



Signalling product healthiness through symbolic package cues: Effects of package shape and goal congruence on consumer behaviour



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ABSTRACT

Three studies show that product packaging shape serves as a cue that communicates healthiness of food products. Inspired by embodiment accounts, we show that packaging that simulates a slim body shape acts as a symbolic cue for product healthiness (e.g., low in calories), as opposed to packaging that simulates a wide body shape. Furthermore, we show that the effect of slim package shape on consumer behaviour is goal dependent. Whereas simulation of a slim (vs. wide) body shape increases choice likelihood and product attitude when consumers have a health-relevant shopping goal, packaging shape does not affect these outcomes when consumers have a hedonic shopping goal. In Study 3, we adopt a realistic shopping paradigm using a shelf with authentic products, and find that a slim (as opposed to wide) package shape increases on-shelf product recognition and increases product attitude for healthy products. We discuss results and implications regarding product positioning and the packaging design process.

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1. Introduction

As approximately 60 per cent of adults in Western industrialized countries are classified as being overweight (WHO, 2016), the demand for healthier food has increased. This is reflected in the growing market share of food that is considered as “healthier” or “functional”, such as food with added nutrients, or food that contains less sugar or fat (Colby, Johnson, Scheett, & Hoverson, 2010; Siró, Kápolna, Kápolna, & Lugasi, 2008). Moreover, food policy authorities and NGO's are looking for ways to stimulate consumers to eat less and healthier, for instance by communicating nutrition information such as health claims, logos, or nutrition facts labels (FDA, 2016). A number of experimental studies suggest that these types of explicit information positively affect healthiness inferences (e.g., Andrews, Netemeyer, & Burton, 1998; Hersey, Wohlgenant, Arsenault, Kosa, & Muth, 2013; Lee, Shimizu, Kniffin, & Wansink, 2013; Liem, Aydin, & Zandstra, 2012; Verbeke, Scholderer, & Lähteenmäki, 2009) and consumption behaviour (e.g., Belei,

Geyskens, Goukens, Ramanathan, & Lemmink, 2012). In spite of the recent attention to more implicit means of communication (Becker, van Rompay, Schifferstein, & Galetzka, 2011; Spence, 2012; van Rompay, Fransen & Borgelink, 2014), there has been limited attention to more implicit means of communicating the healthiness of foods. This is unfortunate, because implicit communication may serve as a useful tool to communicate healthiness, or to enhance or complement such explicit healthiness communication, which could be helpful in situations where consumers lack the motivation and/or ability to process explicit claims (cf., Keller et al., 1997; Van Ooijen, Fransen, Verlegh, & Smit, 2016). This is a common situation in busy and cluttered supermarkets with large assortments where distracted consumers are buying their food (See also Newman, Howlett, & Burton, 2015). In addition, when consumers do scrutinize explicit information, explicit claims may induce reactance or other types of resistance to persuasion, which reduces their effectiveness (Brehm, 1966; Darke & Ritchie, 2007; Fransen, Verlegh, Kirmani, & Smit, 2015; Friestad & Wright, 1994).

In this paper we study the use of packaging design as a means to implicitly communicate product healthiness. Although the present research focuses on packaging as an implicit cue, it should be noted that implicit cues should not be seen as a replacement of explicit communication on packaging, via text and logos. Rather, implicit

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communication should be seen as a supplement to more explicit messages. As a first step, however, the present work studies the effect of implicit cues for healthiness in isolation, to get an impression of its possible effects.

In this study we argue that packaging can symbolically signal healthiness of products by mimicking the shape of a healthy body. Specifically, we argue that packaging shape can implicitly communicate healthiness by simulating a slim vs. wide body shape. In this way, slim (versus wide) packaging can nudge consumers who are looking for healthy foods toward these options. Importantly, we propose that the effect of simulating body shape on these consumer outcomes is goal dependent (c.f., [Bargh, 1989](#)), because the communicated healthiness attribute would be (most) relevant to consumers who are looking to buy healthy foods.

We report three studies in which we investigate the effect of packaging shape on healthiness perception and evaluative outcomes under different (i.e., relevant and irrelevant) consumption goal conditions. The contribution of this work is to demonstrate that 1) a slim packaging shape serves as a symbolic cue for healthiness and increases healthiness perception of the product, 2) it makes healthy food products more appealing, and 3) it serves as a cue that makes it easier to find healthy food products on the shelf. Importantly, 4) we show that the effects of packaging shape on product attitude, choice, and on-shelf product recognition are goal dependent. Specifically, we demonstrate the effectiveness of packaging shape to increase consumer evaluations when consumers have a health-focused shopping goal, while not affecting behaviour when consumers have a hedonic shopping goal. Furthermore, 5) we contribute to existing literature by demonstrating the effect of slim packaging design in a realistic retail context, hereby enhancing the external validity of the investigated mechanism.

