UNIVERSITY OF TWENTE

GIVE ME A SIGN

Master Thesis

Give me a Sign:

Unconsciously Influencing Purchase Intention through Front-of-Pack Logos

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Abstract

The purpose of the present study was to investigate to what extend it would be possible to influence the purchase behaviour of consumers by presenting a front-of-pack nutrition logo. It was assumed that a nutrition logo can function as a prime, which is able to activate associated goals. Therefore two experiments were conducted. The first experiment was meant to test the ability of a new developed logo to activate an associated goal. In the second experiment participants were subliminal primed by the same logo before they had to indicate to what extent they would like to purchase several food products. Results showed that front-of-pack logos are capable of goal activation and can influence purchase intention. Furthermore, study 2 revealed that even an unfamiliar logo can provoke the same effect. These results provide new insights and opportunities for marketers and the development of effective interventions to promote healthier eating.

Samenvatting

Het doel van dit onderzoek was nagaan in welke mate het mogelijk is om de koopintentie van consumenten te beïnvloeden door het laten zien van een voedsellogo. Er werd verondersteld dat een voedsellogo kan functioneren als een soort prime en hierdoor in staat is geassocieerde doelen te activeren. Om dit te testen werden twee experimenten uitgevoerd. De bedoeling van het eerste experiment was testen of een nieuw ontwikkeld logo een geassocieerd doel kon activeren. In het tweede experiment werden de proefpersonen subliminaal met hetzelfde logo geprimed voordat ze moesten aangeven in welke mate ze geneigd zijn om enkele voedselproducten te kopen. De resultaten laten zien dat voedsellogo's in staat zijn om geassocieerde doelen te activeren en de koopintentie kunnen beïnvloeden. Verder laat het tweede experiment zien dat zelf een onbekend logo tot hetzelfde effect kan leiden. Deze resultaten geven nieuwe inzichten in de werking van voedsellogo's en leveren nieuwe mogelijkheden voor marketeers en voor de ontwikkeling van effectieve interventies om gezond eetgedrag te bevorderen.

'Pick the Tick' in Australia, role on the 'Wheel of Health' in the UK, look through the 'Green Keyhole' in Sweden, 'Shop Smart With Heart' in Canada or just make the right 'Choices' with Unilever all around the world.

These are just a few examples of front-of-pack nutrition logos (FOP logos) that are used on food packages worldwide. They are supposed to help consumers to make a better and healthier food choice on the supermarket shelf.

Given all the different packaging designs and other awareness influencing promotions the question arises if these logos could have any effect on consumers' purchase intention. In the last couple of years researchers tried to give an answer to that question.

Whereas in a study by Rayner, Boaz and Higginsons (2001) no evidence for any effectiveness of FOP logos was found, there are quite a few recent studies that report positive research results. In 2007, the Dutch food manufacture Unilever conducted a study to test the effectiveness of several nutrition labelling formats. In their study especially the simple FOP logos, compared to more detailed nutrition information, had a positive influence on the perceived healthiness of products. Furthermore, these logos not just changed the health perception of products, participants' intention to choose healthier food options also increased (Feunekes, Gortemaker, Willems, Lion, & Van den Kommer, 2007). According to research findings from Herpen and Van Tijp (2011), participants needed less attention time to recognise the more simple nutrition logos compared to the more detailed nutrition information without losing effectiveness. Thus, simple FOP logos seem to still be effective even under time pressure.

Although these findings sound promising, several other studies could only find effects of nutrition logos when giving participants the explicit goal to choose healthy products (Visschers, Hess, & Siegrist, 2010; Vyth, Steenhuis, Mallant, Mol, Brug, Temminghoff, Feunekes, Jansen, Verhagen, & Seidell, 2011; Mhurchu & Gorton, 2007).

To date, the question about the effectiveness of FOP logos still remains unanswered. Maybe, it is not just the question about the effectiveness that has to be investigated but also the question about the underlying mechanism should be a main point of interest.

In 2010, a neuroscientific research, conducted in Germany, tried to find out if FOP logos cause any reaction in the brain. They showed participants food with the broadly known German eco-label ('Bio-Siegel') and asked them to estimate how much they would be ready to pay for it. Interestingly, the eco-label seemed to activate the reward system in the brain of participants and increased the willingness to pay more for eco-labelled food (Linder, Uhl,

Fliessbach, Trautner, Elger, & Weber, 2010). Thus, obviously nutrition logos could have a bigger influence compared to just being a sign that helps indicating healthier food options.

The idea that logos can influence our behaviour is not new at all. Zhong and DeVoe (2010) already showed that fast food symbols, like the arch of McDonalds, are able to activate time saving goals and in that way unconsciously influence behaviour. Furthermore, in another study, the brand logo of Apple made people perform more creatively in comparison to participants who were exposed to the brand logo of IBM (Fitzsimons, Chartrand, & Fitzsimons, 2008). Both studies argue that brand logos are able to activate associated goals which influence behavioural reactions.

As previously mentioned, a lot of studies about the effectiveness of FOP nutrition logos could only find an effect when giving people the goal to make a healthy food choice.

If brand logos like Apple are able to influence behaviour through the process of goal activation, maybe the same mechanism underlies the functioning of nutrition logos as well. This would mean that it could be possible to activate people's health goal, which is defined as the goal to choose and eat healthy products, and by doing so to unconsciously influence their purchase behaviour. That could give new insights not only for manufacturers and marketers but especially for the development of effective health campaigns.

Thus, the aim of the current study is to investigate as to what extent it is possible to influence consumer product purchase intention through front-of-pack logos. Furthermore, the assumption that such logos function through goal activation will be tested. In that way, the current study could provide more insight in the mechanisms that underlie the functioning of these logos.

To further understand the process of influencing behaviour through goal activation it is necessary to understand the concept of goals.

Goals, Goal systems and their influence on human behaviour

In the literature, goals are defined as pre-existing, desired end-states which are represented in the human mind like other schemas or concepts (e.g. Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trötschel, 2001). Goals are important to human life because all human actions are goal-directed. To achieve a goal it is necessary to make decisions and guide behaviour towards that goal. Through this, goals are able to influence human behaviour (e.g. Dijksterhuis & Aarts, 2010; Chartrand, Huber, Shiv, & Tanner, 2008).

According to the Goal System theory (GST), goals are connected with each other and build a hierarchical order. This order includes on the one hand higher order goals which are connected to lower order goals, also referred to as means. Means are defined as opportunities to act on fulfilling the related goal. On the other hand, higher order goals are also connected to other competing higher order goals (Shah, Kruglanski, & Friedman, as cited in Förster, Liberman, & Friedman, 2002). Furthermore, GST holds that these interconnected higher and lower order goals are able to make each other accessible when one of them is activated. Thus, the activated goal and all associated information will be retrieved from long-term memory and placed into working memory for further processing (Moskowitz & Gesundheit, 2009). Related goals are then able to facilitate or inhibit each other depending on their relationship (Van Osselaer, Ramanathan, Campbell, Cohen, Dale, Janiszewski, Kruglanski, Lee, Read, Russo, & Tavassoli, 2005). If they are positively related, like the higher order goal of 'socializing' and the sub-goal of 'going to a party', they will facilitate each other. By contrast, if they are contradictory, like the higher order goal of 'studying' and the sub-goal of 'going to a party', they will inhibit each other. Therefore, activating the goal of 'socializing' would automatically activate related means like 'going to a party' and inhibit contradictory means like 'studying'.

As previously mentioned, goals are represented in the human mind. They can be seen as cognitive structures that hold relations not just to other goals but also to other cognitive structures like objects, behaviours and behavioural consequences, as well. It is that link between goals, objects, behaviours and behavioural consequences that enables activated goals to influence human behaviour (Dijksterhuis & Aarts, 2010). According to Chartrand and Bargh (1996), goal activation facilititates, without any conscious attention, goal-related structures and in that way guides information processing towards the goal. As mentioned by Dijksterhuis and Aarts (2010), incoming information that is related to the activated goal becomes more attention. So to speak, activated goals bias our perception and attention to support goal pursuit.

As an example, imagine sitting in your car driving along the highway and suddenly the arch of McDonalds grasps your intention. Out of nowhere, you decide to pull over and get something to eat. In this situation the goal to eat could have biased your attention and triggered the behavioural reaction that was in line with the goal, namely stop and get something to eat. But for a lot of people the logo of McDonalds is not just related to eating, it is even more related to enjoyment.

