



Nudging with Music

The Influence of Associated Music, in
combination with Volume, on Product
Choice in a Virtual Supermarket

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Author: Jasper Freriks

Contact: jasper.freriks@wur.nl

Student number: 891006247040

1th supervisor: dr. H.W.I. (Erica) van Herpen

2nd supervisor: A.J. (Anna) Maaskant

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Preface

In front of you lies the result of 6 months of work, my MSc thesis 'Nudging with Music: The Influence of Associated Music, in combination with Volume, on Product Choice in a Virtual Supermarket'. This MSc Thesis is part of the master program 'Management, Economics & Consumer Behaviour' at Wageningen University. I wrote this thesis at the chair groups Marketing and Consumer Behaviour (MCB) and the research institute Food and Biobased Research (FBR).

My warm thanks go to my supervisors Erica van Herpen (MCB) and Anna Maaskant (FBR) for their feedback as well as support during my thesis period. In specific, during the analyses their help was more than useful.

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Wageningen, March 2015

Summary

In the consumer decision-making process, consumers respond to more than just the product itself (Billings, 1990). Also stimuli in a certain environment can have an effect on the feelings and behaviour of consumers (Mehrabian, 1976). This effect of stimuli can take place in several ways, for example by nudges. Nudges are subtle ways of steering consumers to the most desirable outcome (Lewis, 2008). In the DONRO-project music is one of the nudging strategies that will be researched. The effect of music, that is associated with a product category, is aimed to be identified. Also the effect of volume of this music is aimed to be identified.

Literature about music in a retail environment is limited. Within the existing literature two important theories concerning the effect of music on consumer behaviour exist. The first theory is the stimulus –organism – response model by Mehrabian and Russel (1974) and focusses on emotional states (pleasure, arousal, and dominance). The second theory is the association theory and focusses on interconnected cognitive concepts. This association theory also focusses more, compared to the Mehrabian and Russell model (1974), on the final purchase. In literature is found that songs that were strongly associated with a country had an effect on product purchase. These songs resulted in buying relatively more wine from the associated country (North et al., 1999). However, besides this study there is little research done yet on the influence of a strongly associated song on product choice in a retail environment. Next to that, the effect of volume of this music is unknown. This research aims to gain more insights on the effect of musical nudges. These nudges should ultimately lead to healthier and more sustainable food choice, which is relevant for the society.

From the pre-tests was concluded that the Asian song (Danosongs – Ambershire), Mediterranean song (Italian Medley) and neutral song (Easy Listening Music: Guitar & Sax) were most useful. The Asian and Mediterranean song have the strongest associations with respectively Asian and Mediterranean meals versus other meals. Therefore, these songs have been used as nudge in the virtual supermarket and have been compared with neutral music. In the virtual supermarket 10 Asian, 10 Mediterranean and 10 other meal packages were used. 294 participants were divided in one of the conditions from a 3 (song type: Asian, Mediterranean, neutral) x 3 (volume: loud, medium, soft) between subjects design.

The hypotheses showed that it was expected that a strongly associated song leads to more sales of the associated meal packages. Next to that it was expected that those associated meal packages would be better recognized in case the associated song was played. No significant results of the songs on product choice and product recognition (memory) were found. Besides, volume of music did not have an influence on both processes (product choice and product recognition).

In conclusion, this research seems not to support the theory that strongly associated music can influence product choice and recognition (memory). This research can be considered as a useful starting point for future research concerning the effect of music on associated product categories. As described in the discussion, it might be that no significant results were found because the music was considered as too inappropriate. Future research are advised to make use of songs that are more appropriate in a supermarket environment. Next to that, it might be that concerning meal packages participants had a strong opinion. It could be that other products or other product categories are easier to nudge. This could be taken into account when doing future research.

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1. Introduction

Nowadays it is known that, within the complex consumer decision-making process, consumers respond to more than just the product itself or service being offered (Billings, 1990). Studies of psychologists show important environment-behaviour relationships, resulting in a growing psychological discipline called 'environmental psychology' (Donovan & Rossiter, 1982). This discipline focusses on the effect of stimuli in a certain environment on the feelings and behaviour of consumers (Mehrabian, 1976). Stimuli are aspects that have an impact or effect on a person so that the behaviour is modified or changed (Bitner, 1992). The effect of stimuli in a certain environment on the feelings and behaviour can take place in several ways, for example by nudges. Lewis (2008) described nudges as subtle ways of steering consumers to the most desirable outcome.

In retail environments, like a supermarket, consumers can be influenced by many different types of stimuli. Among many in-store elements, music is one of the stimuli factors that can exert influence on consumers. Many articles showing effects of music on certain emotions, beliefs and physiological sensations, already exist (Bitner, 1992; McGoldrick & Pieros, 1998; Hosea, 2004; Alpert & Alpert, 1990). Another way in which music can be used (as a nudge) is by associations of that music. When music is heard, associations can come up in the mind of a consumer. These associations could influence consumer behaviour and is therefore of relevance. This because this steering method (nudge) could be applied for products or product categories that are healthy and/or sustainable, this in order to stimulate purchases of these products or product categories. Nowadays, health and sustainability are important topics, because of the increasing problem of obesity (Wyatt et al., 2006) and the need to behave in a sustainable way to ensure a liveable environment for next generations (Degenhardt, 2002).

This study is part of the DONRO-project, which means: Developer of Nudges for Retail and Out-of-Home. The DONRO-project has as main goal to measure the direct effect of nudges on individual consumers. This in order to measure possible changes in choice behaviour. Retail as well as catering companies are involved in this project. This research will specifically focus on nudging with music in a retail environment.

1.1 Background

Two important theories concerning the effect of music on consumer behaviour exist and are discussed in this section. The first theory that is discussed below, is the stimulus –organism – response model by Mehrabian and Russel (1974) and focusses on emotional states (pleasure, arousal, and dominance). The second theory is the association theory and focusses on interconnected cognitive concepts. This association theory also focusses more, compared to the Mehrabian and Russell model (1974), on the final purchase.

One way in which music can influence consumer behaviour is via primary emotional responses. This can be explained by the classical environment model by Mehrabian and Russell (1974). The Mehrabian- Russell approach uses a stimulus –organism – response model. Music could act as a stimulus (from the environment) in a store. Thus, music could influence the organism and, in specific, the emotional state. Mehrabian and Russell's model states that three basic emotional states (pleasure, arousal, and dominance) create all the feelings a person could have. This framework

suggests that a certain environmental stimulus, like music, could cause a particular individual emotional response, which, in turn, influences the individual. As a behavioural response, a person could approach or avoid the environment to a relatively greater or lesser degree (Mehrabian, 1976). According to Mehrabian and Russell (1974) approaching behaviour consist of physically moving toward, exploring, communicating, and performing in an environment. Avoidance behaviour leads to a desire to leave, disinterest, lack of interaction, and poor performance in an environment.

A different theory, which is discussed more recently, concerning the influence of music on consumer behaviour, is through knowledge activation and connections. Martindale and Moore (1988) argued that a persons' mind consists of interconnected cognitive concepts. Those concepts are connected with each other by association. Whenever a person thinks about a concept, the person will also think about related aspects. Concepts differ in strength in which they can be activated. Concepts that are associated frequently are stronger than associations that are not made often. Which concepts become activated depends also on the availability and accessibility of those concepts (Niedenthal et al., 2011). In case a concept is recently activated, it is possible that this influences the interpretation of later encountered information. Within the psychological science, this process is called priming (Kunda, 1999). In case of music, certain music can possibly activate related knowledge structures. When music in stores leads to an activation of relevant related knowledge structures, this might also influence purchase decisions. Literature supports this theory, since Areni & Kim (1993) showed that consumers bought more expensive wine in a wine store when classical music was the background music, compared to pop music. This is probably because people associate the (classical) music with more expensive products (Oakes, 2000). North et al. (1999) found that songs that were strongly associated with a country had an effect on product purchase. These songs resulted in buying relatively more wine from the associated country.

Two important theories concerning the effect of music on consumer behaviour are discussed. Although both theories can be used to study the effect of music on consumer behaviour, the theories differ greatly with regard to the explanation. As shown, the Mehrabian- Russell approach uses a stimulus –organism – response model, while the second theory focusses on associations and the knowledge structure. In the next sections, this thesis will focus on the association and knowledge structure theory, because this (more recent) theory is able to provide new insights concerning the effect of music on consumer behaviour. The new insights are explained in the section 1.2.

1.2 Relevance and aim

Since most studies studying music as a stimulus make use of the model by Mehrabian & Russell (1974), the knowledge structure and association theory is not fully studied. This is because the Mehrabian & Russell (1974) model does not explicitly include associations with a certain product or product category in their model. Moreover, previous studies that do use the association theory, only apply the theory at the wine section category (Areni & Kim, 1993; North et al., 1999). So, no research is done, concerning the effect of music and the activation of an association in other product groups than wine. As explained, certain music could influence whether or to what extent an activation of association occurs. Besides this, within the association theory, the effect of volume of music is not studied. Previous research shows that volume can have major effects (Garlin and Owen, 2006; Smith & Curnow, 1966). For example, a soft volume led to a longer stay compared to a louder volume (Smith & Curnow, 1966). Although these studies are done in a stimulus –organism – response model,

in this study it is expected that also in the association and knowledge theory volume can play an important role. It is possible that a higher or lower volume increases the activation or strength of an association with a certain product or product category. This increase of activation or strength of an association, could work in various ways. It could be the case that a higher volume results in more awareness of the music. Which, in turn, could lead to a greater chance or stronger effect of associating related products or product category. The increase of associations with related products, could lead to more sales of those products. However, music could also lead to an unpleasant feeling, resulting in a desire to leave. Another possibility is that people become more aware of the nudge which could result in resistance.

Existing studies mainly focus on the outcomes of affective variables of consumer behaviour (Dubé & Morin, 2001; Alpert et al., 2005; Alpert & Alpert, 1990), while in this thesis the focus on consumer behaviour consists of two aspects. *First*, the effect of music on the sales of the test products (product choice); *second*, the effect of music on product recognition (product memory). The effect on product sales is of importance since results of this aspect could show whether an association of music with certain products or product category (due to music) also leads to actual purchases of these products. Product recognition (memory) is also relevant since it could be that music that is associated with a certain product or product category does not lead to an increase of the sales of those products, but does create more attention to these products. This attention can be measured by product recognition, since literature has shown that recognition can be used as an indicator of attention (Pieters et al., 2002). More attention will lead to a better recognition of products. This increase of attention (and thus recognition) could be a beginning of, ultimately, more (associated) product or product category purchases, as is explained in chapter 2.3.

Next to this knowledge gap, more information about the potential influence of musical association by music, and the musical characteristic volume, on consumer behaviour is also of practical relevance. When it is shown that an association of music can lead to different product choices, these nudges can be applied to stimulate purchases of other product categories (for example healthy and/or sustainable food).

Thus, since the effect of volume combined with music that is strongly associated with a certain product or product category is unknown, a new useful research could be carried out. A conceptual model of the research is shown in figure 1.

This figure shows that music can lead to an association of a product or product category. The activation or strength of an association on a product or product category could differ per song, therefore two different songs will be used. Volume can also play a role in this association. Music volume is expected to have an influence in the activation process. As explained, it is possible that a higher (or lower) volume increases the activation or strength of an association with a certain product or product category. However, it should be taken into account that the effect of volume on the association could differ per song, since a certain level of volume could fit better in a certain song compared to another song. The derived association can influence product recognition (memory) and product choice.

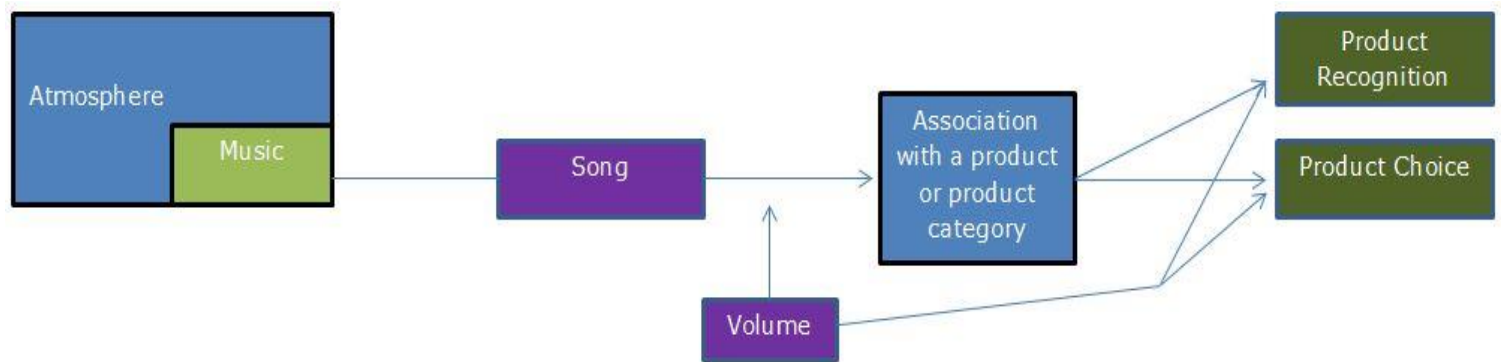


Figure 1: Conceptual model of research.

1.3 Research questions

Main question:

What is the influence of associated music, and the musical characteristic volume, on product choice and product recognition (memory)?

Sub questions:

What is the influence of music, which is associated with a certain product or product category, on product choice and product recognition?

What is the influence of volume on product choice and product recognition?

In the next chapter literature is discussed. By making use of this literature, hypotheses are derived. Chapter 3, the methodology, describes how the hypotheses are tested. In chapter 4 the results of this research is discussed. Finally, conclusions and the discussion are presented in chapter 5.

2. Literature background

First, the effect of typical songs on consumer behaviour and the association theory is described. Thereafter, literature concerning volume is discussed. Although, these studies make use of the 'classical environment model' (Mehrabian & Russel, 1974), the main results and findings can be considered as relevant background information. At last, working memory and product recognition literature is discussed.

In this literature background, literature concerning consumption and purchases are used. To make clear what the differences are between consumption and purchases, the following distinction is used: consumption is the act or process of consuming by eating or drinking, while a purchase is when a good or service is bought. Although this thesis will focus on consumer behaviour in a retail environment (virtual supermarket), theories and literature discussed about consumption will also be used. These are used because literature concerning purchase behaviour is limited. Literature using consumption is also relevant since the theories concerning food intake also deal with influences from the atmosphere, like music.

2.1 Associations

In this part, literature that supports that music can be associated with certain products or product categories, is explained. Thereafter is explained how these musical associations work in a consumers' mind.

Effect of typical songs on consumer behaviour

Different typical songs can lead to different product choices (Agmon, 1990). Certain types of background music may influence consumers to spent more expensive products, as shown by Areni & Kim (1993). They discussed that consumers bought more expensive wine (in a wine store) when classical music was heard, compared to a condition in which pop music was heard. This is a result of the linkage and association of classical music with expensive products (Oakes, 2000). A study that supports this theory, is done by North et al. (1999). They found that songs that were strongly associated with a country had an effect on product choices. These songs resulted in buying relatively more wine from the associated country. In specific, French music resulted in relatively more purchases of French wine and German music of German wine. However, Wilson (2003) showed that classical music does not necessarily leads to more consumption or purchasing. In the research was found that people consumed more beverages in a restaurant when jazz, easy listening or popular music was played, compared to classical music. This because classical music did not seem to fit in the context. These findings support the theory from Radocy and Boyle (1997), they suggested that people spend more money and time in a store or restaurant in case the music played was considered as appropriate. Similarly, MacInnis and Park (1991), discussed that people are easier to persuade in case the music is appropriate for the context.

Thus, musical associations can influence the product choice of consumers. A prerequisite is that the music fits within the context. How these musical associations work in a consumers' mind, is explained in the next section.

Regarding the effect of different typical songs on '*product recognition*', a gap in literature exists. However, literature concerning product recognition and working memory does exist and is of importance. Therefore, a sidestep is made and literature concerning working memory and product recognition is discussed in section 2.3.

Association and knowledge structure theory

Since this study makes use of the association and knowledge structure theory, this theory is discussed. In the introduction, this theory is already shortly introduced, but in this part it is explained in detail.

A lot of information is perceived in daily life, people classify this information in concepts. A concept is a mental representation of a category, this category is an amount of objects (or attributes) that we think that belong together (Smith, 1990). Those concepts can contain abstract as well as concrete objects. For example, when one thinks about Italy, pizza and pasta may be associated, but also happiness because of your last holiday in Rome. The concepts allow us to classify things (like behaviour, events and people), to interpret our world and make implications that are not directly observed. All concepts together, form a framework, which help us in daily life. This because it helps us to classify, with communicating, reasoning, guiding attention and interpretation (Bargh, 2006; Kunda, 1999).

Within the association and knowledge structure theory, different views exist, namely: classical, probabilistic and concepts as theory based view. In the classical view, the main assumption is that concepts consist of necessary and sufficient attributes. Defining for example the concept 'banker' one may be considered as a banker if he or she has all of the attributes. Moreover, if anyone has all the attributes, one must be a banker. After some critique concerning this view, the probabilistic view came up. Wittgenstein (1953) stated that a category can be described by a list of attributes that are typical of it, but not necessarily define it. As a clear example he used birds; they fly and nest in trees, but a chicken is also a bird and does not show this behaviour. The theory-based view is mostly similar to the probabilistic view, but it adds that many concepts and attributes are connected because of causal relationships (Keil, 1989). For example, when one thinks about obesity, one could probably think of unhealthy food. This because unhealthy food can lead to obesity; there is a causal relationship. Since the theory based view is the most comprehensive, this view is used.