2. Theoretical framework and hypotheses

Healthiness is strongly associated with body shape. There are several ways in which healthiness can be quantified based on spatial bodily characteristics. For instance, restricted by certain boundaries, a lower ratio between body circumference and length is associated with greater health ([Bergman et al., 2011](#)). Also, a lower waist-to-hip ratio is associated with greater (perceived) health in women ([Singh, 1993, 2002](#)) and in men ([Welborn, Dhaliwal, & Bennett, 2003](#)). Moreover, it has been demonstrated that individuals are *perceived* to be thinner when they are portrayed as eating healthy meals compared to unhealthy meals – even in the lbpresence of the same height and weight information ([Bock & Kanarek, 1995](#); [Stein & Nemeroff, 1995](#)). Studies conducted among nine year old children indicate that these negative associations between increased body size and healthiness already develop relatively early in childhood (e.g., [Hill & Silver, 1995](#)).

Recent theories on embodiment ([Barsalou, 2008](#); [Lakoff & Johnson, 1999](#)) argue that associations between concrete sensory information and abstract concepts affect inferences in related domains. For instance, the association between (body) size and healthiness may metaphorically spill over to packaging, such that a slimmer packaging may induce higher healthiness inferences. The use of a phrase such as *fitness* (i.e., *being healthy, but also 'fitting' in something*) reflects the existence of such a metaphoric relation. Therefore, based on embodiment accounts, we propose that healthiness may also be interpreted in terms of shape in other contexts, such as product packaging. Specifically, we argue that package shape communicates healthiness by simulating a healthy vs. unhealthy body shape, so that the width-to-height ratio of a package is an implicit signal of the extent to which the food is healthy. Hence, we predict.

H1: Products with a long, slim package shape (a) evoke increased perceptions of healthiness and (b) are expected to contain a lower amount of calories than products with a wide, short package shape.

2.1. The role of goal relevance

Goal dependent effects. We propose that packaging shape is a symbolic cue for healthiness. Similar to general multi-attribute type of models, which predict that the impact of a certain belief increase with the extent to which it is relevant (“important”) in a certain context, we propose that such cues will only impact consumer evaluation and choice if they are relevant to the consumer in a particular context. In other words, even if products with a slim package shape are perceived as healthier, they would only be preferred if consumers attach relevance to product healthiness.

This notion is consistent with literature on the activation of (automatic) processes, which suggests that their impact is moderated by motivations and goals. For instance, according to [Bargh \(1989\)](#), unintended automaticity can be goal dependent and often only emerges when the cue is goal relevant ([Irmak, Vallen, & Robinson, 2011](#); [Macrae, Bodenhausen, Milne, Thorn, & Castelli, 1997](#); [Niedenthal, Winkielman, Mondillon, & Vermeulen, 2009](#)). [Karremans, Stroebe, and Claus \(2006\)](#) for example found that a very short– subliminal – presentation of soda brand cues only affected participants' consumption behaviour when they were thirsty (i.e., a drinking-goal was activated). Although packaging shape is not a cue that is often perceived subliminally, we believe that, because of the unobtrusive, implicit nature of this cue, it will render similar results as for subliminal priming (see also [Chartrand, 2005](#)). We therefore propose that consumers are only responsive to symbolic cues that are associated with healthiness when these cues are relevant for the consumer's shopping goal: That is, health-related cues like a long shaped package may be used as a cue to evaluate the qualities of a product when consumers have a relevant, health goal (i.e., focused more on functional, necessary characteristics), but not when they have an irrelevant, hedonic goal (i.e., focused on the pursuit of (short-term) sensory pleasure, cf. [Belei et al., 2012](#); [Chernev, 2004](#)).

H2: A slim package shape (vs. a wide package shape) increases product attitude and choice for consumers who have a healthiness goal, but not for consumers who have a hedonic goal.

2.1.1. Goal directed behaviour

2.1.1.1. The role of attention. If package shape would function as a symbolic cue for healthiness, products with a slim shape should help to identify healthy products. Indeed, it has been demonstrated that salient visual information only directs attention when its characteristics match an active task, and not when they are task irrelevant ([Folk, Remington, & Johnston, 1992](#)). Goal-dependency effects also occur when the visual cue is symbolic. For instance, [Eimer \(1997\)](#) found that participants automatically use relevant symbolic cues (i.e., arrows) to identify the position of a target object, even if these cues turn out to be misleading. Furthermore, as demonstrated with spatial cueing paradigms in psychology, the goal to detect a specific stimulus results in an attention focus on the characteristics that are associated with this stimulus, even if these characteristics are present in unrelated stimuli ([Folk et al., 1992](#); [Vogt, De Houwer, & Moors, 2015](#)). These results demonstrate that an attention focus on goal relevant stimuli occurs automatically and without intention. Until now however, knowledge on the interaction between goal directed behaviour and attention to symbolic visual cues in a retail context is lacking. Especially in a retail environment it is possible that package cue perception is being interfered by contextual cues such as packaging attributes or other

products and brands – while this is not the case for, for instance, a spatial cueing paradigm (Folk et al., 1992). We therefore test this notion and propose that products with a slim package shape are more likely to grab the attention of consumers who are looking for healthy foods:

H3: A slim (vs. wide) package shape increases on-shelf recognition of foods, but only if these foods are related to the goal of healthier eating, and not if they are related to unrelated goals (e.g., hedonic goals).

