each element or member of a population has an independent and equal chance of being selected into the sample. In contrast, nonprobability sampling strategies' participant selection is not based on chance and thus each element or member of a population does not have an independent and equal chance of being selected into the sample. As an example, convenience sampling is often used in psychological research and the sample usually consists of psychology students. (Salkind 2009, 90–98.) Selecting the sampling method requires balancing accuracy against feasibility and cost (Schofield 2006, 29). In this study, convenience sampling is used in both surveys in order to get sufficient amount of data relatively easy – following a common style of selecting the sample from university students.

The survey data was collected by means of two separate Webropol online surveys between 12th of May and 26th of June 2014. Due to difficulties in acquiring enough answers and data for reliable analyses, both surveys were held open unusually long; approximately 6 weeks. The professional survey was sent to two Finnish organizations whose members belong to the target group of marketing professionals. One of the organizations operates locally and the other nationally. The latter organization also has members that do not belong to the target group, which was taken into account in the accompanying letter (see Appendix 3). In total, an estimated 10 000 individuals were exposed to the survey either by an e-mail or as a part of an e-newsletter. Out of these individuals, it is estimated that about 1/5 belong to the target group. The response rate was rather low with only 28 answers and the survey was opened without sending the results 87 times. This could indicate that the topic of the survey was perceived as difficult or that the potential respondents did not feel comfortable with the subject. Due to reasons beyond the author's influence, no reminder was sent to the sample.

The consumer survey was sent to a total of 3478 students of the University of Turku by an e-mail (see Appendix 4). The sample consisted of students who had begun their studies in 2009 or later and who were present and studying at the time of the survey. Three specific faculties were chosen to the sample based on their relevance to the subject; Turku School of Economics (N=1764), faculty of medicine (N=944) and faculty of social sciences (N=770). Additionally, the survey was delivered by an e-mail to a total of 98 individuals who were gathered from the personal network of the researcher, based on their interest in the subject. In total, 232 answers were submitted resulting in a response rate of 6.5%. The survey was opened without sending results 217 times, which could also indicate that similarly to the professional sample, the topic of the survey could have been perceived difficult. Due to reasons beyond the author's influence, no reminder was sent

to the sample. The samples of both surveys and respondent profiles are summarized next in the following Table 7.

Table 7: Survey respondent profiles

Characteristic	% Consumers (N=232)		% Professionals (N=28)	
Age				
	29,3	(19-22y)	25,0	(25-42y)
	30,2	(23-25y)	25,0	(43-51y)
	22,4	(26-30y)	25,0	(52-56y)
	18,1	(31-62y)	25,0	(57-59y)
Gender				
Female	67,2		50,0	
Male	32,8		50,0	
Education				
Basic education	0,4		-	
Upper secondary school	12,9		3,6	
Vocational school	2,2		28,6	
Vocational high school	14,7		42,9	
University	69,4		21,4	
Postgraduate degree	0,4		3,6	
Field of education				
Educational science	0,4		-	
Humanities and arts	0,4		7,1	
Business	53,0		53,6	
Social sciences	21,1		-	
Natural sciences	1,7		3,6	
Technology	1,7		17,9	
Agriculture and forestry	0,9		3,6	
Health and welfare	18,5		7,1	
Services	1,3		3,6	
Other	0,9*		3,6**	

* = Originally 10 responses but 8/10 moved to their appropriate classes (7 to Health and welfare, 1 to Social sciences), remaining 2: Legal
** = Industrial management

Mean age of the consumer survey respondents is 27 years. Distribution of ages is positively skewed (2,118); the 25th, 50th and 75th quartiles were 22, 24 and 28, respectively, while the range was 43, between 19 and 62 years. This is according to presumptions as

majority of the sample are university students but also individuals from the personal network of the researcher are included in the sample, based on their interest in the subject. Mean age of the professional survey respondents is 49 years. Distribution of ages is slightly negatively skewed (-0,919) but overall with kurtosis of 0,256, the ages are quite normally distributed. Range of ages is 34, between 25 and 59 years. Respondents of both surveys are grouped into four classes which are not equidistant. This decision is based on the fact that with the non-normal distribution of public survey respondent's ages, equidistant classes would be highly disproportional, and because of scarcity of professional survey responses would lead to impractical classes.

Majority of consumers are female (67,2%) whereas professionals include exactly 50% of both genders. The gender distribution of consumers could be explained by the fact that 60% of the students of the University of Turku were female in 2013 (Turun yliopiston tutkinto-opiskelijat syyslukukausi 2013) and the majority of the sample are students of the university.

Not surprisingly, the most common level of education among consumers is university (69,4%), followed by vocational high school (14,7%), upper secondary school (12,9%), vocational school (2,2%), post graduate degree (0,4%) and basic education (0,4%). The level of education is more diverse among professionals, the most common education being vocational high school (42,9%) followed by vocational school (28,6%), university (21,4%), postgraduate degree (3,6%) and upper secondary school (3,6%). While only 28 professionals responded, it is still interesting to note that only one fifth of them have a university degree and as much as a third of them do not have a higher education.

Business (53%), social sciences (21,1%) and health and welfare (18,5%) are the most common fields of education – as expected based on the sample – among consumers, while business (53,6%) and technology (17,9%) are the dominant fields among professionals. Other respondents of both surveys divide fairly evenly between other fields, such as natural sciences. Perhaps surprisingly, almost a fifth of marketing professionals have an educational background from technology.

Additional professional survey background questions about the respondents' marketing experience and their employers' marketing research methods are presented in the following Table 8.

Table 8: Additional professional survey background questions

Characteristic	% Professionals (N=28)
Years of working with marketing	
Less than 15	35,7
15–24	28,6
25 or more	35,7
Company's methods of acquiring information to support marketing decision-making	
Surveys	64,3
Personal interviews	64,3
Brain imaging methods (i.e. EEG)	-
Focus group interviews	21,4
Physiological measurements (i.e. GSR)	-
Consumer panels	17,9
Internal information sources	75,0
External information sources	60,7
Observational studies	7,1
Laboratory tests	-
Test market/ing	21,4
Other	14,3*

* = 2 "gut feelings", 1 no marketing/none of the mentioned, 1 empty

The background questions of the professional survey also include questions of years of work experience mainly with marketing and their company's methods of acquiring information to support marketing decision making. Work experience with marketing is quite evenly distributed as 35,7% have less than 15 years of experience, 28,6% have 15 to 24 years of experience and 35,7% have 25 or more years of experience. The main methods of acquiring information to support marketing decision making include the company's own internal information sources (75%), surveys (64,3%), personal interviews (64,3%) and external information sources such as public statistics (60,7%). Two professionals also mention that they use their "gut feelings" (7,1%), one does not engage in marketing activities (3,6%) and one answer is missing. None of the professionals use brain imaging methods (i.e. EEG), physiological measurements (i.e. GSR) or laboratory tests to acquire marketing information.

The professional's positions in their companies include for example marketing and sales managers, account managers, product managers, local managers, entrepreneurs, marketing assistant and CEO. A full list of respondent positions is presented in Appendix 5.

4.2.3 Data analysis

The survey data was analysed using IBM SPSS Statistics program. Based on multiple reasons, mainly basic nonparametric analyses were conducted. First of all, based on the purpose of the study, complex data analyses are not relevant. Second, convenience sampling was used which restricts the generalization of results. Third, the number of responses is small – especially with the professional survey – which further restricts the use of certain analyses. Finally, there is an ongoing debate between authors whether or not data collected with Likert or Likert-type scales could be interpreted and used as interval or just ordinal data. As the use of these scales has increased notably by marketing practitioners during the last decades (Edmondson, Edwards & Boyer 2012, 82), the issue of appropriate data analysis methods is important to discuss.

The basis of this debate is that data from Likert or Likert-type scales is ordinal because there is no certainty that the values are equidistant (Edmondson et al. 2012, 83; Calder & Sapsford 2006, 209), but there is statistical evidence suggesting that it is justifiable to assume equality of equal intervals within rating scales such as Likert (Calder & Sapsford 2006, 209). Ordinal data is sometimes analysed as interval data perhaps because of the more powerful parametric statistical tests which provide more information and are easier to interpret than alternative nonparametric tests (Allen & Seaman 2007, 64) or because it might sometimes be difficult to identify the investigated data type (Calder & Sapsford 2006, 209). Lantz (2013, 17) argues that when choosing between statistical methodologies to analyse Likert-type data, researchers should consider if respondents perceive the response scale as equidistant in which case parametric methods could be used in analysing the data. Murray (2013) studied whether using different analysing methods (parametric and nonparametric) on Likert scale data affected conclusions deduced from the results and found out that it depended on the exact tests used in the analysis; some tests did not affect the conclusions drawn but at least one test did. In conclusion, the debate still continues and both views have supporting evidence from numerous studies.

However, as it is common practice to calculate means using ordinal data from opinion polls in order to get an overview of a phenomenon rather than exact arithmetic results (Holopainen & Pulkkinen 2012, 15) and as this is the purpose of the study, the data collected will be in some cases interpreted as interval. Similar approach has been used by Eser et al. (2011) in their study of perceptions of marketing professionals, neurologists and marketing academics about neuromarketing in which a five-point Likert scale was used to collect the data and parametric tests were used to analyse the data. Overall, the discussion above should be kept in mind when interpreting the results.

4.3 Qualitative study

Based on the purpose of the study, theme interviews were chosen as the interview method in this study. Theme interviews include certain predetermined themes which are chosen to cover the whole phenomenon without restricting the interview too much with strict, predetermined questions or structure. Theme interviews usually produce in-depth knowledge and include fewer informants or interviewees than structured interviews. (Kananen 2008, 73–74.) The interview themes follow the overall structure of the study, which in turn is based on the four research sub-questions: (1) Benefits of consumer neuroscience, (2) Limitations and challenges of consumer neuroscience, (3) Ethical issues of consumer neuroscience and (4) Future prospects of consumer neuroscience in Finland. Some questions regarding the themes were designed beforehand to guide the interview if necessary, but otherwise the interviews could advance freely within the themes, based on the interviewees' answers (see Appendix 6 for a summary of actual interview questions).

4.3.1 Data collection

The population of the qualitative study is neuromarketing companies operating in Finland but contrary to quantitative research, sampling is not relevant with qualitative research. Instead, the interviewees are chosen based on their relevance to the purpose of the study or research question, and they need to be representing and know as much as possible of the phenomenon in question. The sufficient amount of interviewees for a particular research can be determined with the process of saturation: the sufficient amount of interviewees has been achieved when new interviewees do not add anything new to the interpretations. Qualitative research is not striving for generalizations so determining the saturation point is important in order to achieve enough information and on the other hand to avoid never-ending research processes. (Kananen 2008, 33–39.) The two interviewees chosen for this study represent two different companies that are currently using consumer neuroscience techniques in their operations in Finland. They were specifically chosen as they are among the few operators currently using the techniques in Finland and thus thought as representative to study the phenomenon.

The two separate theme interviews were conducted on 28th of November 2014. These interviews were designed to complement the professional survey. The interviewees represented a small Finnish neuromarketing company and an internationally operating medium-sized market research company that offers neuromarketing and other research services in Finland. The latter provides the actual measurements for the former, which in turn utilizes its own core know-how in interpretation of the data. Both companies only

offer neuromarketing services with EEG. Respondent profiles of the theme interview are summarized in the following Table 9.

Table 9: Respondent profiles of the theme interviews

Interviewee	Company	Company size
Managing Director	Neuromarketing	Small
Director	Market research	Medium-sized

Both interviews were conducted on the same day but separately and recorded for later analysis. Another employee was present and also contributed to the first interview, based on expertise and knowledge of the themes. Their answers will be clearly differentiated when discussing the findings.

4.3.2 Data analysis

The interview data was transcribed, coded and compressed before analysis. Coding the data needs to be done with care in order to reveal structures, regularities, themes and models while avoiding losing some of the information (Kananen 2008, 89). The analysis of qualitative data is focused on searching meanings by looking for patterns and themes in the data, rather than merely quantifying the responses. After coding and organizing the data, the next step of analysis is to determine whether there are relationships between found concepts and based on this, to generate new ideas to answer the research question. (Kolb 2008, 230-239.) This analysis process is used in this study.

4.4 Reliability and validity of the empirical studies

In quantitative research, validity refers to the ability of data collection methods to measure accurately what they were supposed to measure and whether the finding are actually about what they claim to be about. Internal validity is threatened by for example biases resulting from research subject selection that can be unrepresentative of the population, while external validity is concerned with whether the conclusions can be generalized to other research settings. Reliability refers to the ability of data collection and analysis methods to

produce consistent findings when used on other situations or by other researchers. (Saunders & Lewis 2012, 127–128.)

In qualitative research, the terms reliability and validity have received varying interpretations. Some authors argue that in case studies and interviews, the traditional indicators of reliability and validity that are used with quantitative studies are not suitable to be used as there are no two similar cases or interviews. Still, the reliability and validity of all studies should be addressed regardless the terms used. The reliability of qualitative studies can be increased by detailed descriptions of different stages of the study. This includes clear and honest descriptions of the conditions in which the study was executed, possible sources of errors, researcher's own assessment of the research and reasons on which the interpretations are based on – for example in terms of direct citations. (Hirsjärvi et al. 2000, 214–215.) Validity in qualitative research can refer to the 'goodness' of the data or the 'status' of the findings. The former refers to the kind, accuracy, relevance and richness of the data derived from sample units and the latter refers to the hardness, generalizability or truth of the findings. (Sykes, 1990, according to Kent 1993, 125–126.)

5 RESEARCH FINDINGS

First, findings of the surveys are discussed, followed by findings of the interviews. The discussions of survey research findings will follow the overall structure of the study and research sub-questions: (5.1) perceptions of benefits, (5.2) perceptions of limitations and challenges, (5.3) perceptions of ethical issues and (5.4) future prospects of consumer neuroscience in Finland. Research findings of both surveys are discussed together and findings from the consumer survey precede findings of the professional survey throughout the chapter.

5.1 Benefits of consumer neuroscience

Means, standard deviations and proportions of "*I don't know*" answers of survey questions related to benefits of consumer neuroscience are summarized in the following Table 10. The statements in this first part of the surveys are all phrased negatively while the response alternatives range from "*strongly agree*" (1) to "*strongly disagree*" (5), the neutral option of "*neither agree nor disagree"* (3) being in between.