Among the many concepts, some may become salient and others not. This depends on two aspects, namely accessibility and availability. Availability is about the framework that exists in the mind of a person. Whether those concepts are available depends on earlier experiences and the connections that are made in the past between aspects that belong to the concept. Because experiences play a large role in this association theory, the concepts that are formed are personal and are applicable for a person only. However, some aspects are experienced by a lot of people, for example a lot of people will associate Italy and pizza (Niedenthal, 2011).

Accessibility is the possibility to activate available knowledge. Whether a concept becomes activated depends on three factors, namely: the stimulus, the context and the person who perceives it. The activation of the concepts can be influenced by a stimulus. For example, when one sees a bald head of a men one may interpret this person as a bit older person who lost his hair, but when this is a woman with a bald head it may be interpreted with a certain illness. Thus, this interpretation of a stimulus can activate different concepts. Context can also have an influence on the process of activation. This phenomena is called contextual priming (Morris & Folk, 1998). An example of contextual priming is shown by a study of Berger et al. (2008). They discussed that the place where people vote had an influence on their eventual vote. The person who perceives it, or called 'the observer', also influences concepts that are activated. This because their personal framework is formed by their own life (Kunda, 1999). For example, someone who likes the Nokia phones, will recognize those phones in less time and needs less input than someone who does not like or is not familiar with Nokia phones. Next to that, people are also more likely to activate concepts that help to achieve their goals (Kunda, 1999).

There are three types of knowledge representation models that show how concepts are represented and interrelated. These models also describe how the knowledge activation and retrieving process work. These are the consensus, associative network and parallel-constraint-satisfaction model.

A consensus map is a tool to look into the mind of a consumer and shows the unconscious process. Those maps show shared thoughts and/or feelings by consumers about products, next to that they also represent general concepts. Also the interaction between the concepts of a product can be shown in a consensus map (Zaltman, 2003).

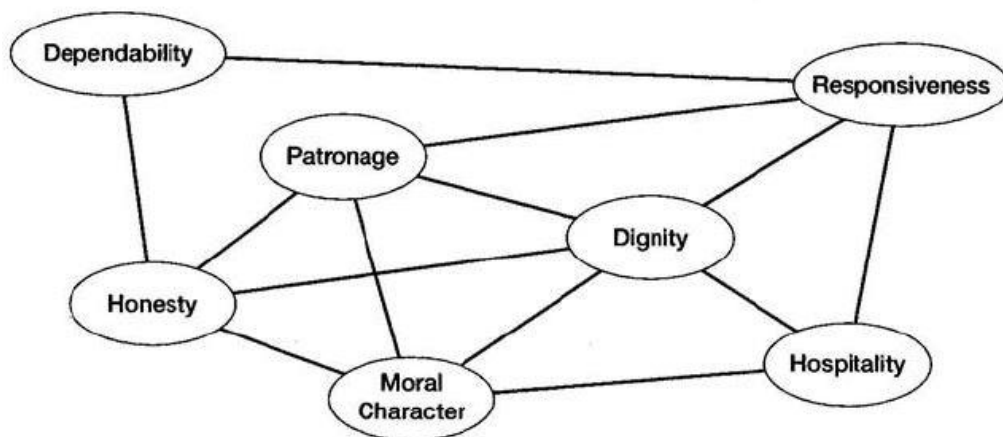


Figure 2: Example of a consensus map (Zaltman, 2003).

Next to those consensus maps, also associative network maps exist. The consensus maps focus on thoughts and feelings about a product, but this association map focusses on the association with a certain product or product category. These associative network maps (see figure 3) show mental representations as networks of nodes. Nodes are features, concepts or proposition and those nodes are linked by associations. When a certain node is perceived, this node can be activated and also related nodes can become activated. So, if one thinks about a certain node, the chance of activation of related nodes increases. Every node has its own level of activation, since it depends on the occasion. In case a certain node is more activated, it is more likely people become aware of that

node. Next to that, when a node is more times activated, it is also more likely that the node will be recalled and that it will be applied to incoming information. In case of a strong association, related nodes will be activated easier and faster (Kunda, 1999). In case a node is activated recent, it can influence interpretation of information which is perceived later on. This process is also called priming (Bargh, 2006). After being activated, the level of activation of a node decays over time (Kunda, 1999).

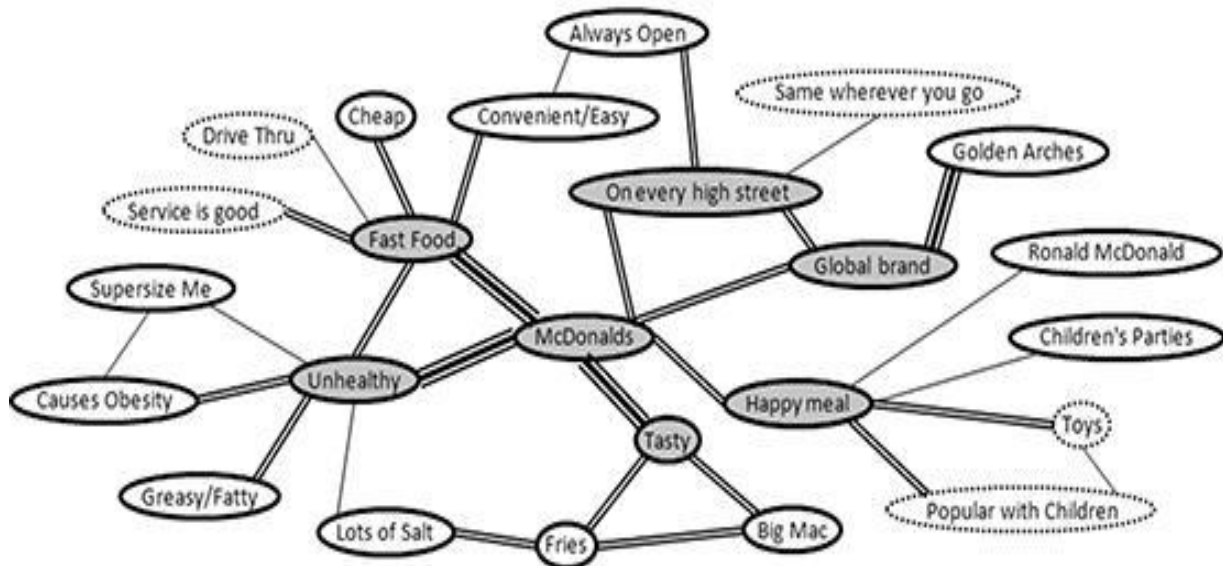


Figure 3: Example of an associative network, case: McDonalds (French & Smith, 2013).

The Parallel-constraint-satisfaction model has a lot in common with the associative network model, but add that when nodes are activated, nodes can not only active related nodes, but also deactivate them (Rumelhart & McClelland, 1986). In case nodes have a positive link, activation of a node will increase activation of the other node. But, in case nodes have a negative link, activation of one node will lead to a decrease of activation of the other node. Using figure 3, a link between Children's parties and Cheap can be added, but a link between Children's parties and unhealthy is less likely to be activated. This because, most of the times, cheap is seen as something positive, while unhealthy is seen as negative. The parallel-constrain-satisfaction model can be divided in two models that have a different level of abstraction of the conceptualized nodes. Those classes are local representations and distributed representations (Kunda, 1999). Local representations are similar to associative network maps, as described on the previous page, with addition of the (de-)activation. Distributed is more hierarchical and the nodes are in this model more basic, lower level elements. Thus, a concept consists of a number of nodes to become clear. The distributed representation is for example used in order to recognize a word and is less relevant in this study.

In this thesis, the associative network model is most applicable. This because the distributed representation of the parallel-constraint-satisfaction model is not useful, since this is too hierarchical, this is more useful for word recognition. Next to that the associative network model focusses on associations and not only on thoughts and feelings, like a consensus map. Moreover, the association theory focusses on effects of association, which is of relevance. In this thesis an association effect could be that music could influences product choices.

Making this association effect more specific, it is likely that music that is associated with a certain product or product category leads to more purchases of this product or product category. A comparison can be made between music that is associated with a certain product or product category with music that is not associated with a certain product or product category.

Taken above information into account, hypothesis 1 is derived.

Hypothesis 1: When consumers listen to music that is associated with a product or product category, this will lead to more product purchases of that product or product category compared to when consumers listen to music that is not associated.

2.2 Effect of volume of music on product choice

In this part the effect of volume of music on product choice is discussed. Product choice is the sales of the test products. Studies concerning the effect of the musical characteristic volume show different results. It should be noted that those studies mainly focus on certain emotions, beliefs and physiological sensations. The studies do not make use of the association theory, as explained in 1.1.

Within the aspect ‘*product choice*’ studies have shown that in case volume is relatively high, consumers will spend less time in a supermarket. However, the rate of spending per minute in a store will increase compared to a lower volume (Smith & Curnow, 1966). Garlin and Owen (2006) suggested that a lower music volume leads to a longer stay and, ultimately, more purchases. Herrington and Capella (1996) found no effect of volume on shopping expenses.

Concerning consumption, literature shows that food consumption seems to increase when loud and fast music is played (McCarron & Tierney, 1989), while on the other hand slower and softer music leads to a longer stay which also leads to more consumption (Stroebele & De Castro, 2004). Sullivan (2002) mentioned that soft music leads to more food intake compared to loud music. However, Sullivan (2002) also noted that there might be a medium amount of dB in which intake could be optimized.

To make the volume section more clear, table 1 is provided on the next page. Within this table the effect of an increase of volume on product choice / food intake, is shown. The first 3 studies (Garlin & Owen, 2006; Herrington & Capella, 1996; Smith & Curnow, 1966) are concerning purchases and the last 3 studies are concerning consumption (Sullivan, 2002; Stroebele & De Castro, 2004; McCarron & Tierney, 1989).

<i>Reference</i>	<i>Genre</i>	<i>Environment</i>	<i>Volume</i>	Dependent Variable
				<i>Product Choice or Food Intake</i>
Garlin & Owen, 2006	Various (no specific genre mentioned)	Retail	Soft / Loud (No dB mentioned)	PC: NS
Herrington & Capella, 1996	Various (no specific genre mentioned)	Supermarket	Soft / Loud (No dB mentioned, supermarket manager decided)	PC: No effect
Smith & Curnow, 1966	Background (No specific genre mentioned)	Supermarket	Soft / Loud (No dB mentioned, supermarket manager decided)	PC: No effect
Sullivan, 2002	Background (No specific genre mentioned)	Restaurant	95 per cent of the sample agreed that the volume was either soft or loud	FI: -
Stroebele & De Castro, 2004	Background (No specific genre mentioned)	Restaurant	Soft / Loud (No dB mentioned)	FI: NS
McCarron & Tierney, 1989	Background (No specific genre mentioned)	Restaurant	Soft: 70 dB Loud: 90 dB	FI: +

Table 1: The effect of the independent variable volume of music on product choice and stay duration.

To summarize, the effect of a higher volume on product choice is unclear. This because out of the six studies, four different results are found. This could be the case because different studies used different amounts of decibels or did not even mention the amount but just mentioned ‘louder music’. The thought that the amount of decibels could play a role can be combined with previous research done by Vitz (1972). He showed that a preference for tone intensity (dB) has the form of an inverted U. In this inverted U, soft music is preferred above loud, but a in between option leads to optimization of preference

Combining the association theory and literature regarding volume, it can be stated that volume also has an influence on product purchases. As shown by Sullivan (2002) a low volume is preferred above a high volume. It is assumed that a (too) high volume could lead to an unpleasant feeling, because one could consider the music as too loud, resulting in a desire to leave. Next to that, because of the reduced pleasantness, a person’s mind could be less open for associations. Another possibility, because loud music stands out, is that people become more aware of the ‘nudge’ which could result in resistance. Because of this resistance, people could decide to not buy anything that is associated with the music. This in order to ‘make a point’ against being controlled. Sullivan (2002) also noted that there might be a medium amount of dB in which intake could be optimised. This thought can be combined with the inverted U of Vitz (1972). It is assumed that when people feel pleasant (like in the top of the inverted U), people are more open for associations. It could be the case that a middle volume results in more awareness of the music. Which, in turn, could lead to a greater chance or stronger effect of associating related products or a product category, and thus purchases of these products. Thus, product sales of the associated products or product categories will also increase in this ‘middle’ phase. So, it is expected that the loudness of music results in more awareness, which has a positive influence on the association effect. This process work until a certain point, in which

music becomes too loud and this has several negative influences. Making use of this literature, hypothesis 2 is derived.

Hypothesis 2: The effect of volume on purchase of products (associated with the music) will have the form of an inverted U

2.3 Working memory and product recognition

The effect of music that is associated with certain products, could directly lead to purchases of those products as well as in an indirect way. In this indirect manner, the viewing behaviour is of importance and this is explained in this section.

This attention-getting process is best described by Duncan and Humphreys (1989). They described that visual information is stored or maintained in working memory. A close interaction between working memory and attention exist. Downing (2000) showed not only that what has been seen (attention) is stored in working memory, but also that the information processed in working memory influences what is attended in the visual scene later on. Aspects that are already processed once, will stand out later on. Thus, a product which is processed in working memory (due to attention) will stand out later on. This standing out, could result in more attention which, in turn, might result in a purchase. So an increase in attention, could lead to a direct purchase, but could also lead to a purchase later on. However, it should be noted that the duration of this standing out effect is limited. This limitation differs per product and person (Downing, 2000).

In case a certain location or object gets attention, processing of it is enhanced, while at the same time processing of not selected locations and/or objects is suppressed (Pieters & Wedel, 2004). Two mechanisms play a role in this process, namely bottom up and top down mechanisms. Both mechanisms have an influence on the visual attention.

Bottom up evolves from the visual environment, for example by visual stimuli. Shortly, it is emanating from the stimuli that a consumer is exposed to (Pieters & Wedel, 2006); attention can be captured by features of a stimulus that are salient, for example by colour, luminance or orientation, or the appearance of new objects (Jonides & Yantis, 1988; Yantis & Hillstrom, 1994). In particular, irregularities from the global image structure lead to a bottom up mechanisms. The manipulation of features means this type of search can be efficient and providing quick reaction times by creating a pop out effect (Treisman & Gelade, 1980). This pop-out effect can only occur in the bottom-up mechanism, in this effect an odd item gets attention immediately, independent of the present distractors (Pieter & Wedel, 2006).

On the other hand, top down processes can steer attentional guidance. This process is evolving from the behavioural aspects of visual scenes and originates for example from goals, memory and states and traits of a person. This could be in case consumers pay attention to specific spots or regions (Posner, 1980), or when they direct attention towards certain individual objects (Duncan, 1984; Rock & Gutman, 1981) or features of objects (Bacon & Egeth, 1994). There is no pop out effect like in a bottom up process, therefore it is harder to identify the products for consumers. Mostly, this process takes more time and can be considered as less efficient compared to the bottom up process (Pieters & Wedel, 2006).

To measure viewing behaviour, the extent to which participants could recognize a product afterwards can be used. Literature shows that recognition of products is strongly influenced by the extent to which one maintains a visual focus on a single place (eye fixation) (Loftus, 1972; Loftus et al., 1991; Pieters et al., 2002). Moreover, Danaher & Mullarkey (2003) found that web page exposure duration is a good indicator of banner advertising recognition afterwards. Furthermore, Rethans et al. (1986) showed that recognition of advertising content increased when the frequency of exposure increased.

The association effect that is explained in 2.1, will also have influences on the viewing behaviour. The music played, could result in an association with a product or product category. Music could create a top down effect, as just described. In this effect attentional guidance is dominated and it could be that consumer create or have spots or regions which they attend to (due to music). For example, it could be that Italian music leads to attention for pizza out of the freezer. It can be hypothesized that these products will therefore get more attention compared to situations with unassociated music. This increase in attention, could lead to a better product recognition as shown by Pieters et al. (2002). Below, hypothesis 3 is derived.

Hypothesis 3: When consumers listen to music that is associated with a product or product category, these products or product category will be better recognized compared to when consumers listen to music that is not associated.

As described in hypothesis 3, attention and thus recognition will increase with the associated products. However, Pieters and Wedel (2004) also showed that in case a certain object is selected by attention, processing and paying attention of it is enhanced, while at the same time processing and attention of not selected locations and/or objects is suppressed. So, an increase of attention towards associated products, will lead to a decrease of non-associated products. This increase in attention, could lead to a better product recognition as shown by Pieters et al. (2002). Therefore hypothesis 4 is derived.

Hypothesis 4: An increase of recognition towards associated products is coupled to a decrease in recognition towards unassociated products.

As explained in section 2.2, volume of music could also have an effect on viewing behaviour. It is assumed that when people feel pleasant (like in the top of the inverted U), people are more open for associations. In this inverted U soft volume will result in more attention compared to loud volume. The increase of the association will result in more attention to the associated products. This attention, can be measured by product recognition as shown by Pieters et al. (2002). Therefore hypothesis 5 is derived.

Hypothesis 5: The effect of volume on recognition of products (associated with the music) will have the form of an inverted U.

Also in this case, theory from Pieters and Wedel (2004) could be applied. It could be that the more increase of attention towards associated products, the more decrease of attention towards unassociated products. Again, this is measured by product recognition.

Hypothesis 6: The better the recognition of associated products, the worse the recognition of unassociated products.

As described in hypotheses 2 and 5 an inverted U curve could occur. However, every song is different. A low volume could be more suitable for a certain song compared to another. For example, a jazz song could feel pleasant (resulting in more product choices) with a lower volume, compared to a gospel song that could feel more comfortable when played with more decibels. So the inverted U differs per song and is not fixed to a certain amount of decibels.

3. Methodology

The hypotheses that were formulated in the literature research were tested in a virtual supermarket experiment. However, first was determined which music or song had a strong association with a product or product category. Results of a previous pre-test and pilot study were used. Moreover, a new pre-test was conducted to find a (second) useful song. Thereafter another pre-test was done to determine which volume per different stage (soft, medium, loud) should be used per song. In the end of this section, the methodology for the virtual supermarket is described. In this study all kind of meals could be mentioned, but in the virtual supermarket however, several meal kits were used.

