Goal-directed visual attention drives health goal priming: An eye-tracking experiment.

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Running head: Role of attention in goal priming

Abstract

Objective: Several lab and field experiments have shown that goal priming interventions can be highly effective in promoting healthy food choices. Less is known, however, about the mechanisms by which goal priming affects food choice. This experiment tested the hypothesis that goal priming affects food choices through changes in visual attention. Specifically, it was hypothesized that priming with the dieting goal steers attention towards goal-relevant, low energy food products, which in turn increases the likelihood of choosing these products.

Methods: In this eye-tracking experiment, 125 participants chose between high and low energy food products in a realistic online supermarket task while their eye movements were recorded with an eye-tracker. One group was primed with a health and dieting goal, a second group was exposed to a control prime, and a third group was exposed to no prime at all.

Results: The health goal prime increased low energy food choices and decreased high energy food choices. Furthermore, the health goal prime resulted in proportionally longer total dwell times on low energy food products, and this effect mediated the goal priming effect on choices.

Conclusions: The findings suggest that the effect of priming on consumer choice may originate from an increase in attention for prime-congruent items. This study supports the effectiveness of health goal priming interventions in promoting healthy eating and opens up directions for research on other behavioral interventions that steer attention towards healthy foods.

Keywords: goal priming; food choice; visual attention; dietary restraint

Introduction

Globally, overweight and obesity rates continue to rise (Ng et al., 2014). This obesity problem stands in sharp contrast with individuals' intentions, as one of the major self-reported motives for food choices is health (Carrillo, Varela, Salvador, & Fiszman, 2011) and 50-60% of the Western female population has the explicit goal to limit their food intake (Fayet, Petocz, & Samman, 2012; de Ridder, Adriaanse, Evers, & Verkes, 2014; Rideout & Barr, 2009). The rise in overweight and obesity rates is often attributed to the fact that energy-rich foods as well as attractive food cues have become omnipresent in the living environment and continuously tempt us to eat (Harris, Bargh, & Brownell, 2009; Ng, Stice, Yokum, & Bohon, 2011; Swinburn et al., 2011).

Recent research on nonconscious self-regulation suggests that the effects of such temptations in one's environment can be understood through the goals that they activate through priming. Specifically, external cues (e.g., images of attractive food) can increase the mental accessibility of an associated goal (e.g., eating and enjoying tasty food), and motivate behavior to attain it, while at the same time inhibiting competing goals (e.g., dieting; Fishbach, Friedman, & Kruglanski, 2003; Papies & Aarts, 2016; Papies, 2016; Shah, Friedman, & Kruglanski, 2003; Stroebe, Mensink, Aarts, Schut, & Kruglanski, 2008). The effect of priming on behavior is even more pronounced when the primed concept is motivationally relevant, for instance priming with thirst-related words or soft drink brands when thirsty (Karremans, Stroebe, & Claus, 2006; Strahan, Spender, & Zanna, 2002). Across various domains of behavior including, for example, voting behavior and interpersonal interaction, it has been shown that active goals increase liking for goal-related stimuli and shift individuals' preferences towards behaviors that facilitate goal pursuit (Ferguson & Bargh, 2004; Ferguson & Wojnowicz, 2011; Hassin, Ferguson, Shidlovski, & Gross, 2007). While this is typically a highly adaptive mechanism that allows us to navigate complex environments efficiently, it can be problematic in the current living environment, where the abundance of attractive food cues typically triggers these processes in favor of the goal of enjoying good food (Papies, Stroebe, & Aarts, 2007; Stroebe et al., 2008). This may ultimately lead to overeating and to weight gain.

Recent studies, however, have shown that the same priming mechanisms can also be employed as intervention tools to stimulate healthy, instead of unhealthy choices (for a review, see Papies, 2016). Specifically, priming with cues related to the long-term goal of maintaining a healthy weight can promote healthy eating by increasing the mental accessibility of that goal. Applying this principle, a recent set of field experiments has shown that goal priming interventions are highly effective in promoting healthy food choices (Papies & Hamstra, 2010; Papies & Veling, 2013; Papies, Potjes, Keesman, Schwinghammer, & van Koningsbruggen, 2014). For example, Papies and colleagues (2014) found that priming overweight individuals' dieting goal by handing out recipe flyers with diet-related words at the entrance of a supermarket, resulted in a 75% decrease in their snack food purchases.