We do not just eat because we are hungry we also eat because we enjoy the taste of certain food (e.g. chocolate). Hence, when you see the arch of McDonalds appearing on the highway, maybe you decide to pull over not because you are hungry but because the logo activated the goal of enjoying the taste of a hamburger or some french-fries. In that case the logo influenced your decision to eat but not the need to eat.

During the whole process of goal activation and completion no conscious awareness or conscious will is needed. Goal activation and goal fulfilment can function as an automated process (Bargh et al., 2001). Although, the process of goal pursuit works in an automatic fashion, what happens when two opposing goals are active at the same time?

The dilemma of conflicting goals

As mentioned before, goals and their means are not standing alone. They are interrelated and can activate each other. Therefore, activating one goal can result in activating another opposing goal as well. Given that we have only restricted mental recourses, the activated goals will fight for them. This process will lead to an inner goal conflict in which the competing goals are taking away attention from each other (Fishbach, Kruglanski, & Friedman, 2003).

Attention is critical in goal pursuit because it guides our environmental perception (Chartrand & Bargh, 1996). Thus, in taking away attention from one another the competing goals are likely to inhibit each other. The fact that people have a lot of different goals and are confronted with choices which are related to opposing goals at the same time makes it even more likely that goal conflicts will occur (Fishbach & Dahr, 2007).

One of the most famous goal conflicts in the western society occurs when it comes to eating. As stated by Laran and Janiszewski (2009), food choices are often choices between two contradictory options, which are the enjoyment of palatable food on the one hand and eating healthier food on the other hand. The problem is that even if people want to eat healthy, they still like the enjoyment of palatable food. According to Berridge (1996), to want food and to like food are two different concepts. Wanting food is a motivational concept which holds that someone requires eating to satisfy one's hunger. By contrast, liking food is an affective process in which the sensory pleasure that is connected to certain food gives the motivation to eat. Thus, even if a person wants to eat healthy, he/she can have a strong liking for palatable food. The result is an ongoing inner conflict between seeking pleasure in the short run and staying healthy in the long run.

Furthermore, the conflict between these two goals (pleasure and health) can result in a self-control dilemma in which the long-term goals of staying healthy competes with the short-term goal of food enjoyment (e.g. Fishbach & Dhar, 2005; Fishbach et al., 2003). To act in line with the long-term goal of staying healthy, consumers need to resist the short-term goal of eating palatable food. Thus, consumers need to execute self-control to act in a goal pursuing way. Acting out self-control is a mentally exhausting process that cannot function in an automatic way and decreases when other intervening influences (e.g. a conversation with a friend, remembering the shopping list) are active (Förster et al., 2007).

A typical situation of such a conflict occurs in many cafeterias during lunch break every day. Standing in the queue, people need to make a quick choice between tasty options with high calorie content (acting on the goal of pleasure) and the healthier options with less calories and vet (acting on the health goal). Which one they are going to choose in the end depends on the activation level of their goals. The goal that is more active at the moment of choice will enhance the motivation to choose an option that will fulfil the active goal (Osselaer et al., 2005). Especially activated goals that are contradictory to other goal options are able to inhibit competing goals. The inhibition of one goal through another mentally linked goal is referred to as 'goal shielding' (Förster et al., 2007).

Therefore, by activating a person's health goal it would be possible to influence that person's choice or purchase behaviour. This suggests that through activating the right goal at the right time it would be possible to help people to solve their inner goal conflicts, and as a result help them to reach their long-term goals.

Pulling the right string at the right time

As mentioned by Chartrand and Bargh (1996), behavioural actions and also decisions are unconsciously prepared in the mind. Hence, before we consciously know what we are going to do we unconsciously already made that decision. The perceptual system scans the environment and together with pre-existing knowledge structures and thoughts our attention will be directed to the situational important events (e.g. Dijksterhuis, Chartrand, & Bargh, 2007). Dijksterhuis and colleagues further point out that, after the input of important information, motor programs are launched that result in behavioural output. At that point, the direct activation of goal structures comes into play. The activation of these mental constructs will lead to the start of connected psychological processes that are in line with the activated goal (Dijksterhuis, Aarts, & Smith, 2005).

According to Fishbach, Kruglanski and Friedman (2003), goals and other representations like environmental events, objects or even other people can become mentally connected when they are activated at the same time. Thus, through continuously pairing a certain goal with an environmental stimulus these two concepts can be linked to each other. Activating one of them will automatically activate the other one as well (e.g. Chartrand et al., 2008; Bargh et al., 2001). Whether the activation facilitates or inhibits behavioural actions depends on the relation between the activated goal and behavioural programs (Fishbach et al., 2003). Therefore, associated environmental cues can be enough to trigger the activation of a goal and provoke goal-directed behaviour. The person in the cafeteria, that still has to make a choice between the palatable and the healthy food, would thus probably choose the healthy alternative if something in the environment would activate the person's health goal.

Activating goals by situational cues is referred to as 'priming'. In the literature, priming is described as a process by which a mental representation is made accessible by an environmental cue (e.g. Moskowitz & Gesundheit, 2009). According to Moskowitz and Gesundheit (2009), such cues consist of information that is inherently connected to the goal. Furthermore, the perception of the cue triggers the associated knowledge structures to respond and make all connected information available for further use. In that way, outside of conscious awareness appropriate actions will be prepared to fulfil the goal (Dijksterhuis et al., 2007; Dijksterhuis & Aarts, 2010).

Taken together this would mean that in situations where people are confronted with two conflicting alternatives which put them into an inner goal conflict, activating the more important long-term goal through an environmental cue will influence their choice and lead them to choose the alternative option which is in line with the activated goal. Most importantly, the whole process of goal activation through priming can occur without any conscious awareness (Fishbach & Dhar, 2007). In that way, it is possible to guide and even influence consumer choice quiet unconsciously.

The notion that any environmental stimulus would be capable of priming a goal as long as the stimulus is connected to the goal leads to the hypothesises that also FOP nutrition logos have that capacity.

Priming people with front-of-pack logos to promote healthy choices

A lot of different studies in recent years have shown how influential priming can be. Researchers have influenced drinking behaviour (Aarts, Custers, & Veltkamp, 2008; Strahan,

Spencer, & Zanna, 2002), led people to eat more or less (Papies & Hamstra, 2010), increased performance (Bargh et al., 2001), and, most importantly, successfully influenced consumer choice (Chartrand et al., 2008, Karremans, Stroebe, & Claus, 2006; Papies, Stroebe, & Aarts, 2008; Berger & Fitzsimons, 2008; Verwijmeren, Karremans, Stroebe, & Wigboldus, 2010).

Priming can work through several mechanisms. One is by activating prime consistent semantic concepts. The activation of a related prime representation spreads through the semantic network and activates corresponding information (Förster et al., 2007). Another possible priming effect can occur through the activation of goal systems. Instead of activating semantic information, goal priming activates an important goal concept which will guide one's attention and behaviour towards the goal pursuit (e.g. Custers & Aarts, 2005).

Compared to semantic priming goal activation has several advantages. Whereas semantic activation disappears after a brief period of time, goal activation not only stays active until goal fulfilment is achieved but also increases in strength over time (e.g. Bargh et al., 2003). In addition, goal priming has the power to influence the perceived value of different things as objects, products or certain behaviours by attaching a more positive value to the things that are in line with the goal. As a result, goal priming can make some choice opportunities more attractive than others which, in the end, enhance the likelihood that they will be attained as well. By contrast, semantic priming neither has any influence on perceived value nor is it susceptible by the amount of value that is assigned to a specific outcome (for further discussion, also see Förster et al., 2007). These advantages make goal priming more effective in influencing choice. Thus, a critical criterion in effectively influencing product choice is the existence of a goal that can be activated through a priming stimulus. Only if the to-be-activated-goal already exists in the mind of the person, can priming be affective (Custer & Aarts, 2006). Otherwise the priming stimulus will only activate prime-related semantic knowledge structures without any affect on the goal pursuit (Strahan, Spancer, & Zanna, 2005).

The notion that any environmental stimulus could activate a certain goal as long as the stimulus and the goal are associated with each other (Moskowitz & Gesundheid, 2009), gives rise to the hypothesis that also a front-of-pack logo could be an appropriate prime. Furthermore, if front-of-pack nutrition logos could fulfil that function, the activation of a goal can then set the process of goal-pursuit into motion. In order to reach the desired state, consumers will be influenced to choose means that are able to bring them closer to the goal-state. It is important to mention that the whole machinery will even work outside of consumers' awareness.

These assumptions are rather theoretical and, to my knowledge, have not been yet tested. This is why the present research tries to investigate this specific question;

To what extend would it be possible to unconsciously influence consumers' purchase intention through the presence of a front-of-pack logo?