3.1 Results of a previous pre-test and pilot study

In research done by Kappen (2014) a pre-test and pilot study were carried out to measure the association of music with products or product categories. Among the different songs, it became clear that Asian music was most useful. This type of music had the most advantages compared to the other songs. The Asian music had a strong association with the Asian meals 'Indian Chicken Tandoori', 'Chinese Beef Shanghai' and 'Japanese Teriyaki'. Moreover, it had a weak association with all other (non-Asian) meals. In summary, the two most important pros of Asian music were:

- 1) Music was strongly associated with Asian meals.

- 2) Respondents showed a fast reaction time with the association on oriental meals.

Therefore, also in the pre-test the same Asian song was used. The stimulus Asian music was expected to associate with the product category Asian meals, like 'Indian Chicken Tandoori', 'Chinese Beef Shanghai' and 'Japanese Teriyaki'.

Another pre-test was carried out to find a second useable song that was associated with a different meal or none. New songs, that were expected to have an association with a certain product or product category, were used in the new pre-test. Also two songs that were not expected to have an association with a certain product or product category were tested. These songs could be used as a control condition.

3.2 Pre-test songs

In order to know which song had an association with a product or product category, some tests were done.

Participants

In this pre-test 35 respondents participated. All respondents were students. Of the 35 respondents, 18 (51%) were male, 17 (49%) female. The average was 22.49 years ($SD = 1.92$), ranging from 18 to 27 years old.

Stimuli

When choosing a certain song, two conditions were taken into account. Namely, the songs did not mention the brand, product or product category in the song itself and all the song could be

considered as background music and not a single (short) jingle or tune. Vocal (song) as well as instrumental songs were used and are shown below. Of every song, a YouTube link can be found in appendix 1.

Mediterranean (Music that was expected to associate with Mediterranean meals).

- Instrumental: Italian Medley (Song 1).
- Vocal: Teddy Reno - Piccolissima Serenata (Song 2).
- Vocal: Claudio Villa – Qui Sotto Il Ciepo Di Capri (Song 3).
- Vocal: Domenico Modugno – Volare (Song 4).
- Instrumental: Sunset in Capri (Tarzia/Cipolla) (Song 5).

Asian (Music that was expected to associate with Asian meals).

- Instrumental: Danosongs – Ambershire. This song was already used in a study by Kappen (2014) and had an association with Asian meals (Song 6).

Unassociated music (Music that was not expected to associate with a certain product or product category).

- Vocal: Peter North - Slow love (Song 7).
- Instrumental: Background Instrumental Music (Song 8).

Procedure

In the questionnaire, the order of songs was mixed. This in order to make sure that a person not listened to 5 songs of the same expected association after each other. The playlist for all respondents is shown in table 2.

Song number	Played in questionnaire	Order of playing in questionnaire
Song 1 Mediterranean: Italian Medley.	# 1	Song 1 Mediterranean: Italian Medley.
Song 2 Mediterranean: Teddy Reno - Piccolissima Serenata.	# 3	Song 7 Unassociated: Peter North - Slow love.
Song 3 Mediterranean: Claudio Villa – Qui Sotto Il Ciepo Di Capri.	# 5	Song 2 Mediterranean: Teddy Reno - Piccolissima Serenata.
Song 4 Mediterranean: Domenico Modugno – Volare.	# 7	Song 6 Asian: Instrumental: Danosongs – Ambershire.
Song 5 Mediterranean: Sunset in Capri (Tarzia/Cipolla).	# 8	Song 3 Mediterranean: Claudio Villa – Qui Sotto Il Ciepo Di Capri.
Song 6 Asian: Instrumental: Danosongs – Ambershire.	# 4	Song 8 Unassociated: Background Instrumental Music.
Song 7 Unassociated: Peter North - Slow love.	# 2	Song 4 Mediterranean: Domenico Modugno – Volare.
Song 8 Unassociated: Background Instrumental Music.	# 6	Song 5 Mediterranean: Sunset in Capri (Tarzia/Cipolla).

Table 2: Order of playing the eight songs of pre-test 1.

On beforehand, respondents were asked to listen to a song first. From every song, 30 seconds of music was heard. This in order to have an idea of the complete music fragment. After listening, respondents had to answer open questions about their thoughts and whether they could match a product or product category that could fit the music. Next to that, it was also asked which countries were associated with the song. Also questions about arousal, familiarity, liking and the appropriateness of the song in a supermarket were asked.

Measures

As explained, questions were asked about the association of meal(s) with a certain song and the association with a country or countries with a certain song. These questions were in an open form. Respondents could answer with a maximum of three meals and/or countries, but were not forced to give an answer. Questions concerning liking, arousal and appropriateness of the song in a supermarket were asked using a slide bar with a scale ranging from 0 to 100. Familiarity was asked in a closed form with just the answers yes or no (for the whole questionnaire see appendix 2). Below, the importance of every musical aspect is shortly explained.

Stroebele & De Castro (2004) found that music can have an effect on *arousal*. Arousal can be described as a state in which people are awake and reactive to stimuli (Cahill & McGaugh, 1998). An increase in arousal can in turn, result in an increase in food intake and fluid consumption. Next to that, Stroebele & De Castro (2004) also stated that when the arousal of a consumer increases, it will lead to a greater desire to return to the same spot. This arousal factor should be taken into account when doing research.

Articles have shown that *familiar* music results in a more positive feeling among consumers. This positive feeling influences consumers. Namely, consumers shop longer when they are exposed to familiar music (Yalch & Spangenberg, 2000; Garlin & Owen, 2006). Besides, shopping expenditure seemed to increase according to the level of *liking* the music (Herrington & Capella, 1996). So, since familiarity as well as preferences could have an influence on music and consumer behaviour, this should be taken into account when doing research.

Radocy and Boyle (1997) suggested that people spend more money and time in a store or restaurant in case the music played was considered as *appropriate* (fit in context). Similarly, MacInnis and Park (1991), discussed that people are easier to persuade in case the music is appropriate for the context.

Another factor that could play a role is *tempo*. For example, the genre happy hard-core will probably have a higher tempo compared to classical music. Research has shown that a slower tempo can lead to a longer stay of a consumer in a retail environment, leading to relatively more purchases compared to the extra time stayed (Smith & Curnow, 1966; Caldwell & Hibbert, 2002; Garlin & Owen, 2006). Therefore an expert was asked to search for music with comparable, or at least not significantly different, level of tempo.

Data analysis

Answers of the respondents were compared. First, a coding scheme is presented below. As shown in table 3, the American kitchen was added, since it became clear that a certain song was associated with those meals (hamburger and hotdogs).

<u>Meals</u>	<u>Including</u>
Asian meals	Rice, curry, sushi, stir fry dishes, spring rolls and (flour) noodles.
Mediterranean meals	Lasagna, pasta, cannoli, pizza and paella.
American meals	Hamburger and hotdogs.
Others	All other meals.
<u>Countries</u>	
Asian countries	Japan, China, India, Vietnam, Taiwan, Malaysia, Indonesia and Japan.
Mediterranean countries	Spain, Greece, Portugal and Italy.
Others	Countries that were mentioned less than 2 times (for one song).

Table 3: Coding scheme.

To compare the answers, a content analysis was done concerning association with meals. When a respondent named three different meals from one region (like Asian meals), this was just counted as one association. For example, when a respondent was asked what meals were associated with a certain song and the respondent answered with lasagna, pizza and pasta, this was considered as one association with Mediterranean meals (and not three). This was chosen because the aim was to measure an association with a broad group of respondents and not just a couple of respondent with a very strong association. Respondents could maximally mention 3 meals but were not forced to give an answer. Concerning the amount of associated countries, the same method was used to analyze the results. The only aspect added, was that a country should be mentioned at least 2 times (for one song) to be part of the figure, otherwise it would be mentioned as 'others'.

The strength of an association was based on the amount of respondents that associate the music with a certain meal or region. The songs with the strongest association were used in the virtual supermarket.

Results

The main goal of this pre-test was to test whether a certain song was associated with meals from a region. Therefore results showing associations of the 8 songs with meals were analyzed first. Song 1 up to and including song 5 were expected to associate with Mediterranean meals, song 6 with Asian meals and song 7 and 8 to not associate with meals. First the songs concerning Asian meals are discussed.

Asian

Song 6 was the only Asian song and associates with meals from an Asian region. This song seems to be very useful, also in this test this song had a lot of associations with Asian meals and not many with other meals than Asian.

Mediterranean

Song 1 to 5 were expected to have associations with Mediterranean meals. Looking at figure 4, it becomes clear that song 1, 2, and 4 had strong associations. Next to that all three songs did not have many associations with other meals, just as the Asian song 6. Therefore songs 1, 2 and 4 seem to be useful.

Unassociated

Concerning the unassociated songs (7 and 8), it seems that song 7 had some associations with American meals. Therefore this region was added. Song 8 does not have many associations with meals and therefore song 8 seems useful.

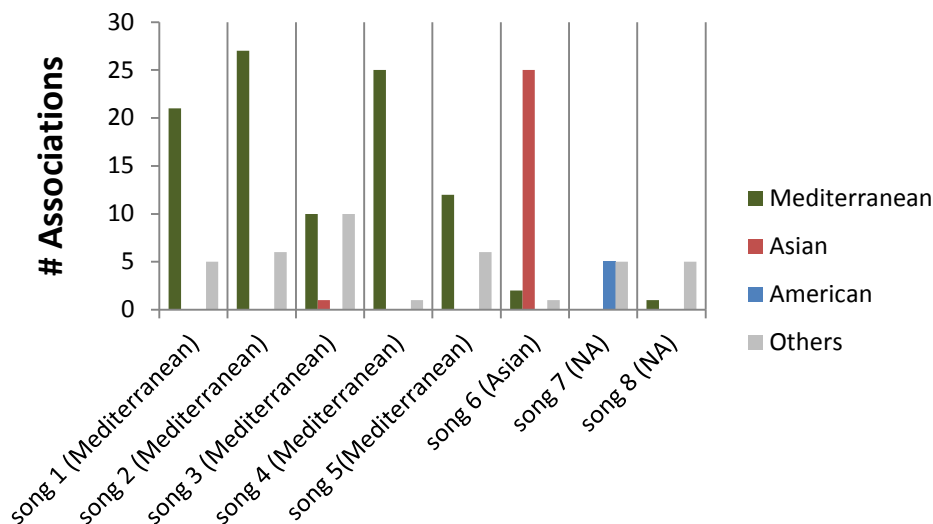


Figure 4: Number of association per song with meals from a region.

Next to the associations with meals from a certain region, it could also be of importance with what country a certain song was associated. In case a certain country was mentioned 2 times for a song, it is shown. Otherwise it is shown in 'others'.

Asian

As shown in figure 5, Asian song 6 had a lot of associations with Asian countries. Next to that, it had only a few associations with other countries. These results confirm that song 6 seems to be useful.

Mediterranean

Mediterranean songs 1 to 5 did all have many associations with Mediterranean countries. Since it was already shown that song 1, 2 and 4 seemed to be most useful, the focus is on these three songs.

Unassociated

Song 7 was many times associated with the USA. Song 8 however, was not much associated with any country, which could be seen as a positive aspect for a song in the control condition.

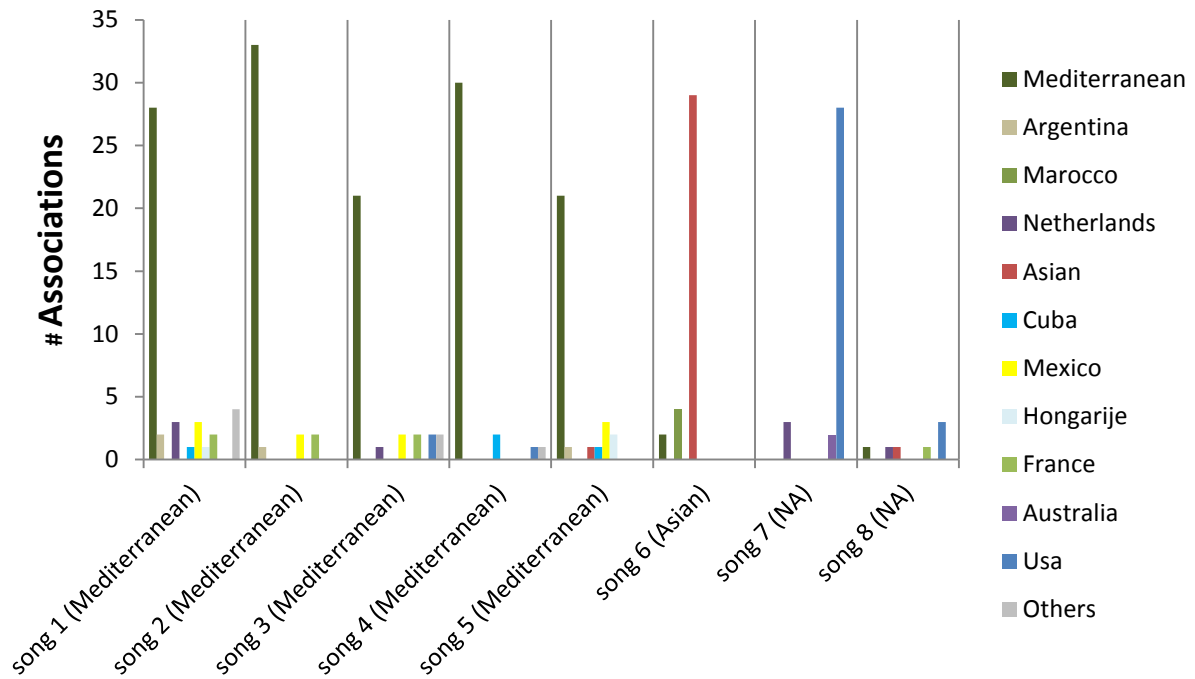


Figure 5: Number of association per song with a country or countries.

From the literature background it became clear that musical fit in a certain context, arousal, familiarity and liking could have effects. Therefore questions were asked about these aspects (for the whole questionnaire see appendix 2). Only the most useful songs were included in table 4.

Asian

Song 6 was the Asian song that was used in the virtual supermarket. It scored quite low on the musical fit, arousal and liking aspects. Next to that, the song was quite unknown since only 6 percent knew the song.

Mediterranean

Looking at the three useful Mediterranean songs (1, 2 and 4), song 1 and 2 show the least differences with Asian song 6 concerning musical fit, arousal and liking. Song 1 however, was just like Asian song 6 instrumental and was therefore preferable.

Unassociated

Comparing song 8 with song 1 and 6, musical fit has a very high mean and arousal very low mean. Another pre-test was done in order to find a useful control condition (see section 3.3).

	song 1 Mediterranean	song 2 Mediterranean	song 4 Mediterranean	song 6 Asian	song 8 NA
Musical fit	21.85 (20.57)	37.24 (20.99)	48.73 (22.99)	28.48 (21.78)	50.61 (24.54)
Arousal	38.28 (17.92)	36.74 (16.37)	48.10 (18.39)	31.03 (17.75)	19.97 (15.31)
Knows the song %	3	3	74	6	3
Liking	44.15 (25.83)	39.34 (22.54)	59.64 (21.97)	36.76 (22.89)	55.94 (22.92)

Table 4: Means and standard deviation of musical fit, arousal, familiarity and liking of the eight songs.

Differences song 1 and 6

To measure whether the differences concerning musical fit, arousal and liking from song 1 and 6 (as in table 4) were significant, a paired sample t-test was carried out.

Musical fit:

There were no significant differences between song 1 and 6 concerning musical fit ($t(33) = -1.70$, $p = 0.10$).

Arousal:

There were no significant differences between song 1 and 6 concerning arousal ($t(30) = 1.35$, $p = 0.19$).

Liking:

There were no significant differences between song 1 and 6 concerning arousal ($t(35) = 1.51$, $p = 0.14$).

Differences in association with meals song 1 and 6

As shown in figure 5, song 1 had 21 associations with the expected region and 5 other associations concerning meals. Song 6 had 25 associations with the expected region and 3 other associations concerning meals. A chi-square test showed that the respondents that listened to a certain song, did not significantly differ in choosing (associated) products ($\chi^2(2) = 0.25$, $p = .62$).

Discussion results pre-test

Since song 1 and 6 had strong association with associated countries as well as meals, these songs seem useful. Next to that, they had not many associations with other countries and meals. Furthermore, the songs did not significantly differ concerning familiarity, musical fit, arousal and liking. So song 1 (Italian Medley) and song 6 (Danosongs – Ambershire) are used.

It was chosen to carry out another pre-test in order to search for a song which could be used as a control condition. This song should score in between or around the means of song 1 and 6 concerning musical fit, arousal, familiarity and liking.

3.3 Pre-test songs 2

In order to know which song does not have an association with a product or product category, tests were carried out. The procedure and data analysis were the same as in pre-test 1.

Participants

In this pre-test 33 respondents participated. All respondents were students. Of the 33 respondents, 17 (51%) were male, 16 (49%) female. The average was 22.09 years ($SD = 1.72$), ranging from 19 to 25 years old.

Stimuli

The background songs that were used, are shown below. In appendix 1 YouTube links are provided.

Song 1: Guitar backing track A minor/C Major

Song 2: George Ezra - Listen to the Man

Song 3: Easy Listening Music: Guitar & Sax

Song 4: Happy Acoustic Background Music - Shining Through by Alumo

Song 5: Mousse T - Ooh Song

Results

Again, the procedure and data analysis were the same as in pre-test 1. Therefore this thesis continues with the results. First, the association with meals were analysed. Looking at figure 6, it seems that song 2, 3 and song 5 were the most useful songs since those songs were not much associated with Asian or Mediterranean meals.