Table 10: Benefits questions' means for consumers and professionals

No	Question	Consumers			Professionals		
		Mean	SD	Don't know	Mean	SD	Don't know
1	It is not possible to find out which elements of advertisements viewers attend the most with brain imaging methods	4,14	0,98	18 (7,8%)	4,38	0,77	4 (14,3%)
2	It is not possible to find out what kind of products or services consumers want with neuromarketing	3,54	1,07	28 (12,1%)	3,91	0,97	6 (21,4%)
3	It is not possible to study compulsive buying behaviour with brain imaging methods	4,12	0,91	39 (16,8%)	4,10	0,77	7 (25,0%)
4	It is not possible to develop better products or services with the help of brain imaging methods	3,76	1,08	33 (14,2%)	3,88	0,95	4 (14,3%)
5	Neuromarketing is not a more objective way of studying consumer preferences than surveys	3,55	1,08	41 (17,7%)	3,55	1,01	6 (21,4%)
6	It is not possible for consumers to better understand their own buying behaviour with the help of neuromarketing	3,79	1,05	26 (11,2%)	3,70	0,97	5 (17,9%)
7	It is not possible to study success of branding with neuromarketing	-	-	-	3,65	1,11	5 (17,9%)
8	Findings of brain imaging studies do not increase trustworthiness of marketing	3,37	1,13	47 (20,3%)	3,83	0,94	5 (17,9%)

Consumer respondents disagree slightly with statements "*it is not possible to find out which elements of advertisements viewers attend the most with brain imaging techniques*"

(mean 4,14) and "*it is not possible to study compulsive buying behaviour with brain imaging techniques*" (mean 4,12), while all other statements in this first part have more neutral answers with means ranging in between 3,37 and 3,79. Although the answers are quite neutral, they are all on the same negative side of the scale, disagreeing more than agreeing with the statements.

Professional respondents also slightly disagree with the statements 1 and 3 (means 4,38 and 4,1), while being fairly neutral with rest of the statements with means ranging from 3,55 to 3,91. Similarly to consumer respondents, regardless of the answers being quite neutral, they are all on the negative side of the scale. The neutral line of answers continues with the professional-only statement "i*t is not possible to study the success of branding with neuromarketing*", resulting in a mean of 3,65.

One particularly interesting finding throughout both surveys is the amount of "*I don't know*" answers. The response alternative was introduced based on assumptions of lack of knowledge regarding the subject, in order to separate neutral perceptions from lack of knowledge or willingness to answer. This seems to have been a justified decision based on the findings; "*I don't know*" answer occurrence in the first part range from 8–20% in consumer survey and 14–25% in professional survey answers, playing an important role. Perhaps surprisingly, consumers' percentage of these answers is smaller than that of the professionals, given that there is a notable difference in sample sizes.

Due to small sample size in the professional survey and abnormalities of both surveys' data, certain statistical tests cannot be reliably conducted for all of the data. Thus analyses of influences of demographic variables to results are not discussed in detail. Nevertheless, some interesting findings arise from the consumer survey data – findings within common boundary values of the statistical test. Chi-Square statistical test is used with acknowledged boundary values of maximum of 20% of cells with expected count less than 5 and minimum expected count over 1 (Saastamoinen & Olkkonen 2012, 48). Significance level of 5% (p-value 0,05) is used. The professional survey will not be analysed due to mentioned, notable restrictions.

When comparing respondents with a business education to all other respondents with different educations, a perhaps not so surprising difference arise from the data. There is a statistically significant difference (p-value 0,029) between the groups with the statement "*findings of brain imaging studies do not increase trustworthiness of marketing*". Respondents with business education perceive that brain imaging studies do increase marketing trustworthiness more than respondents with other educational background. There are no other statistically significant differences based on demographics (age groups, gender, level of education), or the boundary criteria of reliable analyses are not met.

A comparison between consumers' and professionals' perceptions in relation with benefits of consumer neuroscience is conducted using Mann-Whitney test, based on several factors. Mann-Whitney test requires that variables have been measured at least on

ordinal scale and that the values of random variables X and Y are independent samples of two populations – these requirements are both met. Additionally, Mann-Whitney test is commonly used instead of independent samples t-test when the variables are not normally distributed, as required by the t-test. It should also be noted here that Mann-Whitney test compares *medians* of the distributions, not means. (Holopainen & Pulkkinen 2012, 197.) Findings of this comparison are presented in the following Table 11. Significance level of 5% (p-value 0,05) is used.

Table 11: Comparison of perceptions of consumer neuroscience benefits between consumers and professional

No	Question	Mann-Whitney	
		Z	p-value
1	It is not possible to find out which elements of advertisements viewers attend the most with brain imaging methods	-1,017	0,309
2	It is not possible to find out what kind of products or services consumers want with neuromarketing	-1,620	0,105
3	It is not possible to study compulsive buying behaviour with brain imaging methods	-0,494	0,621
4	It is not possible to develop better products or services with the help of brain imaging methods	-0,329	0,742
5	Neuromarketing is not a more objective way of studying consumer preferences than surveys	-0,260	0,795
6	It is not possible for consumers to better understand their own buying behaviour with the help of neuromarketing	-0,693	0,488
8	Findings of brain imaging studies do not increase trustworthiness of marketing	-1,712	0,087

Although there is a difference between the groups regarding statement "f*indings of brain imaging studies do not increase trustworthiness of marketing*", it is not statistically significant (p-value 0,087). Thus there are no statistically significant differences between consumers' and professionals' perceptions of consumer neuroscience benefits.

5.2 Limitations and challenges of consumer neuroscience

Means, standard deviations and proportions of "*I don't know*" answers of survey questions related to limitations and challenges of consumer neuroscience are summarized in the following Table 12. The statements in this second part of the surveys are all phrased positively while the response alternatives range from "*strongly agree*" (1) to "*strongly disagree*" (5), the neutral option of "*neither agree nor disagree"* (3) being in between.

Table 12: Limitations and challenges questions' means for consumers and professionals

No	Question	Consumers			Professionals		
		Mean	SD	Don't know	Mean	SD	Don't know
9	It is possible to read people's minds with brain imaging methods	3,69	1,25	16 (6,9%)	3,48	1,26	3 (10,7%)
10	It is possible to unconsciously affect consumers with neuromarketing	1,95	0,76	24 (10,3%)	2,55	1,01	6 (21,4%)
11	Neuromarketing studies usually need to be conducted in specific environments	2,49	1,20	74 (31,9%)	2,94	1,14	11 (39,3%)
12	There is a scientific consensus regarding findings of neuromarketing studies	4,13	0,77	95 (40,9%)	3,20	1,21	15 (53,6%)
13	Findings of neuromarketing studies can be generalized	-	-	-	3,21	0,92	9 (32,1%)
14	It is possible to infer from brain imaging studies that decision-making processes are located in a specific area of the brain	2,02	0,87	48 (20,7%)	2,14	1,01	7 (25,0%)
15	Neuromarketing is expensive	2,22	0,93	84 (36,2%)	2,54	1,05	15 (53,6%)
16a	I could participate neuromarketing studies as a research subject	2,19	1,18	30 (12,9%)	-	-	-
16b	It is easy to find research subjects for neuromarketing studies	-	-	-	3,17	1,12	16 (6,9%)

Consumer respondents' answers in the second part are again fairly neutral but few interesting findings arise from the data. The mean of answers (3,69) of the first statement "*it is possible to read people's minds with brain imaging methods*" differ from the mean of answers (1,95) of the second statement "*it is possible to unconsciously affect consumers with neuromarketing*", so that consumer respondents to some extent disagree with possibility of mind reading but somewhat agree with possibility to unconsciously affect consumers with neuromarketing. Additionally, consumers seem to disagree (mean 4,13) with the statement "*there is a scientific consensus regarding findings of neuromarketing studies*", while somewhat agreeing (mean 2,02) with the statement "*it is possible to infer from brain imaging studies that decision-making processes are located in a specific area of the brain*". The respondents seem to be willing to participate in neuromarketing studies as research subjects, with the mean of answers being 2,19.

In the professional survey, the neutral line of answers also continue. While answers for the first two statements are similar to those of consumer respondents, the means are slightly closer to neutral; 3,48 for the first statement of possibility to read minds and 2,55 for the second statement of possibility of unconsciously affect consumers with neuromarketing. The professionals also slightly agree (mean 2,14) with the statement 14 that it is possible to infer the specific location of decision-making processes from brain imaging studies. While consumers are somewhat willing to participate in a neuromarketing study as a research subject, professionals do not have a clear opinion on the statement "i*t is easy to find research subjects for neuromarketing studies*" with a mean of 3,17.

Care should be taken when interpreting the findings of this second part as the amount of "*I don't know*" answers range from 7% to 41% per statement for consumers and 7% to 54% for professionals. The statement "*there is a scientific consensus regarding findings of neuromarketing studies*" yields the most of these answers for both consumers (41%) and professionals (54%). Similar trend continues with the expensiveness of neuromarketing as 36% of consumers and 54% of professionals do not know or are unwilling to answer this statement. Especially the high percentage of professionals' answers is perhaps surprising but yet again, the small sample size should be taken into account.

As with the previous part of findings, statistical test (Chi-Square) is used to analyse the effect of demographic variables where appropriate and the data is within mentioned boundary values (maximum of 20% of cells with expected count less than 5 and minimum expected count over 1). Significance level of 5% (p-value 0,05) is used. The professional survey will not be analysed due to mentioned, notable restrictions.

There is a statistically significant difference (p-value 0,004) between respondents with business education and respondents with other education regarding the statement "*neuromarketing studies usually need to be conducted in specific environments*". Respondents with business education disagree more with the statement. Same trend continues with the statement "i*t is possible to infer from brain imaging studies that decision-making processes are located in a specific area of the brain*" as respondents with business education differ statistically significantly (p-value 0,035) from the rest by agreeing with the statement more than others. There are no other statistically significant differences based on demographics (age groups, gender, level of education), or the boundary criteria of reliable analyses are not met.

A comparison between consumers' and professionals' perceptions in relation with limitations and challenges of consumer neuroscience is conducted using Mann-Whitney test. Findings of this comparison are presented in the following Table 13. Significance level of 5% (p-value 0,05) is used.

Table 13: Comparison of perceptions of consumer neuroscience limitations and challenges between consumers and professional

No	Question	Mann-Whitney	
		Z	p-value
9	It is possible to read people's minds with brain imaging methods	-0,817	0,414
10	It is possible to unconsciously affect consumers with neuromarketing	-3,102	0,002
11	Neuromarketing studies usually need to be conducted in specific environments	-1,490	0,136
12	There is a scientific consensus regarding findings of neuromarketing studies	-3,210	0,001
14	It is possible to infer from brain imaging studies that decision-making processes are located in a specific area of the brain	-0,465	0,642
15	Neuromarketing is expensive	-1,337	0,181

Contrary to the first part of the surveys, there are statistically significant differences between consumers and professionals regarding two of the survey items in this second part: "*it is possible to unconsciously affect consumers with neuromarketing*" with p-value of 0,002 and "*there is a scientific consensus regarding findings of neuromarketing studies*" with p-value of 0,001. Consumers agree more on the former whereas they disagree more on the latter.

5.3 Ethical issues of consumer neuroscience

Means, standard deviations and proportions of "*I don't know*" answers of survey questions related to ethical issues of consumer neuroscience are summarized in the following Table 14. The statements in this third part of the surveys are all phrased negatively while the response alternatives range from "*strongly agree*" (1) to "s*trongly disagree*" (5), the neutral option of "*neither agree nor disagree"* (3) being in between.

Table 14: Ethical issues questions' means for consumers and professionals

No	Question	Consumers			Professionals		
		Mean	SD	Don't know	Mean	SD	Don't know
17	Brain imaging methods should not be used in marketing	3,21	1,20	13 (5,6%)	3,38	1,28	4 (14,3%)
18	Neuromarketing is not manipulative	3,64	1,03	18 (7,8%)	3,65	1,04	8 (28,6%)
19	Neuromarketing does not expose young and otherwise vulnerable people to be exploited	3,77	1,01	29 (12,5%)	3,83	1,15	10 (35,7%)
20	Brain imaging methods do not cause side effects to research subjects	2,39	1,08	81 (34,9%)	2,80	1,24	8 (28,6%)
21	Brain imaging methods are not unpleasant to research subjects	2,41	1,01	85 (36,6%)	2,47	1,07	11 (39,3%)
22	Neuromarketing is not a way of selling unnecessary products and services	3,18	1,28	30 (12,9%)	3,10	1,30	8 (28,6%)
23	Use of neuromarketing should not be restricted by laws and regulations	3,71	1,16	29 (12,5%)	3,53	1,26	9 (32,1%)

All statements in this third part are exactly the same for both respondent groups. Perhaps surprisingly, these statements concerning ethical issues of consumer neuroscience seem not to elicit strong opinions in either way. Means of consumers' answers range from 2,39 to 3,77 while means of professionals' answers range from 2,47 to 3,83. The statement "*neuromarketing does not expose young and otherwise vulnerable people to be exploited*" slightly stands out as both respondent groups seem to some extent disagree with it.

The amount of "*I don't know*" answers within this third part of the surveys range between 6% to 37% for consumers and 14% to 39% for professionals. The statement "*brain imaging methods are not unpleasant to research subjects*" stands out from both respondent groups with 37% and 39%. Additionally, 35% of consumers do not know or are unwilling to answer whether brain imaging studies cause side effects and 36% of professionals have a similar situation regarding the statement "*neuromarketing does not expose young and otherwise vulnerable people to be exploited*". Interestingly, when asked about whether brain imaging methods should not be used in marketing, both consumers and professionals have the lowest percentage of "*I don't know*" answers in this part – 6% and 14%. Both groups seem to have some kind of opinion about this, regardless of it being quite neutral.

Chi-Square statistical test is again used to analyse the effect of demographic variables where appropriate and the data is within mentioned boundary values, revealing some interesting findings. Significance level of 5% (p-value 0,05) is used. The professional survey will not be analysed due to mentioned, notable restrictions.

Respondents with business education differ, with statistical significance (p-value 0,000), from respondents with other educational background with the statement of "*brain*

imaging methods should not be used in marketing". The same statistically significant difference can be observed with statements "*neuromarketing is not a way of selling unnecessary products or services*" (p-value 0,008) and "*use of neuromarketing should not be restricted by laws and regulations*" (p-value of 0,001). Respondents with business education are more positive about the use of consumer neuroscience in marketing, do not perceive consumer neuroscience being a way of selling unnecessary goods as much as other respondents and also feel that consumer neuroscience should not be restricted more than other respondents with different educations. Finally, there is a statistically significant difference (p-value 0,024) between women and men regarding the last statement of not restricting use of consumer neuroscience as men agree with the statement more. There are no other statistically significant differences based on demographics (age groups, gender, level of education), or the boundary criteria of reliable analyses are not met.

A comparison between consumers' and professionals' perceptions in relation with ethical issues of consumer neuroscience is conducted using Mann-Whitney test. Findings of this comparison are presented in the following Table 15. Significance level of 5% (p-value 0,05) is used.