To answer that question two studies were conducted to provide further insight into the prospects and limits of influencing consumer choice through front-of-pack logos. The purpose of the first study was to investigate if a simple front-of-pack logo would actually be able to activate a desired goal. In order to find out, a new logo was designed and introduced to participants as being a new health label. In the second study it was tested if such a logo could also influence participants' product choice. Again, the logo from the first study was presented to participants. Further, in a priming task the logo was paired with several products and participants' choice behaviour was observed.

Whereas in the first study a supraliminal priming method was used, participants in the second study were primed subliminally. The difference between supraliminal and subliminal priming is the magnitude to which the priming stimulus can be perceived consciously. As discussed by Dijksterhuis et al. (2005), a subliminal prime cannot be perceived consciously because the prime is either presented to short to reach conscious awareness or it is masked by another visual occurrence. Comparing to that, a supraliminal prime can be perceived consciously. In addition, the priming stimulus can be detected consciously, whereas the influence that the stimulus has on the behaviour or motivation of a person still remains undetected. Remember the person driving on the highway and deciding to stop to get something to eat while seeing the arch of McDonalds. In that example the arch of McDonalds can be seen as supraliminal priming stimulus. Even if the person has consciously seen that symbol it is very likely that he/she is not aware that the actual symbol has activated the motivation to eat.

The type of presentation (subliminal or supraliminal) makes no difference to the perceived effect. So to speak, through both priming methods an effect can be produced. The only difference could occur in the strength of that effect (Bargh & Chartrand, 2000). Usually, supraliminal priming generates stronger effects compared to subliminal priming. The difference can be explained by the stronger activation that occurs as a consequence of the consciously perceived stimulus. Thus, it could be expected that, because of the supraliminal

prime used in the first study, observed effects will be stronger than compared to the second study in which a subliminal prime was used.

Study 1: Activating a health goal by presenting a front-of-pack logo as supraliminal priming stimulus

The aim of the first study was to test if a front-of-pack logo is capable of activating an attached goal. Therefore a newly designed logo was connected with the goal of eating healthy. After participants learned the meaning of the logo, they had to complete a lexical decision task (LDT) in which they were supraliminal primed with the logo. The LDT consisted of words which are or are not connected to the priming stimulus.

As previously discussed, the theory of goal priming predicts that words which are related to the activated goal will be recognised faster compared to non-related words. The activated goal automatically guides attention to goal-related concepts and, in that, fastens up reaction time. It is important to note that goal-activation will only be affective for people which also hold that goal as desired in their mind.

Another possible mechanism that is also capable of increasing reaction time is semantic activation. The positive association between prime and target words could also lead to a faster perception of prime-related words. Thus, in order to proof that a front-of-pack logo is able to activate goal concepts, it is necessary to distinguish between semantic activation and goal activation. Hence, it was hypothesised that the prime logo will enhance the reaction time of recognising goal related target words but only for participants with a desirable health goal in their mind. By contrast, participants without a health goal will not be affected by the prime logo. As a result, the time they need to recognise goal-related words will be slower compared to participants who have a health goal.

H1: A health logo will enhance the recognition time of health-related target words for those participants that also have a pre-existing health goal.

H2: Compared to participants with a health goal, reaction times from participants without a health goal will be slower when primed with the health logo.

Another property that distinguishes goal activation from semantic activation is that goals stay active as long as they are not fulfilled. Semantic activation instead disappears after a short decay (Förster et al., 2007). That suggests that if the front-of-pack logo is able to activate a person's health goal, that goal is going to stay active until the person acts to fulfil the goal.

To further confirm that the logo influences goal activation after a short filler task participants were given several food options and had to report their purchase intention. It was predicted that if the presentation of a health logo would activate people's health goal they would be more likely to buy the healthy options instead of the non-healthy options. Again, that prediction only holds for those participants that also have the goal to eat healthy.

H3: *Participants with a pre-existing health goal will have a greater purchase intention of healthy food options compared to participants without a health goal when primed with the health-logo.*

H4: *There is no difference in purchase intention for participants who are not primed by the health logo.*

Method

Participants

One-hundred-and-one people from different places in Germany participated in the first study. Sixty-four of all participants were female and 37 were male. They were recruited through an internet link which was posted on the social network site Facebook.

Design

A 2 (condition: prime vs. no prime) × 2 (eating habits: health goal vs. no health goal) design was chosen with prime appearance as an independent variable, and reaction time and purchase intention as a dependent variable. To take part in the study participants selected one of two internet links. In that way, participants were randomly assigned to either the experimental condition (with prime logo) or the control condition (without prime logo).

Procedure

The study was conducted as an online experiment. One of two internet links were randomly posted to different people on the social network site Facebook together with a request to participate in an online experiment about consumer behaviour carried out by a student at Twente University. The message also included the request to post the link further to other German members of Facebook. In total the two links were originally posted to 26 people who spread the links further around.

In order to make all steps in the experiment plausible, participants were told that the aim of the study was to introduce a new health logo which was developed to mark healthy food products and to test to what extend cognitive abilities influence the perception of said logo.

In the first part of the experiment the logo was introduced and explained. Thereafter, participants had to answer six questions which were about design characteristics and logo appearance (e.g. How do you like the logo in general?). Following this, they were given the 'box-use' task as used by Shah and Kruglanski (2001). In this specific task, participants had one minute to mention as much as possible about the variety of things one can use a box for. They were told that this task is used to investigate their 'functional thinking' and that in general people could mention at least three different things within that time. The purpose of the box-use task was to override any previous goal activation which could have been a consequence of the previous logo introduction. The box-use task was followed by the actual experimental manipulation; the lexical decision task (LDT).

Lexical decision task. In the control condition (without prime logo) the LDT was introduced as a test to investigate the subject's cognitive abilities. Whereas in the experimental condition (with prime logo), participants were told that the aim of the test is to investigate which influence logos have on their cognitive functioning.

In both conditions, participants were told that in the middle of the screen words will appear. The task is it to investigate as quick as possible whether the words they are going to see are existing or non-existing words by pressing a 'yes' or 'no' button on their computer. Whilst participants in the control condition were presented with words only, participants in the experimental condition additionally saw the prime logo. The prime logo was placed above the appearing words and was present during the whole task (see figure1).

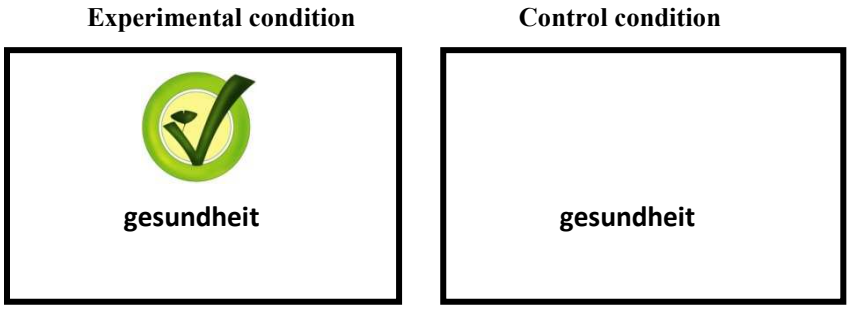


Figure 1. Example of the Lexical Decision Task as used in the experiment

The whole task included 40 words. Twenty of them were existing German words (e.g. Brieftasche (wallet), Verpackung (packaging), Gesundheit (health)) and 20 were non-existing words (e.g. jungsefhei, venklerman, unwelchung). Before the task started, participants in both conditions were given five practice words to get used to the task. The practice words were not used in the actual experiment. All words were written in lower-case letters of similar length and consisted of a similar amount of syllables. The words 'gesund' (healthy) and 'Gesundheit' (health) were used as target words. Both of them were related to the primed health goal and, through this, had to be recognised faster than the other words. Reaction times of each word were saved.

To create a time delay between the experimental manipulation and the following questions, a filler task was presented following the LDT. The filler task consisted of a short text about physics that had to be typewritten without the letter 'e'.

Subsequent to the filler task a list of 20 food products was presented consisting of five products which are generally known as healthy products (salad, tomatoes, apples, grapes and bananas) and five products which are generally known as unhealthy products (chocolate, potato chips, pizza, ice crème, French fries). The rest consisted of other food products to fill up the list (e.g. minced meat, cheese, rice, chicken, pork, milk). Participants were asked to imagine they were shopping in a supermarket and to indicate on a 9-point scale (going from 'not at all' up to 'very much') as to what extent they would like to buy the products on the list.