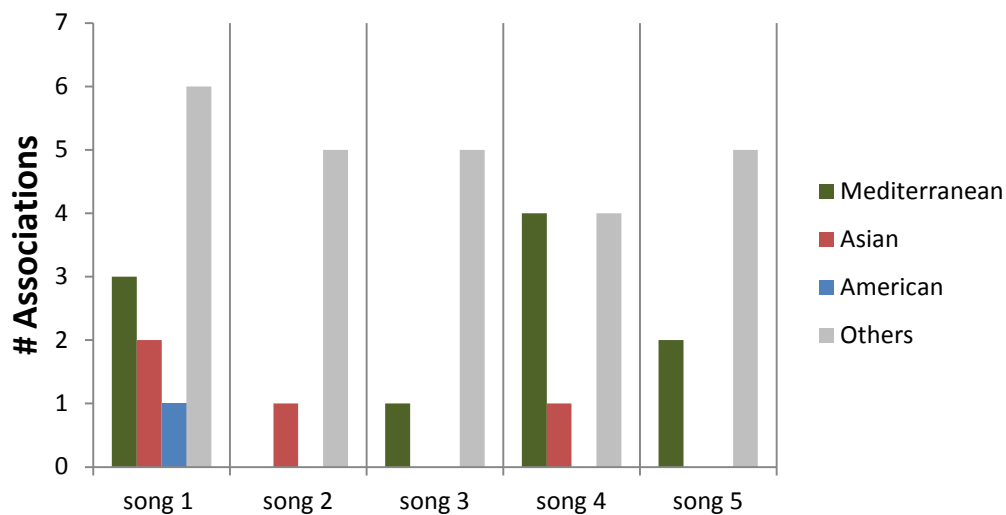


Figure 6: Number of association per song with meals from a region.

Concerning the (useful) songs 2, 3 and 5, it seems that song 3 and 5 were not much associated with countries, as shown in figure 7. Especially song 3 was not much associated. So, song 3 and 5 seem to be good songs for the control condition.

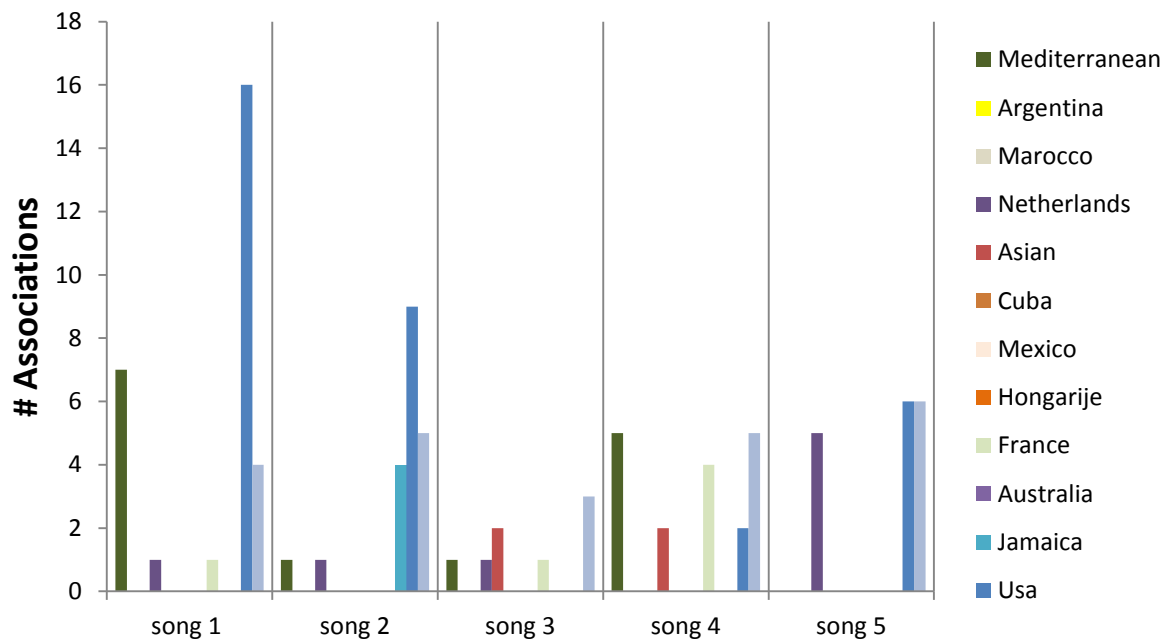


Figure 7: Number of association per song with a country or countries.

Concerning musical fit, arousal, familiarity and liking the control condition song should score in between or near Mediterranean song 1 and Asian song 6. As shown in table 5, song 5 clearly scored a lower mean on musical fit and higher on arousal. On liking song 5 scored also lower than song 1 and 6. Song 3 however, scored in between song 1 and 6 concerning liking and familiarity. Next to that, concerning arousal and musical fit it scored means which were relatively nearby song 1 and 6.

	song 3	song 5	song 1 and 6
Musical fit	30.50 (25.67)	20.58 (18.90)	21.85 – 28.88
Arousal	39.85 (14.73)	63.85 (12.04)	38.28 – 32.61
Knows the song %	3	3	3 – 6
Liking	43.94 (24.08)	34.67 (24.57)	44.15 – 36.97

Table 5: Means and standard deviation of musical fit, arousal, familiarity and liking compared to song 1 and 6 of the previous pre-test.

Differences song 3 – song 1 and 6.

To measure whether the differences in musical fit, arousal and liking from song 3 and song 1 and 6 (as in table 5) were significant, a paired sample t-test was carried out.

Differences concerning song 3 and song 1.

Musical fit:

There were no significant differences between song 3 and 1 concerning musical fit ($t(30) = 1.71, p = 0.10$).

Arousal:

There were no significant differences between song 3 and 1 concerning arousal ($t(28) = 1.50, p = 0.88$).

Liking:

There were no significant differences between song 3 and 1 concerning liking ($t(30) = -0.58, p = 0.56$).

Differences concerning song 3 and song 6.

Musical fit:

There were no significant differences between song 3 and 6 concerning musical fit ($t(30) = 0.22, p = 0.83$).

Arousal:

There were no significant differences between song 3 and 6 concerning arousal ($t(29) = 1.19, p = 0.24$).

Liking:

There were no significant differences between song 3 and 6 concerning liking ($t(30) = 0.83, p = 0.41$).

So, the songs did not significantly differ concerning musical fit, arousal and liking.

Discussion results pre-test

Since **song 3** (Easy Listening Music: Guitar & Sax) was not much associated with meals and countries, this song was used as a control condition. Moreover, it scored in between or near Mediterranean song 1 and Asian song 6 concerning musical fit, arousal, familiarity and liking.

3.4 Pre-test volume

Now the three songs that will be used are clear, it is of importance to determine what volume should be used. As explained, every song has its own characteristics; a certain amount of decibel could be more suitable or preferred for a certain song compared to another. Therefore a pre-test was done to examine per song what could be considered as 'soft' 'medium' and 'loud'.

Participants and design

In this pre-test the 10 respondents participated, all students. Of the 10 respondents, 5 were male (50%), 5 female (50%). The average age was 20.7 years ($SD = 2.50$), ranging from 18 to 25 years old.

Stimuli

Three songs were used, namely song 1: Italian Medley, song 2: Danosongs – Ambershire and song 3: Easy Listening Music: Guitar & Sax.

Procedure

The participant listened to every song and adjusted the sound level in which one would describe the volume as 'soft', 'medium' and 'loud' (for the full questionnaire see appendix 4). The adjusting of sound level (volume) was done by using the slider of volume on the computer. This procedure was done, per song per setting ('soft' 'medium' and 'loud'). The average results were used in the virtual

supermarket. The amount of decibels per setting per song was measured with a decibel meter. This decibel meter was placed in front of the respondent (about half a meter).

Results

In table 6 below, the means are shown. The means did not differ much per song. In the brackets, the ranges are shown and they showed no clear outliers (for all the results, see appendix 5).

	Song 1	Italian medley	
	low	middle	high
Decibels	40 (37-44)	53 (49-56)	71 (68-74)
	Song 2	Danosongs – Ambershire	
	low	middle	high
Decibels	38 (35-40)	49 (46-51)	72 (70-74)
	Song 3	Easy Listening Music: Guitar & sax	
	low	middle	high
Decibels	38 (35-40)	47 (43-49)	68 (66-73)

Table 6: Means of the three songs, concerning a low, middle and high volume.

Discussion results pre-test volume

The means of the decibels per setting per song, as described in table 6, were used in the virtual supermarket.

3.5 Try-out

Before the experiment in the virtual supermarket took place, a try-out was done to find out whether there were any improvements possible.

Method

3 Dutch students from the WUR participated, of which 2 were male (age 19 and 21), 1 female (age 22). The experiment took approximately 20 minutes. Because only three students participated, only one of the three songs was used. In this case was chosen for the Asian song (Danosongs – Ambershire). A volume of 49 decibels was used. The virtual supermarket was displayed on three large screens and music was played by speakers.

Procedure

The participants participated one after another. They read the task description as in appendix 9. Thereafter they used the virtual supermarket and completed the tasks. Afterwards they filled in a questionnaire (as in appendix 10) on a laptop. At last, they were asked whether anything was unclear or could be improved.

Results try-out

Since the aim of the try out was to find out whether anything could improve, only results concerning this aspect were discussed. The participants mentioned 4 improvements, 3 concerning the virtual supermarket, 1 concerning the questionnaire. The first aspect was that the participants found that they had to be too close to a product before they could pick it up. The distance, to be able to pick up a product, should be larger in order to improve user-friendliness. The second aspect was that the start position in the virtual supermarket was quite strange, namely with the eyes pointing at the wall. When a participant wanted to walk into the right direction, a 180 degree turn was directly necessary. The third aspect was that some meal packages were bigger than others, while this should not be the case. Concerning the questionnaire it became clear that the loading of the images took relatively much time.

The 4 noticed possible improvements, which became clear, were applied before the virtual supermarket experiment took place. So, the distance to be able to pick up a product was made larger, the start position was changed, the meal packages have the same size and the images have fewer pixels in order to reduce the loading time.

3.6 Virtual supermarket

Participants and design

Participants were 294 students from Wageningen University ranging in age from 18 to 37 years ($M = 20.74$, $SD = 2.44$), with 153 (52%) of them female and 141 (48%) male. During the experiment the male/female percentage per condition was taken into account in order to avoid major differences. Students with colour blindness were excluded from participation. Participants participated in one of the conditions from a 3 (song type: Asian, Mediterranean, neutral) x 3 (volume: loud, medium, soft) between subjects design. The conditions were equally divided between mornings and afternoons, as shown in appendix 6.

Stimuli

Music

As before, three different songs were used. Namely: Asian song (Danosongs – Ambershire), Mediterranean song (Italian Medley) and (in the control group) neutral song (Easy Listening Music: Guitar & Sax). These different songs were mixed with background sounds from a supermarket, e.g. the bleep sound of the pay desk. The background sounds were added in order to make the virtual supermarket more realistic. Per condition, a different volume was used. The mean amount of decibels which was most suitable for the condition was tested in a pre-test. Table 7 on the next page provides an overview.

Music + volume level	Mean dB
Asian Loud	72
Asian Medium	49
Asian Soft	38
Mediterranean Loud	71
Mediterranean Medium	53
Mediterranean Soft	40
Neutral Loud	68
Neutral Medium	47
Neutral Soft	38

Table 7: Mean amount of dB per condition.

Products

When the products (that were associated with certain music) were chosen, the differences between products were taken into account. Research has namely shown that when a product does not possess objective advantages or differences, compared to other products, persuasion with background music is more effective (Kotler, 1973; Batra & Ray, 1983). A high degree of similarity in most attributes is called 'product parity' (Myers, 2003). So, if product attributes are comparable and do not possess lot of differences or advantages (product parity), persuasion is easier. For example, two types of meal packages can be bought. When both products are comparable among most attributes, but only differ in, for example, origin. Persuasion with making use of this origin is easier compared to a case in which the products differ in more attributes. For example, when product a is also strikingly less salty compared to product b.

Products that were nudged were meal packages from different regions. These products were comparable and the meal packages did not possess objective advantages or differences between each other. In this case Asian and Mediterranean meals were nudged against other meals. Concerning the meal packages, per region (Asian/ Mediterranean/ others) 10 products were placed in the virtual supermarket. In appendix 7 all products that were part of this research are shown and also a screenshot of the shelf is shown.

Procedure

The study consisted of three phases: (1) introduction, consent and information (2) doing groceries in a virtual supermarket (3) an additional questionnaire. When participants walked into the room in which the experiment took place, the background music was already playing. The amount of decibels (of the music) was measured by using a decibel meter, the decibel meter was placed in front of the participants' seat (about half a meter) and when the right amount of decibels was set, participants were welcome and the decibel meter was removed.

First, participants filled in the consent form. In this consent form background information was described and participants signed when they agreed. The consent form is shown in appendix 8. Thereafter participants took place in front of the virtual supermarket. At this moment they read the task description, as shown in appendix 9. After reading, the experiment took place. Participants did groceries with a given shopping list (as shown in the task description) in a virtual supermarket. In this given shopping list was instructed to buy three products (apple, pack of cookies and a package of margarine). This was done so that participants get used to the virtual supermarket and the

navigation, before a participant bought a meal package. An overview of the virtual supermarket was shown in the task description in order to make it easier to find the products.

After doing the groceries, participants had to fill in a questionnaire on a laptop (for the full questionnaire, see appendix 10). Questions that were asked were related to their emotions, experiences and product choice. Concerning emotions, the 20 items of the PANAS (Positive and Negative Affect Schedule) (Watson et al., 1988) were used, which is considered as a reliable and valid measure (Crawford & Henry, 2004). Concerning experiences, was for example asked whether they had noticed striking aspects. Concerning product choice, questions concerning the recognition of products were asked. Of 21 products was asked whether the participants had seen the products in the shelf or not. The order of questions and whether they were in shelf or not, is shown in appendix 11. Per song type 7 products were shown, of which 5 were in the shelf.

Furthermore, participants had to answer background questions like age, gender and what they think the purpose of the study was. Participation lasted around 20 minutes and participants received a reward (chocolate bar, bag of nuts or bag of chips).

Measures

Product choice

Per respondent could be seen which meal package was chosen and in which condition the participant participated. The chosen meal package could be a Mediterranean, Asian or other meal package.

Product picked up

Also data concerning the products that were picked up were collected by the experiment using the virtual supermarket. Per respondent could be seen whether and how many times a Mediterranean, Asian and/or other meal packages was/were picked up. Also in this case was registered in which condition the participant participated.

Product recognition

Of 21 products was asked, in the questionnaire, whether a person had seen that product in the virtual supermarket. The wrong answers concerning the recognition of 21 products were counted per person. Also the wrong answers concerning the recognition of only the products that were in the shelf (15 products) were counted.

Emotions and mood

Also questions about *emotions and mood* were asked in the questionnaire. The 20 items of the PANAS were used (10 positive, 10 negative)(Watson et al., 1988). To find out whether items within the subscale 'positive mood items' were reliable, Cronbach's Alpha was measured. The subscale consisted of the items 'geïnteresseerd', 'opgewekt', 'sterk', 'enthousiast', 'zelfverzekerd', 'alert', 'geïnspireerd', 'vastberaden', 'aandachtig' and 'energiek', and its Cronbach's Alpha was .80. This suggesting that the items have relatively high internal consistency (Field, 2009). In case any item would be deleted Cronbach's Alpha would not increase.

To find out whether items within the subscale 'negative mood items' were reliable Cronbach's Alpha was measured. The subscale consisted of the items 'bedroefd', 'terneergeslagen', 'schuldig', 'angstig', 'vijandig', 'geirriteerd', 'bang', 'gespannen', 'beschaamd' and 'zenuwachtig'. Its Cronbach's Alpha was .90. This suggesting that the items have relatively high internal consistency (Field, 2009). In case any item would be deleted Cronbach's Alpha will not significantly increase.

So, 2 new variables were created, which were the mean of positive items (named 'Positive items') and the mean of the negative items (named 'Negative items').

Experiences and opinion

Concerning experiences and opinion, was asked for example whether the participant noticed striking aspects and whether the situation was realistic. Also question were asked about their food consumption. For example, if the participants (or whether they have taken into account others that) do not eat particular food, and if they normally would use a meal package. Also questions about the liking of music were asked, namely: 'Hoe (on)prettig vond u de muziek?' and 'Hoe (on)aangenaam vond u de muziek?'. To find out whether the items were reliable, Cronbach's Alpha was measured. The subscale consisted of the items '(on)prettigheid' and '(on)aangenaamheid', and its Cronbach's Alpha was .83. This suggesting that the items have relatively high internal consistency (Field, 2009). So, a new variable was created, which was named 'liking of music'.

Also questions with regard to the fit of the music in a supermarket environment were asked, namely: 'Hoe passend (in een supermarkt omgeving) vond u de muziek?' and 'Hoe geschikt (voor in een supermarkt omgeving) vond u de muziek?'. To find out whether the items were reliable Cronbach's Alpha was measured. The subscale consisted of the items 'passendheid' and 'geschiktheid', and its Cronbach's Alpha was .86. This suggesting that the items have relatively high internal consistency (Field, 2009). So, a new variable was created, which was named 'music fit'.

Background characteristics

Finally, background characteristics of the participants were collected. These include socio demographic characteristics, like age and gender.

4. Results virtual supermarket

4.1 Statistical analysis

For the results, shown in chapter 4, the program SPSS was used (version number 22). In the results chi-square tests and two-way ANOVA tests were carried out. For hypothesis 4 correlation tests were carried out and for hypothesis 5 also a repeated measures ANOVA was conducted.