Table 15: Comparison of perceptions of consumer neuroscience ethical issues between consumers and professional

No	Question	Mann-Whitney	
		Z	p-value
17	Brain imaging methods should not be used in marketing	-0,617	0,537
18	Neuromarketing is not manipulative	-0,350	0,972
19	Neuromarketing does not expose young and otherwise vulnerable people to be exploited	-0,387	0,699
20	Brain imaging methods do not cause side effects to research subjects	-1,401	0,161
21	Brain imaging methods are not unpleasant to research subjects	-0,309	0,757
22	Neuromarketing is not a way of selling unnecessary products and services	-0,369	0,712
23	Use of neuromarketing should not be restricted by laws and regulations	-0,619	0,536

There are no statistically significant differences between consumers' and professionals' perceptions of ethical issues of consumer neuroscience. Although fairly neutral, both groups seem to have similar perceptions of these ethical issues.

5.4 Future prospects of consumer neuroscience in Finland

Means, standard deviations and proportions of "*I don't know*" answers of survey questions related to future prospects of consumer neuroscience are summarized in the following Table 16. The statements in this fourth part of the surveys are all phrased positively while the response alternatives range from "s*trongly agree*" (1) to "*strongly disagree*" (5), the neutral option of "*neither agree nor disagree"* (3) being in between.

Table 16: Future prospects questions' means for consumers and professionals

No	Question	Consumers			Professionals		
		Mean	SD	Don't know	Mean	SD	Don't know
24	Use of neuromarketing will increase in the future	1,72	0,61	22 (9,5%)	1,96	0,62	4 (14,3%)
25	Use of neuromarketing will increase in Finland during next 5 years	2,09	0,83	31 (13,4%)	2,09	0,52	5 (17,9%)
26	Neuromarketing will replace current marketing research methods	-	-	-	2,86	1,01	7 (25,0%)
27	Neuromarketing will become a cost-efficient tool for marketing as the techniques improve	-	-	-	2,52	0,87	7 (25,0%)
28	Our company will use neuromarketing in the future	-	-	-	3,17	1,47	16 (57,1%)
29	Increase of use of neuromarketing is a good thing	3,19	0,94	29 (12,5%)	-	-	-
30a	Knowledge of use of neuromarketing in conjunction with a certain product or service affects my purchase intention negatively	2,93	1,08	36 (15,5%)	-	-	-
30b	Consumer's knowledge of use of neuromarketing in conjunction with a certain product or service affects his/her purchase intentions negatively	-	-	-	2,79	0,86	9 (32,1%)
31	Use of neuromarketing affects the company's image negatively	2,89	1,02	35 (15,1%)	2,82	0,95	11 (39,3%)
32	I would like to know more about neuromarketing	1,89	0,95	6 (2,6%)	2,04	1,14	3 (10,7%)
33	I am interested in using neuromarketing	-	-	-	2,82	1,47	11 (39,3%)
34	I will follow advancements of neuromarketing	2,30	1,07	27 (11,6%)	2,04	0,68	3 (10,7%)

Consumer respondents seem to agree with the statements "*use of neuromarketing will increase in the future*" (mean 1,72) and "u*se of neuromarketing will increase in Finland during next 5 years*" (mean 2,09). Furthermore, they would like to know more about neuromarketing (mean 1,89). On the other hand consumers are neutral about whether increase

of use of neuromarketing is a good thing (mean 3,19), whether knowledge of use of neuromarketing in conjunction with a certain product or service would affect their purchase intentions (mean 2,93) and whether use of neuromarketing affects the company's image negatively (mean 2,89).

The professionals also agree with the first two statements claiming that use of neuromarketing will increase and that it will increase in Finland, with means of 1,96 and 2,09, respectively. They are not as certain with statements that neuromarketing will replace current marketing research methods (2,86), that neuromarketing will become a cost-efficient tool for marketing as the techniques improve (2,52) and that their company will use neuromarketing in the future (3,17). Additionally, the professionals have a neutral opinions about whether consumer's knowledge of use of neuromarketing in conjunction with a certain product or service affects their purchase intentions negatively (mean 2,79) and whether use of neuromarketing affects the company's image negatively (mean 2,82), which are aligned with consumers' neutral responses. Finally, professional respondents would like to know more about neuromarketing (mean 2,04), will follow the advancements of neuromarketing (mean 2,04) but their interest in using neuromarketing is neutral with a mean of 2,82.

The amount of "*I don't know*" answers divide between groups in this last part of the surveys as for consumers the frequency range from 3% to 16%, whereas for professionals the frequency range from 11% to 57% per statement. Perhaps not so surprisingly, the highest percentage of these answers for professionals (57%) relates to the statement "o*ur company will use neuromarketing in the future*" and the somewhat related statement of "*I am interested in using neuromarketing*" also receive a fair share of these answers (40%). On the contrary, consumers seem to have formed a clearer, albeit quite neutral, perception of these issues.

Chi-Square statistical test is used to analyse the effect of demographic variables where appropriate and the data is within mentioned boundary values (significance level of 5% is used). The professional survey will not be analysed due to mentioned, notable restrictions. In the previous parts, respondents with business education have differed from respondents with other educational background and the same trend continues in this part. There is a statistically significant difference (p-value 0,000) between the mentioned groups with the statement "*increase of use of neuromarketing is a good thing*", respondents with business background being notably more positive compared to others. The same goes when asked whether knowledge of use of consumer neuroscience in conjunction with a certain goods affects purchase decisions – again respondents with business education differ with statistical significance (0,008) from others, their purchase intentions being less affected. There are no other statistically significant differences based on demographics (age groups, gender, level of education), or the boundary criteria of reliable analyses are not met.

A comparison between consumers' and professionals' perceptions in relation with future prospects of consumer neuroscience is conducted using Mann-Whitney test. Findings of this comparison are presented in the following Table 17. Significance level of 5% (p-value 0,05) is used.

Table 17: Comparison of perceptions of consumer neuroscience future prospects between consumers and professional

No	Question	Mann-Whitney	
		Z	p-value
24	Use of neuromarketing will increase in the future	-1,914	0,056
25	Use of neuromarketing will increase in Finland during next 5 years	-0,546	0,585
31	Use of neuromarketing affects the company's image negatively	-0,342	0,733
32	I would like to know more about neuromarketing	-0,484	0,628
34	I will follow advancements of neuromarketing	-0,736	0,462

There is a slight difference between the groups regarding the statement "*use of neuromarketing will increase in the future*", but it is not statistically significant (p-value 0,056). Thus there are no statistically significant differences between consumers' and professionals' perceptions of consumer neuroscience's future prospects.

5.5 Neuromarketing professionals' views

In this section the results from the two interviews are discussed, following the themes: (1) Benefits of consumer neuroscience, (2) Limitations and challenges of consumer neuroscience, (3) Ethical issues of consumer neuroscience and (4) Future prospects of consumer neuroscience in Finland. The quotations are translated from Finnish and revised into standard language, and thus they include some level of interpretation. Nevertheless, the author has attempted to stay as true to the original meaning as possible.

5.5.1 Reasons for using neuromarketing

When asked about the benefits of using neuromarketing in marketing research, both interviewees discussed the most about the possibility of acquiring unconscious, more honest and non-rationalized information that cannot be accessed with traditional marketing research methods such as surveys, and about the relatively fast research process – with EEG – compared to traditional research methods. In their view, a survey research does not reveal true motivations and focus group research often has group pressure affecting the results. As the first interviewee puts it:

> *"The main advantage is probably the possibility to access the unconscious reactions that cannot be studied with surveys. People do things without knowing why […] and when a person answers a question, we are already on the conscious side. Perhaps [neuromarketing] is more honest [compared to traditional marketing research methods] because there is no group pressure as is the case with focus groups. And then again, there are quite a few topics in which people more or less lie – such as sexuality – and do not have the courage to say aloud what they think, but with neuromarketing even these can be measured."*

The second interviewee shares similar opinions and notes that as buying decisions are made rather quickly and often without conscious processing, in a grocery store for example, neuromarketing allows insights into these decision-making processes. Further, traditional research methods and neuromarketing methods are measuring different things:

> *"Buying decisions usually develop rather quickly, especially in grocery stores where one moves quite swiftly and a single item on the shelf is not looked at for a long time. When some particular item then stops the customer – often without conscious processing – the interesting question is what the reasons were that caught the customer's attention. Neuromarketing gives answers to this question: what affects the customer's buying decisions in their unconscious mind at a millisecond level. This is something that could not be done earlier. People tend to rationalize and justify their answers in surveys and this does not always lead to accurate results."*

> *"[…] as we have done many cases where we used surveys or interviews and then measured with EEG, the results do not add up. Here we can see that they measure different things. One is not necessarily better than the other, but they reveal different things."*

The other major topic that arose from the interviews was the relatively fast research process when compared to traditional marketing research methods. The clients tend to be in a hurry to test for example a television commercial and an EEG research can be carried through in a short period of time, as mentioned by the first interviewee:

> *"[...] generally our clients are always in a hurry and as we want to have a sample of at least 40 persons for our research projects, the process with other research methods would be more difficult. We have two partners in cooperation who can each test these 40 persons in a day. As a typical situation for us is that a TV ad is finished by Monday and the client wants research results for it by Friday, before it will be launched on Saturday, neuromarketing is one of the few methods with which it is possible to research in this short period of time what actually happens in the ad. [...] After we receive the ad to be researched, it takes two days to recruit the research subjects, a day or two for the actual measurements but after we receive the data, it will take only two hours for it to be ready for analysis."*

According to the first interviewee's co-worker, this relatively fast research process is partly due to the automatic data processing. The data from EEG measurements has to be processed automatically with computer algorithms and as a by-product of this, arises the possibility to execute research projects quite quickly. While their data analysis is automated and fast, the recruiting and measuring of research subjects still take a lot of the research project's time. The second interviewee concurs with the fast research project and considers neuromarketing to be perhaps one of the fastest marketing research methods.

Other advantages mentioned by the first interviewee included a good temporal resolution of EEG, reasonably cheap cost of equipment, the fact that a full laboratory team of engineers is not required for the measurements and that they already have a rich databank of Nordic TV advertisements' research results. The temporal resolution allows them to observe phenomena within tiny time scales and as the equipment do not cost much and do not require large professional teams to run, the research project prices can be adjusted so that the client companies are willing to pay for them. The databank can be used as a comparison for individual advertisement's results in order to see how it performs.

Both interviewees mentioned that they are using neuromarketing mainly in brand or branding research, package or product testing and (print and television) advertisement testing. As the first interviewee describes:

> *"Our services include three categories. First, we study value propositions – what and how a brand should communicate in order to deliver the core*

> *message to the consumer. Second, we test packages and products. Third, we test print and television advertisement. We have done more testing for television advertisements due to cost issues with print advertising."*

The second interviewee continues:

> *"Advertising is probably the most important application of neuromarketing, because it attempts to influence consumers and leave a memory trace that would affect the buying decisions in the future. Then again we have a lot of industrial enterprises that are interested in package testing in order to stand out from stacked shelves within small periods of time. We have also studied magazine covers."*

The first interviewee mentioned that in Sweden, TV advertisement testing is more common than in Finland, where package testing is more common at the moment. The second interviewee also mentioned that the applications of neuromarketing are affected by their existing clientele, for which it is at the moment easier to sell neuromarketing services. These clients include major Finnish food industry operators that utilize neuromarketing services mainly in package testing, but also in advertisement testing. Example cases include the following, as described by the first interviewee:

> *"Last year [2013] we conducted a big project for a consumer goods company that had a problem here in Finland – their image was good and they were well-known but these facts did not result in sales. We studied whether they should communicate differently and found out that they are generally being associated with durability. This was not a good sales argument because the 'price' for the consumer was too far in the future. [We argued that] it would be more efficient to – for example – offer a mobile phone as a free gift than to communicate that the product would last 20 years. We studied this with EEG by reading different statements for the research subjects while at the same time showing them the company's logo. The client was satisfied with the results and changed their sales materials and sales training based on the study results, focusing on arguments that were perceived as best. The arguments were also divided into two, conscious and unconscious, to be utilized in slightly different manners."*

> *"We took part in a large scale launch by testing three different concepts of TV advertisement [with EEG] and found out that none of them really worked well. The client then picked elements from all three concepts,*

> *based on our results, and issued a new assignment for the advertising agency. We then tested the new concept and it worked notably better than the previous ones. We have done a similar study [with EEG] for a TV advertisement of a major Swedish energy company, with similar results."*

The second interviewee also discussed about an example study that they have conducted. In their study, food packages (liver casserole and pasty packages) had four different alternatives and they used EEG and eye-tracking simultaneously, followed by a survey that evaluated different attributes of the packages, to study which package was the best. Surprisingly, the one that yielded the worst results with EEG was chosen as the best in the survey. As the interviewee puts it:

> *"[When the research subjects were filling the survey] they already had thought about the decision for over 20 minutes and rationalized it, which would not be the case in the grocery store. No one looks at [liver casserole or pasty] packages on the shelf for 20 minutes, but rather just a few seconds. At that point we thought that the results from EEG would probably be better indicator on purchase decisions – compared to the situation of analysing the packages long enough for everything to look good in the end. […] We then decided to conduct a similar study in which after the EEG measurements, we immediately asked the participants which package is the best. We asked the question before they had the time to think about it. Now the results actually were – approximately – in line with each other."*

5.5.2 Reasons limiting use of neuromarketing

When asking about the limitations and challenges, the main topics that arose from the discussions were the limitations of applications of neuromarketing, the lack of so-called buy-buttons or possibility to unconsciously affect consumers, the costs of neuromarketing and the relative ease of recruiting research subjects. Other observations included challenges with how neuromarketing methods are *applied in practice*– as opposed to challenges with the methods per se – and how different neuromarketing companies operate.