In the last part of the experiment participants had to complete 25 questions which were chosen from the Food Choice Questionnaire (FQC), developed by Steptoe, Pollard and Wardle (1995). The selected questions measured the dimensions of 'health', 'weight control', 'sensory pleasure', 'convenience' and 'price'. A typical question of the dimension of health was, for example, 'It is important to me that the food I eat on a typical day contains a lot of vitamins and minerals.'. On the basis of the FQC, participants which were holding a health goal (when it comes to eating) could be identified.

Results

Reaction times. First of all for both experimental conditions (with prime logo and without prime logo appearance) it was tested whether there were any significant differences in reaction times between existing words and non-existing words. An independent sample t-test was used with existing/non-existing words as a grouping variable and reaction time as a dependent variable. The results showed a significant difference in reaction time between existing- and non-existing words in the condition without prime logo ($Ms_{existing}$ = 805 and $Ms_{non\text{-}existing}$ = 989), $t(85) = -6.096$, $p < .01$, as well as in the condition with prime logo appearance ($Ms_{existing}$ = 774 and $Ms_{non\text{-}existing}$ = 933), $t(92) = -8.191$, $p < .01$. As can be seen in figure two, in both conditions people recognised the existing words significantly faster than the non-existing words.

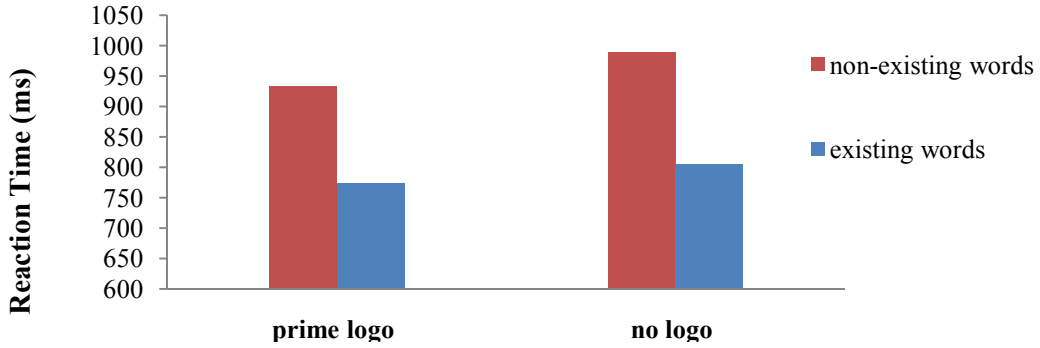


Figure 2. Recognition time for existing en non-existing words separated by prime logo appearance

In order to investigate whether there was a significant difference in reaction times of health-related and unrelated words for both conditions, another independent sample t-test was performed with health-related/unrelated words as a grouping variable and reaction time as a dependent variable. Again, people in the prime logo condition recognised the health related words faster than the unrelated words ($Ms_{Health\text{-}related}$ = 687 and $Ms_{Health\text{-}unrelated}$ = 785), $t(93) = 4.158$, $p < .01$. Likewise, in the condition without prime logo a significant difference in reaction time between health-related and unrelated words were found ($Ms_{Health\text{-}related}$ = 706 and $Ms_{Health\text{-}unrelated}$ = 819), $t(102) = 5.382$, $p < .01$.

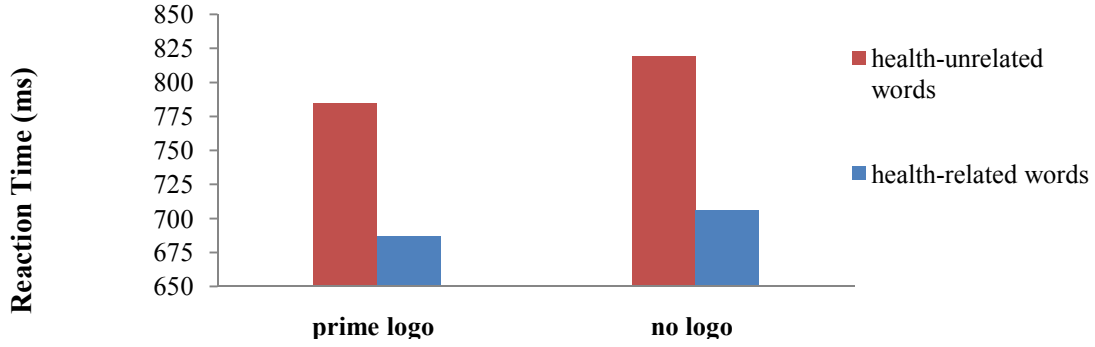


Figure 3. Recognition time for health-related en unrelated separated by prime logo appearance

As expected, participants were able to recognise existing words faster than non-existing words. Furthermore, health-related words could be detected faster than health-unrelated words as well, which was not expected. A possible explanation for the disparity in recognition time could be a difference in the participants' health concerns.

To examine a possible mediation of health concerns on reaction time, participants' mean-score on the dimension of health from the Food Choice Questionnaire was calculated. A median split was conducted to examine participants with a health goal and participants without such a goal. Participants with an average health score above the median (Med_{Health} = 3.4) were grouped as holding a health goal and participants with a lower score on the dimension of health were grouped as holding no such goal.

An independent sample t-test in both conditions revealed in the no-logo–condition that no difference in recognizing health related words among participants with a health-goal and participants without a health-goal could be found, $t(51) = .007$, $p = .99$. Likewise, the difference in recognizing health-unrelated words was not found to be significant, $t(51) = .494$, $p = .62$. By contrast, people with a health goal that were primed by the health logo identified health-related words significantly faster than contestants without a health goal, $t(46) = 2.548$, $p = .01$. No difference in reaction time of health-unrelated words was observed, $t(46) = .968$, $p = .34$.

Thus, only participants with a health goal that were primed with the health logo recognised health-related words significantly faster than their counterparts (see figure 4).

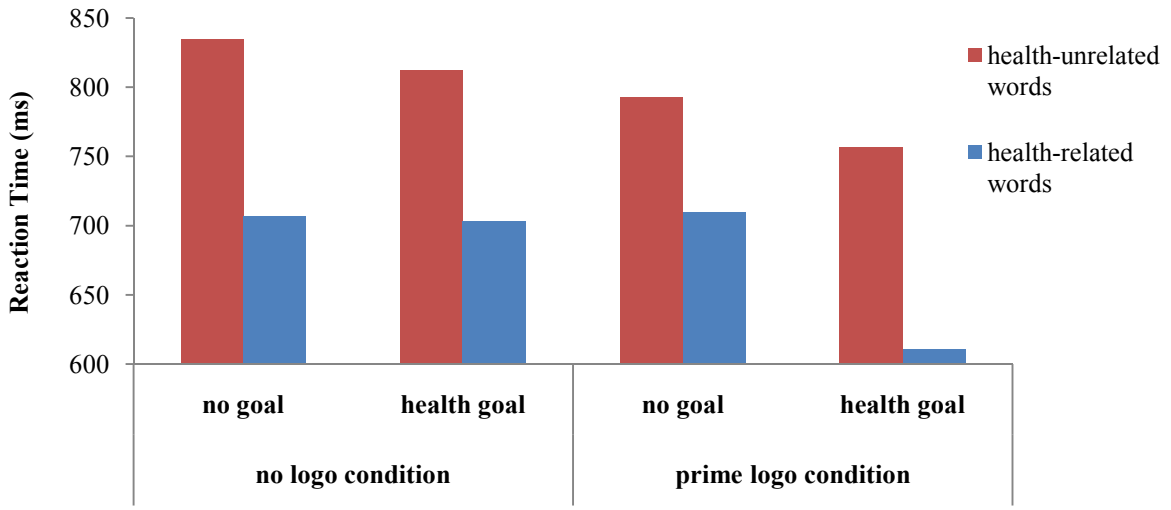


Figure 4. Reaction time of health-related en unrelated words as a function of goal concern and prime appearance

Purchase intention. Several independent sample t-tests were used to investigate a possible influence of logo perception on purchase intention.

First, for each participant the average score of purchase intention of healthy and unhealthy products were estimated and compared. In both conditions a significant difference in purchase intention of healthy and unhealthy products was found ($t(104) = 11.854$, $p < .01$, for the no logo condition; $t(94) = 8.538$, $p < .01$, for the prime logo condition). As indicated by figure five in both experimental conditions, participants preferred healthy products over unhealthy products.