4.2 Sample

All students spoke and understood the Dutch language. Next to the Dutch nationality, also 7 students with a German nationality participated. No problems concerning this nationality were expected because they stated that they understood and spoke the Dutch language. Next to that, these German students had been living at least 7 months in The Netherlands.

4.3 Similarity constrains

The Asian, Mediterranean and control group should be similar concerning to other aspects that were of importance in this research. Therefore these groups were compared on several aspects by making use of the results of the questionnaire (as in appendix 10). In this paragraph, these results are described.

Age

Although the average age between the types of song did not seem to differ much (Asian $M = 21.28$, Mediterranean $M = 20.37$, Neutral $M = 20.55$) there was a significant main effect of 'type song' on 'age' ($F(2, 294) = 3.83, p = .02$). Also concerning the means of the volumes (Loud $M = 20.29$, Medium $M = 20.75$, Soft $M = 21.16$), the differences seemed small. However, there was also a significant main effect of 'volume' on 'age' ($F(2, 294) = 3.17, p = .04$), as well as the 'type song' x 'volume' interaction ($F(4, 294) = 2.58, p = .04$).

Table 8, below, provides an overview of the mean of the age per condition.

Song heard	Volume of music	N	Mean	SD
Asian	Loud	32	20.44	2.31
	Medium	32	21.50	3.40
	Soft	35	21.86	2.93
	Total	99	21.28	2.95
Mediterranean	Loud	33	19.64	1.71
	Medium	32	20.13	1.64
	Soft	32	21.37	2.50
	Total	97	20.37	2.10
Neutral	Loud	32	20.81	2.09
	Medium	33	20.64	1.93
	Soft	33	20.21	2.30
	Total	90	20.55	2.11

Table 8: Overview of the average age per condition.

The differences in age could influence this research, therefore these differences were taken into account when analysing.

Gender

The participants that listened to a certain song type, did not differ in gender ($\chi^2(2) = 0.19, p = .91$). Also the participants that heard a certain volume, did not differ in gender ($\chi^2(2) = 0.97, p = .62$).

Table 9 provides an overview of the participants per condition and shows the number of male/female. In total 153 participants were female (52%) and 141 male (48%).

Asian Song								
Asian Loud	#	%	Asian Medium	#	%	Asian Soft	#	%
Male	15	47%	Male	18	56%	Male	16	44%
Female	17	53%	Female	14	44%	Female	19	54%
Total	32		Total	32		Total	35	
Mediterranean Song								
Mediterranean Loud	#	%	Mediterranean Medium	#	%	Mediterranean Soft	#	%
Male	17	52%	Male	14	44%	Male	14	44%
Female	16	48%	Female	18	56%	Female	18	56%
Total	33		Total	32		Total	32	
Neutral Song								
Neutral Loud	#	%	Neutral Medium	#	%	Neutral Soft	#	%
Male	17	53%	Male	16	48%	Male	14	42%
Female	15	47%	Female	17	52%	Female	19	58%
Total	32		Total	33		Total	33	

Table 9: Participants per condition.

So, there was no difference between male and female regarding type of song heard and volume. Thus, possible effects cannot be attributed to differences in gender.

Buying meal packages

Concerning the frequency of buying meal packages, 14.6 percent of the participants stated that they never use a meal package. The table concerning whether and how frequent participants use a meal package is shown below.

Answer	Frequency	Percent
No, I never use meal packages	43	14.6
Yes, less than once a year.	11	3.7
Yes, 1 time in the 6 months to once a year	31	10.5
Yes, 1 time in the 3 to 6 months	29	9.9
Yes, 1 time in the month to 3 months.	58	19.7
Yes, 1 time in the two weeks to 1 month	61	20.7
Yes, 1 time in the week to two weeks.	55	18.7
Yes, 2 to 5 times a week.	6	2.0
Total	294	100

Table 10: Frequency of using a meal package.

The participants that listened to a certain song type, did not differ in the frequency of buying meal packages ($\chi(14) = 20.44, p = .12$). Also the participants that heard a certain volume, did not differ in the frequency of buying meal packages ($\chi(14) = 12.35, p = .58$).

The participants that listened to a certain song type and volume, did not differ in the frequency of buying meal packages. Thus, possible effects cannot be attributed to differences in buying meal packages.

Music familiarity

Table 11 below provides an overview with regard to familiarity of the songs. Looking at the percentages, no major differences are found. In the three different song conditions, the most of the participants were not familiar with the song. Only some of them stated that they heard the song, but did not know the title or artist. None of the participants knew the artist and/or title of the song.

The participants that listened to a certain song type, did not differ in familiarity with the song ($\chi(2) = 2.70, p = .26$). Also the participants that heard a certain volume, did not differ in familiarity with the song ($\chi(2) = 5.29, p = .77$).

Was u bekend met het nummer?	Muziek gehoord			
	Asian	Mediterranean	Neutral	Total
Nee	89%	83%	91%	87%
Ja, ik het nummer wel eens gehoord, maar ken titel en artiest niet	11%	17%	9%	13%

Table 11: Familiarity of the songs.

The participants that listened to a certain song type and volume, did not differ in familiarity with the song. Thus, possible effects cannot be attributed to differences in familiarity with the song.

Music liking

There was a significant main effect of 'type song' on 'music liking' ($F(2, 267) = 4.10, p = .02$). No effect of 'volume' on 'music liking' was found: $F(2, 267) = 0.55, p = .58$. No interaction was found between 'type song' x 'volume' on 'music liking' ($F(4, 267) = 1.01, p = .40$).

The significant effect of 'type song' on 'music liking' was further explored with a post hoc test (using LSD). This test showed that the only significant difference was the liking of Asian and neutral music ($p = .01$). The means show that the neutral music was most liked ($M = 63.40, SD = 19.42$), followed by the Mediterranean music ($M = 58.55, SD = 20.82$, and Asian as least liked ($M = 54.35, SD = 24.69$).

Unfortunately, there was a significant difference concerning 'music liking' and 'type song'. However, the partial $\eta^2 = .03$, which means that this measurement of effect size shows that this was a small effect (Field, 2009). The differences in liking of the music could influence this research, therefore these differences were taken into account when analysing.

Music fit

There was a significant main effect of 'type song' on 'music fit' ($F(2, 267) = 14.14, p < .001$). No effect of 'volume' on 'music fit' was found: $F(2, 267) = 0.70, p = .50$. No interaction was found between 'type

song' x 'volume' on 'music fit' ($F(4, 267) = 1.60, p = .18$). The significant effect of 'type song' on 'music fit' was further explored with a post hoc test (using LSD). This test showed that there is a significant difference between neutral and Asian ($p < .001$), neutral and Mediterranean ($p < .01$) and between Mediterranean and Asian ($p = .03$). The means show that neutral music was considered as most appropriate ($M = 52.31, SD = 23.56$), followed by the Mediterranean music ($M = 41.95, SD = 24.94$) and lastly the Asian song ($M = 34.83, SD = 21.15$).

So, unfortunately, there was a significant difference concerning 'music fit' and 'type song'. However, Partial $\eta^2 = .1$, which means that this measurement of effect size shows that this was a weak effect (Field, 2009). The differences in musical fit could influence this research, therefore these differences were taken into account when analysing.

Mood

There was no effect of 'type song' on 'positive items' found ($F(2, 294) = 0.77, p = .46$). Also no effect of 'volume' on 'positive items' was found ($F(2, 294) = 0.25, p = .78$). No interaction was found between 'type song' x 'volume' on 'positive items' ($F(4, 294) = 0.88, p = .48$). Overall, participants positive mood items scored a mean of 60.16 ($SD = 0.60$).

There was also no effect of 'type song' on 'negative items' found ($F(2, 294) = 0.15, p = .86$). Also no effect of 'volume' on 'negative items' was found ($F(2, 294) = 2.26, p = .11$). No interaction was found between 'type song' x 'volume' on 'negative items' ($F(4, 294) = 0.66, p = .62$). Overall, participants negative mood items scored a mean of 17.40 ($SD = 0.82$).

To be sure, each item was compared individually, and still no significant differences were found (for details, see appendix 12). In total it can be concluded that participants' mood in the conditions was similar.

Overall conclusion for 'similarity constrains' :

There are no significant differences between the conditions with regard to gender, frequency of buying meal packages, familiarity of music and mood.

Effects were found with regard to age, music fit and music opinion. These effects were small, as shown by the partial η^2 and Cramer's V (Field, 2009).

So, only small differences exist. Therefore, all the participants included and groups of participants were considered as equal. The significant differences in age, music liking and music fit, were taken into account. This was done by carrying all tests of this experiment out with age, music fit and music liking as a co-variant. No significant effects of age, music liking and music fit were found. Next to that age, music liking and music fit had no major influence on outcomes of the virtual supermarket experiment. For example, it did not influence whether an outcome was significant or not.

4.4 Manipulation check

Opinion of volume of music heard

There was no effect of 'type song' on 'opinion of volume' found ($F(2, 267) = 2.01, p = .14$). There was a significant main effect of 'volume' on 'opinion of volume': $F(2, 267) = 46.69, p < .001$. No interaction was found between 'type song' x 'volume' on 'opinion of volume' ($F(4, 267) = 1.01, p = .40$).

The significant effect of 'volume' on 'volume opinion' was further explored with a post hoc test (using LSD). This test showed that there was a significant difference between loud and soft ($p < .001$), between loud and medium ($p < .001$) and between medium and soft ($p < .001$). The means show that loud music is considered as most loud ($M = 59.59, SD = 11.54$), followed by the medium music ($M = 53.69, SD = 10.31$) and soft music lastly ($M = 44.22, SD = 10.93$).

The significant main effect of 'volume' on 'opinion of volume' was expected. It was intended that a loud volume was considered as more loudly, compared to medium or soft volume by the participants. Looking at figure 8, it shows that the expectations are met.

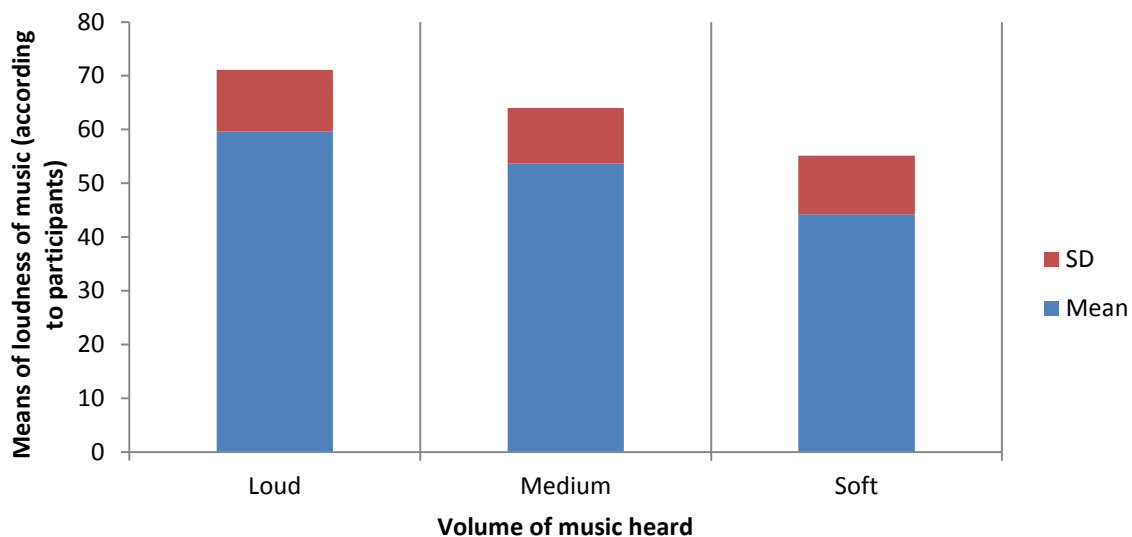


Figure: 8: Loudness of music per volume condition.

So, the opinion of volume was as expected (loud is considered as loud, medium as medium, soft as soft). Furthermore, there was no effect of 'type song' on 'opinion of volume'. This is a positive result, because effects of volume cannot be attributed to different types of songs.

Music heard

Although music was played during all experiments, it might be that some participants did not hear the music. The participants that listened to a certain song type, differed in hearing the music during the experiment. The type of song heard had an effect on hearing the music during the experiment ($\chi(2) = 6.88, p = .03$). The participants that heard a certain volume, did not differ in hearing the music during the experiment ($\chi(2) = 3.15, p = .21$). So volume did not influence whether a song was heard.

The Asian music was heard more times than the neutral music (97% compared to 87%) and also the Mediterranean music was heard a little bit more times compared to the neutral music (89% compared to 87%)

Table 12 provides an overview concerning the amount of participants that heard music per condition.

Volume of music	Music heard	Song type		
		Asian	Mediterranean	Neutral
Loud	No	0%	12%	3%
	Yes	100%	88%	97%
Medium	No	9%	16%	12%
	Yes	91%	84%	88%
Soft	No	0%	6%	24%
	Yes	100%	94%	76%
Total	No	3%	11%	13%
	Yes	97%	89%	87%

Table 12: Frequency of music heard per condition.

A possible explanation for the difference concerning ‘music heard’ and ‘type song’ is that the Asian and also, although to a lesser extent, Mediterranean music was more striking than the music from the control group, because people were not used to this type of music in a supermarket environment. The Cramer’s V is 0.15, therefore this result can be considered as having only a small effect size (Field, 2009). The differences in hearing the music during the experiment could influence this research, therefore these differences were taken into account when analysing.

Realism of virtual supermarket

Of the 294 participants, 98 (33%) stated something about one or more unrealistic aspect(s) of the virtual supermarket. These 98 answers were found by a content analysis concerning the question: ‘What did you remember of the virtual supermarket? Did you noticed something about the supermarket?’. The most heard comments concerning the realism, were that the supermarket was small, had a lot of grey colour with no decoration (like posters or advertisements) and that there was no cash desk. The opinion of the realism of the virtual supermarket did not differ between the conditions. The type of song heard had no effect on the opinion of the realism of the virtual supermarket ($\chi^2(2) = 2.01, p = .37$). The participants that heard a certain volume, did not differ in the opinion of the realism of the virtual supermarket ($\chi^2(2) = 3.03, p = .22$).

4.5 Results

Product choice

The participants that listened to a certain type of song, did not significantly differ in choosing products ($\chi(4) = 3.03, p = .55$).

In table 13 one can see the distribution of the amount of products that were chosen per condition.

Type of song + volume	Product Chosen						Total
	Asian		Mediterranean		Other		
	#	%	#	%	#	%	#
Asian Loud	14	44	13	41	5	16	32
Asian Medium	11	34	15	47	6	19	32
Asian Soft	12	34	16	46	7	20	35
Total Asian	37	37	44	44	18	18	99
Mediterranean Loud	8	24	17	52	8	24	33
Mediterranean Medium	10	31	15	47	7	22	32
Mediterranean Soft	12	38	13	41	7	22	32
Total Mediterranean	30	31	45	46	22	23	97
Neutral Loud	10	31	14	44	8	25	32
Neutral Medium	11	33	16	48	6	18	33
Neutral Soft	5	15	18	55	10	30	33
Total Neutral	26	27	48	49	24	24	98

Table 13: Product purchases per condition.


Also the participants that listened to a certain volume level, did not significantly differ in choosing products ($\chi(4) = 0.82, p = .94$). Also other tests were carried out, in which participants that listened to the same type of song, but a different volume were compared. Concerning Asian music, with different volumes, the difference with regard to chosen products was not significant ($\chi(4) = 0.86, p = .93$.) Concerning Mediterranean music, with different volumes, the difference with regard to chosen products was not significant ($\chi(4) = 1.40, p = .85$). Concerning neutral music, with different volumes, the difference with regard to chosen products was not significant ($\chi(4) = 3.84, p = .43$).


Table 14 on the next page, provides a clear overview. The percentages of the chosen products per different volume level, did not have the form of an inverted U. So, a medium level of associated music, did not result in more chosen products (of associated products) compared to a loud or soft volume.

Song Heard	Product Chosen in %
	Asian
Asian Loud	44
Asian Medium	34
Asian Soft	34
	Mediterranean
Mediterranean Loud	52
Mediterranean Medium	47
Mediterranean Soft	41
	Neutral
Neutral Loud	24
Neutral Medium	21
Neutral Soft	29

Table 14: Relevant product chosen per condition.

In conclusion, there seemed to be no effect of volume or type of song on purchase of products (associated with the music). Thus, it did not matter which type of song or volume level the song was played with regard to which product participants choose. **So, hypothesis 1 as well as hypothesis 2 are rejected.**

 *H1: When consumers listen to music that is associated with a product or product category, this will lead to more product purchases of that product or product category compared to when consumers listen to music that is not associated.*

 *H2: The effect of volume on purchase of products (associated with the music) will have the form of an inverted U.*

Product picked up

Next to the chosen products, also data with regard to whether participants picked up a product (Asian, Mediterranean or other) were analyzed. As described in 2.3 this attention is of importance since products which are processed in working memory (due to attention) will stand out later on. This standing out, could result in more attention which, in turn, might result in a purchase.

The participants that listened to a certain type of song, did not significantly differ in picking up products. The difference concerning Mediterranean product(s) picked up was not significant ($\chi(2) = 0.26, p = .88$). The difference concerning Asian product(s) picked up was not significant ($\chi(2) = 3.15, p = .21$). The difference concerning other product(s) picked up was also not significant ($\chi(2) = 1.65, p = .44$).

Table 15 on the next page, shows the results concerning the distribution of the number of participants that viewed a certain type of product (Asian, Mediterranean or other) per condition.