Although goal priming can be effective, less is known about the mechanisms by which it affects food choice. Here, it is proposed that goal priming affects behavior through an attentional mechanism. Specifically, the increased mental accessibility of the dieting goal caused by the goal prime will steer attention towards goal-congruent products. This increased attention then increases the likelihood of choosing products congruent with the primed goal. Indeed, there is evidence that attentional mechanisms are affected by active goals, irrespective of whether the goal is activated by external or internal (e.g., hunger or thirst) cues (Ferguson et al., 2011; Papies et al., in press ; Xu, Schwarz, & Wyer, Jr., 2015). It has been shown, for example, that goal-congruent objects (e.g., palatable foods or a glass of water) are perceived as larger in size when the relevant goal (e.g., eating enjoyment or drinking) has been activated by priming (van Koningsbruggen, Stroebe, & Aarts, 2011; Veltkamp, Aarts &

Custers, 2008). Also, it has been shown that desires can influence an individual's interpretation of ambiguous stimuli that assign the individual to a favored outcome (Balcetis & Dunning, 2006). Similarly, active goals can hinder performance on other tasks, which suggests attentional distraction from tasks that are unrelated to the goal (Masicampo & Baumeister, 2011a; Masicampo & Baumeister, 2011b).

Less is known, however, about the direct effects of goal priming on the allocation of visual attention, and about the potential mediating role of these processes in actual subsequent goal pursuit. Previously, it has been shown that primes influence attention, typically assessed in indirect ways. For example, when mating motives are primed, men display increased attention and memory for attractive females, and when disease threat is primed, individuals have more attention for disfigured faces (Ackerman et al., 2009; Kenrick, Neuberg, Griskevicius, Becker, & Schaller, 2010). However, the effects of these attentional effects on behavior have not yet been studied. In the domain of health, to date only one study assessed whether a diet prime influences attention for food words (Papies, Stroebe, & Aarts, 2008). However, an indirect measure of attention was used, and again, no measure of food choice behavior was included. In addition, using food words may not yield a valid measure of the visually rich food cues that are encountered in real life (Bruce & Jones, 2004). There is ample evidence, however, that products within a choice set that receive most attention (i.e., that are looked at longest) are more likely to be chosen (Krajbich, Armel, & Rangel, 2010; van der Laan, Hooge, De Ridder, Viergever, & Smeets, 2015). Furthermore, experimentally manipulating looking duration for a specific product within the choice set increases the likelihood that it is chosen (Armel, Beaumel, & Rangel, 2008; Shimojo, Simion, Shimojo, & Scheier, 2003). This suggests that if a prime increases attention for specific products, this could directly affect choice behavior.

Building on these findings, the present work was designed to test the novel hypothesis that increased attention for goal-congruent, healthy foods drives the effects of health goal primes on behavior. Thus, it was hypothesized that priming with a health and dieting goal will lead to goal-congruent effects on visual attention and choice behavior. More specifically, it was hypothesized that health and dieting primes would increase the looking time at low energy foods at the cost of high energy foods and would increase the number of low versus high energy foods chosen. In addition, it was predicted that the effect of the goal prime on choices would be mediated by increased attention for low energy food products. To this end, choices and eye movements were measured while individuals choose between low and high energy food products in a realistic online supermarket task. Since primes are more likely to affect the behavior of individuals when they activate a goal that is relevant to them (Anschutz, Van Strien, & Engels, 2008; Papies et al., 2010). it was hypothesized that the diet prime would affect choice and visual attention more in individuals high in dietary restraint, i.e., individuals that have the goal to restrict energy intake in order to control body weight (Herman & Mack, 1975). By directly examining eye movements as a function of goal priming, and by testing their mediating role for priming effects on behavior, this work can further inform research and theory on nonconscious goal pursuit, as well as interventions to facilitate healthy behavior.