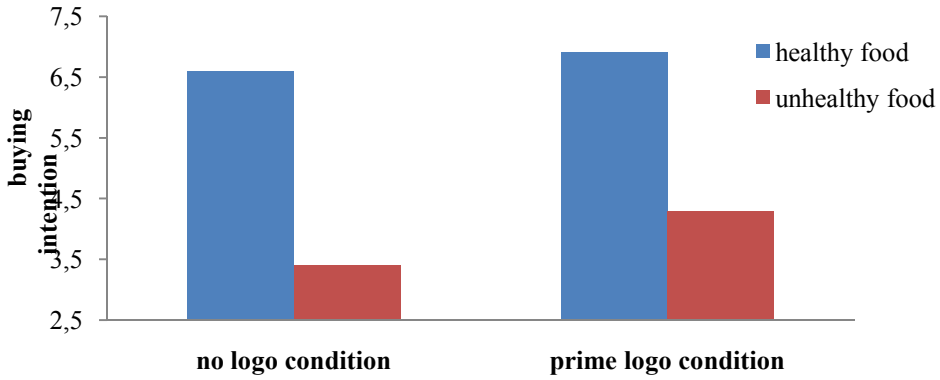


Figure 5. Purchase intention of healthy and unhealthy food products separated by experimental condition

In a next step, the purchase intention of both conditions was compared to find any difference between prime and control group. An ANOVA with experimental condition as an independent variable and purchase intention of unhealthy and healthy products revealed no significant difference in purchase intention of healthy food products for those two groups, $F(1, 99) = 1.395$, $p = .24$. Nevertheless, the purchase intention of unhealthy food products was found to be significant, $F(1, 99) = 7.518$, $p < .01$. Surprisingly, participants in the control condition had a much lower purchase intention for unhealthy products compared to participants in the prime condition.

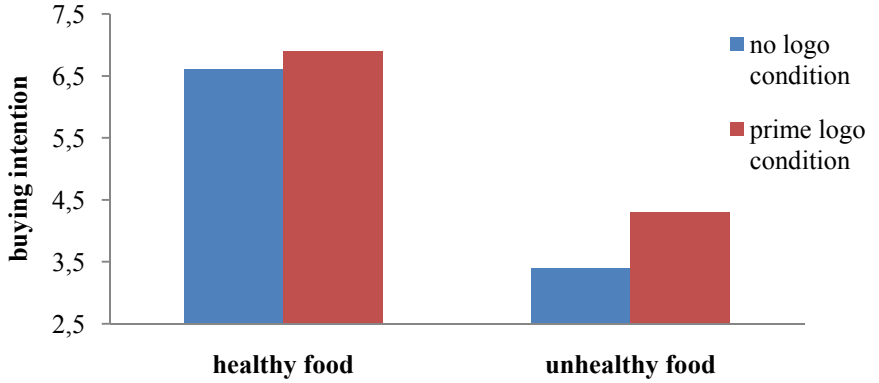


Figure 6. Purchase intention of healthy and unhealthy food products separated by experimental condition

A possible explanation could have been the higher health concerns that participants had in the control condition. In the prime logo condition the average score of all participants on the dimension of 'health' from the FQC was $M_{prime} = 2.82$, SD = .54. Whereas participants in the control condition had a much higher average health-score, $M_{control} = 3.82$, SD = .61. Therefore, the perceived importance of health, or in other words, holding a health goal could have had an influence on the purchase intention. Hence, it was tested whether there was a significant influence by having a health goal on purchase intention.

An ANOVA with health concern as an independent variable and purchase intention as a dependent variable revealed no significant difference in the purchase intention of healthy products, $F(1, 99) = 1.469$, $p = .35$. By contrast, the purchase intention of unhealthy products was found to be significant, $F(1, 99) = 3.957$, $p = .04$. In other words, the perceived importance of health had influenced the purchase intention of unhealthy products. As shown in figure seven, participants with higher health concerns were less likely to buy unhealthy products than their counterparts with lower health concerns.

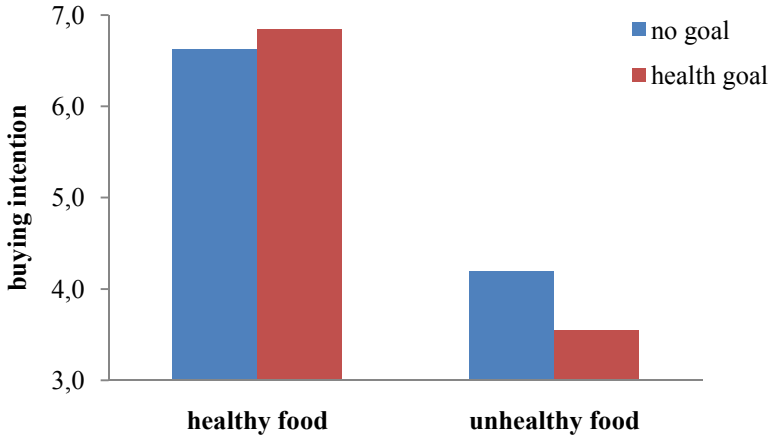


Figure 7. Purchase intention of healthy and unhealthy products in dependence of having a health goal

It was also tested if there were any significant differences in purchase intention among participants with high health concerns that were primed with the health logo and those who were not primed. No significant difference between these two groups could be found, neither for the purchase intention of unhealthy products, $F(1, 53) = 2.843$, $p = .10$, nor for the purchase intention of healthy products, $F(1, 53) = 1.291$, $p = .26$. Thus, showing the prime logo had no influence on participants' purchase intention.

Discussion

The aim of the first study was to test whether a front-of-pack logo is capable of activating an attached goal. It was hypothesized that the health logo will activate people's pre-existing health goal which, then, will guide their attention towards goal-related concepts. Accordingly, it was expected that the activated health goal will speed up the recognition time of health-related target words. By contrast, priming people without such a pre-existing health goal will not affect recognition time of health-related target words. In the control condition no difference in reaction times was expected to be found.

As the present results show, participants in the prime logo condition as well as participants in the control condition recognised health-related words faster than health-unrelated words. These findings were rather unexpected and could have been the result of a general perceptual preference for the words 'gesund' (healthy) and 'Gesundheit' (health). Nevertheless, the results showed that only participants who had a pre-existing health goal reacted to the prime and recognised the health-related target word much faster compared to the other participants. Those results give rise to the assumption that the health logo was able to activate participant's health goal and likewise speeded up participant's perception.

Furthermore, it was assumed that the activated health goal remains active and influences people's perception and behaviour until the goal is fulfilled. That assumption was tested by measuring participant's purchase likelihood of healthy products after a short time delay. However, no such influence could be observed. All participants showed a purchase preference for healthy compared to unhealthy products.

Although, the first study showed that priming people with a front-of-pack logo can influence the perception of those people that have a goal that is connected to the meaning of that logo, it could not prove whether such a logo could also have an influence on the purchase likelihood of products. Thus, the question still remains whether a front-of-pack-logo could also influence people's purchase behaviour.

To investigate that question further, a second experiment was designed in which several products were subliminally primed with a front-of-pack logo. Further, immediately after the priming manipulation participants had to indicate to what extent they would like to buy the primed product.

Study 2: Influencing product attractiveness and purchase intention by presenting a front-of-pack logo as subliminal priming stimulus

One possible way to influence people's consumption behaviour through priming is by activating certain goals. As already mentioned, the goal will guide their intention towards means that are in line with the goal (e.g. Shah & Kruglanski, 2003). This implies that people need to know the right alternatives that are capable of fulfilling the goal, but especially when it comes to the goal of healthy eating the right opportunities are not always that obvious.

Another possibility in influencing consumer behaviour is to prime a mean directly. A recent study conducted by Verwijmeren en colleagues (2010) showed that instead of priming a goal, priming a mean directly influenced participants' choice of that mean. They suggested that activating a goal has no influence on which alternatives people choose to reach the goal.

According to Fishbach, Shah and Kruglanski (2004), a goal can be connected to several different means. The mean that will be perceived as most appropriate to serve goal fulfilment has the greatest chance to be chosen. Fishbach and colleagues further suggest that the positive affect which is associated with the active goal could spread over to means making them also more positive. In that way, a front-of-pack logo could not just activate the goal of eating healthy it could also influence the perception of the primed product as an effective option to reach the goal. The positive affect that is connected with the logo would get over to the product to which the logo is sticked on. That would have a positive influence on peoples' purchase intention and make the choice of the primed product more likely.

That suggests that priming a product directly with a front-of-pack logo will enhance the perception of that product as more attractive and, in that way, will positively influence the purchase intention of that product. According to these theoretical notions it was hypothesized that:

H1: The presence of a familiar health-related front-of-pack logo (as opposed to an unfamiliar logo) activates people's health goal and through this enhances the attractiveness and the purchase intention of that product.