Song Heard			Product Picked Up				Total
	Asian		Mediterranean		Other		
	#	%	#	%	#	%	#
Asian Loud	14	44%	13	41%	5	16%	32
Asian Medium	12	33%	18	50%	6	17%	36
Asian Soft	12	33%	17	47%	7	19%	36
Total Asian	38	37%	48	46%	18	17%	104
Mediterranean Loud	10	28%	18	50%	8	22%	36
Mediterranean Medium	10	29%	16	47%	8	24%	34
Mediterranean Soft	12	36%	14	42%	7	21%	33
Total Mediterranean	32	31%	48	47%	23	22%	103
Neutral Loud	10	30%	15	45%	8	24%	33
Neutral Medium	11	32%	16	47%	7	21%	34
Neutral Soft	5	14%	20	57%	10	29%	35
Total Neutral	26	25%	51	50%	25	25%	102

Table 15: Product picked up per condition.

Also tests were carried out in which not only was analysed whether a certain product type (Asian, Mediterranean, other) was picked up, but also the number of times a certain product type was picked up. In this test the effect of 'song type' on 'total Asian products picked up' was examined. The same tests were carried out concerning Mediterranean and neutral products picked up. Again, no significant differences were found (Asian: $F(2, 293) = 1.18, p = .31$ Mediterranean: $F(2, 293) = 0.54, p = .58$ and neutral: $F(2, 293) = 2.32, p = .10$).

Also, the participants that listened to a certain level of volume, did not significantly differ in picking up products. The difference concerning Mediterranean product(s) picked up was not significant ($\chi(2) = 0.39, p = .82$). The difference concerning Asian product(s) picked up was not significant ($\chi(2) = 0.94, p = .62$). The difference concerning other product(s) picked up was also not significant ($\chi(2) = 0.21, p = .90$).

Also when tests were carried out concerning the number of times a certain product type was picked up, no significant effect of volume were found. In this test the effect of 'volume' on 'total Asian products picked up' was examined. The same tests were carried out concerning Mediterranean and neutral products picked up. Again, no significant differences were found (Asian: $F(2, 293) = 0.01, p = .99$ Mediterranean: $F(2, 293) = 0.40, p = .96$ and neutral: $F(2, 293) = 0.11, p = .89$).

In conclusion, there seemed to be no difference between conditions with regard to the meal package picked up. Thus, it did not matter which volume the music or which type of song was played with regard to which product(s) participants picked up. **So, this enhances the idea that hypothesis 1 as well as hypothesis 2 can be rejected.**

Product recognition

There was no effect of 'type song' on 'wrong answers' found. Regarding wrong answers concerning Asian products no significant effect was found ($F(2, 293) = 0.98, p = .38$), regarding wrong answers concerning Mediterranean products no significant effect was found ($F(2, 293) = 0.05, p = .96$), and also regarding other products no significant effect was found ($F(2, 293) = 0.48, p = .62$).

Table 16 below, shows the means of wrong answer per condition, per product type (Asian, Mediterranean or other products).

Music heard	Means of wrong answer(s) (SD)		
	Wrong concerning Asian products	Wrong concerning Mediterranean products	Wrong concerning other products
Asian	2.12 (1.67)	2.30 (1.41)	3.04 (1.80)
Mediterranean	2.38 (1.46)	2.35 (1.42)	2.80 (1.88)
Neutral	2.41 (1.63)	2.30 (1.24)	2.83 (1.91)

Table 16: Means of wrong answer(s) per condition.

Also when the wrong answers of the recognition of the products that were in the shelf were analyzed, no significant effect of 'type song' on 'wrong answers' was found (Wrong answers concerning Asian products: $F(2, 293) = 1.81, p = .16$, Mediterranean products: $F(2, 293) = 0.15, p = .86$, other products: $F(2, 293) = 0.07, p = .94$).


For each type of song (Asian, Mediterranean or neutral), tests with a different volume were compared. Concerning Asian music, with different volumes, the difference with regard to recognition of Asian products was not significant ($F(2, 99) = 0.75, p = .47$). Concerning Mediterranean music, with different volumes, the difference with regard to recognition of Mediterranean products was not significant ($F(2, 97) = 0.09, p = .92$). Concerning neutral music, with different volumes, the difference with regard to recognition of other products was not significant ($F(2, 98) = 0.21, p = .81$).


In table 17 the means of wrong answers per song heard and volume condition are shown. An inverted U form is not visible.

Song heard	Volume	Mean of wrong answers (SD)
Asian		Concerning Asian Products
	Hard	1.97 (1.43)
	Medium	1.97 (1.73)
Mediterranean	Soft	2.40 (1.82)
		Concerning Mediterranean Products
	Hard	2.30 (1.36)
Neutral	Medium	2.44 (1.50)
	Soft	2.31 (1.45)
		Concerning Other Products
	Hard	2.84 (1.85)
	Medium	2.97 (2.07)
	Soft	2.67 (1.85)

Table 17: Means of wrong answer(s) per song ad volume level.


In conclusion, there seemed to be no difference between conditions with regard to product recognition. Thus it did not matter which type of song or volume of a song was played concerning recognition of products. **So, hypothesis 3 and 5 are rejected.**

 *H3: When consumers listen to music that is associated with a product or product category, these products or product category will be better recognized compared to when consumers listen to music that is not associated*

 *H5: The effect of volume on recognition of products (associated with the music) will have the form of an inverted U.*

A repeated measures ANOVA was conducted to compare the effect of song type on the wrong answers of product recognition concerning Asian, Mediterranean and other products. The test showed that there was no significant interaction effect of song type ($F(2, 291) = 0.22, p = .80$).

In conclusion, an increase of recognition towards associated products was not coupled to a decrease in recognition towards unassociated products. Since hypothesis 3 is rejected, it might not be surprising that also **hypothesis 4 is rejected.**

 *H4: An increase of recognition towards associated products is coupled to a decrease in recognition towards unassociated products.*


Correlation tests show that 'wrong answer Asian', 'wrong answer Mediterranean' and 'wrong answer others' were significantly correlated. The wrong answers concerning Asian products significantly correlated with wrong answers concerning Mediterranean products ($r(292) = .13, p = .03$). The wrong answers concerning Asian products correlated significantly with wrong answers concerning others products ($r(292) = .23, p < .001$). The wrong answers concerning Mediterranean products correlated significantly with wrong answers concerning others products ($r(292) = .14, p = .02$). These correlations might indicate that the better the recognition of associated products, the better the recognition of unassociated products. Therefore these correlations were analyzed in detail.

Table 18 below provides an overview of the correlations concerning 'wrong answer Asian', 'wrong answer Mediterranean' and 'wrong answer others' when a certain song type was heard. Although not all correlations were statistically significant, the Pearson's r was in all the results positive. This indicates that some participants were relatively good in recognition of products and others had more difficulties in recognition. This is not in line with the hypothesis, which presupposes a contrast of recognition between associated products and unassociated products.

Song Type	N	Wrong	Asian	–	Wrong	Asian	–	Wrong	Med	–
		Wrong	Med		Wrong	Others		Wrong	Others	
		<i>r</i>	<i>p</i>		<i>r</i>	<i>p</i>		<i>r</i>	<i>p</i>	
Asian	99	0.16	.12		0.24	.02		0.24	.02	
Mediterranean	97	0.10	.35		0.13	.19		0.05	.61	
Neutral	98	0.12	.23		0.33	.001		0.14	.18	

Table 18: Correlation in case a certain type of song is heard.

Since this hypothesis is in the extension of hypothesis 4, it is not surprising that this hypothesis is not accepted. In conclusion, the better the recognition of associated products, the better the recognition of unassociated products. **So, hypothesis 6 is rejected.**

 *H6: The better the recognition of associated products, the worse the recognition of unassociated products.*

5 Conclusion

5.1 Discussion

The aim of this study was to find out what the effect is of a strongly associated song, combined with a certain volume, on consumers' product choice (in a virtual supermarket). From the pre-tests was concluded that the Asian song (Danosongs – Ambershire), Mediterranean song (Italian Medley) and neutral song (Easy Listening Music: Guitar & Sax) were most useful. These songs were used in the virtual supermarket experiment. No significant results of the songs on product choice and product recognition were found. Besides, volume of music did not have an influence on both processes (product choice and product recognition).

In contrast to results of Agmon (1990), Areni & Kim (1993) and North et al. (1993), this study found that music had no significant effect on product choice. There are several ways which could explain this (non) effect. First of all, this result may be due to the (in) appropriateness of the Mediterranean and Asian music in a supermarket environment. As shown in the results, both songs scored relatively low on the 'appropriate' aspect. Wilson (2003) showed that people consumed more beverages in a restaurant when jazz, easy listening or popular music was played, compared to classical music due to the appropriateness. In addition MacInnis and Park (1991), discussed that people are easier to persuade in case the music is appropriate for the context. Although nudging is not the same as persuasion, it might be that no significant results were found because the music was considered as too inappropriate.

Another reason might be that concerning meal packages participants had a strong opinion. It could be that other products or other product categories are easier to nudge. This might also be a reason why Areni & Kim (1993) and North et al. (1993) found significant effects of music on product choice. Since they used wine as a product category, which might be a product where people have a less strong opinion about.

Besides, no significant effects of music on product recognition were found. This might be due to that people's mind-set was not focused on remembering the specific products. It was not their task, and there was no need to remember these products. It might be that storing aspects in memory is a more conscious process. In fact, Yonelinas (2001) found that consciousness is one of the three crucial c's (next to control and confidence) for recognition. So, because people were not consciously busy with storing the products which they had seen, it might be that no significant effect were found.

Also no effect of volume on both processes (product choice, product recognition) was found. So, it seems that awareness of the music did not influence the musical association on specific products. It seems likely that the volume did not influence the processes (product choice, product recognition) because the manipulation was well applied. It became clear that people considered loud music as loud, medium as medium and soft as soft. Another reason for finding no effect might be that the differences between soft, medium and loud were not distinctive enough to find significant effects, this in spite of earlier pre-tests with volume. In case the three volume conditions were not distinctive enough, those conditions are seen as equal and no effect of different volumes was measured.

In conclusion, this research seems not to support the theory that strongly associated music can influence product choice and recognition (memory). Furthermore was found that volume does not have an influence in this process.

5.2 Limitations and future research

Although the Asian, Mediterranean and neutral song in the *pre-test* had no significant differences in liking or appropriateness in the virtual supermarket experiment significant differences were found. This might be the case because in the pre-tests participants listened to a lot of songs, one after another. This fixed order of playing the songs, might have influenced the answers. For example, one might rate a song higher concerning liking, because the song before was definitely not what the participant liked. However, when participants participated in the virtual supermarket, this was not the case and they listened to only one song. Another reason might be that the number of participants in the pre-test (respectively 35 and 33) were too small. It might be that when more respondents participated, the results were also significant difference. In future research a randomized order of playing the songs (in the pre-tests) is a solution for this limitation. Besides, more participants in the pre-tests would increase the reliability and validity.

As explained, during the experiment the *music was playing*. Thus, when participants filled in the questionnaire they still could hear the music. In research of Kappen (2014) a significant effect of music on product choice was found when participants that did not hear the music were excluded. In this experiment a relatively high amount of people heard the music and there was no difference when these people were excluded. The fact that music was played while filling in the questionnaire might have had influence on answers in the questionnaire, while this was not the aim. For example, it was asked whether people heard music while doing groceries. It might be that people then started listening and filled in 'yes' while they did not hear music when doing groceries. Filling in the questionnaire in another room is a solution for this limitation.

In the results became clear that 33% of the participants stated something about an or more *unrealistic* aspect(s) of the virtual supermarket. Due to this striking number of 33 percent that noticed unrealistic aspects, it can be questioned whether the results of this virtual supermarket are valid in a real supermarket environment. It might be that the virtual supermarket was too unrealistic and therefore behaviour changed. Research and tests can be done in other to find out to which extent a 'real' supermarket and virtual supermarket are comparable.

5.3 Implications

As described in the introduction, there is only little research done yet concerning the effect of strongly associated music on product choice. This research can be considered as a contribution to a start point for further research in this field.

In general, retailers cannot be advised to use musical associations in order to influence the product choice of consumers. However, it should be noted that this experiment only investigated the effect of these music samples on a specific category (meal packages). So, no conclusions can be drawn on the effect on other product categories. Because of that, retailers are advised to do more research concerning the effect of associated music on product choice, before a retailer might think of implementing this strategy.

References

- Agmon, E. (1990). Music theory as cognitive science: some conceptual and methodological issues. *Music Perception*, Volume 7(3), 285-308.
- Alpert, I. J., Alpert, I.M. (1990). Music Influence on Mood and Purchase intentions. *Psychology and Marketing*, Volume 7(2), 109-133.
- Alpert, I. J., Alpert, I.M., Maltz, E.N. (2005). Purchase occasion influence on the role of music in advertising. *Journal of Business Research*, Volume 58, 369– 376
- Areni, C. S., Kim, D. (1993). The Influence of Background Music on Shopping Behavior - Classical Versus Top-40 Music in a Wine Store. *Advances in Consumer Research*, Volume 20, 336-340.
- Bacon, W.F., Egeth, H.E. (1994). Overriding stimulus-driven attentional capture. *Perception & psychophysics*, Volume 55(5), 485–496.
- Bargh, J.A. (2006). What have we been priming all these years? On the development, mechanisms, and ecology of nonconscious social behavior. *European Journal of Social Psychology*, Volume 36, 147-168.
- Batra, R., Ray, M.L. (1983). Advertising situations: The implications of differential involvement and accompanying affect responses. *Information Processing Research in Advertising*, 127-151.
- Berger, J., Meredith, M., Wheeler, S. C. (2008). Contextual priming: Where people vote affects how they vote. *Proceedings of the National Academy of Sciences of the United States of America*, Volume 105 (26), 8846-8849.
- Billings, W.L. (1990). Effects of Store Atmosphere on Shopping Behaviour. *Honors Projects*. Paper 16. http://digitalcommons.iwu.edu/busadmin_honproj/16
- Bitner, M.J. (1992). Servicescapes: the impact of physical surroundings on customers and employees. *The Journal of Marketing* , Volume 56, 57–71.
- Cahill, L. McGaugh, J. L. (1998). Mechanisms of emotional arousal and lasting declarative memory. *TINS*, Volume 21 (7), 294-299.
- Caldwell, C., Hibbert, S.A. (2002). The influence of music tempo and musical preference on restaurant patrons' behavior. *Psychology of Marketing*, Volume 19, 895.
- Crawford, J.R., Henry, J. D. (2004). The Positive and Negative Affect Schedule (PANAS): Construct validity, measurement properties and normative data in a large non-clinical sample. *British Journal of Clinical Psychology*, Volume 43, 245-265.
- Danaher, P. J., Mullarkey, G.W. Factors affecting online advertising recall: A study of students. *Journal of advertising research*, Volume 43 (3), 252-267.
- Degenhardt, L. (2002). Why Do People Act in Sustainable Ways? Results of an Empirical Survey of Lifestyle Pioneers. *Psychology of Sustainable Development*, 123-147.

- Donovan, R., Rossiter, J. (1982). Store Atmosphere: An Environmental Psychology Approach. *Journal of Retailing*, Volume 58, 34-57.
- Downing, P. E. (2000). Interaction between visual working memory and selective attention. *Psychological Science*, Volume 11, 467–473.
- Dubé, L., Morin, S. (2001). Background music pleasure and store evaluation Intensity effects and psychological mechanisms. Volume 54, 107-113.
- Duncan, J. (1984). Selective attention and the organization of visual information. *Journal of Experimental Psychology*, Volume 113(4), 501–517.
- Duncan, J., Humphreys, G. W. (1989). Visual search and stimulus similarity. *Psychological Review*, Volume 96, 433–445.
- Field, A. (2009). Discovering statistics using SPSS. Thousand Oaks: Sage Publications.
- French, A., Smith, G. (2013). Measuring brand association strength: a consumer based brand equity approach. *European Journal of Marketing*, Volume 47 (8), 1356 – 1367.
- Garlin, F. V., Owen, K. (2006). Setting the tone with the tune: A meta-analytic review of the effects of background music in retail settings. *Journal of Business Research*, Volume 59(6), 755-764.
- Herrington, J.D., Cappella, L.M. (1996). Effects of music in service environments: a field study. *Journal of Services Marketing*, Volume 10 (2), 26-41.
- Hosea, M. (2004). Let the music play. *In-store marketing*, 27–29.
- Jonides, J., Yantis, S. (1988). Uniqueness of abrupt visual onset in capturing attention. *Perception & Psychophysics*, Volume 43(4), 346–354.
- Kappen, H. (2014). Nudging with Auditory Cues. Wageningen University.
- Keil, F.C. (1989). Concepts, kinds, and cognitive development. Cambridge: MIT Press.
- Kotler, P. (1973). Atmosphere as a Marketing Tool. *Journal of Retailing*, Volume 49, 48-64.
- Kunda, Z. (1999). Social cognition: Making sense of people. Cambridge: MIT Press.
- Lewis, A. (2008). The Cambridge handbook of psychology and economic behaviour. Cambridge, Cambridge University Press: 1 online resource.
- Loftus, G.R. (1972) Eye fixations and recognition memory for pictures. *Cognitive Psychology*, Volume 3 (4), 525-551.
- Loftus, F., Hoffman, H., Loftus, G.R. (1991). Eye fixations and memory for emotional events. *Journal of Experimental Psychology*, Volume 17 (4), 693-701.
- MacInnis, D.J., Park, C. (1991). The Differential Role of Characteristics of Music on High- and Low Involvement Consumers' Processing of Ads'. *Journal of Consumer Research*, Volume 18, 161–73.