Methods

Participants

One hundred twenty-five participants completed the study. Data from 18 participants were excluded because of technical problems with the eye-tracker/failed calibration (n = 5) or low eye-tracking data quality (n = 13). The final sample consisted of 100 females and 7 males with a mean age of 22.6 years (*SD* = 4.9) and a mean body mass index (BMI) of 21.9 kg/m^2

(*SD* = 2.7). Table 1 presents characteristics of participants in the three study conditions; the conditions did not differ significantly on any of the characteristics. Participants were recruited with posters at the University Medical Center Utrecht, The Netherlands, and the adjacent university campus. Potential participants received a screening questionnaire with questions on food allergies, vegetarianism, eating behaviour (Dutch Eating Behaviour Questionnaire; Van Strien, Frijters, Bergers, & Defares, 1986), and height and weight. Vegetarians, individuals with food allergies, and individuals following a medically prescribed diet, were not invited for participation because they might show altered responses to some of the food stimuli. Participants received course credit or 5 euro for participation. All participants provided written informed consent.

Design

The experiment had a between subjects design with three conditions, namely a health/diet prime condition and two control conditions: a control prime condition and a no prime condition. In the health/diet prime condition, participants were primed during food choice with recipe banners that contained words related to health and dieting. In the control prime condition, the recipe banners contained a control prime unrelated to health. In the no prime condition, food choices were not accompanied by a banner.

Procedure

Participants were instructed to refrain from eating and drinking (except water) for at least two hours, but to have preferably eaten a meal two to three hours before the study session. Upon arrival, participants were seated behind a desktop computer with eye-tracker. They were randomly assigned to one of the study conditions and performed an online supermarket food choice task with health goal primes, control primes or no primes, while their eye movements were recorded. Next, they completed a number of questionnaires. A subgroup (n = 69) rated the expected tastiness, healthiness and energy content of products from the online supermarket choice task on a 9-point scale ranging from 1 = very untasty/very unhealthy/very few calories to 9 = very tasty/very healthy/very many calories[1]. Finally, participants were asked what they thought the aim of the study was and were debriefed.

Online supermarket eye-tracking task

The online supermarket food choice task was designed to resemble an existing Dutch online supermarket. Simulated online grocery store methods have been shown to be effective research tools for investigating food choices (Benn, Webb, Chang, & Reidy, 2015; Heard, Harris, Liu, Schwartz, & Li, 2015; Van Ooijen, Fransen, Verlegh, & Smit, 2016). Participants were instructed to use the interface as if they were grocery shopping for their own consumption for the following two days. Participants were presented with 24 choice screens, each displaying six products to choose from. Of the 24 trials, 18 trials presented meal (e.g., bread, cheese, sauce, meat) and snack food categories, with each of these showing three high energy and three low energy options. The other six trials presented discounted items or special offer trials with three food and three non-food options (results not reported here). In the prime conditions, recipe banners with a health goal prime or control prime were presented on the top of each choice screen. In the no prime condition, no banner was presented. In each trial, participants chose one product. As a dependent variable, the proportion of low energy food choices was calculated in the 18 meal and snack trials for each participant.

Trial structure. The trial structure is depicted in Figure 1. Each trial commenced with the presentation of a fixation cross for 1 or 2 seconds followed by a choice screen. Decision-making was self-paced to ensure naturalistic viewing of the screens (Pieters &

Wedel, 2007). Participants could indicate with the right arrow key when they had made their choice. Subsequently, a response screen with six black rectangles appeared. The locations of the black rectangles corresponded to the locations of the choice screen. The participants indicated their choice by pressing one of the 4-9 keys on the number pad of the keyboard with equivalent location to the product on the screen. Each trial ended with the presentation of a fixation cross; the next trial commenced upon a button press. To familiarize participants with the task, six practice trials preceded the actual task.