According to the interviewees, there are several limitations of applications of neuromarketing – most of them inherent to EEG. The first interviewee mentioned that for example testing tastes and smells is not possible with EEG because the stimuli needs to be presented on screens and they need to be exactly the same for all the participants. The second interviewee adds that there cannot be any disturbances within the measurement room as the EEG is basically measuring all the brain activity and if something other than

the stimulus catches the attention of the participant, the measurement is not about the stimulus. Thus it is not possible to try to solve all marketing research questions with neuromarketing. Other major limitations include signal noise, as the first interviewee's coworker argues:

> *"It is not as simple as when measuring for example the length of a toe. The [EEG] signal contains a lot of noise and we need to utilize complex algorithms with all kinds of parameters to extract the essential information, so there is a margin of error. The noise means that the results always contain a level of randomness but as the number of research subjects increases, and perhaps as our experience accumulates, we learn to identify situations where something is wrong. So there are notable challenges with EEG due to the complicated nature of the measured variable."*

The first interviewee concurs and summarizes the effect of these limitations:

> *"I would not argue that EEG is some kind of ultimate truth or that it is the best brain imaging method for all neuromarketing applications. […] In general, my opinion is that neuromarketing is relatively bad for answering the question 'why'. Rather, it answers the question 'how much'."*

Both interviewees clearly state that it is not possible to find any "buy-buttons" from the brain or unconsciously affect consumers with EEG, even though the fears might be understandable. As the first interviewee phrases:

> *"If these [claims] were true, we would not be here but somewhere else. Let us think about this the other way around. We make TV ads more efficient, but we are restricted by the fact of how much TV ads actually influence our buying decisions. The consumer does not suddenly decide that 'today I will buy a car' based on an ad. If the consumer has decided to buy a car within a time period, advertising can affect that decision to some extent by favoring a certain car brand. Additionally, we can argue that whether neuromarketing can make an ad 5% or 15% better. Ok, the ROI of advertising increases but nevertheless, the free will of consumer is still there. Unfortunately, neuromarketing is not so effective [as to be able to manipulate consumers]."*

The second interviewee continues:

> *"No, [it is not possible to find so-called buy-buttons or read people's minds], at least with EEG. Most of the time we are dealing with retail package designs and we try to figure out which of the alternatives is the best. People will anyway buy these products."*

According to the second interviewee, neuromarketing has been more expensive in the past when it had to be done in laboratories and university-settings, but the costs have since decreased. At the moment the cost of an EEG research is more in line with other marketing research methods and clients are capable of buying these neuromarketing services. This is the case with EEG, but as the first interviewee points out, fMRI and MEG are far more expensive as they require special equipment and environments, in addition to dedicated teams to run the experiments. Thus, at the moment these methods are not economically viable for them.

When asked about recruitment of research subjects for neuromarketing studies, both interviewees stated that unlike they feared or expected, it has actually been easier to recruit research subjects compared to traditional marketing research projects. People have been eager to participate in studies and even asked to take pictures of them with the EEG equipment. The first interviewee ponders that this might be based on the charm of novelty of EEG studies, and the second interviewee points out that the research project is also easier for research subjects – all they have to do is sit and look at the material whereas interviews and surveys require more from the participants.

The interviewees also discussed about the challenges regarding how neuromarketing is applied in practice and how neuromarketing companies operate. The challenges are not only related to the neuromarketing methods per se but also to the ways of how these methods are applied. The first interviewee mentioned that some foreign neuromarketing companies operate with questionable equipment and procedures, and the second interviewee also stressed the importance of expertise by arguing that if neuromarketing research findings are only delivered to the clients in the raw – without any further, professional analysis on behalf of the marketing research or neuromarketing company – there is a risk that the clients do not understand and appreciate the results, perhaps influencing negatively to the reputation of neuromarketing. Additionally, interpretations should not be done in a "neuromarketing bubble" but based on all relevant information from all relevant information sources to avoid unconnected research results that this field has been criticized for. Their company differs from other neuromarketing companies as they do not try to do the whole research project from start to finish. Their core know-how is the measuring techniques and signal noise reduction algorithms, all the rest is done in cooperation with market research companies. This helps them to overcome the above mentioned problems, as described by the first interviewee:

> *"We bring neuromarketing findings to [a market research company] which they can merge to their own know-how and tacit knowledge, to further deepen their insights and analyses. In this way neuromarketing research is not just superimposed, which is the case far too often if a neuromarketing company conducts the whole research process itself."*

> *"In my opinion it is madness for a neuromarketing company to do everything from start to finish."*

5.5.3 Ethical issues to consider

The discussions about the ethics theme revolved around two main topics: whether to use or not to use neuromarketing in marketing research, and ethical norms and regulations of neuromarketing. The first interviewee stressed that neuromarketing is not manipulative. The changes they can make with neuromarketing are quite small as consumers all have a free will, but even the smallest change – say 2% increase in sales – can be substantial for a company using neuromarketing. As the interviewee phrases:

> *"All this [ethics discussion] relates to all marketing and advertising activities. The tool is not to blame for what it is being used for. […] I do not see difference between asking a person what they are thinking on the conscious side, compared to unconscious side. We can polish ads or packages to be a bit better but we cannot make the consumer to buy a banana instead of a yoghurt. That is impossible."*

Ethical norms and regulations were discussed by both interviewees. They stressed that all marketing research follows certain standards and ethical norms, such as that research subjects have to be at least 18 years old. Additionally, the first interviewee mentioned that their company has in addition pledged to comply with ethical rules of *Neuromarketing science and business association* (NMSBA) which are mainly related to who to test, what to test and quality criteria. Both interviewees also pointed out that their companies would not do projects that are unethical – such as advertising alcohol or cigarettes to minors. As the second interviewee puts it:

> *"Our decisions [for projects] are always case-specific but we do not do neuromarketing studies to minors and we comply with market research industry's ethical norms. Moreover, our clients are usually consumer goods manufacturers or food industry operators so the tested products are*

> *usually basic consumer goods. Our uncompromising limit is selling for example cigarettes to minors and such."*

The interviewees argue that neuromarketing does not differ from traditional marketing research in this sense. The second interviewee also discussed about whether neuromarketing should be regulated or restricted by laws or official norms:

> *"Perhaps not at the moment as neuromarketing is currently done so little, but I believe that at some point some operator might get an idea that would not be ethical. So perhaps at some point official norms could be beneficial. It could lower the bar for trying neuromarketing as people would know that it is generally acceptable. At the moment, if someone does something stupid, everyone can suffer from the consequences"*

The first interviewee added that even though research subjects commonly ask for their own brainwave prints after the research, they have not given them. They feel that it would not be ethical as they want the research results to be part of the mass.

5.5.4 Future guidelines

The final theme of the interviews was the future of consumer neuroscience and the discussions revolved around four main topics: the importance of their clients' attitudes, the growth of the field worldwide and in Finland, the possibility of replacing current marketing research methods and the attitudes of the public towards consumer neuroscience.

As the first interviewee mentioned, the most positive attitudes towards this field are held by their clients – those who have seen that the methods work. Their clients include a Finnish brewery and a Finnish convenience food industry operator, whose all new product launches will go through their testing. Similarly, a chain of stores regretted afterwards for not listening enough suggestions based on neuromarketing studies; they had found out later in their own studies that the elements suggested by neuromarketing studies were actually the most effective. These and other cases have led to a situation in which clients themselves are proactive in neuromarketing studies, as described by the first interviewee:

> *"Now that neuromarketing is growing, we are being contacted out of nowhere which did not happen when we started. In my view this is a good sign that the buzz is growing, but to be honest [neuromarketing] is still in*

> *its infancy. Additionally, I feel that knowledge about neuromarketing research has increased lately and you can see it for example by watching TV."*

The second interviewee shared similar ideas but mentioned that the clients' attitudes correlate with their knowledge about the subject:

> *"[…] many clients are interested in hearing more about neuromarketing. The attitudes towards neuromarketing vary a lot. Some clients are well informed and believe in it which makes the selling of these services easy. Some clients however, in some way, do not believe in neuromarketing which makes the selling difficult. These clients feel that it will not work or wonder what they could possibly do with the results. Thus the attitudes vary notably according to the clients' viewpoints. Of course they are increasingly hearing from increasing number of sources that this is a common practice and they should perhaps be better informed."*

The growth of this field worldwide and in Finland was perceived similarly by both interviewees. They felt that neuromarketing is more common in the world, especially in the US, but also that it will grow in Finland as well. The first interviewee mentioned that when they founded their company, there were no neuromarketing companies in Sweden but at the moment there are at least two – one of which utilizes the interviewed company's equipment and algorithms – and both in the Netherlands and in Germany there are already at least five companies. In Finland their company has practically no competition at the moment, but there have been other companies who have tried to enter the market. Lack of references and awareness were mentioned as primary reasons for no serious competition. Thus the future looks bright for them, as mentioned by the first interviewee. The second interviewee continued about the growth of neuromarketing in Finland:

> *"I believe that neuromarketing will rise as one field of [marketing research] here in Finland but not necessarily as one of the most important fields. It will be a part of the services offering and its applications might expand. […] I believe that it will be a growing field also for us because as I have been presenting this method for clients, the interest in it has been constantly growing. The biggest problem [for neuromarketing growth] may be that as companies have regularly been utilizing [traditional marketing research methods] and got used to them, neuromarketing has not yet reached a similar status. It has been used more infrequently and in separate projects so it is not yet an established research method."*

Regarding the competition in Finland, the second interviewee mentioned that there are some operators that can be considered as competitors but mostly these companies are larger groups that operate from Sweden or from Estonia. Thus the markets are still developing but they already have a strong foothold here in Finland with their partner in cooperation – the first interviewee's company. As the second interviewee phrases the situation:

> *"Yes, [references and acquired knowledge affect the competitive situation], and thus it is difficult to enter neuromarketing markets starting from scratch."*

When asked whether neuromarketing will replace existing marketing research methods in the future, the second interviewee mentioned that at least in advertising research neuromarketing could replace older methods but otherwise it will likely establish its position as one of the marketing research methods instead of replacing existing methods. The first interviewee shared similar ideas and felt that neuromarketing will at least in the beginning complement the other marketing research methods, although they already have few clients that only want neuromarketing research:

> *"We already have few clients that have stated that they do not want any other research services other than neuromarketing. In my opinion it is not wise, at least in the very beginning, to restrict research methods only to neuromarketing. […] Neuromarketing and other research methods reveal different things. They are like the two sides of a mirror – the other methods look at the image on the mirror and neuromarketing looks behind the mirror."*

Neither interviewee felt that use of neuromarketing would affect negatively to consumers' purchase decisions or the image of the companies using it – at least not significantly. The first interviewee noted that although negative attitudes are somewhat common in the media as neuromarketing is not fully understood, most of their clients are happy to publicly share their experiences with neuromarketing. The second interviewee continued that although some individuals might be affected negatively, neuromarketing is not as special as perhaps thought. The same products would still be on the shelves, regardless of whether neuromarketing has been used or not in the package designing. Additionally, also the second interviewee mentioned that their clients have had positive attitudes towards neuromarketing. The clients have also accepted the fact that neuromarketing is still in its infancy, as described by the second interviewee:

"[When we have the research results] we communicate to the client in a tangible manner what they mean and what they should do. However, we cannot know everything [based on neuromarketing research results], as we are measuring unconscious things. Surprisingly many clients are able to accept this fact that not everything can be explained thoroughly at the moment."

6 CONCLUSIONS

In this chapter, research findings are compared to current consumer neuroscience literature and conclusions are drawn to fulfill the purpose of this study. First the survey conclusions are discussed, followed by interview conclusions.

6.1 Benefits

The first part of the survey deals with consumer neuroscience's *benefits,* according to the first sub-question of this study. A comparison between current literature and respondent groups' perceptions in this matter is summarized and visualized in Figure 6, based on which conclusions are drawn.

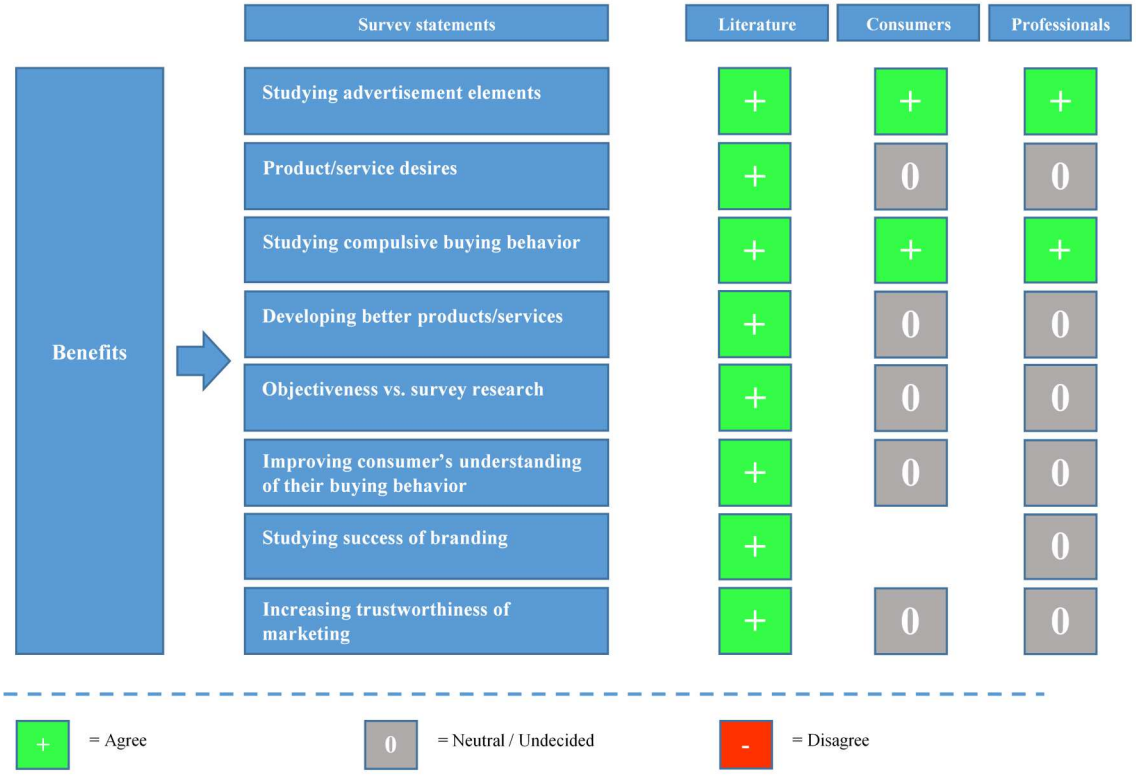

Figure 6: Visualization of conclusions on benefits

Both consumers and professionals seem to agree with researchers on the possibilities of studying, with brain imaging techniques, which elements of advertisements viewers attend the most. Currently advertisement processing, recalling and recognition are all studied within this field (Hubert & Kenning 2008, 282) and brain imaging techniques are being proposed as potential tools for comparing different sequences of TV advertisements

(Kenning et al. 2007, 147). Similarly, consumers' and marketing professionals' perceptions of the possibility of studying compulsive buying behaviour appear to be in line with the literature as it has already been studied with fMRI by Raab et al. (2011) and other researchers also raise this issue as potential ground for research (Hubert & Kenning 2008, 288).

All other statements are perceived in a neutral manner by both respondent groups. While Hubert and Kenning (2008, 275) argue that consumer neuroscience can provide information about what kind of products consumers want, and whereas some researchers are optimistic about possibilities of developing more desirable and meaningful products with the help of brain imaging techniques (Hubert & Kenning 2008, 288; Lindström 2008, 5), both respondent groups' perceptions are neutral. Additionally, while authors argue that consumer neuroscience has potential of predicting behaviour more accurately (Plassmann et al. 2012, 30) and could provide a more objective and thorough understanding of consumers' desires (Hubert & Kenning 2008, 273–275) than traditional self-report methods, respondents' perceptions are yet again neutral. Finally, consumer neuroscience's possibilities of helping consumers better understand their own buying behaviour do not elicit any notable opinions regardless of potential seen by researchers (Hubert & Kenning 2008, 288; Lindström 2008, 4–5).