Nevertheless, as previously mentioned, goal priming can only be affective if the primed goal already pre-exists in the persons mind. According to that, only participants with a pre-existing health goal should be influenced by presenting the health logo. Participants without such a goal should be unaffected by the prime logo.

Furthermore, to activate participants' health goal the prime needs to be mentally connected to that goal. Thus, presenting another unknown logo should not have any affect at all.

H2: The health-related front-of-pack logo only enhances the perceived product attractiveness and the purchase intention of people who have a health goal. People without an explicit health goal are not affected.

Method

Participants

One-hundred-twenty-six people from different places in Germany participated in the second study. Sixty-two of all participants were male and 64 were female. Again, they were recruited through an internet link which was posted on the social network site Facebook.

Design

A 3 (condition: health-logo vs. unknown logo vs. no logo) × 2 (eating habits: health-goal vs. no health-goal) design was chosen with logo appearance as an independent variable and product attractiveness and purchase intention as a dependent variable. In order to take part in the study participants selected one of three internet links. In that way, participants were randomly assigned to one of three conditions (with health-logo, with unknown logo or without a logo).

Procedure

The second study was designed as an online experiment as well. An open event was created on Facebook with a short description of the study and three experimental links. Each of the internet links represented one of the three experimental conditions. People were told to choose one link to participate in the study. To make sure that no one who participated in the first study participated in the second study as well, a note on the first page of each link was included with the notion not to take part if one had already participated in another study about consumer behaviour a few weeks ago.

In the beginning of the experiment participants read a short study description in which they were told that a major Dutch food manufacturer is going to bring some of its products to the German market. Therefore, they would like to test different possible product designs.

The participants were not aware that a possible new health-logo, which was already in use in the Netherlands, was to be tested.

The experiment consisted of three parts. In the first part, the health-logo was introduced. The same procedure from study one was used in which participants read a short description of the logo and thereafter had to answer six questions about design aspects and logo appearance. The aim of the first part was to let participants learn the meaning of the logo. The second part included the judgment of the product designs and the actual priming manipulation. To avoid any distraction during the priming manipulation participants were asked to make sure that they are not disturbed by cell phones, radios, television or surrounding people.

Priming Manipulation. Participants were shown 24 different products from eight food categories. The categories were cheese, ketchup, spaghetti, margarine, wine gums, milk, biscuits and muesli (for a list of all products see appendix II). All products from all categories were shown in a random order.

Prior to the product a black cross appeared for 500ms on the computer screen. Participants were told to concentrate on the black cross to avoid that anything disturbs there awareness. The function of the cross was to make sure that all participants looked at the computer screen during the priming manipulation. The cross was followed by a black square (the pre-mask) that was shown for 20ms and replaced by either the prime (the health logo in the first condition or the unknown logo in the second condition) or no prime (in the third condition). The prime was also presented for 20ms. Thereafter, a second black square (the post-mask) appeared on the screen for 20ms. The pre- and post-mask were used to cover the prime. In that way, participants were not able to consciously recognise the appearance of the logos. At the end, a product was shown for 3000ms.

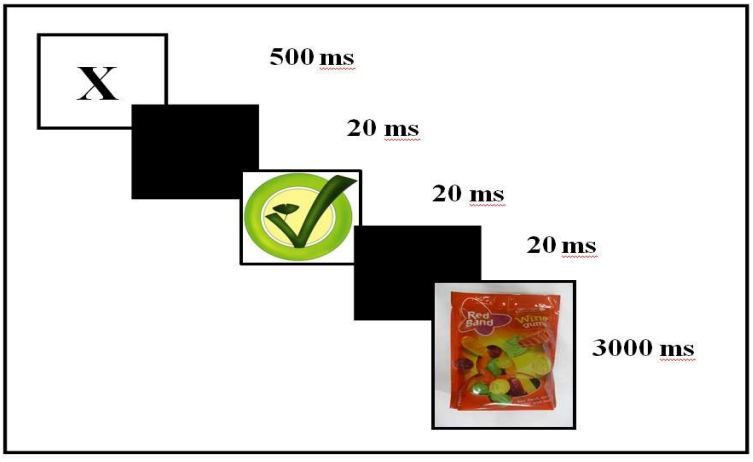


Figure 9: Example of the priming manipulation as used in the experiment

After each product two questions had to be answered. The questions were ‘How attractive is the product design to you?’ and ‘In how far would you like to by that product?’. The first question was asked to measure the product attractiveness whereas with the second question the actual purchase intention was to be investigated. The questions appeared on separate screens one after the other. Participants could indicate their answer on a 9-point scale reaching from ‘very much’ to ‘not at all’.

The third and also last part of the experiment was mentioned to investigate which of the attendants were holding a health goal. Therefore, a list of 25 questions from the Food Choice Questionnaire, which was used in the first study, had to be answered. To make the questioning about food preferences plausible for the participants it was stated that these questions were necessary to investigate whether certain food preferences had influenced the product evaluations.

Results

Perceived product attractiveness. For each participant the average score of perceived product attractiveness of all products were calculated. To identify any significant differences in perceived product attractiveness between the different experimental conditions, an ANOVA was performed with experimental condition as an independent variable and scores of product attractiveness as a dependent variable. The results showed a significant difference in product attractiveness between the three experimental conditions, $F(2, 123) = 3.489$, $p = .03$.

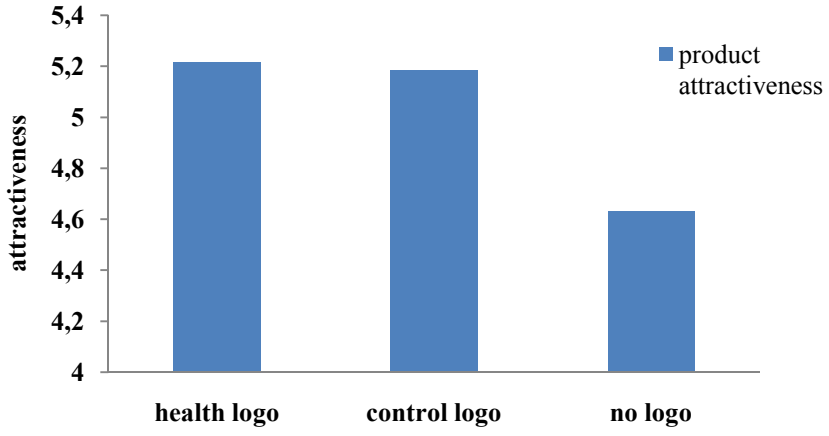


Figure 10. Perceived product attractiveness in dependence of experimental condition

In order to further investigate the origin of this difference, a post hoc test was performed. Although the differences in perceived product attractiveness between the three

experimental conditions was found to be significant the post hoc test revealed a marginal significant difference between the experimental condition with prime logo and the condition without logo (p = .07), and between the condition with the unknown logo and the condition without logo (p = .07). No significant difference between the prime logo condition and the unknown logo condition was found (p = 1.0).

To further test the hypothesis that the prime logo activates a person's health goal and, by that, positively influences the attractiveness of the primed product, the average health score of each participant was calculated. In order to separate participants with and without an explicit health-goal, again, the median of all participants on the dimension of health was used. Participants with an average health score above the median (Med $_{\text{Health}}$ = 3.0) were classified as having a health goal.

For both groups, with and without explicit health goal, another ANOVA was performed to investigate significant differences in product attractiveness between the three different experimental conditions. As expected, no significant differences in attractiveness was found in the group without health goal, $F(2, 52) = .431$, $p = .65$. By contrast, the scores of product attractiveness in the group of participants with a health goal were found to be significantly different, $F(2, 68) = 4.755$, $p = .01$.

According to the post hoc test the prime logo condition did no significantly differ in product attractiveness compared to the control condition without logo (p = .07), or compared to the condition with an unknown logo (p = 1.0). Surprisingly, participants that were subliminal primed by an unknown logo perceived the primed products as more attractive compared to participants that were not primed by logo (p = .02).