Choice options. Products were taken from the website of the existing online supermarket and were well-known products to Dutch consumers. Each product was represented by a name and a picture, see Figure 1. The mean energy content of the high energy products (e.g., croissants, cookies, crisps) was 349 kcal/100 g (*SD* = 181); the mean energy content of low energy products (e.g., whole wheat bread, fruit and snack vegetables) was 183 kcal/100 g (*SD* = 148). The healthiness ratings provided by a subgroup of participants ($n = 69$) confirmed this categorization, with high energy products being rated as significantly lower in healthiness (high energy products $M = 3.3$, $SD = 1.0$; low energy products $M = 5.5$, $SD = 1.6$; $p < 0.01$) and higher in perceived amount of calories (high energy products $M = 6.7$, $SD = 1.0$; low energy products $M = 4.4$, $SD = 1.3$; $p < 0.01$). There was no significant difference in tastiness rating between high and low energy products (high energy products $M = 6.3$, $SD = 1.0$; low energy products $M = 6.1$, $SD = 1.2$; $p = 0.36$).

Goal priming manipulation. Participants in the health goal prime and control prime conditions were presented with recipe banners at the top of each choice screen. Each recipe banner consisted of a text block with the dish title and a selection of the ingredients, a colour image of the dish, and a text block with words either related to the healthiness of the dish (health goal prime condition, e.g., “Healthy”, “Good for your figure”) or words not related to health (control prime condition, e.g., “New recipe”, “Try it out now”). The same prime words as in Papies and colleagues (2014) were used. In addition, the colour blue was used in the recipe banners of the health goal prime condition because this colour has been shown to be associated with healthiness (van der Laan, De Ridder, Viergever, & Smeets, 2012; Gelici-Zeko, Lutters, & ten Klooster, 2012). In total, six banners were presented (i.e., six for the health goal prime condition and six for the control prime condition), of which each was repeated four times to cover all 24 choice screens. Figure 2 depicts an example of a health goal prime banner and control prime banner. In the no prime condition, no banner was presented. This extra control condition without prime was added in case the expected behavioural effect of the health prime on food choice would not replicate. In case that no significant differences in proportion of chosen high energy products were found between the health goal prime and control banner, these conditions could be collapsed to see if the presence of a recipe alone affected food choices or dwell times.

Dietary restraint

The restrained eating scale of the Dutch Eating Behavior Questionnaire (Van Strien et al., 1986) was used to measure dietary restraint levels. The mean level of dietary restraint in the sample was 2.80 (SD = 0.73), which is in the ‘above average’ range for non-obese females, according to the norm tables of the DEBQ. The restraint scale had a good internal consistency in this study sample (Cronbach’s = 0.92).

Apparatus

Eye movements were recorded at 52 Hz with an Easygaze^{TM} Eyetech TM3 eye tracker (Design Interactive, Inc. Oviedo, FL). The choice task was presented with Matlab (MathWorks) on a monitor with screen resolution 1280 x 1024 pixels. Participants were seated at 58 cm distance away from the monitor and placed their chin on a chin rest during the recording.

Fixation detection was established by marking fixations with an adaptive velocity threshold method (Hooge & Camps, 2013), with 58 ms as (default) lower cut-off for a single fixation duration (in line with Toffolo, Van den Hout, Hooge, Engelhard, & Cath, 2013; van der Laan et al., 2015).

Eye-tracking measures

Eye-tracking data from the choice screen presentations was used to assess the effect of the prime on attention. Each choice screen was divided into three areas of interest (AOI), namely ‘high energy products’, ‘low energy products’, and the ‘banner’. The total dwell time was calculated for each AOI. For each participant, the proportion mean total dwell time on low energy foods was calculated by dividing the mean total dwell time on low energy foods by the sum of the mean total dwell times on low and high energy foods in the meal and snack trials.

Data analysis

The statistical program R was used to conduct statistical analyses (R Development Core Team, 2007). To test for differences in food choice and attention between the health prime condition and the control conditions, independent samples t-tests were conducted. Mediation was tested by using bootstrapping as implemented in the R *mediation* package for causal mediation analysis. ANCOVAs were conducted to investigate whether the effects of the prime condition were moderated by dietary restraint.