The professionals do not have a clear opinion whether it would be possible to study the success of branding with brain imaging methods. In their well-known study with Coca-Cola and Pepsi (see chapter 3.5.2), McClure et al. (2004) concluded that subjects' expressed behavioural preferences were significantly influenced by brand information. This study – keeping in mind the discussed restrictions in interpretation of results – is an example of how brain imaging methods could be used to study branding and success of branding.

The final statement of the first part of both surveys is "f*indings of brain imaging studies do not increase trustworthiness of marketing*". Lindström (2008, 4–5) sees that consumer neuroscience offers consumers knowledge and understanding of their own behaviour so that they are aware and capable of defending against advertisers' tricks and tactics. In other words, the transparency of marketing could increase as the underlying processes of buying behaviour could be exposed – perhaps leading to increase in trustworthiness of marketing. The respondents however do not seem to agree nor disagree with this statement.

The first sub-question of this study is "*what are the benefits of consumer neuroscience*" and while in the consumer neuroscience literature several beneficial aspects are acknowledged, both respondent groups have neutral opinions about the benefits. It seems that either the respondents lack information on the subject to from a clear opinion or that they simply do not perceive consumer neuroscience having notable benefits. If at least marketing professionals do not perceive the field as beneficial, the future of consumer

neuroscience in Finland might be difficult. Marketing professionals are in key position in determining what marketing research methods their companies will be using and it seems that they are not aware of the potential in consumer neuroscience, as proposed by academics. The consumers' lack of knowledge or neutral opinion on the benefits on the other hand is not necessarily a crucial factor in the future of the field – instead more important factors will be the following limitations and challenges, along with ethical issues.

6.2 Limitations and challenges

The second part of the survey deals with consumer neuroscience's *limitations and challenges*, according to the second sub-question of this study. A comparison between current literature and respondent groups' perceptions in this matter is summarized and visualized in Figure 7, based on which conclusions are drawn.

Figure 7: Visualization of conclusions on limitations and challenges

The very first statement of this second part is that "*it is possible to read people's minds with brain imaging methods*" which is based on the study of Wardlaw et al. (2011). In

their study 34% of respondents of the public survey and 29% of respondents of the (neuroimaging) expert survey believed that brain imaging methods currently had "to some extent" potential to read people's minds. Other response alternatives were "not at all" and "very well". Although there were only three response alternatives, and keeping in mind that *reading minds* can be understood ambiguously, their findings concerning this research item are interesting. However, as the present study is constructed differently, the results cannot be directly compared. In this study, neither of the respondent groups have a clear opinion about the statement.

An interesting shift of perceptions can be noted between the first and second statement. Both respondent groups' seem to agree with the second statement that it is possible to unconsciously affect consumers with neuromarketing, while disagreeing with the possibilities of mind reading. In current literature the existence of such things as unconscious "buy-buttons", that could be triggered with consumer neuroscience, have been unanimously discarded as being highly unlikely now and in the future (i.e. Javor et al. 2013, 7; Yoon et al. 2012, 484). Fisher et al. (2010, 235) also state that it is not possible to manipulate consumer behaviour with current consumer neuroscience techniques. To date, to the knowledge of the author, no such possibilities have been presented in peer reviewed journal articles. It should be noted here that the phrasing of the first two statements slightly but perhaps meaningfully differ, the first mentioning brain imaging techniques and the second mentioning neuromarketing.

According to Plassmann et al. (2007, 169) special medical and technical environments are needed for consumer neuroscience studies, limiting experimental designs that could lead to unrealistic results in marketing context. Other researchers concur at least with the special requirements of fMRI (Rinne et al. 2006, 127) and MEG (Mason et al. 2013, 193). The respondents neither agree nor disagree with current literature which could be explained by unawareness of what techniques are used in neuromarketing or how these techniques work. On the other hand, both respondent groups to some extent agree with current literature that neuromarketing is expensive. For example Perrachione and Perrachione (2008, 314) and Plassmann et al. (2007, 156) argue that conducting neuroscientific research is expensive – apart from EEG.

A fair amount of criticism towards consumer neuroscience is based on frail validity and reliability of study findings as there are not enough replicating studies, sample sizes are small and experimental settings are relatively simple (Hubert 2010, 813–814; Georges et al. 2014, 50). Additionally, the research on consumer neuroscience currently consist mainly of unrelated studies covering a range of potentially relevant issues (Plassmann et al. 2007, 151) and not much progress has been made to integrate and verify existing theories (Solnais et al. 2013, 79). Thus, a scientific consensus on consumer neuroscience findings does not at the moment exist. Consumer respondents seem to agree with this,

while professional respondents' answers are again neutral. The professionals do not have an opinion about whether findings of neuromarketing studies can be generalized, either.

Perhaps the most interesting finding of this part is related to the statement "*it is possible to infer from brain imaging studies that decision-making processes are located in a specific area of the brain*". This statement was chosen to the surveys based on important limitations of reasoning related to consumer neuroscience studies – reverse inference – which is increasingly used (Reimann et al. 2011, 612; Plassmann et al. 2012, 29). It is not deductively valid to infer engagement of certain cognitive functions based on activation in certain regions of brain. Instead this only permits researchers to infer something about the role of certain regions of brain in certain cognitive functions. (Poldrack 2006, 59.) This reverse inference can lead to over-simplifications (Solnais et al. 2013, 75). Furthermore, as neurophysiological processes are complex (Plassmann et al. 2007, 170), statements such as this don't have, at least unanimous, support among researchers. Both respondent groups however, to some extent, agree with the statement and seem to have a more optimistic perception than the current literature allows.

Based on the study of Eser et al. (2011), the last statements relate to finding participants to consumer neuroscience research. In their study, finding participants were not perceived as either difficult or easy (Eser et al. 2011, 863). In this study, consumer respondents are willing to participate in a neuromarketing study as research subjects but the professionals do not have an opinion whether it is easy to find subjects for neuromarketing studies. Naturally, the statements are not directly comparable with those of Eser et al. (2011) but are to some extent parallel, and although the findings somewhat differ, they are not contradicting.

The second sub-question of this study is "*what are the limitations and challenges of consumer neuroscience*" and when compared to the benefits, academic researchers are more unified in this matter. A number of limitations and challenges have been presented by different researchers and it seems that – at least currently – there are more unsolved issues in this field than there are reliable and ready answers for marketing. However, the respondents' answers in this study are again fairly neutral. This could indicate that again the respondents lack information to form opinions or that they do not perceive consumer neuroscience having major limitations or challenges. For the future of consumer neuroscience, these findings are promising as if the marketing professionals do not perceive the field having major limitations, they are perhaps more likely to use consumer neuroscience techniques. In addition, if the consumers are not excessively sceptic, the willingness of companies to utilize these methods in marketing research might increase. Still, one particularly interesting finding arise from the data. Both respondent groups seem to agree that it is possible to unconsciously affect consumers with neuromarketing. This might yield negative publicity but transparent communication and educating the consumers can help avoid excessive and unfounded fears.

6.3 Ethical issues

The third part of the survey deals with *ethical issues* of consumer neuroscience, according to the third sub-question of this study. A comparison between current literature and respondent groups' perceptions in this matter is summarized and visualized in Figure 8, based on which conclusions are drawn.

Figure 8: Visualization of conclusions on ethical issues

There is an ongoing debate whether brain imaging methods should or should not be used in marketing. Neither consumers nor professionals have a clear opinion whether or not brain imaging methods should be used in marketing, which is an interesting finding, given the slightly negative reputation gained from the media (i.e. Etchells 2013, Singer 2010) and the undecided debate among researchers. Furthermore, answers for the statement about neuromarketing being manipulative are surprisingly neutral for both respondent groups. Similarly to the previous statement, this is also a contested ground within scientific community. Only one thing can be confidently mentioned here: there is no consensus in this matter. For example Georges et al. (2014, 46) argues that brain imaging techniques can be used in misleading and manipulative manners but emphasizes that research should not be intercepted as knowledge itself is not unethical.

Murphy et al. (2008, 298–299) have created a code of ethics for consumer neuroscience and one part of it is protection of vulnerable populations (i.e. children and people

with psychological disorders) that can be easily influenced. Although such a code of ethics has been proposed, there are, to the knowledge of the author, no documented cases of exploitation of these potentially vulnerable populations. Additionally, consumer neuroscience studies on children – such as that of Bruce et al. (2014) studying children's neural responses to logos – are not very common compared to studies on adults. Neither consumers nor professionals have a clear opinion about whether neuromarketing exposes children or otherwise vulnerable people to be exploited, but the answers are slightly tilted towards agreeing that neuromarketing could do this. It should be noted here that this statement can perhaps be understood in two ways; exploitation during consumer neuroscience research and exploitation in general, based on consumer neuroscience research. Care should be taken when interpreting the results of this particular statement.

Perhaps based on unawareness of neuromarketing and its techniques, the responses from both groups are neutral for statements about brain imaging causing side effects to research subject and about brain imaging techniques being unpleasant. Out of the four discussed brain imaging techniques – EEG, MEG, PET and fMRI – only PET is invasive as radioactive tracers are being used and this limits the application of this technique with consumer neuroscience (Plassmann et al. 2007, 155; Kenning et al. 2007, 139). On the other hand, Aalto (2006, 123) argues that healthy subjects are in no threat as the radiation stress during an experiment is low. Based on current literature, there are no side effects to research subjects – apart from PET. Senior et al. (2007) studied participants' perspectives about brain imaging techniques and found out that while fMRI and MEG had slightly negative reputations, and MEG was reported to be tiring and uncomfortable, in general the experiments were reported to be positive and fascinating – although some participants felt still anxious about the techniques after experiments.

The last two statements are "*neuromarketing is not a way of selling unnecessary products and services*" and "*use of neuromarketing should not be restricted by laws and regulations*". Means for both respondent groups are yet again neutral for both statements. Georges et al. (2014, 46–47) distinguish between motivating and manipulating consumers – motivating referring to mutual benefits for consumers and companies, manipulating referring to one-sided benefit for companies – and in this sense, consumer neuroscience could be seen as mutually beneficial and not as a way of selling unnecessary goods. Regarding the latter statement, there seems to be a sort of agreement among researchers that consumer neuroscience should at least have procedures of dealing with incidental findings (Illes et al. 2006, 783; Nelson 2008, 319) and a code of ethics (Murphy et al. 2008, 295). In their study, Eser et al. (2011, 863) also had a statement "n*euromarketing is a manipulative way to sell unnecessary goods and services*" and marketing academics, neurologists and marketing professionals all more or less disagreed with the statement.

The third sub-question is "*what are the ethical issues of consumer neuroscience*" and this is again a contested ground in the literature: should or should not brain imaging techniques be used in marketing. That is an important question to answer but researchers are divided on this matter. Some authors are excited about the possibilities offered by consumer neuroscience, while other authors are sceptical or even oppose using brain imaging techniques in commercial applications. In this study, both respondent groups have a surprisingly neutral opinion about these ethical issues at least when compared to the debates in scientific community and popular media. Returning to the question mentioned above, the respondents do not agree nor disagree whether brain imaging techniques should be used in marketing. Similar trend continues with all other statements in this section. This could be perceived as a positive starting point for consumer neuroscience. If the public or marketing professionals would be critical of these ethical issues, the future of consumer neuroscience would be at the very least challenging.

6.4 Future prospects

The fourth part of the survey deals with *future prospects* of consumer neuroscience, according to the last sub-question of this study. A comparison between current literature and respondent groups' perceptions in this matter is summarized and visualized in Figure 9, based on which conclusions are drawn.

Figure 9: Visualization of conclusions on future prospects

Both consumer and professional respondents agree with the first two statements about increase of use of neuromarketing in general and about increase of use particularly in Finland, suggesting that both groups perceive consumer neuroscience being a growing field. This is an interesting finding when compared to previous, mainly neutral, opinions related to different aspects of consumer neuroscience. During the last few years, the number of companies providing neuromarketing services has increased notably (Page 2011, 134) and the subject has been increasingly studied as discussed earlier.

Professionals-only statements related to whether consumer neuroscience will replace existing marketing research methods and whether it will become a cost-efficient tool for marketing as techniques improve are again perceived in a neutral manner, without a clear opinion in either direction. In the literature perhaps the most common argument is that current neuroimaging techniques are unlikely to replace traditional research methods but

rather they will be used together to gain more thorough understanding of various components of consumer behaviour (i.e. Solnais et al. 2013, 79). The price development is rarely discussed by researchers but it may be safe to assume that advances in technology will reduce the prices of consumer neuroscience studies to some extent. Interestingly, the professionals are not sure if their company will be using neuromarketing in the future but on the other hand, they are not denying it either. Similarly, consumer respondents do not have an opinion about whether the increase of use of neuromarketing is a good thing or not. For the future of consumer neuroscience in Finland, this might be a good starting point as even though consumers and professionals are not keen about it, at least they are not strictly against it either.

In this last part, two parallel but individually phrased statements were presented for respondents; consumers were asked if knowledge of use of neuromarketing in conjunction with a certain product or service affects their purchase intentions negatively and professionals were asked if consumer's knowledge of use of neuromarketing in conjunction with a certain product or service affects her or his purchase intentions negatively. Means for these items are surprisingly neutral. These items are not based on specific studies but rather serve as coarse indicators whether use of consumer neuroscience would affect purchase intentions, because the general image around this field seems to be slightly negative both in the media and scientific community as discussed earlier. Furthermore, it seems that use of neuromarketing does not affect the company's image negatively either as both respondent groups have a neutral opinion about this. It appears that use of consumer neuroscience does not affect, at least in a notable way, to purchase intentions nor the image of the company that is using brain imaging methods in marketing.

Finally, both respondent groups were asked whether they would like to know more about consumer neuroscience and whether they will follow advancements of consumer neuroscience. Both consumers and professionals seem to be interested in consumer neuroscience and will probably follow how the field evolves in the future. The professionals were also asked if they are interested in using consumer neuroscience, but they seem to be rather undecided regarding this statement with a neutral mean.

The last sub-question of this study is "*what are the future prospects of consumer neuroscience in Finland*". Both respondent groups perceive consumer neuroscience as a growing field both globally and in Finland, while at the same time they are not sure if they will be using the techniques themselves (marketing professionals) or whether the increase of use is a good thing (consumers). Important questions in the future of consumer neuroscience are whether the consumers' knowledge of the use of these techniques in marketing would negatively affect their purchase intentions or the image of the company using them. In this study, no such effects arise from the findings – which is again promising sign for this field. Benefits gained from using brain imaging techniques in marketing

could be easily undermined if as a consequence the purchase intentions of consumers or the image of the company would change negatively.