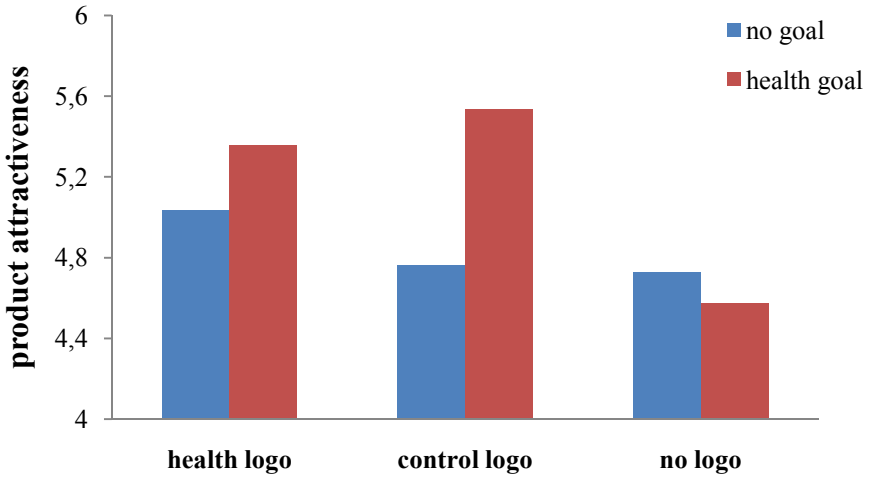


Figure 11. Perceived product attractiveness in each experimental condition in dependence of having a health goal

As can be seen in figure 11, the health logo did not significantly influence the perceived product attractiveness of people with an explicit health goal. By contrast, against the expectations the control logo did positively change the attractiveness of the primed products. Furthermore, even if unexpected, the control logo only had an influence on people that were holding a health goal which suggests that the appearance of the logo must have unconsciously activated that goal.

Purchase Intention. To analyze logo influence on purchase intention first of all for each participant the average purchase score of all products were calculated. After that an ANOVA was performed with experimental condition as an independent variable and purchase intention as a dependent variable. A significant difference in purchase intention between the three experimental conditions was found, $F(2, 123) = 6.319$, $p < .01$.

Subsequently, a post hoc test was performed to further investigate this difference. The post hoc analysis revealed that the purchase intention of participants that were primed by the health logo were significantly higher than the purchase intention of participants that were not primed by a logo ($p < .01$). Likewise, the purchase intention of participants that were primed by an unknown logo were higher compared to the control group without any logo ($p = .02$). No significant difference between the two logo conditions (health vs. unknown logo) could be observed ($p = 1.0$).

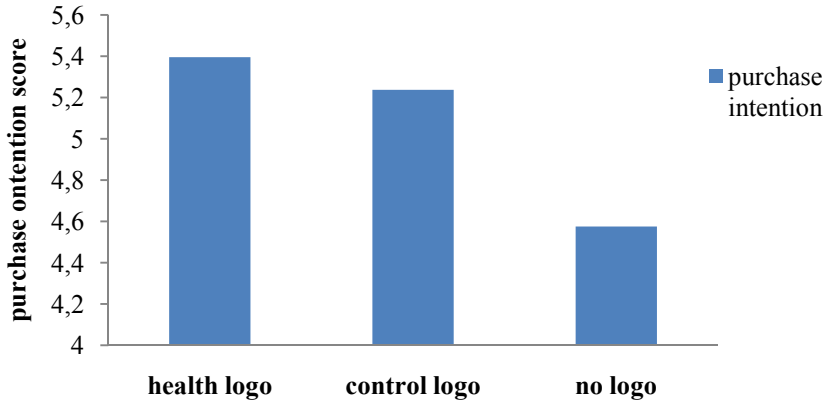


Figure12. Product purchase intention separated by experimental condition

To further test the hypothesis that the health logo influences the purchase intention only of participants with a health goal the purchase intention of people with and without such a goal were analyzed separately. In the group without a health goal no significant difference was observed, $F(2, 52) = 1.569$, $p = .22$. By contrast, in the group with a health goal the difference in purchase intention between the three experimental conditions was found to be significant, $F(2, 68) = 4.979$, $p = .01$.

According to the post hoc analysis, only participants with high health concerns who were also primed by the familiar logo showed a higher purchase intention compared to participants with high health concerns who were not primed (p = .02). Likewise, the unfamiliar logo enhanced the purchase intention of those participants compared to the no logo condition (p = .04).

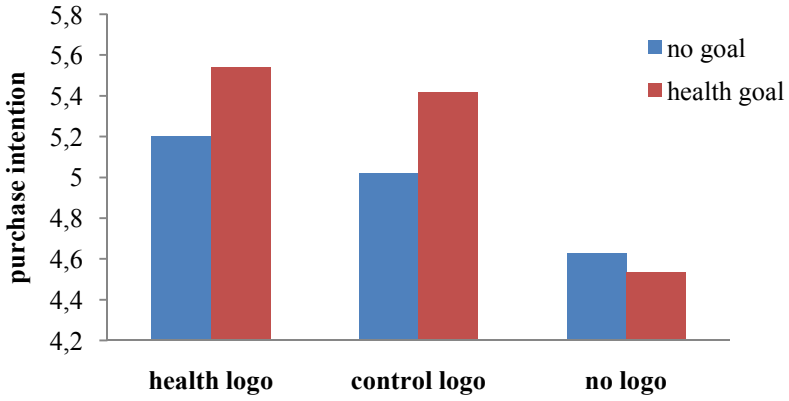


Figure13. Product purchase intention in each experimental condition in dependence of having a health goal

As can be seen in figure 13, although the difference in purchase intention of participants without a health goal was not found to be significant, a tendency of such an influence is observable.

Discussion

The purpose of the second study was to investigate as to what extent it is possible to unconsciously influence people's purchase intention by priming a product with a front-of-pack logo. It was hypothesized that a known health-related logo will activate a pre-existing health goal and through this unconsciously influence the attractiveness and purchase intention of the primed product. It was assumed that the logo has only an influence on participants with a pre-existing health goal. Participants without such a goal were thought to be unaffected. Furthermore, the possibility of influencing people's purchase intention and product attractiveness just by presenting any logo was tested as well. No influence of such an unknown logo was expected to be found.

In the current study an overall effect of prime logo as well as control logo appearance on attractiveness and purchase intention was found. Both logos enhanced perceived product attractiveness and purchase intention of the primed products. Whereas that effect was expected as the result of priming a product by the previously introduced health logo, the fact that the unknown logo produced the same outcome was rather surprising.

Further, it was hypothesized that the health logo will activate a pre-existing health goal and through that only influence participants who were also holding such a goal. That hypothesis could only partly be verified.

As hypothesized, only participants with an actual health goal reacted to the logos and perceived the primed products as more attractive than participants who were not primed by a logo or were not having a health goal. Likewise, they were more likely to buy the primed products compared to their counterparts. However, a further analysis revealed that not just the health logo had a positive influence on participants purchase intention. Both logos, the known health logo and the unknown control logo, affected purchase intention. Furthermore, the introduced health logo did not significantly enhance product attractiveness for participants with a health goal whereas the unknown control logo did.

In summary, against any expectations both logos did positively influence people with a pre-existing health goal. This suggests that both logos were capable of activating a pre-existing health goal and therefore of influencing people's purchase behaviour. Beyond that, only the unknown logo was also able to enhance the attractiveness of the primed products.

General Discussion

The present research was conducted to give more insight in the working and effectiveness of front-of-pack logos. The aim of the study was to test to what extend it would be possible to unconsciously influence product purchase behaviour by presenting a logo. The first experiment was meant to test whether a previously introduced logo is capable of activating people's goal to choose and eat healthy. Therefore, an unknown logo was introduced and associated with the goal of eating healthy.

According to the hypotheses, in the first experiment it was suggested that only people with a health goal will be influenced by presenting the previously introduced logo. Hence, they are able to recognise health-related words faster than people without a health goal or people who were not primed with the logo.

The second experiment was conducted to further investigate whether such a logo is not only able to influence perception but also the purchase behaviour of people. Therefore, participants were subliminal primed by either a health logo, which was introduced in the beginning of the experiment, or an unfamiliar logo that they never saw before. Furthermore, participants in the control condition were not shown any logo at all. According to the theoretical background it was suggested that people with high health concerns would be

influenced by the health logo and, through this, would perceive the primed products as more attractive and have a higher purchase intention compared to participants who were primed by the unfamiliar logo or people in the no-logo condition.

Against the expectations, the results of the first experiment showed, that in general participants reacted faster to the health-related words than to the health-unrelated words. As already mentioned, this could be due to a general attentiveness to health-related words. Different German governmental health campaigns like 'IN FORM' (Bundesministerium für Gesundheit, 2004) on one hand and, on the other hand, a higher demand for organic products as a result of several animal diseases and food contamination over recent years (Reuter, 2002), could have lead to a higher attentiveness to health related concepts.

Another possible explanation for the difference in reaction times in both experimental conditions could be a semantic activation of health-related concepts produced by the logo introduction in the beginning of the experiment.