Results

Effect of health goal prime on food choices

Independent-samples t-tests were conducted to compare the proportion of low energy food choices in the health prime banner and the control conditions (Figure 3a). As hypothesized, the proportion of low energy food choices was significantly higher in the health prime (*M* = 0.67, *SD* = 0.20) compared to the control prime (*M* = 0.56, *SD* = 0.22) condition; *t*(64)= -2.17, *p* = .033. The proportion of low energy food choices was also significantly higher in the health prime compared to the no prime (*M* = 0.57, *SD* = 0.20) condition; *t*(73)= 2.13, *p* = .036.

Effect of health goal prime on visual attention during food choices

Mean total dwell times on high and low energy food products are shown in Table 2. Independent-samples t-tests were conducted to compare the proportion of mean total dwell time on low energy foods in the health prime and the control conditions (Figure 3b). As predicted, the proportion of mean total dwell time on low energy foods was significantly higher in the health prime (*M* = 0.55, *SD* = 0.06) compared to the control prime (*M* = 0.53, *SD* = 0.05) condition; *t*(64)= -2.07, *p* = .042. The proportion of mean total dwell time on low energy foods was marginally significantly higher in the health prime compared to the no prime (*M* = 0.53, *SD* = 0.05) condition; *t*(73)= 1.91, *p* = .060.

Together, these findings show that participants in the health prime condition looked more at healthy items and made healthier choices than participants in the control conditions.

Mediation analysis

To test whether the effect of prime (health versus control prime) on food choice was mediated by attention, a mediation analysis was performed. As Figure 4 illustrates, the standardized regression coefficient between prime (health prime versus control prime) and the proportion of mean total dwell time on low energy foods was statistically significant, as was the standardized regression coefficient between the proportion of mean total dwell time on low energy foods and the proportion of low energy food choices. The standardized indirect effect was (0.03)(3.17) = 0.10. The significance of this indirect effect was tested using bootstrapping procedures. Unstandardized indirect effects were computed for each of 10,000 bootstrapped samples, and the 95% confidence interval was computed by determining the indirect effects at the 2.5th and 97.5th percentiles. The bootstrapped unstandardized indirect effect was 0.09, and the 95% confidence interval ranged from 5.8×10^{-3} to 0.17 (p = .03). Thus, the effect of the health goal prime on the proportion of low energy food choices was mediated by attention for low energy food products.

Potential moderation by dietary restraint

Dietary restraint was positively correlated with the proportion of low energy food choices (r = .46, p < .001) and the proportion of mean total dwell time on low energy foods (r = .38, p < .001).

To investigate whether the effects of the prime condition were moderated by dietary restraint, two separate ANCOVAs were conducted with proportion of chosen high energy foods or the proportion of dwell time on high energy foods as dependent variable, and condition (health prime banner or control prime banner), dietary restraint and an interaction term for Condition × Dietary Restraint as predictors. There was no significant interaction between condition and dietary restraint score for the model explaining the proportion of high energy food choices (p =.87) or the model explaining the proportion of dwell time on high energy foods (p = .59). Thus, the effects of the health prime were similar for participants high and low in dietary restraint.

Attention for the health goal prime and control prime banners

Mean total dwell time on the banner was 380 ms (*SD* = 445 ms). Independent-samples t-tests were conducted to compare the mean total dwell time on the banner in the health prime banner and the control prime banner conditions. The proportion of mean total dwell time on the banner was significantly higher in the health prime (*M* = 496, *SD* = 531) compared to the control prime (*M* = 256, *SD* = 292) condition; $t(64) = -2.26$, $p = .028$.

Discussion

This is the first study that investigated visual attention as a crucial process through which health goal priming influences behaviour. In line with earlier studies, health goal primes were effective in promoting low energy food choices. Furthermore, health goal primes resulted in proportionally longer total dwell times on low energy food products, and this effect mediated the goal priming effect on choices. These findings are important for better understanding the mechanisms through which the increased mental accessibility of goals that results from goal priming actually influences behaviour. The current findings support the idea that the behavioural effect of priming is driven by an increase in attention for prime-congruent items, and as such has implications for our understanding of nonconscious self-regulation and for designing effective interventions to facilitate health behaviour.