6.5 Novelty of the phenomenon and lack of knowledge

The response alternative of "*I don't know*" was introduced to the survey based on assumptions of lack of knowledge regarding the subject, in order to separate neutral opinions from lack of knowledge or willingness to answer. This seems to have been a justified decision based on the findings as throughout the survey, the percentage of these answers range between 3% and 41% per statement for consumer respondents, and between 7% and 57% per statement for professional respondents. The high occurrence of these answers seem to indicate – as suspected – that the respondent groups lack knowledge of consumer neuroscience. What is surprising though is that the percentage is higher in the professional survey, as it could be a justified assumption that marketing professionals have more knowledge of this phenomenon emerging in their field of expertise.

Overall, it could be argued that the high number of "*I don't know*" answers throughout the surveys yield valuable information. It could indicate that the field of consumer neuroscience is just emerging in Finland or that it has not yet entered the awareness of both the consumers and marketing professionals in Finland. This can be either positive or negative for the field depending on how the information of advancements within consumer neuroscience research will reach these relevant interest groups in the future – transparent and truthful disclosure of both academic and practical research results could be seen as an important factor. Disinformation could potentially lead to similar outcome as when subliminal advertising caused a public outcry, even though no scientific evidence supported the claims. Transparent and truthful communication by all involved parties could potentially increase interest in consumer neuroscience across the board.

6.6 Neuromarketing professionals' opinions

The two neuromarketing professionals' interviews complement the survey and add valuable practical perspective to the results. Although the views proposed by the interviewees are mainly in line with current academic literature, they also illuminate the practical point of view which is often disregarded in the literature, and shed light on new and perhaps surprising perspectives and ideas regarding neuromarketing. Both interviewees only use EEG as a research technique but their ideas and opinions can be seen as representative of the whole field of neuromarketing, based on their accumulated expertise and general knowledge.

The findings that arose from the first theme of the interviews – reasons for using neuromarketing – are similar to the arguments commonly used in the literature. The interviewees felt that with neuromarketing it is possible to reveal consumers' true motivations which is difficult with surveys for example (i.e. Plassmann et al. 2012, 30–32; Hubert & Kenning 2008, 275–283). Neuromarketing can also be used to study quick decision-making processes that are often unconscious (Reimann et al. 2011, 611). While additional benefits were also discussed, these were their main reasons for using neuromarketing and they are in line with arguments presented in the literature. On the other hand, the interviewees also mentioned reasons that are not commonly cited by academic researchers and one of them was the faster research process when compared to traditional research methods. Neuromarketing studies can be conducted fairly quickly due to automated data processing which was seen as an important benefit of the method.

The second theme – reasons limiting use of neuromarketing – yielded findings that are in line with arguments in the literature but again new or divergent views were also discussed. The interviewees were aware of limitations inherent in the techniques of neuromarketing and mentioned such as limitations in applications and challenges with measuring (i.e. Plassmann et al. 2007, 169). Based on the limitations, they felt that neuromarketing is not useful for trying to answer all marketing research questions; it is not useful for answering the question 'why', but rather the question 'how much'. The same limitations were also reasons why it is not in their view possible to find any so-called buy-buttons from the brain or to read people's minds, which is true to arguments proposed by academic researchers (i.e. Fisher et al. 2010, 235). Contrary to some views presented in the literature about the expensiveness of neuromarketing (i.e. Hubert & Kenning 2008, 288), EEG is already for them and their clients an affordable technique for marketing research but other techniques such as fMRI are still not economically viable.

The third theme related to ethical issues did not reveal any surprising findings. The interviewees had a clear stand on this matter and mentioned that neuromarketing is not manipulative as the research results usually lead to small changes in package designs or advertisements, and it does not differ from other marketing research methods regarding ethical norms and regulations. They felt that the fear of possibility of manipulation and such might be due to lack of knowledge regarding what neuromarketing is and what it is capable of. Additionally, whereas they already comply with normal regulations of marketing research industry and further ethical norms developed by a worldwide organization of neuromarketing companies, official regulations specifically for neuromarketing could be instituted in their view. This could prevent the worst excesses within the field.

Findings that arose from the last theme – future prospects of neuromarketing – imply encouraging future for neuromarketing both worldwide and in Finland. As one of the main reasons for the growth, the interviewees mentioned the importance of their clients' positive attitudes towards neuromarketing. Their clients' attitudes are correlating both

with successful projects and their own knowledge about neuromarketing. Successful projects bring valuable references and with their help, the interviewees' companies have a strong foothold on the neuromarketing market in Finland. Additionally, their clients have lately been proactive about using neuromarketing services which was not the case few years ago. The growth of neuromarketing as a field might at some point lead to replacement of some traditional marketing research methods in some applications but both interviewees stressed that because neuromarketing cannot answer all the questions, it will probably just establish its position as one legitimate marketing research method among others – complementing rather than replacing. Finally, neither interviewee felt that consumers' knowledge of use of neuromarketing would affect negatively their purchase decisions or the image of the company using neuromarketing.

Although the interview findings are largely in line with academic literature, they also revealed valuable insights regarding the practical point of view of neuromarketing. Based on the findings it is reasonable to conclude that perhaps the academic research has been focusing excessively on the scientific or academic perspectives while generally ignoring the practitioners' point of view. There are limitations both inherent in the techniques and in applications of neuromarketing, and there are ethical issues that require thorough discussions, but still neuromarketing already offers benefits that are already applied in practice. It will not give answers to all marketing questions but it has already been used successfully in many applications and offers encouraging opportunities in the future, as demonstrated by the interviewees and their companies.

6.7 Theoretical and managerial implications

There are several theoretical implications based on this study. First of all, currently the academic research on the phenomenon is a variety of unconnected studies that are rarely replicated which compromises the generalisation of research findings. Additionally, the relationship between traditional marketing research methods and consumer neuroscience has not been studied but rather the two have been studied in isolation. This leads to a situation in which different methods are easily seen only as competing instead of complementing. In addition to this, based on the neuromarketing professionals' interviews, there seems to be a gap also between academic level and practical level research in consumer neuroscience. As an example, the neuromarketing professionals stress the speed of research as one of the biggest advantages of consumer neuroscience methods, which is rarely mentioned in the academic literature. Scepticism towards current benefits of consumer neuroscience is also fairly common in the literature but as indicated by the interviewees of this study, their clients are already seeing enough benefits for them to utilize consumer neuroscience's methods in their marketing activities. Finally, the findings of

this study exposed a lack of information about consumer neuroscience among both consumers and marketing professionals. Perhaps not surprisingly the consumers were not familiar with consumer neuroscience but interestingly the marketing professionals were also largely uninformed of this phenomenon – at least in terms of the four themes applied in this study. Clearly more research and replicating studies are needed especially about the relationship between traditional research methods and consumer neuroscience, and more information needs to be distributed from academic research to marketing practitioners and general public – and vice versa – if consumer neuroscience is to grow into a legitimate field of marketing in the future.

There are also several managerial implications based on this study. First, this study gives an overview of the phenomenon and can serve as an introduction to consumer neuroscience which individuals in relevant managerial positions, mainly marketing managers etc., can use as a base for future decisions regarding this field. Additionally, this study revealed that consumer neuroscience could potentially offer promising results for certain marketing applications. Both the academic literature – regardless of the limitations – and ongoing practical level research indicate that consumer neuroscience methods can be used successfully at least as a complementary method along with traditional research methods. These applications include for example advertising and package designing. Finally, this study revealed that even though both consumers and marketing professionals lack knowledge of consumer neuroscience, both groups are interested in and have positive opinions about the future of field which is a good basis for growth.

This study also exposes few new areas of potential future research within the field of consumer neuroscience. Whereas this study focused on consumers' and marketing professionals' opinions towards consumer neuroscience, other relevant interest groups such as neuroscientist could also be studied. Additionally, besides the opinions of relevant groups, also the actual results of Finnish neuromarketing studies could be investigated to determine their impact and relevance. Finally, the focus of future studies could include wider geographical areas such as Europe.

6.8 Limitations of the study

There are several general limitations in this study. First, the statements of the survey were mainly developed by the author as there were, to the knowledge of the researcher, no such measurements used before in the literature. Thus validity – the ability of data collection methods to accurately measure what they were supposed to measure (Saunders & Lewis 2012, 127–128) – of the survey could be compromised. Second, convenience sampling was used with the survey research which limits the possibility to generalize the findings into larger population, as the sample may not be representative. Third, the number of

survey answers were low, especially in the professional survey, further limiting the generalizability of findings. Fourth, the phenomenon in question is fairly new and complex, and some of the respondents were unfamiliar with it which could have affected the answers. This could have also affected the response rates of the survey.

Regarding the data collection methods, there are some limitations with the Likert method applied in the survey that need to be considered. First, items chosen for the questionnaire may not measure appropriately the attitudes of interest. For example the researcher may lack understanding of participants' cultural backgrounds. Second, Likert scale is an ordinal scale although many researchers assume that it provides interval data, meaning that it is possible to rank individuals based on the favorableness toward the objects but it is not possible to say how much one is more favorable than other. The acquired survey data in this study has been interpreted mainly as ordinal data and analysed accordingly but in order to get a better overview of the phenomenon, it has also been interpreted as interval data and analysed as such. Finally, all attitude scales share some common limitations. Attitude scales are indirect measures where "real" attitudes are inferred from verbal statements. They are also self-report measures that are subject to factors such as social expectancy, willingness to cooperate and interpretation of verbal stimuli. (Burns 2000, 560.)

There are also limitations with the conducted theme interviews. As there were only two interviews, it can be argued whether the data saturation point has truly been reached so that no additional or complementary information can be obtained. On the other hand, both interviewees mentioned that they do not have serious competition in Finland which restricts the number of potential interviewees. Additionally, the interviews were translated from Finnish and revised into standard language which may have affected the conclusions drawn from them. Based on these limitations, the results of this study should be interpreted with care.

7 SUMMARY

The purpose of this study was to map the fairly new and growing field of consumer neuroscience in Finland by studying the opinions of both Finnish consumers and marketing professionals towards it and comparing the opinions to the current consumer neuroscience literature, and based on that evaluate the usability of consumer neuroscience as a marketing research method. At the moment majority of research is still unconnected, individual studies that cover a variety of issues such as what are the benefits of using brain imaging techniques in marketing, what are the unresolved challenges that limit the applications, what kind of ethical issues arise and what does the future of consumer neuroscience look like. The research sub-questions were based on these issues: what are the benefits of consumer neuroscience, what are the limitations and challenges of consumer neuroscience, what are the ethical issues of consumer neuroscience and what are the future prospects of consumer neuroscience in Finland?

The literature review revealed that consumer neuroscience research is still evolving. Many studies have shown that the field has potential as a marketing research method, by for example uncovering unconscious processes underlying consumption that cannot be achieved by means of more traditional research methods. On the other hand, many studies have also shown that there are a number of unresolved, noteworthy problems and challenges that are either inherent in the techniques itself or the application of the techniques. All the techniques have limitations such as difficulties of acquiring relevant data, costs or problems with inference. Additionally, the application of these neuroscientific methods in marketing is not straightforward and our lack of understanding regarding the functioning of the brain further restrict the current application of these methods in marketing. Ethical issues are also debated both in the scientific community and media, and many question whether consumer neuroscience should exist at all as they fear that it could be used to manipulate consumers. In the end, regardless of the current challenges, the future of consumer neuroscience seems to be promising. Many researchers are cautiously optimistic that consumer neuroscience will establish its position as an important marketing research method and complete – not replace – the current research methods.

The empirical studies complemented the literature review. The first part of empirical research was a survey which studied the opinions of Finnish consumers and marketing professionals towards consumer neuroscience and was based on the four research sub-questions. Both respondent groups had either neutral opinions or lacked knowledge about the phenomenon to express their opinions. The results suggested that for consumer neuroscience to grow into an established field in Finland, awareness needs to improve at least among marketing professionals who are in key position, making marketing research decisions. Awareness could also improve the consumers' perceptions about consumer neuroscience, easing unfounded fears concerning manipulation possibilities. In the second

part of the empirical research, two individuals from Finnish neuromarketing companies were interviewed to deepen the insights gained from the survey research. The interview themes were also based on the four research sub-questions. The interviewees' answers were mostly in line with current consumer neuroscience literature and they were optimistic about the future possibilities of the field, despite current challenges. Additionally, the interviews exposed a gap between academic consumer neuroscience research and practical level applications.

Even though there are unresolved challenges and not everything is known about the brain, which are common themes in the literature, consumer neuroscience techniques have already been successfully used in practice and the field is steadily growing. A dialogue between researchers and practitioners could be mutually beneficial. Consumer neuroscience seems to be developing into an established marketing research method as long as unfounded claims are eliminated, limitations acknowledged, the results are truly beneficial to the clients and the general public is transparently informed. Whether consumer neuroscience will be just one of many marketing research methods or something more in the future, will be determined by researchers, practitioners and consumers.

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APPENDIX 1 – CONSUMER SURVEY

Tämä kyselytutkimus tutkii mielipiteitä neuromarkkinoinnista. Alla on lyhyt esittely aiheesta:

Neuromarkkinointi tarkoittaa aivotutkimusmenetelmien ja niiden tuloksien käyttöä markkinoinnissa, esimerkiksi markkinatutkimuksessa tai mainonnan suunnittelussa.

Aivotutkimusmenetelmillä voidaan tutkia aivojen rakennetta ja toimintaa. Aivotutkimusmenetelmiä käytetään perinteisesti lääketieteellisessä tutkimuksessa (esim. aivovammojen tutkiminen) ja yleisessä aivotutkimuksessa, jonka tavoitteena on selvittää aivojen toimintaa ja ihmisen käyttäytymistä. Viime vuosina näitä menetelmiä on alettu yhä enemmän käyttää myös mm. kaupallisiin tarkoituksiin. Viimeisimpiä ilmiöitä on **neuromarkkinointi, jossa aivotutkimusmenetelmiä ja niiden tuloksia käytetään markkinoinnissa.**

Tämä kyselytutkimus tutkii mielipiteitä neuromarkkinoinnista. **Vastaa kysymyksiin oman näkemyksesi perusteella.** Kaikki vastaukset käsitellään anonyymisti eikä yksittäistä vastaajaa pysty tunnistamaan vastauksista. Kyselyn täyttäminen kestää noin 5-10 minuuttia.

1. Ikä *

0 merkkiä jäljellä

2. Sukupuoli *

- ○ Nainen
- ◉ Mies

3. Koulutus *

- ○ Peruskoulu
- ◉ Lukio
- ○ Ammattikoulutus
- ○ Ammattikorkeakoulu
- ○ Yliopisto
- ○ Tieteellinen jatkotutkinto (lisensiaatti, tohtori)

4. Pääasiallinen koulutusala *

Valitse seuraavista vaihtoehdoista pääasiallinen koulutusalasi. Jos mikään vaihtoehdoista ei vastaa koulutusalaasi, valitse "*muu koulutusala*" ja tarkenna tyhjään kenttään.