- Martindale, C., Moore, K. (1988). Priming, prototypicality, and preference. *Journal of Experimental Psychology: Human Perception and Performance*, Volume 14, 661-670.
- McCarron, A., Tierney, K.J. (1989). The effect of auditory stimulation on the consumption of soft drinks. *Appetite*, Volume 3 (2), 155-159.
- McGoldrick, P.J., Pieros, C.P (1998). Atmospheres, pleasure and arousal: the influence of response moderators. *Journal of Marketing Management*, Volume 14, 173-197.
- Mehrabian, A. (1976) Public Spaces and Private Spaces: The Psychology of Work, Play and Living Environments, New York: Basic Books, Inc.
- Mehrabian, A., Russell, J. (1974). An Approach to Environmental Psychology, Cambridge: MIT Press
- Morris, R.K. Folk, J.R. (1998). Focus as a contextual priming mechanism in reading . *Memory and Cognition*, Volume 26 (6), 1313- 1322.
- Myers, C.A. (2003). Managing brand equity: a look at the impact of attributes. *Journal of Product & Brand Management*, Volume 12(1), 39-51.
- Niedenthal, P. M., Mondillon, L., Effron, D.A., Barsalou, L.W. (2011). Representing Social Concepts Modally and Amodally. In F. Strack, Förster J. (Ed.), Social cognition – The basis of human interaction.
- North, A.C., Hargreaves, D.J., Mckendrick, J. (1999). The Influence of In-Store Music on Wine Selections. *Journal of Applied Psychology*, Volume 84 (2), 271-276.
- Oakes, S. (2000). The influence of the musicscape within service environments. *Journal of Services Marketing*, Volume 14(7), 539-556.
- Pieters, R., Warlop, L., Wedel, M. (2002). Breaking Through the Clutter: Benefits of Advertisement Originality and Familiarity for Brand Attention and Memory. *Management Science*, Volume 48 (6), 765-781.
- Pieters, R., Wedel, M. (2004). Attention capture and transfer in advertising: Brand, pictorial and text-size effects. *Journal of Marketing*, Volume 68, 36–50.
- Pieters, R., Wedel, M. (2006). Eye tracking for Visual Marketing. In Foundations and Trends in Marketing, Volume 1 (4), 231-320. Hanover: Now Publishers.
- Posner, M. I. (1980). Orienting of attention. *Quarterly journal of experimental psychology*, Volume 32(1), 3–25.
- Radocy, R.E., Boyle, J.D. (1997). Psychological Foundations of Musical Behavior. Springfield: Charles C. Thomas.
- Rethans, A. J., Swasy, J.L., Marks, L.J. Effects of television commercial repetition, receiver knowledge, and commercial length: A test of the two-factor model. *Journal of Marketing Research*, 50-61.
- Rock, I., Gutman, D. (1981). The effect of inattention on form perception. *Journal or Experimental Psychology: Human Perception and Performance*, Volume 7(2), 275–285.

- Rumelhart, D.E., McClelland, J.E. (1986). Parallel distributed processing: Explorations in the microstructure of cognition. Cambridge: MIT Press.
- Smith, E.E. (1990). Thinking: An invitation to cognitive science. Cambridge: MIT Press.
- Smith, P. C. & Curnow, R. (1966). 'Arousal hypothesis' and the effects of music on purchasing behavior. *Journal of Applied Psychology*, Volume 50, 255-256.
- Stroebele, N., De Castro, J. M. (2004). Effect of ambience on food intake and food choice. *Nutrition*, Volume 20(9), 821-838.
- Sullivan M. (2002). The impact of pitch, volume and tempo on the atmospheric effects of music. *International Journal of Retail & Distribution Management*, Volume 30 (6), 323-330.
- Treisman, A.M., Gelade, G. (1980). A feature-integration theory of attention. *Cognitive psychology*, Volume 12(1), 97-136.
- Vitz, P.C. (1972). Preference for tones as a function of frequency (hertz) and intensity (decibels). *Perception & Psychophysics*, Volume 11 (1), 84-88.
- Watson, D., Clark, L.A., Tellegen, A. (1988) Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of Personality and Social Psychology*, Volume 54 (6), 1063- 1070.
- Wilson, S. (2003). The effect of music on perceived atmosphere and purchase intentions in a restaurant. *Psychology of Music*, Volume 31, 93-112.
- Wittgenstein, L. (1953). Philosophical investigations. New York: Macmillan.
- Wyatt, S.B., Winters, K.P., Dubbert, P.M. (2006). Overweight and Obesity: Prevalence, Consequences, and Causes of a Growing Public Health Problem. *The American journal of the medical sciences*, Volume 331 (4), 166-174.
- Yalch, R. F., Spangenberg, E. R. (2000). The effects of music in a retail setting on real and perceived shopping times. *Journal of Business Research*, Volume 49(2), 139-147.
- Yantis, S., Hillstrom, A.P. (1994). Stimulus-driven attentional capture: evidence from equiluminant visual objects. *Journal of Experimental Psychology: Human Perception and Performance*, Volume 20(1), 95-107.
- Yantis, S., Jonides, J. (1990). Abrupt visual onsets and selective attention: Voluntary vs. automatic allocation. *Journal of Experimental Psychology: Human Perception and Performance*, Volume 16, 121-134.
- Yonelinas, A.P. (2001). Consciousness, control, and confidence: the 3 Cs of recognition memory. *Journal of Experimental Psychology*, Volume 130 (3), 361-379.
- Zaltman, G. (2003). How Customers Think: Essential Insights into the Mind of the Market. Watertown: Harvard Business School Press.

Appendixes

Appendix 1: Songs and YouTube links.

Pre-test 1			
Song category	Vocal/Instrumental	Song name	YouTube link
Mediterranean	Instrumental	Italian Medley	http://www.youtube.com/watch?v=uKIJCWLaPvg
Mediterranean	Vocal	Teddy Reno - Piccolissima Serenata	https://www.youtube.com/watch?v=4mISkPG2850
Mediterranean	Vocal	Claudio Villa – Qui Sotto Il Ciepo Di Capri	https://www.youtube.com/watch?v=Rye0BNsibb0
Mediterranean	Vocal	Domenico Modugno – Volare	https://www.youtube.com/watch?v=vRF5zSczYEs
Mediterranean	Instrumental	Sunset in Capri (Tarzia/Cipolla)	https://www.youtube.com/watch?v=fjyB-Fh8oLw
Asian	Instrumental	Danosongs – Ambershire	https://www.youtube.com/watch?v=s-_1zlTec8o
Neutral	Vocal	Peter North - Slow love	https://www.youtube.com/watch?v=mfkl-BjAiH8
Neutral	Instrumental	Background Instrumental Music	https://www.youtube.com/watch?v=_s2YxRaiWcQ
Pre-test 2			
Neutral	Instrumental	Guitar backing track A minor/C Major	https://www.youtube.com/watch?v=IFcZ_KZ5S4o
Neutral	Vocal	George Ezra - Listen to the Man	https://www.youtube.com/watch?v=ZS0WvzRVByg
Neutral	Instrumental	Easy Listening Music: Guitar & Sax	https://www.youtube.com/watch?v=A9oU5MDJ70I
Neutral	Instrumental	Happy Acoustic Background Music - Shining Through by Alumo	https://www.youtube.com/watch?v=70VGIBu-noM
Neutral	Instrumental	Mousse T - Ooh Song	https://www.youtube.com/watch?v=IxyOAtxsjvg

Appendix 2: Survey pre-test 1. The questions were asked for all the eight songs.

▶ 00:00 | 00:00

Luister naar het mp3 bestand. Bent u bekend met dit nummer?

☐ Ja

☐ Nee

Wat doet deze muziek met u?

Heel erg kalm Heel erg energiek

Het maakt mij

Aan welk(e) land(en) moet u denken na het horen van dit nummer? (Antwoorden hoeft niet, maximaal 3)

Hoe aantrekkelijk vond u het nummer?

Totaal niet aantrekkelijk Heel erg aantrekkelijk

Mate van aantrekkelijkheid

Wat komt bij u op na het horen van dit nummer? (antwoorden hoeft niet, maximaal 3 antwoorden)

Aan welk maaltijden moet u denken na het horen van dit nummer? (Antwoorden hoeft niet, maximaal 3)

Stel dit nummer zou gedraaid worden in een supermarkt. Hoe goed vindt u dit nummer in een supermarkt passen?

Helemaal niet passend Heel erg passend

Passendheid

Wat doet u in het dagelijks leven?

- ☐ Werkend
- ☐ Student
- ☐ Geen van beide

Wat is uw leeftijd?

Wat is uw geslacht?

- ☐ Man
- ☐ Vrouw

Appendix 3: Overview of both pre-tests.

To make all the results clear, a table with an overview of both pre-test 1 as well as pre-test 2, is provided below. Song 1: Italian Medley, song 6: Danosongs – Ambershire and song 3: Easy Listening Music: Guitar & sax, were used in the virtual supermarket.

	Association meals				Association countries				Other factors			
<u>Pre-test 1</u>	Mediterranean	Asian	American	Others	Mediterranean	Asian	American	Others	Musical Fit	Arousal	Knows the song	Liking
song 1 (Mediterranean)	21			5	28			8	21.85 (20.57)	38.28 (17.92)	3	44.15 (25.83)
song 2 (Mediterranean)	27			6	33			5	37.24 (20.99)	36.74 (16.37)	3	39.34 (22.54)
song 3 (Mediterranean)	10	1		10	21			9	24.97 (18.51)	44.25 (17.77)	6	38.82 (22.9)
song 4 (Mediterranean)	25			1	30			8	48.73 (22.99)	48.10 (18.39)	74	59.64 (21.97)
song 5 (Mediterranean)	2			6	21	1		4	36.82 (23.09)	44.16 (17.89)	0	45.67 (21.41)
song 6 (Asian)		25		1	2	29		5	28.48 (21.78)	31.03 (17.75)	6	36.76 (22.89)
song 7 (NA)			5	5			28		24.62 (21.54)	43.09 (20.80)	17	49.31 (24.85)
song 8 (NA)	1			5	1	1			50.61 (24.54)	19.97 (15.31)	3	55.94 (22.92)
<u>Pre-test 2</u>												
song 1 (NA)	3	2	1	6	7		16	6	35.85 (23.41)	30.21 (12.29)	3	56.27 (17.23)
song 2 (NA)		1		5	1		9	10	48.91 (22.91)	54.39 (18.12)	6	64.47 (17.90)
song 3 (NA)	1			5	1	2		5	30.50 (25.67)	39.85 (14.73)	3	43.94 (24.08)
song 4 (NA)	4	1		4	5	2	2	11	50.06 (19.65)	27.67 (12.01)	3	58.21 (21.22)
song 5 (NA)	2			5			6	11	20.58 (18.90)	63.85 (12.04)	3	34.67 (24.57)

Appendix 4: Survey pre-test volume. The questions were asked for all the three songs.

Luister naar nummer

Wanneer vind u het volume te zacht voor een supermarkt omgeving?

Decibels:

Computer:

Wanneer vind u het volume goed voor een supermarkt omgeving?

Decibels:

Computer:

Wanneer vind u het volume te hard voor een supermarkt omgeving?

Decibels:

Computer:

Appendix 5: Results pre-test volume.

Song 1 Italian Medley		
Low	Middle	High
38	52	72
39	54	71
44	56	74
40	50	69
43	53	68
42	49	70
41	53	72
39	54	73
41	56	70
37	52	71
Mean:		
40.4	52.9	71

Song 2 Danosongs - Ambershire		
Low	Middle	High
37	49	71
36	49	73
40	51	72
38	46	72
38	47	74
39	50	71
35	48	72
37	50	71
39	47	74
38	48	72
Mean:		
37.7	48.5	72.2

Song 3 Easy Listening Music: Guitar & sax		
Low	Middle	High
36	47	70
37	45	73
36	49	69
35	50	66
40	44	67
40	43	68
38	45	70
39	47	68
38	47	67
38	49	66
Mean:		
37.7	46.6	68.4

Appendix 6: Schedule.

Gebouw (lokaal)	Forum (0034)	Forum (0034)	Forum (0034)	Forum (0034)	Forum (0034)
Datum	Maandag 12 januari	Dinsdag 13 januari	Woensdag 14 januari	Donderdag 15 januari	Vrijdag 16 januari
Conditie ochtend	Opbouwen	Neutraal middel	Aziatisch middel	Aziatisch zacht	Mediterraans middel
Conditie middag	Neutraal zacht	Aziatisch zacht	Neutraal hard	Neutraal hard	Aziatisch middel
Gebouw (lokaal)	Forum (0034)	Orion (G2010)	Orion (G2010)	Orion (G2010)	Orion (G2010)
Datum	Maandag 19 januari	Dinsdag 20 januari	Woensdag 21 januari	Donderdag 22 januari	Vrijdag 23 januari
Conditie ochtend	Aziatisch hard	Opbouwen	Neutraal zacht	Aziatisch hard	Neutraal hard
Conditie middag	Aziatisch zacht	Mediterraans zacht	Mediterraans middel	Neutraal middel	Aziatisch middel
Gebouw (lokaal)	Orion (G2042)	Orion (G2042)	Orion (G2042)	Orion (G2042)	Orion (G2042)
Datum	Maandag 26 januari	Dinsdag 27 januari	Woensdag 28 januari	Donderdag 29 januari	Vrijdag 30 januari
Conditie ochtend	Mediterraans zacht	Mediterraans middel	Neutraal middel	Mediterraans hard	Mediterraans hard
Conditie middag	Neutraal zacht	Aziatisch hard	Mediterraans hard	Mediterraans zacht	

Appendix 7: Overview of products in the virtual supermarket.

Asian products in the virtual supermarket:

- Conimex Foo yong Hai
- Conimex Babi Pangang
- Conimex Babi Ketjap
- Conimex Mihoen Speciaal
- Conimex Thaise Nasi
- Conimex Tjap Tjoi
- Conimex Kip Kerrie Madras
- Honig Kip Tandori
- Honig Nasi Speciaal
- Honig Fijne Mie

Mediterranean products in the virtual supermarket:

- Knorr Macaroni
- Knorr Risotto
- Knorr Paella
- Knorr Spaghetti con Funghi
- Knorr Ovenpasta Tomaat Mozzarella
- Knorr Ovenpasta Carbonara Kaas
- Honig Macaroni ovenschotel Carbonara
- Honig Tagliatella Roomsaus
- Honig Lasagne Tradizionale
- Honig Lasagnesaus

Other products in the virtual supermarket:

- Maggi Hollands Pannetje Jachpannetje Sperziebonen
- Maggi Hollands Pannetje Champignons Prei
- Maggi Hollands Pannetje Rode Kool Appel
- Knorr Gegratineerde Witlof-Ham rolletjes
- Maggi Stroganoff
- Maggi Hollandse Aardappelgratin Kip Tomaat
- Maggi Zuurkool Craime Fraiche met gehakt uit de oven
- Maggi Prei Kerrie met gehakt uit de oven
- Maggi Witlof Spekjes met gehakt uit de oven
- Maggi Bloemkool room met gehakt uit de oven

Informatiebrief onderzoek - Virtuele supermarkt

Waarom doen we dit onderzoek?

Dit onderzoek is bedoeld om meer inzicht te krijgen in de keuzes die mensen maken bij het doen van boodschappen in de supermarkt.

Wie mag er meedoen?

Voorwaarden om me te kunnen doen aan het onderzoek zijn:

- Voldoende kunnen horen
- Voldoende kunnen zien
- Bereid zijn een toestemmingsverklaring te tekenen

Wanneer en waar is het onderzoek?

Deelname kan nu direct. Het onderzoek neemt ongeveer 15 a 20 minuten in beslag. Het vindt plaats in lokaal 0034 op het universiteitsgebouw Forum of in lokaal G2010 op het universiteitsgebouw Orion.

Wat houdt het onderzoek in?

Dit onderzoek gaat over het selecteren van producten. Het bestaat uit de volgende onderdelen:

- Ondertekenen van een toestemmingsverklaring
- Een korte introductie
- Het kiezen van een product in een virtuele omgeving (op de computer)
- Een afsluitende vragenlijst

Heel soms kan het bij het gebruik van de virtuele omgeving (op de computer) gebeuren dat mensen wat last krijgen van misselijkheid. Dit gebeurt voornamelijk bij mensen die last hebben van wagenziekte en dan nog in zeldzame gevallen.

Privacy

Gegevens die verzameld zijn tijdens het onderzoek zullen uiteraard vertrouwelijk worden behandeld.

Vergoeding

Na afloop van het onderzoek krijgt u een 'bedankje' naar keuze, als dank voor uw deelname. Uiteraard kunt u op elk moment zonder opgave van reden stoppen met het onderzoek.

Door wie wordt dit onderzoek uitgevoerd?

Dit onderzoek wordt uitgevoerd door:

Wageningen UR, Marketing and Consumer Behaviour and Food and Biobased Research:

Jasper Freriks, jasper.freriks@wur.nl, 0640271962.

Erica van Herpen, erica.vanherpen@wur.nl

Anna Maaskant, anna.maaskant@wur.nl

Met eventuele vragen kunt u ook bij hen terecht.

Deelnemerslijst - Toestemmingsverklaring

Met de ondertekening van dit formulier verklaart u deel te nemen aan het onderzoek en geïnformeerd te zijn over het doel en de opzet van het onderzoek.

Naam	Datum	Tijd	Handtekening
1.			

Appendix 9: Instructions.

Instructies navigatie:

Het lopen door de supermarkt kan door middel van de spacenavigator (3Dconnexion) en de muis. De spacenavigator werkt als een joystick en u kunt lopen naar de gewenste richting. Doormiddel van het indrukken van de spacenavigator kunt u bukken en producten die lager staan goed bekijken, als u de spacenavigator omhoog beweegt, gaat u weer naar de normale hoogte. Met de muis kunt u klikken op een product en deze van dichterbij bekijken. U dient wel in de buurt van het product te staan om erop te kunnen klikken. Vervolgens kunt u besluiten (door middel van klikken met de muis) dit product terug te leggen of te kopen. Als u een kruispunt nadert, komen er pijlen in beeld. U kunt dan met de muis op de pijltjes klikken om een bepaalde kant op te gaan. Hierna kan je de Spacenavigator weer gebruiken.