Recent research on the mechanisms leading to unhealthy eating has suggested that exposure to environmental cues that activate the eating enjoyment goal can trigger an attentional bias for palatable high energy foods (Papies et al., 2008). In addition, this attention bias for palatable high energy foods is at the expense of the conflicting long-term goal (Papies et al., 2007; Stroebe et al., 2008). Once an attentional bias for palatable food has been initiated, this will continue to activate the eating enjoyment goal, which in turn will maintain the attentional bias for palatable unhealthy foods (Papies et al., 2008). Thus, it becomes increasingly difficult to direct attention away from palatable unhealthy foods. Importantly, the results of the current study suggest that this vicious circle can be broken exposing people to reminders of their long term health goals, and that such reminders work through visual attention for goal-congruent information. Specifically, by priming with the concept of dieting, the diet goal is activated, and attention is steered towards low energy food products, which are congruent with the pursuit of that goal.

The question remains how exactly increased visual attention for goal-congruent foods increases their choice. One possible mechanism through which increased dwell time on certain stimuli might influence choice is by enhancing the influence of fixated information (Orquin & Mueller, 2013). Thus, increasing attention on goal-congruent items enhances the importance of attributes of low energy products, such as the taste and long term health effects of eating the food, which are typically less salient (Papies, 2013). Armel and colleagues (2008) showed that when fixation duration on initially liked products was experimentally increased, subjects were more likely to choose the product, while the opposite effect was found when fixation duration was increased for initially aversive items. Hence, increasing attention for an item appears to amplify the effect of existing preference during decision-making. This way, health goal primes that steer attention towards congruent alternatives might influence choice by amplifying the effect of the initial preference. In other words, the initial preference of the item for which attention is increased becomes relatively more important, and when this item is liked it is then more likely to be chosen. However, when this item is initially not liked, it becomes less likely to be chosen. This suggests that a boundary condition for the intervention to be effective in stimulating healthy choices might be that the goal-congruent products are already initially liked to a certain extent. This is an important topic for future research.

In contrast to earlier studies which found that the effect of health goal primes was stronger or only present in subgroups for which the goal is particularly relevant (e.g., individuals high in dietary restraint, overweight and obese individuals) the present study found a similar effect of the prime in the whole sample, independent of dietary restraint. A possible explanation for this is that the current study population consisted primarily of young females, who are generally more concerned with their weight (de Ridder et al., 2014) and thus generally found the primed goal personally relevant. This was also evident in the relatively high restraint scores found in the study population of the current study.

The current findings suggest that interventions that steer attention towards healthy alternatives are particularly promising for promoting healthy eating. This approach parallels the finding of Van Dillen and colleagues (2013), who showed that diverting attention away from attractive stimuli facilitated self-control. Specifically, it was found that a concurrent demanding task decreased attention (as indicated by reaction times in a categorisation task) to palatable foods and increased healthy food choices. In addition, our findings are in line with attentional re-training interventions that teach participants to shift attention towards healthy items, at the cost of unhealthy items, and have been found to result in healthier choices (see for example Kemps et al., 2014; Schoenmakers et al., 2010). A potentially fruitful direction for future research is to assess the effectiveness of combined interventions, i.e., that both steer attention towards healthy options and distract attention away from unhealthy foods, for stimulating healthy eating. Indeed, our findings further suggest that goal priming interventions may mostly be effective if goal-congruent choices are easily available (see Papies, 2016).

A practical implication of the current study is that online supermarkets appear to be a place where consumers' choices can be effectively steered into the "right" direction. This is important because online grocery shopping is rapidly becoming more popular in Western

European countries: in the Netherlands, for example, money spent on online grocery shopping increased with 34% from 2014 to 2015 (Thuij, 2015). In the U.K., approximately 20% of households buy groceries online every month (Ranking, 2013). Considering that grocery shopping affects the eating behavior of several people over several days, and the largest household budget for food is spent at the supermarket, online supermarkets are a particularly relevant setting for implementing interventions for healthy eating.