- ○ Yleissivistävä koulutus
- ○ Kasvatustieteellinen ja opettajankoulutus
- ○ Humanistinen ja taidealan koulutus
- ◉ Kaupallinen koulutus
- ○ Yhteiskuntatieteellinen koulutus
- ○ Luonnontieteellinen koulutus
- ○ Tekniikan koulutus
- ○ Maa- ja metsätalousalan koulutus
- ○ Terveys- ja sosiaalialan koulutus
- ○ Palvelualojen koulutus
- ○ Muu koulutusala, mikä? _____

5. Arvioi seuraavia väittämiä **oman käsityksesi mukaisesti:**

Huom! **Ei samaa eikä eri mieltä** = neutraali mielipide, **EOS** = en tiedä / en osaa sanoa

	Täysin samaa mieltä	Osittain samaa mieltä	Ei samaa eikä eri mieltä	Osittain eri mieltä	Täysin eri mieltä	En osaa sanoa
Aivotutkimusmenetelmillä ei voida selvittää, mitkä elementit mainoksessa kiinnittävät eniten katsojan huomiota	○	○	○	○	○	○
Neuromarkkinoinnilla ei voida selvittää millaisia tuotteita/palveluja kuluttajat haluavat	○	○	○	○	○	○
Aivotutkimusmenetelmillä ei voida tutkia ostoriippuvuutta (=pakonomainen tarve ostaa)	○	○	○	○	○	○
Aivotutkimusmenetelmillä ei voida kehittää parempia tuotteita/palveluja	○	○	○	○	○	○
Neuromarkkinointi ei ole objektiivisempi tapa tapa tutkia kuluttajien mieltymyksiä kuin kyselytutkimukset	○	○	○	○	○	○
Neuromarkkinoinnin avulla kuluttajat eivät voi voi paremmin ymmärtää omaa kuluttajakäyttäytymistä	○	○	○	○	○	○
Aivotutkimuksen tulokset eivät lisää markkinoinnin luotettavuutta	○	○	○	○	○	○

6. Arvioi seuraavia väittämiä **oman käsityksesi mukaisesti:**

Huom! **Ei samaa eikä eri mieltä** = neutraali mielipide, EOS = en tiedä / en osaa sanoa

	Täysin samaa mieltä	Osittain samaa mieltä	Ei samaa eikä eri mieltä	Osittain eri mieltä	Täysin eri mieltä	En osaa sanoa
Aivotutkimusmenetelmillä on mahdollista lukea ihmisten ajatuksia	○	○	○	○	○	○
Neuromarkkinoinnilla voidaan tiedostamattomasti vaikuttaa kuluttajiin	○	○	○	○	○	○
Neuromarkkinointitutkimus on vleensä suoritettava erityisissä tiloissa	○	○	○	○	○	○
Neuromarkkinoinnin tutkimustuloksista on tieteellinen yksimielisyys	○	○	○	○	○	○
Aivotutkimuksen tuloksista voidaan päätellä, että päätöksenteon toiminnot sijaitsevat tietyssä osassa aivoja	○	○	○	○	○	○
Neuromarkkinointi on kallista	○	○	○	○	○	○
Voisin osallistua neuromarkkinointitutkimukseen neuromarkkinointitutkimukseen koehenkilönä	○	○	○	○	○	○

7. Arvioi seuraavia väittämiä **oman käsityksesi mukaisesti:**

Huom! **Ei samaa eikä eri mieltä** = neutraali mielipide, EOS = en tiedä / en osaa sanoa

	Täysin samaa mieltä	Osittain samaa mieltä	Ei samaa eikä eri mieltä	Osittain eri mieltä	Täysin eri mieltä	En osaa sanoa
Aivotutkimusmenetelmiä ei pitäisi käyttää markkinoinnissa	○	○	○	○	○	○
Neuromarkkinointi ei ole manipuloivaa	○	○	○	○	○	○
Neuromarkkinointi ei altista nuoria ja muita heikossa asemassa olevia hyväksikäytölle	○	○	○	○	○	○
Aivotutkimusmenetelmät eivät aiheuta sivuvaikutuksia koehenkilöille	○	○	○	○	○	○
Aivotutkimusmenetelmät eivät ole epämiellyttäviä koehenkilölle	○	○	○	○	○	○
Neuromarkkinointi ei ole tapa myydä tarpeettomia tuotteita ja palveluja	○	○	○	○	○	○
Neuromarkkinoinnin käyttöä ei pitäisi rajoittaa laeilla ja säädöksillä	○	○	○	○	○	○

8. Arvioi seuraavia väittämiä **oman käsityksesi mukaisesti:**

Huom! **Ei samaa eikä eri mieltä** = neutraali mielipide, **EOS** = en tiedä / en osaa sanoa

	Täysin samaa mieltä	Osittain samaa mieltä	Ei samaa eikä eri mieltä	Osittain eri mieltä	Täysin eri mieltä	En osaa sanoa
Neuromarkkinointi tulee lisääntymään tulevaisuudessa	○	○	○	○	○	○
Neuromarkkinointi tulee lisääntvmään Suomessa seuraavien 5 vuoden sisällä	○	○	○	○	○	○
Neuromarkkinoinnin käytön lisääntyminen on hyvä asia	○	○	○	○	○	○
Tieto neuromarkkinoinnin käytöstä jonkin tuotteen/palvelun yhteydessä vaikuttaa ostopäätökseeni negatiivisesti	○	○	○	○	○	○
Neuromarkkinoinnin käyttö vaikuttaa yrityksen imagoon negatiivisesti	○	○	○	○	○	○
Olen kiinnostunut tietämään lisää neuromarkkinoinnista	○	○	○	○	○	○
Aion seurata neuromarkkinoinnin kehitystä	○	○	○	○	○	○

APPENDIX 2 – PROFESSIONAL SURVEY

Tämä kyselytutkimus tutkii mielipiteitä neuromarkkinoinnista. Alla on lyhyt esittely aiheesta:

Neuromarkkinointi tarkoittaa aivotutkimusmenetelmien ja niiden tuloksien käyttöä markkinoinnissa, esimerkiksi markkinatutkimuksessa tai mainonnan suunnittelussa.

Aivotutkimusmenetelmillä voidaan tutkia aivojen rakennetta ja toimintaa. Aivotutkimusmenetelmiä käytetään perinteisesti lääketieteellisessä tutkimuksessa (esim. aivovammojen tutkiminen) ja yleisessä aivotutkimuksessa, jonka tavoitteena on selvittää aivojen toimintaa ja ihmisen käyttäytymistä. Viime vuosina näitä menetelmiä on alettu yhä enemmän käyttää myös mm. kaupallisiin tarkoituksiin. Viimeisimpiä ilmiöitä on **neuromarkkinointi, jossa aivotutkimusmenetelmiä ja niiden tuloksia käytetään markkinoinnissa.**

Tämä kyselytutkimus tutkii mielipiteitä neuromarkkinoinnista. **Vastaa kysymyksiin oman näkemyksesi perusteella**. Kaikki vastaukset käsitellään anonyymisti eikä yksittäistä vastaajaa pysty tunnistamaan vastauksista. Kyselyn täyttäminen kestää noin 5-10 minuuttia.

1. Syntymävuosi (vvvv) *

197

0 merkkiä jäljellä

2. Sukupuoli *

- (•) Nainen
- ( ) Mies

3. Koulutus *

- (•) Peruskoulu
- ( ) Lukio
- ( ) Ammattikoulutus
- ( ) Ammattikorkeakoulu
- ( ) Yliopisto
- ( ) Tieteellinen jatkotutkinto (lisensiaatti, tohtori)

4. Pääasiallinen koulutusala *

Valitse seuraavista vaihtoehdoista pääasiallinen koulutusalasi. Jos mikään vaihtoehdoista ei vastaa koulutusalaasi, valitse "*muu koulutusala*" ja tarkenna tyhjään kenttään.

- (•) Yleissivistävä koulutus
- ( ) Kasvatustieteellinen ja opettajankoulutus
- ( ) Humanistinen ja taidealan koulutus
- ( ) Kaupallinen koulutus
- ( ) Yhteiskuntatieteellinen koulutus
- ( ) Luonnontieteellinen koulutus
- ( ) Tekniikan koulutus
- ( ) Maa- ja metsätalousalan koulutus
- ( ) Terveys- ja sosiaalialan koulutus
- ( ) Palvelualojen koulutus
- ( ) Muu koulutusala, mikä? _____

5. Kuinka monta vuotta olet työskennellyt *pääasiallisesti* markkinoinnin parissa?

Merkitse vuosien määrä (esim. 10).

[ ]

0 merkkiä jäljellä

6. Tehtävä tai asema yrityksessä

Esim. markkinointiassistentti, markkinointipäällikkö jne.

[a]

7. Millä tavoin yrityksenne hankkii tietoa markkinoinnin päätöksenteon tueksi?

Valitse kaikki sopivat.

- [x] Kyselytutkimukset
- [ ] Henkilökohtaiset haastattelut
- [ ] Aivotutkimusmenetelmät (esim. aivosähkökäyrä EEG)
- [ ] Fokusryhmähaastattelut
- [ ] Fysiologiset mittaukset (esim. silmänliikekamera, ihon sähkönjohtavuus)
- [ ] Asiakaspaneelit
- [ ] Yrityksen sisäiset tietolähteet (esim. myyntiluvut)
- [ ] Yrityksen ulkopuoliset tietolähteet (esim. julkiset tilastot)
- [ ] Havainnointitutkimukset
- [ ] Koeasetelmat
- [ ] Markkinatestit
- [ ] Muut, mitkä? _____

8. Jos vastasit edelliseen kysymykseen "*aivotutkimusmenetelmät*", mitä menetelmiä yrityksenne on käyttänyt?

Valitse kaikki sopivat.

- ☐ EEG (aivosähkökäyrä)
- ☐ MEG (aivomagneettikäyrä)
- ☐ PET (positroniemissiotomografia)
- ☐ fMRI (funktionaalinen magneettikuvaus)
- ☐ Muu, mikä? _____

9. Arvioi seuraavia väitteitä **oman käsityksesi mukaisesti:**

Huom! **Ei samaa eikä eri mieltä** = neutraali mielipide, EOS = en tiedä / en osaa sanoa

	Täysin samaa mieltä	Osittain samaa mieltä	Ei samaa eikä eri mieltä	Osittain eri mieltä	Täysin eri mieltä	En osaa sanoa
Aivotutkimusmenetelmillä ei voida selvittää, mitkä elementit mainoksessa kiinnittävät eniten katsojan huomiota	○	○	○	○	○	○
Neuromarkkinoinnilla ei voida selvittää millaisia tuotteita/palveluja kuluttajat haluavat	○	○	○	○	○	○
Aivotutkimusmenetelmillä ei voida tutkia ostoriippuvuutta (=pakonomainen tarve ostaa)	○	○	○	○	○	○
Aivotutkimusmenetelmillä ei voida kehittää parempia tuotteita/palveluja	○	○	○	○	○	○
Neuromarkkinointi ei ole objektiivisempi tapa tapa tutkia kuluttajien mieltymyksiä kuin kyselytutkimukset	○	○	○	○	○	○
Neuromarkkinoinnin avulla kuluttajat eivät voi voi paremmin ymmärtää omaa kuluttajakäyttäytymistä	○	○	○	○	○	○
Neuromarkkinoinnilla ei voida tutkia brändäyksen onnistumista	○	○	○	○	○	○
Aivotutkimuksen tulokset eivät lisää markkinoinnin luotettavuutta	○	○	○	○	○	○

10. Arvioi seuraavia väitteitä **oman käsityksesi mukaisesti:**

Huom! **Ei samaa eikä eri mieltä** = neutraali mielipide, EOS = en tiedä / en osaa sanoa

	Täysin samaa mieltä	Osittain samaa mieltä	Ei samaa eikä eri mieltä	Osittain eri mieltä	Täysin eri mieltä	En osaa sanoa
Aivotutkimusmenetelmillä on mahdollista lukea ihmisten ajatuksia	○	○	○	○	○	○
Neuromarkkinoinnilla voidaan tiedostamattomasti vaikuttaa kuluttajiin	○	○	○	○	○	○
Neuromarkkinointitutkimus on yleensä suoritettava erityisissä tiloissa	○	○	○	○	○	○
Neuromarkkinoinnin tutkimustuloksista on tieteellinen yksimielisyys	○	○	○	○	○	○
Neuromarkkinoinnin tutkimustulokset ovat yleistettävissä	○	○	○	○	○	○
Aivotutkimuksen tuloksista voidaan päätellä, että päätöksenteon toiminnot sijaitsevat tietyssä osassa aivoja	○	○	○	○	○	○
Neuromarkkinointi on kallista	○	○	○	○	○	○
Neuromarkkinointitutkimukseen löytää helposti koehenkilöitä	○	○	○	○	○	○

11. Arvioi seuraavia väitteitä **oman käsityksesi mukaisesti:**

Huom! **Ei samaa eikä eri mieltä** = neutraali mielipide, EOS = en tiedä / en osaa sanoa

	Täysin samaa mieltä	Osittain samaa mieltä	Ei samaa eikä eri mieltä	Osittain eri mieltä	Täysin eri mieltä	En osaa sanoa
Aivotutkimusmenetelmiä ei pitäisi käyttää markkinoinnissa	○	○	○	○	○	○
Neuromarkkinointi ei ole manipuloivaa	○	○	○	○	○	○
Neuromarkkinointi ei altista nuoria ja muita heikossa asemassa olevia hyväksikäytölle	○	○	○	○	○	○
Aivotutkimusmenetelmät eivät aiheuta sivuvaikutuksia koehenkilöille	○	○	○	○	○	○
Aivotutkimusmenetelmät eivät ole epämiellyttäviä koehenkilölle	○	○	○	○	○	○
Neuromarkkinointi ei ole tapa myydä tarpeettomia tuotteita ja palveluja	○	○	○	○	○	○
Neuromarkkinoinnin käyttöä ei pitäisi rajoittaa laeilla ja säädöksillä	○	○	○	○	○	○

12. Arvioi seuraavia väitteitä **oman käsityksesi mukaisesti:**

Huom! **Ei samaa eikä eri mieltä** = neutraali mielipide, EOS = en tiedä / en osaa sanoa

	Täysin samaa mieltä	Osittain samaa mieltä	Ei samaa eikä eri mieltä	Osittain eri mieltä	Täysin eri mieltä	En osaa sanoa
Neuromarkkinointi tulee lisääntymään tulevaisuudessa	○	○	○	○	○	○
Neuromarkkinointi tulee lisääntymään Suomessa seuraavien 5 vuoden sisällä	○	○	○	○	○	○
Neuromarkkinointi tulee syrjäyttämään nykyisiä markkinoinnin tutkimusmenetelmiä	○	○	○	○	○	○
Neuromarkkinoinnista tulee tekniikoiden kehityksen myötä kustannustehokas markkinoinnin työkalu	○	○	○	○	○	○
Yrityksemme tulee käyttämään neuromarkkinointia tulevaisuudessa	○	○	○	○	○	○
Kuluttajan tieto neuromarkkinoinnin käytöstä jonkin tuotteen/palvelun yhteydessä vaikuttaa hänen ostopäätökseen negatiivisesti	○	○	○	○	○	○
Neuromarkkinoinnin käyttö vaikuttaa yrityksen yrityksen imagoon negatiivisesti	○	○	○	○	○	○
Olen kiinnostunut tietämään lisää neuromarkkinoinnista	○	○	○	○	○	○
Olen kiinnostunut käyttämään neuromarkkinointia	○	○	○	○	○	○
Aion seurata neuromarkkinoinnin kehitystä	○	○	○	○	○	○

APPENDIX 3 – PROFESSIONAL SURVEY COVERING LETTERS

The first covering letter was sent to members of the smaller, locally operating organization, via their staff.