According to Förster and colleagues (2007), when it comes to priming it is necessary to distinguish between semantic priming and goal priming. Whereas in goal priming the activated goal persists over time, until the goal will be satisfied, in semantic priming the activation of related knowledge structures disappears within seconds (e.g. Dijksterhuis et al., 2007). In both experimental conditions the logo introduction was not immediately followed by the Lexical Decision Task. Thus, any semantic activation evoked by the logo introduction would have disappeared during the time delay. This fact makes semantic activation as a reason for the present findings rather unlikely.

Although, semantic activation can be ruled out as possible reason for the difference in reaction times, there is still the possibility of goal activation. The introduction and explanation of the logo in the beginning of the experiment could also have activated a health goal. If that would have been the case participants in both conditions with a health goal would have had faster reaction times than their counterparts without a health goal. According to the present results, that was not the case. A comparison of both experimental groups showed, that only the participants with a pre-existing health goal who were primed by the logo, were able to recognize the health-related words faster.

Taken together, these assumptions give rise to the assertion that a general attentiveness to health concepts caused the observed general variation in recognition time between health-related and unrelated words. Furthermore, the result that, as hypothesised, only participants with a pre-existing health goal that were primed by the logo recognised the target words much

faster than the other contestants shows that the introduced logo was able to activate the health goal of people.

To further proof that the developed logo was able to influence goal activation it was hypothesized that after a short time delay the goal would be still active and, in that way, would influence choice behaviour. Participants were given a list of products containing typical healthy and unhealthy food options. Although, the results revealed a general preference for healthy products, the prime logo seemed to have no influence on participants' choice behaviour.

Taking into account that the prime was only able to influence reaction times of participants that also had a pre-existing health goal, the question appears why the choice behaviour of those people seemed to be unaffected.

A possible explanation why the prime had no influence on choice behaviour could be a general preference for the more healthy food options. The given choice options were not pre-tested, thus, it is unknown if these products were comparable in preference.

Likewise, the procedure which was used in the first study had a significant difference compared to other priming studies in which participants' choice behaviour was observed. Whereas in other studies the priming manipulation was immediately followed by the observed choice behaviour (e.g. Papies & Hamstra, 2010; Strahan, Spencer et al., 2005; Verwijmeren et al., 2010), that was not the case in the current study. In the current study a filler task was used to create a time delay between showing the prime and product choice. The time delay was actually meant to increase the strength of the activated goal but it cannot be ruled out that the filler task has overridden the previously activated health goal.

Nevertheless, the results of the first study showed that the logo can influence peoples' environmental perception in dependence of goal activation.

The second experiment further revealed that the logo could not just influence participant's perception but also their behaviour. Results showed that only participants with a health goal were more likely to purchase the primed products compared to products that were not primed. By contrast, the result that even an unknown logo can unconsciously influence people's perception and behaviour was rather surprising.

In the priming literature it is stated that any cue that is associated with a certain goal is able to unconsciously activate that goal (e.g. Bargh et al., 2001). However, the control logo that was used in the current study was not previously shown. That would suggest that the logo must have had a certain inner characteristic that introduced an association with the goal of

health. Such an inner characteristic could have been the green-white leaf that was presented in the middle of the logo (see Appendix II).

Likewise, the logo colour or form could have produced an unobserved effect that, in turn, was responsible for the observed purchase likelihood. The colours of the logo could have introduced a positive affect which made the products to appear more attractive. The form could have reminded participants of other common health logos that they already know. Nevertheless, if the positive effect on attractiveness and purchase intention was due to the colour or form of the logo, no difference should have been found for people with and without a health goal.

Another interesting and unexpected discovery was that the previously introduced health logo was not able to influence product attractiveness of people with a health goal but was able to enhance the purchase likelihood of those people. That suggests that activating a goal does not necessary make the primed object or behaviour more attractive in the eyes of the person. Nevertheless, it still makes the person more likely to act on the primed behaviour or choose the primed object. This could be due to the fact that to be attracted to something and to actually choose it, are two different things.

Berridge (1996) already showed that there is a difference in what people want and what they like. According to him liking is an affective process whereas to want something underlies a motivational process. That would suggest that even if the health logo was not effective in affecting the attractiveness of the primed product (liking), it still could have influenced their purchase behaviour (wanting). The logo could have changed the reward value of the primed product. An increase in value would then have led to an increased motivation to purchase the product. In other words, participants who were primed by the health logo did not like the products more but they wanted them more.

Practical Implications and Future Research Issues

The ability of a simple logo to change the value of certain food and to make people to unconsciously want them more, could help to make better food choices. By sticking a logo on more healthy food products it would be possible to influence people's purchase likelihood of these products in the moment of choice. Remember the person in the cafeteria that is standing in the queue and still has to make a decision what to choose for lunch? Imagine that person has to choose between the delicious looking hamburger, which taste he/she loves to enjoy, and a chicken sandwich, which is low in calories and would help that person to maintain

his/her weight and stay healthy. That situation is a typical example of two conflicting goals that are active at the same time. A logo that sticks on the chicken sandwich could be an easy way to solve that goal conflict and would help the person to reach his/her more important goal (e.g. maintaining weight to stay healthy).

The logo is not only able to activate an associated goal (e.g. eat healthy) but also attaches a positive valence to the product. In other words, the logo works in two directions, on one hand as a prime that activates an associated goal and, on the other hand, the logo primes a mean of that goal with positive affect. That combination of bottom-up priming (priming a goal) and top-down priming (priming a mean) makes a logo more effective in influencing choice behaviour.

A recent study conducted by Veltkamp and colleagues (2011) already showed that through affective priming it is possible to promote a specific behaviour which makes people more likely to act on it. The positive value of a prime functions as a reward signal that makes the primed behaviour more desirable and creates the goal to perform that behaviour. However, Veltkamp and colleagues (2011) primed a behavioural concept (top-down priming) instead of a specific mean (bottom-up priming). Anyway, attaching a positive value to a product could have the same effect. Hence, a logo that is positive in its' own right could be able to change the choice behaviour of all people and not just of those ones, that have a certain goal when it comes to eating.

However, the results of the present study showed that not only a familiar logo is able to influence purchase behaviour. More interesting is the result, that even a rather unfamiliar logo can produce the same effect. That provides new opportunities for marketers and the development of effective health campaigns likewise.

It seems not necessary to launch expensive campaigns to teach people the meaning of a new logo. As the present results indicate, including familiar design elements, which are in general associated with the intended meaning of the new logo, would be enough to make the logo effective. That also implies that products with the logo on it would be bought more often. That makes the logo use even more interesting for marketers. Research indicates that the attractive outcomes of using a logo as marketing tool, can even promote healthy food production (Young & Swinburn, 2002). Young and Swinburn (2002) showed that in Australia the amount of salt, used in the food production, significantly decreased since the introduction of the 'Pick-the-Tick' logo.

The current study is one of the first that tried to give more insights in the working and especially in the underlying mechanisms of front-of-pack nutrition logos. However, further research is needed to rule out other interpretations of the present results and to test the theoretical assumptions mentioned above. For example an interesting question would be whether a logo would be still effective when priming a familiar product with a well known brand identity rather than an unfamiliar product. Although, the effect of a more abstract symbol, that is less interpretative should be tested. In this case it could be excluded that just by attaching a logo to a product the product becomes more valuable to a person.

The aim of future research should be to further investigate how front-of-pack logos actually work and in what way they influence consumers. In a world of an ever-increasing number of such logos (e.g. health logos, fair trade logo, ecological logos) it should be seen as necessary to know whether they are actually able to unconsciously influence our behaviour or if they are just a sign.

Appendix I

logo used in study 1

words used in the Lexical Decision Task (in German)

real words:	Gesund	***nonsense words:***	abgahnen
	Abnehmen		bennhock
	Diätplan		erwaschlag
	Verpackung		habfehlter
	Blumentopf		halfgollung
	Gesundheit		jungsefhei
	Buchrand		kallermer
	Flaschen		havezlar
	Hausboot		lehnoor
	Jackentasche		kattkehflem
	Kamera		telloris
	Meerblick		mackruller
	Messbecher		mettbeisung
	Standuhr		pallorwen
	Stehlampe		venklerman
	Stuhlbein		rompelpat
	Taschenbuch		unwelchung
	Wandbild		wieseref
	Natürlich		poolcher
	Brieftasche		zennerban

target words:	Gesund
	Gesundheit

Appendix II

logos used in study 2

prime logo

control logo

products used in study 2

biscuits

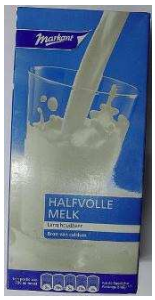
wine gums

cheese

margarine

muesli

milk



ketchup

spaghetti

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