A limitation of the study is that the study population was fairly homogeneous and consisted primarily of female students. Future research is needed to confirm the effect in more varied populations with regard to age, gender, and educational levels. To increase the realism of the online supermarket task, the study stimuli consisted of existing products that are well-known for Dutch consumers. A potential drawback of using existing products is that participants might be inclined to choose the products they purchase habitually. Similarly, brand loyalty might have influenced the choices. Since an effect of the goal prime was found despite these potential influences, it seems that brand loyalty or the presence of known products did not overrule the effect of the goal prime in this study. A further potential limitation may be that a chin-rest was used to increase the quality of the eye-tracking data. The chin-rest improves eye-tracking data quality in two ways. Firstly, it enables placing the eyes in the centre of the headbox of the eye tracker. Secondly, by preventing head movements, the chance that the eye tracker makes tracking errors is reduced significantly. Importantly, the chin-rest did not limit participants' ability to see objects on the screen. The borders of the screen could be easily and comfortably fixated without head movements. To the best of the authors' knowledge, there are no reports on effects of chin-rests on human scanning behavior on medium-sized screens like the one used in the present study (32° x 26°).

In conclusion, this study showed that health goal primes increase attention for goal-congruent items and increase the likelihood of choosing them. This suggests that the effect of goal priming on consumer choice may be driven by an increase in attention for goal-congruent items.

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Content footnotes

[1] Only a subgroup of participants rated the images on these dimensions as it was decided to assess these variables only after data collection had begun.

Tables

Table 1

Characteristics (mean (SD)) of study population

Characteristic	Health prime (n = 34)	Control prime (n = 32)	No banner (n = 41)	Difference between conditions
Age (years)	22.1 (2.8)	23.7 (7.2)	22.1 (3.8)	$F(2,104) = 1.23$, $p = .30$
BMI (kg/m^2)	21.8 (2.6)	22.7 (2.7)	21.5 (2.9)	$F(2,104) = 1.84$, $p = .17$
% female	87.5	97.1	95.1	*Chi-square*(2), $p = .25$
Dietary restraint	2.8 (0.8)	2.9 (0.7)	2.7 (0.8)	$F(2,104) = 0.48$ $p = .62$

Table 2

Mean (SD) proportion of low energy foods chosen, proportion mean total dwell time on low energy foods and mean total dwell time on high and low energy foods in the three conditions of the experiment.

Outcome measure	Health prime banner	Control prime banner	No banner
Proportion low energy foods chosen	0.67 (0.20)	0.56 (0.22)	0.57 (0.20)
Proportion mean total dwell time on low energy foods[b]	0.55 (0.06)	0.53 (0.05)	0.53 (0.05)
Mean total dwell time on high energy foods (ms)	3275 (1159)	3238 (1393)	3124 (1081)
Mean total dwell time on low energy foods (ms)	4100 (1458)	3632 (1613)	3579 (1395)

[a] The proportion of chosen low energy foods is calculated for each subject by dividing the number of low energy foods choices by the sum of high and low energy food choices.

[b] The proportion mean total dwell time on low energy foods is calculated for each subject by dividing the mean total dwell time on low energy foods by the sum of the mean total dwell times on high and low energy foods.

Figures

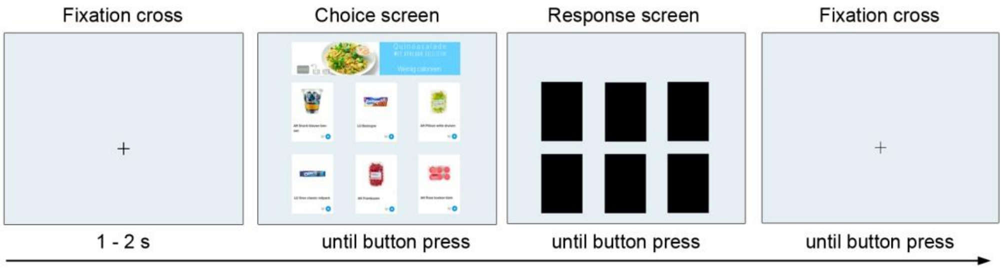

Figure 1. Online supermarket food choice task: trial structure

Figure 2. Example of a health goal prime banner (top) and a control prime banner (bottom).