Hei MARK Turun ryhmän jäsenet!

Mikael Vainio opiskelee Turun kauppakorkeakoulussa ja tekee tutkimusta markkinoinnin ammattilaisten mielipiteistä neuromarkkinointia kohtaan. Neuromarkkinointi tarkoittaa aivotutkimusmenetelmien ja niiden tuloksien käyttämistä markkinoinnissa.

Toivomme, että autat Mikaelia tutkimuksessa ja vastaat lyhyeen kyselytutkimukseen, joka vie aikaasi n. 5-10 minuuttia. Yksittäistä vastaajaa ei ole mahdollista tunnistaa vastauksista. Tässä linkki kyselyyn:

Linkki.

Terveisin,
MARK toimisto

Mikael kiittää ajastanne ja toivottaa mukavaa alkavaa kesää. Mikäli Sinulla on jotain kysyttävää tutkimuksesta, niin tässäpä Mikaelin yhteystiedot:
mikael.vainio@utu.fi

The second covering letter was sent to members of the larger, nationally operating organization, as a part of the organization's e-newsletter.

Osallistu neuromarkkinoinnin tutkimukseen

Markkinoinnin ammattilainen, osallistu tutkimukseen ja kerro mielipiteesi aivotutkimusmenetelmien käyttämisestä markkinoinnissa. Vastaaminen vie aikaa 5-10 minuuttia, eikä vastaajaa voi tunnistaa. Tutkimuksen tekee Turun kauppakorkeakoulun opiskelija Mikael Vainio (mikael.vainio@utu.fi).

Linkki kyselyyn:
Linkki.

APPENDIX 4 – CONSUMER SURVEY COVERING LETTER

The covering letter was sent via the student record administrator of the University of Turku.

Kyselytutkimus neuromarkkinoinnista / Questionnaire about neuromarketing

Hyvä opiskelija,

osallistu Turun yliopiston opiskelijan kyselytutkimukseen, jossa tutkitaan kuluttajien mielipiteitä neuromarkkinoinnista. Neuromarkkinointi tarkoittaa aivotutkimusmenetelmien ja niiden tuloksien käyttämistä markkinoinnissa. Kysely on osa pro gradu-tutkielmaa.

Lyhyt kyselytutkimus vie aikaa n. 5-10 minuuttia eikä yksittäistä vastaajaa voi tunnistaa vastauksista. ÄLÄ VASTAA TÄHÄN VIESTIIN! Mikäli sinulla on kysyttävää tutkimuksesta, voit ottaa yhteyttä tutkimuksen tekijään Mikael Vainioon (mimavai@utu.fi).

Kiitos ajastasi!

Linkki kyselyyn: https://www.webropolsurveys.com/S/AF4DEBD9F1338368.par

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Dear student,

This is an invitation to answer a questionnaire regarding the opinions of Finnish consumers towards neuromarketing, and thus the questionnaire is only in Finnish. The questionnaire is a part of a student's thesis. The available methods did not allow international students to be excluded from this sample.

Thank you for your interest.

APPENDIX 5 – PROFESSIONAL SURVEY RESPONDENT POSITIONS

A full list of professional survey respondent titles or positions.

Asiakaskokemuksesta vastaava
Aluemyyntipäällikkö
Yhteyspäällikkö
Markkinointiviestinnän koordinaattori
Markkinointipäällikkö
Myyntipäällikkö
Asiakkuusjohtaja, hallituksen puheenjohtaja
Hallituksen puheenjohtaja
Manager
Myynti- ja markkinointijohtaja
Toimitusjohtaja
Kasvumarkkinointivalmentaja
Myyntipäällikkö
Koulutusvastaava
Aluemyyntipäällikkö
Yrittäjä
Markkinointipäällikkö
Yrittäjä
Kouluttaja
Aluemyyntipäällikkö
Aluepäällikkö
Aluepäällikkö
Aluemyyntipäällikkö
Markkinointisihteeri
Tuotepäällikkö/Aluemyyntipäällikkö
Tuotepäällikkö
Myynti
Myyntipäällikkö

APPENDIX 6 – INTERVIEW THEMES AND QUESTIONS

The four themes of the interviews were: (1) Benefits of consumer neuroscience, (2) Limitations and challenges of consumer neuroscience, (3) Ethical issues of consumer neuroscience and (4) Future prospects of consumer neuroscience in Finland. The interview questions were adapted according to the flow of the interviews and interviewees' answers, and they slightly differ. The questions are classified so that the first interviewee's questions are marked with number 1, the second interviewee's questions with number 2, and they are presented in chronological order. The questions have been revised into standard language.

- Mitä hyötyä neuromarkkinoinnista on ja miksi sitä tehdään? (1)
- Onko neuromarkkinoinnista muuta hyötyä verrattuna perinteisiin tutkimusmenetelmiin? (1)
- Onko neuromarkkinoinnista hyötyä käyttävän yrityksen lisäksi myös kuluttajille – onko neuromarkkinointi yksipuolista vai molemminpuolista? (1)
- Missä yhteyksissä käytätte neuromarkkinointia? Onko se vain markkinatutkimuksessa vai muutenkin markkinoinnissa ja mainonnassa? (1)
- Onko näissä jotakin painopistettä eli onko jokin osa-alue selkeästi suurin? (1)
- Olisiko sinulla jotakin case-esimerkkejä kampanjoista, joita olette tehneet? (1)
- Onko teillä sen ohella muita tutkimusmetodeja kuten silmänliikekamera? (1)
- Oletteko joskus miettineet käyttävänne muita neuromarkkinoinnin menetelmiä tulevaisuudessa, kuten esimerkiksi funktionaalista magneettikuvausta (fMRI)? (1)
- Tuleeko mieleesi vielä muita neuromarkkinoinnin hyötyjä? (1)
- Onko olemassa alueita, joihin neuromarkkinointia ei suoranaisesti voi käyttää? (1)
- Näetkö rajoitteita tai haasteita neuromarkkinoinnin laitteiden tai metodien suhteen – eli teidän tapauksessa EEG:n suhteen? (1)
- Eli ovatko haasteet siis hyvin tiedossa? (1)
- Onko koehenkilöiden rekrytoinnissa haasteita? (1)
- Minkä takia ette käytä muita neuromarkkinoinnin menetelmiä, kuten MEG:tä? Oletteko harkinneet sen käyttöä? (1)
- Näettekö ongelmia tai haasteita alan tieteellisen tutkimuksen tai teorian suhteen, mihin nykyiset neuromarkkinointimenetelmät perustuvat? (1)
- Kulkevatko neuromarkkinointi ja muut tutkimusmenetelmät käsi kädessä? (1)
- Mitä mieltä olet usein mediassa esitetyistä mahdollisuuksista löytää aivoista ns. buy-button tai ajatusten lukemiseen? (1)

- Miten mielestäsi neuromarkkinointiin suhtaudutaan yleisesti esimerkiksi mediassa tai tiedeyhteisössä? (1)
- Onko asiakkailla yleisesti positiivinen kuva neuromarkkinoinnista? (1)
- Olit hiljattain eräässä radiohaastattelussa aiheeseen liittyen, oliko siellä minkälainen suhtautuminen tai mielikuva neuromarkkinoinnista? (1)
- Onko teillä rajattu, että minkälaisiin kampanjoihin lähdette mukaan vai päätättekö asiasta tapauskohtaisesti? (1)
- Onko teillä on suljettu kokonaan pois mahdollisuus löytää vahingossa jotakin neurologisesti merkittävää? (1)
- Kun ette anna aivosähkökäyriä mukaan koehenkilöille, niin ovatko teidän tulokset yleisesti salaisia vai pystyykö niistä kertomaan avoimesti? (1)
- Miten näet neuromarkkinoinnin tulevaisuuden maailmalla ja Suomessa viiden vuoden sisällä – nousevana, laskevana vai stabiilina? (1)
- Onko teillä Suomessa kilpailua tällä hetkellä? (1)
- Miten näet tulevaisuuden teidän kohdalla? (1)
- Korvaako neuromarkkinointi nykyisiä markkina- tai markkinointitutkimusmenetelmiä tulevaisuudessa? (1)
- Vaikuttaako kuluttajan tieto neuromarkkinoinnin käytöstä sitä käyttävän yrityksen imagoon tai kuluttajan ostopäätökseen? (1)

- Mitä hyötyä neuromarkkinoinnista on ja miksi sitä tehdään? (2)
- Onko neuromarkkinoinnin etu perinteisiin tutkimusmenetelmiin juuri mainitsemasi asia, että saadaan tietoa, jota ei esimerkiksi kyselylomakkeella ole mahdollista saada? (2)
- Mihin kaikkeen neuromarkkinointia voidaan soveltaa? (2)
- Ovatko neuromarkkinointia käyttävät asiakkaanne keskittyneet joillekin aloille? (2)
- Tarjoatteko neuromarkkinointia asiakkaillenne yleensä osana kokonaisuutta vai ihan irrallisena/erikseen? (2)
- Mikä on asiakkaidenne mielikuva neuromarkkinoinnista ja suhtautuminen siihen? (2)
- Pystyykö neuromarkkinoinnilla manipuloimaan ihmisiä tai voiko sillä löytää jotakin ns. buy-buttoneita? (2)
- Onko neuromarkkinoinnin käytöstä ollut selkeää hyötyä asiakkaalle vai pystyykö sitä erottamaan tutkimuskokonaisuudesta? (2)
- Onko sinulla case-esimerkkejä toteutuneista neuromarkkinointiprojekteista? (2)
- Käytättekö EEG:n lisäksi muita neuromarkkinoinnin välineitä? (2)
- Näettekö neuromarkkinoinnin laitteissa itsessään jotakin rajoitteita, mitkä pitää ottaa huomioon? (2)

- Onko neuromarkkinointitutkimus kallista? (2)
- Tarvitseeko neuromarkkinointi kasvaakseen tietoisuuden leviämistä ja referenssejä? (2)
- Onko neuromarkkinointitutkimuksiin helppo löytää koehenkilöitä? (2)
- Onko neuromarkkinoinnin tulosten tulkinnassa jotain haasteita? (2)
- Vaikuttaako isompi otos neuromarkkinoinnissa siten, että tulokset olisi helpompi tulkita? (2)
- Mitä mieltä olet, voiko neuromarkkinoinnilla manipuloida ihmisiä, lukea ajatuksia tai löytää ns. buy-buttonin aivoista? (2)
- Miten mielestäsi neuromarkkinointiin suhtaudutaan eri tahojen puolesta, esimerkiksi mediassa? (2)
- Onko teillä jotain ohjeistuksia, mitä noudatatte neuromarkkinointitutkimuksissa – esim. ei tehdä tällaisille tuotteille tai yrityksille – vai katsotteko tilanteen aina tapauskohtaisesti? (2)
- Raportoidaanko neuromarkkinoinnin tutkimustuloksista julkisesti vai salaavatko yritykset niitä? (2)
- Onko neuromarkkinoinnista hyötyä sitä käyttävän yrityksen lisäksi myös kuluttajalle? Onko hyöty yksipuolista vai molemminpuolista? (2)
- Pitäisikö neuromarkkinoinnin käyttöä jotenkin rajoittaa, säännellä tai tehdä sille jotkin eettiset säännöt? (2)
- Pitävätkö neuromarkkinointia tekevät yritykset itse huolta siitä, ettei tehdä mitään kyseenalaisia projekteja? (2)
- Eroaako neuromarkkinointi siinä mielessä muista tutkimusmenetelmistä? (2)
- Mikä on mielipiteesi neuromarkkinoinnin tulevaisuudesta maailmalla ja etenkin Suomessa? (2)
- Syrjäyttääkö neuromarkkinointi nykyisiä tutkimusmenetelmiä vai tulisiko se niiden rinnalle? (2)
- Onko neuromarkkinointi kasvava osa teidän toimintaanne? (2)
- Onko asiakasreferenssien ja tietoisuuden lisääntyminen juuri tärkeitä neuromarkkinoinnin kasvussa? (2)
- Mitä mieltä olet siitä, että vaikuttaako kuluttajan tieto neuromarkkinoinnin käytöstä hänen ostopäätöksiinsä negatiivisesti tai neuromarkkinointia käyttäneen yrityksen imagoon negatiivisesti? (2)
- Onko teidän asiakkailla jotakin varauksia neuromarkkinoinnin käyttämisestä edellisen kysymyksen suhteen? (2)
- Mitä ”perinteisiä” markkinoinnin tutkimusmenetelmiä käytätte eniten? (2)
- Onko neuromarkkinointitutkimus nopeampi toteuttaa verrattuna muihin tutkimusmenetelmiin? (2)
- Onko työmäärän suhteen eroa muihin menetelmiin? (2)

- Tuleeko mieleesi vielä jotakin muuta neuromarkkinointiin liittyvää? (2)
- Onko teillä muita tällaisia fysiologisia mittauksia käytössä tai oletteko harkinneet sellaisia, silmänliikekameran lisäksi? (2)
- Miten näet linkin tieteellisen neuromarkkinoinnin tutkimuksen ja teidän suorittaman käytännön tason välillä? (2)
- Näkyykö käyttämänne tieteellinen teoriapohja myös asiakkaalle? (2)
- Onko neuromarkkinoinnista käytännön sovelluksista puolestaan hyötyä myös tieteelliselle perustutkimukselle? (2)
- Minkälainen kilpailutilanne Suomessa on neuromarkkinoinnin suhteen? Onko teillä kilpailijoita Suomessa? (2)
- Onko kilpailutilanne neuromarkkinoinnissa Suomessa vakiintunut? (2)