Instructies boodschappen:

Stelt u de volgende situatie voor: u wilt een appel, een pak koekjes, een kuipje margarine (voor op brood) en als laatste een maaltijdmix kopen. U weet nog niet precies welke avondmaaltijd, maar u wilt een keer een maaltijd uit een pakje gebruiken. Koop in de virtuele supermarkt dus:

1 appel

1 pak koekjes

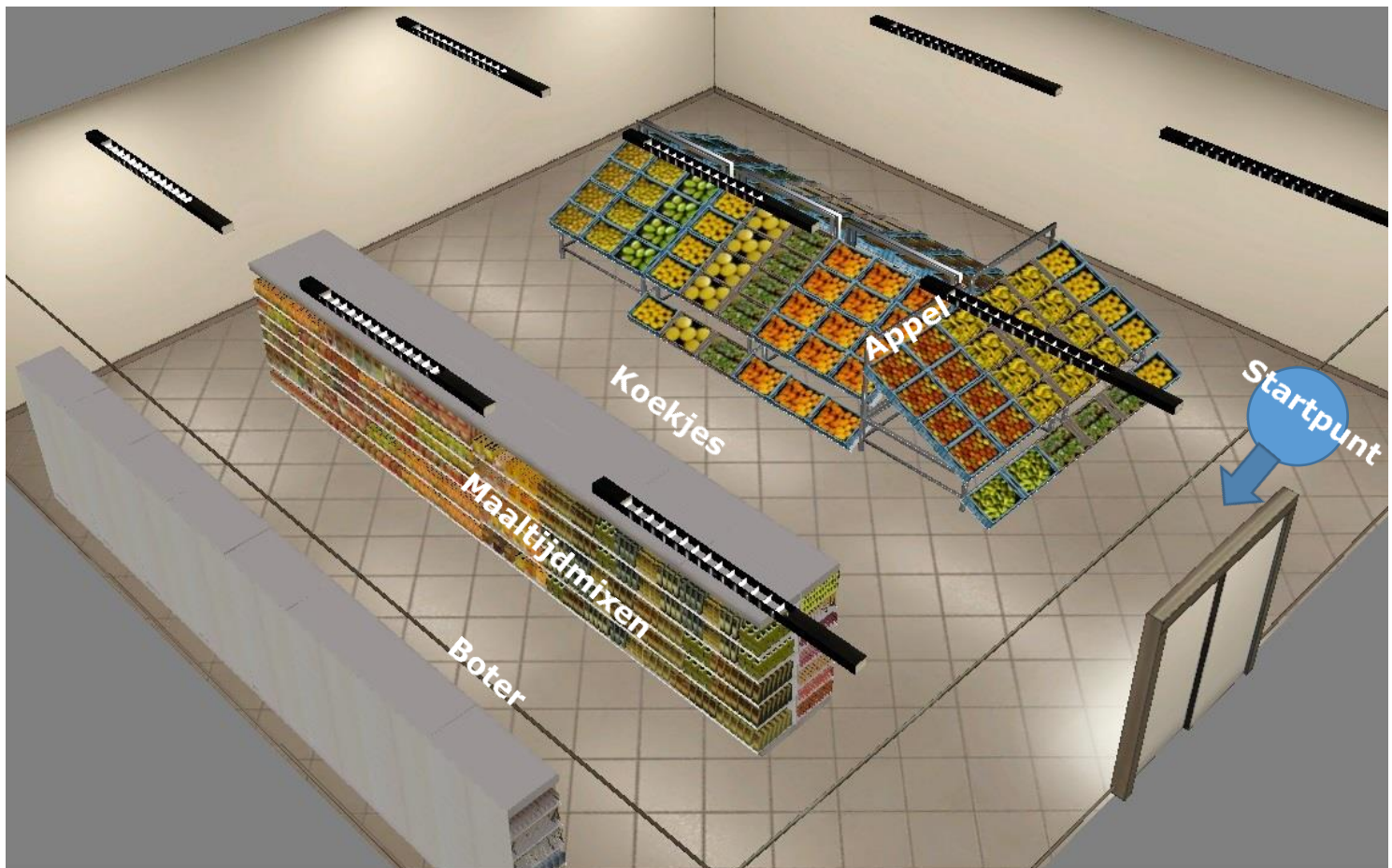
1 kuipje margarine (voor op brood)

1 maaltijdmix pakje naar keuze waarmee u wilt gaan koken. Ga er hierbij vanuit dat u de bijbehorende producten later nog gaat verzamelen.

Indien u alle producten hebt geselecteerd, kunt u mij een seintje geven. U zult vervolgens een kleine vragenlijst invullen.

Screenshot schapoverzicht virtuele supermarkt:

In het onderstaande screenshot is te zien van waar de producten staan in de virtuele supermarkt.



Appendix 10: Survey virtual supermarket.

Geachte meneer/mevrouw,

Bedankt voor het meedoen aan dit onderzoek! Nu volgt een vragenlijst, deze zal ongeveer 10 minuten in beslag nemen. Uw anonimiteit zal gewaarborgd blijven.

Alvast bedankt!

Wat is uw respondentnummer?

Welk maaltijdpakket heeft u gekozen?

Hoe voelde u zich tijdens het rondlopen in de virtuele supermarkt?

	Helemaal niet	Heel erg
1. Geïnteresseerd	<input type="text"/>	<input type="text"/>
2. Bedroefd	<input type="text"/>	<input type="text"/>
3. Opgewekt	<input type="text"/>	<input type="text"/>
4. Terneergeslagen	<input type="text"/>	<input type="text"/>
5. Sterk	<input type="text"/>	<input type="text"/>
6. Schuldig	<input type="text"/>	<input type="text"/>
7. Angstig	<input type="text"/>	<input type="text"/>
8. Vijandig	<input type="text"/>	<input type="text"/>
9. Enthousiast	<input type="text"/>	<input type="text"/>
10. Zelfverzekerd	<input type="text"/>	<input type="text"/>
11. Geïrriteerd	<input type="text"/>	<input type="text"/>
12. Alert	<input type="text"/>	<input type="text"/>
13. Beschaamd	<input type="text"/>	<input type="text"/>
14. Geïnspireerd	<input type="text"/>	<input type="text"/>
15. Gespannen	<input type="text"/>	<input type="text"/>
16. Vastberaden	<input type="text"/>	<input type="text"/>
17. Aandachtig	<input type="text"/>	<input type="text"/>
18. Zenuwachtig	<input type="text"/>	<input type="text"/>
19. Energiek	<input type="text"/>	<input type="text"/>
20. Bang	<input type="text"/>	<input type="text"/>

Hoe voelde u zich tijdens het rondlopen in de virtuele supermarkt?



In hoeverre hebben u gelet op onderstaande aspecten tijdens het kiezen van het maaltijdpakket? (meerdere antwoorden mogelijk)



Heeft u nog op iets anders gelet?

- ☐ Nee
- ☐ Ja, namelijk

In hoeverre heeft u op dit andere gelet?



Zou u het gekozen product normaal ook kopen?

- ☐ Zeer zeker niet
- ☐ Waarschijnlijk niet
- ☐ Neutraal
- ☐ Waarschijnlijk wel
- ☐ Zeer zeker wel

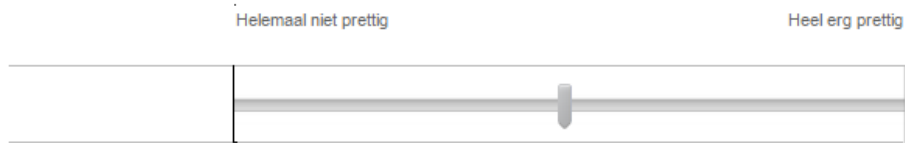
Wat herinnert u zich van de supermarkt? Is u iets opgevallen aan de supermarkt? Schrijf hieronder alles op wat er in u opkomt.

Heeft u muziek gehoord tijdens het uitkiezen van het product?

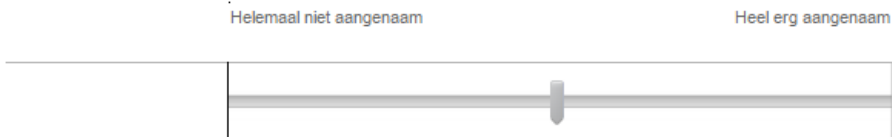
- ☐ Nee
- ☐ Ja

Wat voor soort muziek heeft u gehoord?

Hoe (on)prettig vond u de muziek?



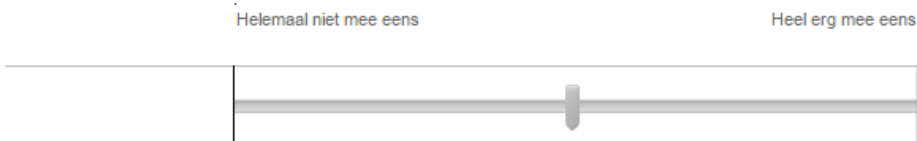
Hoe (on)aangenaam vond u de muziek?



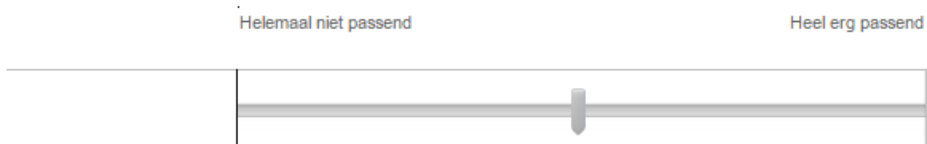
Wat vond u van het volume van de muziek?



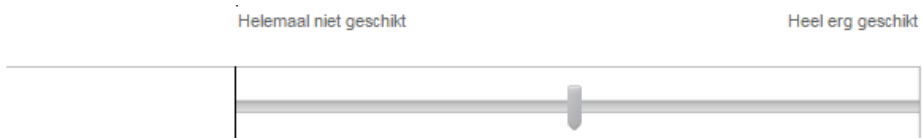
In hoeverre bent u het eens met de volgende stelling: "het volume van de muziek vond ik prima"?



Hoe passend (in een supermarkt omgeving) vond u de muziek?



Hoe geschikt (voor in een supermarkt omgeving) vond u de muziek?



Was u bekend met het nummer?

- ☐ Nee
- ☐ Ja, ik heb het nummer wel eens gehoord, maar ken de titel en artiest niet
- ☐ Ja, ik ken de titel, maar niet de artiest
- ☐ Ja, ik ken de artiest, maar niet de titel
- ☐ Ja, ik ken de artiest en titel

Gebruikt u wel eens de maaltijdpakketten waar u in dit onderzoek uit kon kiezen? En zo ja, hoe vaak?

- ☐ Nee, ik gebruik deze maaltijdpakjes nooit
- ☐ Ja, ik gebruik deze maaltijdpakjes minder dan 1 keer per jaar
- ☐ Ja, ik gebruik deze maaltijdpakjes 1 keer in de 6 maanden tot 1 keer per jaar
- ☐ Ja, ik gebruik deze maaltijdpakjes 1 keer in de 3 tot 6 maanden
- ☐ Ja, ik gebruik deze maaltijdpakjes 1 keer in de maand tot 1 keer in de 3 maanden
- ☐ Ja, ik gebruik deze maaltijdpakjes één keer in de twee weken tot 1 keer per maand
- ☐ Ja, ik gebruik deze maaltijdpakjes één keer per week tot 1 keer in de twee weken
- ☐ Ja, ik gebruik deze maaltijdpakjes 2 tot 5 keer per week
- ☐ Ja, ik gebruik deze maaltijdpakjes meer dan 5 keer per week
- ☐ Ja, ik gebruik deze maaltijdpakjes iedere dag

U krijgt nu een aantal maaltijdpakketten te zien. U zult gevraagd worden of u deze in de virtuele supermarkt hebt gezien of niet. Het laden van de plaatjes kan soms even duren.

Heeft u onderstaand product gezien in de virtuele supermarkt?

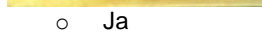


- ☐ Ja
- ☐ Nee

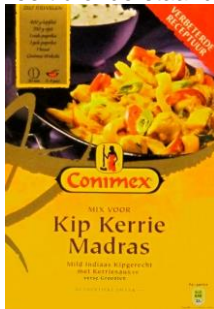
Heeft u onderstaand product gezien in de virtuele supermarkt?



- ☐ Ja
- ☐ Nee



Heeft u onderstaand product gezien in de virtuele supermarkt?



- ☐ Ja
- ☐ Nee

Heeft u onderstaand product gezien in de virtuele supermarkt?



- ☐ Ja
- ☐ Nee

Heeft u onderstaand product gezien in de virtuele supermarkt?



- ☐ Ja
- ☐ Nee

Heeft u onderstaand product gezien in de virtuele supermarkt?



- ☐ Ja
- ☐ Nee

[illegible]

- [illegible]

- Maggi**

Hollands Pannetje

**Jachtpannetje
Spertzebonen met hamlapjes**

 <p>rijke saus 3-4 personen</p>	<p>Vier botersmargarijn Witte ui en paprika Vier grote hamlapjes 4 eieren Een liter melk met zoutpeper</p>	<p>De Maggi  maggi</p>
---	--	--

-
- Conimex**
- MENYODOK
Babi Pangang
Mild Chinese-Indonesian
Vongevorecht met Pangangsaus

Heeft u onderstaand product gezien in de virtuele supermarkt?



- ☐ Ja
- ☐ Nee

Heeft u onderstaand product gezien in de virtuele supermarkt?



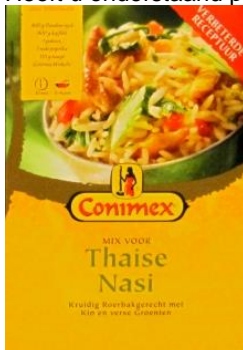
- ☐ Ja
- ☐ Nee

Heeft u onderstaand product gezien in de virtuele supermarkt?



- ☐ Ja
- ☐ Nee

Heeft u onderstaand product gezien in de virtuele supermarkt?



- ☐ Ja
- ☐ Nee

Op de volgende pagina's zullen nog enkele achtergrondvragen volgen.

Heeft u met uw keuze rekening gehouden met bepaalde allergieën of diëten van uzelf of van iemand uit uw huishouden?

- ☐ Ja, namelijk
- ☐ Nee

Hoe oud bent u?

Wat is uw geslacht?

- ☐ Man
- ☐ Vrouw

Wat is uw nationaliteit?

Indien uw nationaliteit niet Nederlands is: Hoeveel jaar woont u al in Nederland?

Wat denkt u dat het doel is van het onderzoek?

Heeft u nog opmerkingen over het onderzoek?

Heel erg bedankt voor het meedoen aan het onderzoek. U mag nu een keuze maken uit 1 van de bedankjes die voor u klaarliggen!

:)

Appendix 11: Overview of order of products in survey.

Product	Aanwezig in VR?	Maaltijdtype
1	Ja	Mediterraans
2	Ja	Oosters
3	Nee	Oosters
4	Ja	Overig
5	Ja	Mediterraans
6	Ja	Oosters
7	Nee	Mediterraans
8	Ja	Overige
9	Ja	Mediterraans
10	Nee	Overige
11	Ja	Mediterraans
12	Ja	Overige
13	Ja	Oosters
14	Nee	Overige
15	Ja	Overige
16	Nee	Oosters
17	Ja	Overige
18	Ja	Oosters
19	Nee	Mediterraans
20	Ja	Mediterraans
21	Ja	Oosters

Appendix 12: Results of PANAS.

Positive Item	Asian		Mediterranean		Neutral		(df1, df2)	F	Sign
	Mean	SD	Mean	SD	Mean	SD			
Geïnteresseerd	68.99	16.68	69.01	14.33	71.23	14.92	(4, 294)	0.53	.72
Opgewekt	60.48	17.58	61.54	16.03	62.79	13.87	(4,294)	1.06	.38
Sterk	50.07	18.37	47.09	16.22	50.62	16.84	(4,294)	1.94	.11
Enthousiast	66.44	15.03	64.49	18.63	65.44	15.07	(4,294)	1.24	.30
Zelfverzekerd	63.04	16.57	60.54	16.42	62.55	18.25	(4,294)	1.10	.36
Alert	61.76	18.20	60.14	19.25	59.83	19.57	(4,294)	1.97	.10
Geïnspireerd	48.83	20.36	49.56	21.43	51.33	18.95	(4,294)	0.96	.43
Vastberaden	55.61	23.20	55.84	20.31	59.65	19.39	(4,294)	0.80	.52
Aandachtig	68.48	17.84	68.74	12.93	70.64	15.04	(4,294)	1.06	.38
Energiek	56.84	15.89	55.89	18.88	57.32	14.84	(4,294)	1.45	.22
<u>Negative Item</u>									
Bedroefd	14.83	18.23	13.22	16.71	12.52	16.57	(4,294)	0.72	.58
Terneergeslagen	16.63	19.23	14.03	16.74	15.09	17.86	(4,294)	1.09	.36
Schuldig	17.69	20.03	19.41	20.08	18.10	20.90	(4,294)	1.49	.21
Angstig	12.95	16.52	12.89	17.45	12.01	18.04	(4,294)	0.48	.75
Vijandig	12.02	16.81	10.85	14.79	9.39	15.27	(4,294)	0.31	.88
Geïrriteerd	25.72	22.83	25.13	23.54	21.27	22.09	(4,294)	1.22	.30
Beschaamd	15.27	17.79	15.22	18.53	16.85	19.05	(4,294)	.60	.66
Gespannen	28.92	23.59	27.61	24.23	29.02	24.06	(4,294)	1.03	.39
Zenuwachtig	25.29	22.73	22.14	21.19	24.60	21.67	(4,294)	0.06	.99
Bang	11.36	15.90	10.94	15.24	10.86	17.86	(4,294)	0.88	.48