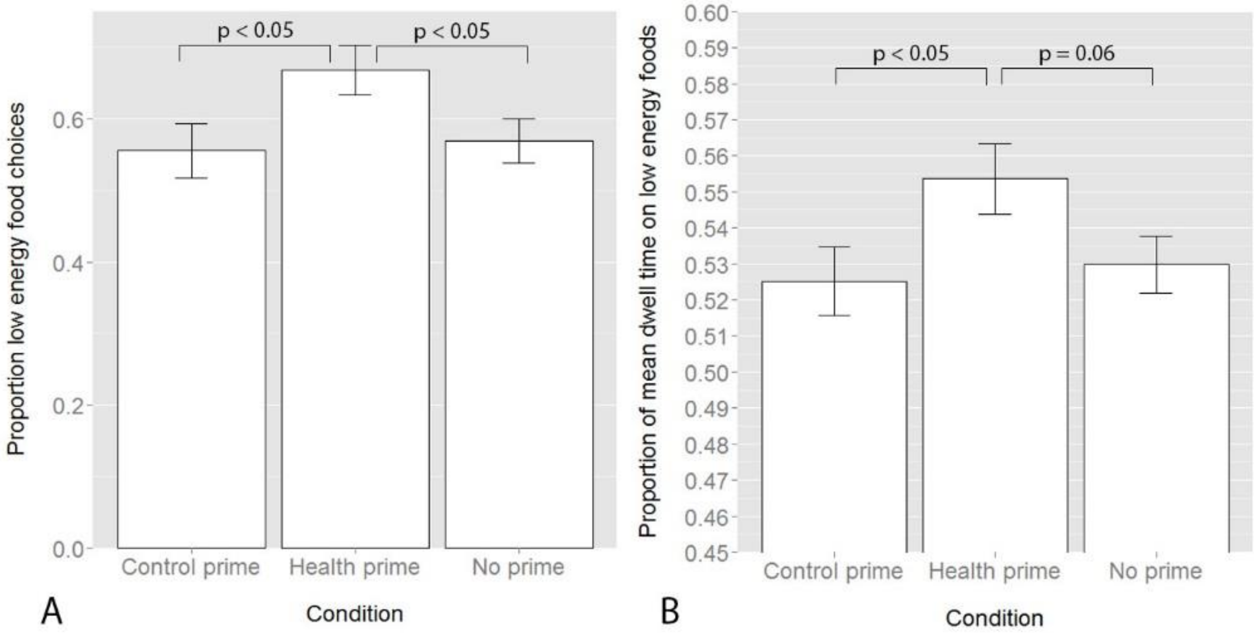

Figure 3. Mean proportion of chosen low energy products (A) and proportion of mean total dwell time on low energy products (B).

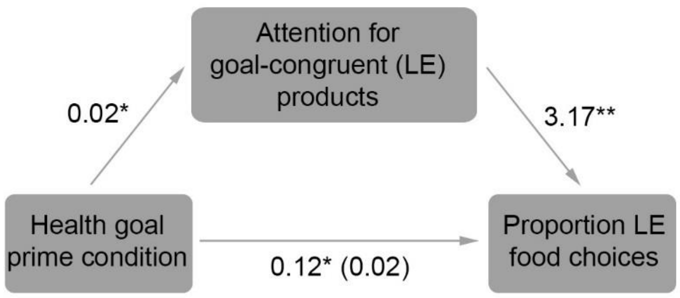

Figure 4. Standardized regression coefficients for the relationship between health goal prime condition and the proportion of low energy food choices as mediated by the proportion of mean total dwell time on low energy products. The standardized regression coefficient between health goal prime condition and the proportion of low energy food choices, controlling for the proportion of mean total dwell time on low energy products, is in parenthesis. * $p < .05$, ** $p < .001$