2.2. Overview of studies

Study 1 serves as a pre-test, in which we explore how different variations of packaging shape (i.e., width-to-height ratio and hourglass shape) alter perception of a product's healthiness. In study 2, we test our first two hypotheses, showing that consumers have different healthiness associations with a brand when its packaging simulates a slim opposed to a wide body shape (H1). In addition, we show that packaging shape affects evaluative outcomes (i.e., product attitude and choice) only when the shopping goal is relevant for the shape cue. That is, we demonstrate that slim package shape increases product evaluations when consumers adopt a healthiness goal, but does not affect evaluations when consumers have a hedonic goal (H2). In Study 3, we enhance the practical relevance of our research and replicate results from Study 2 with a larger, authentic product set in a realistic shopping environment. In addition, Study 3 demonstrates that a slim package shape increases on-shelf product recognition for products advertised as healthy (H3).

3. Study 1: pre-test

3.1. Participants

Thirty-seven student participants (66% female, Mean Age = 22.66) were recruited via the Faculty of Social Sciences, and filled in the questionnaire. Participants received a financial compensation or a partial course-fulfilment for their participation afterwards.

3.2. Design

Study 1 is a pre-test, designed to examine the extent to which different types of packaging shape affects perceptions of the concept healthiness.¹ Furthermore, in view of the associations between product healthiness and tastiness that have been found in the past (e.g., Liem et al., 2012; Raghunathan, Naylor, & Hoyer, 2006), we tested the possibility that packaging shape also affected expected tastiness. In order to test this, we adopted a 1-factor repeated measures design with shape (slim, medium, wide) as within subjects factor, and product category (drink yoghurt, salad dressing) and shape cue (width-to-height ratio, hourglass) as within subject replicator factors.

3.3. Stimuli and procedure

Participants were presented with bottles for drink yoghurt and salad dressing that were designed Using Adobe Photoshop CS6 (Fig. 1). Width-to-height ratio was manipulated by increasing a typical bottle (medium condition) with 10% in width and

decreasing it with 15% in height (wide condition), or the other way around (slim condition). In the hourglass conditions, shape was manipulated by altering the ratio between the width of the bottom and the width of the middle of the bottle to 0.7 (slim), 0.8 (medium), or 0.9 (wide condition). To indicate that all bottles contained the same amount of product, we placed a clear volume indication on the right bottom of the bottles (350 ml).

We instructed participants “We would like to know to what extent you associate certain product properties with different kinds of product packages. The focus is on your intuitive, primary response and not on your rational thoughts”. For both product categories, participants were presented with the range of product bottles (slim, medium and wide) in the middle of the screen, and indicated on two items that assessed on seven-point scales (a) whether they felt that the packaging communicated a low amount of fat per millilitre (1) to a high amount of fat per millilitre product (7), and (b) whether the product had little flavour (1) to much flavour (7). For each shape variant, participants answered the questions on a different page. The sequence of the bottles (e.g., slim, medium wide), as well as the sequence of product categories (drink yogurt, salad dressing) was randomly presented.



Fig. 1. Stimulus materials for the width-to-height and hourglass manipulations used in Study 1, wide, medium, and slim from left to right. Depicted are the varieties for the product category salad dressing.

¹ Part of these results were presented in the conference proceedings of the EAA; van Ooijen, I. (2016). The Power of Symbolic Packaging Cues. In *Advances in Advertising Research (Vol. VI)* (pp. 365–378). Springer Fachmedien Wiesbaden.

3.4. Results

As indicated by Repeated Measures ANOVA, we consistently found effects of the width-to-height and hourglass manipulations on the expected amount of fat in the product. The width-to-height manipulation had a positive linear effect on expected amount of fat for the drink yogurt packaging ($M_{\text{slim}} = 3.30$, $SD = 1.41$; $M_{\text{medium}} = 4.11$, $SD = 0.91$; $M_{\text{wide}} = 5.03$, $SD = 1.42$), $F(1, 36) = 22.48$, $p < 0.0001$, $\eta^2 = 0.38$, and this was also the case for the salad dressing packaging ($M_{\text{slim}} = 3.49$, $SD = 1.39$; $M_{\text{medium}} = 4.16$, $SD = .65$; $M_{\text{wide}} = 4.68$, $SD = 1.53$), $F(1, 36) = 7.00$, $p = 0.012$, $\eta^2 = 0.16$. Thus, the medium packaging was associated with a higher amount of fat than the slim packaging, and the wide packaging was associated with a higher amount of fat than the medium, and the slim packaging.

We found a similar result for the hourglass manipulation, which had a linear effect on expected amount of fat for both the drink yogurt packaging ($M_{\text{slim}} = 3.24$, $SD = 1.07$; $M_{\text{medium}} = 3.89$, $SD = 0.70$; $M_{\text{wide}} = 4.70$, $SD = 1.31$), $F(1, 36) = 29.40$, $p < 0.0001$, $\eta^2 = 0.45$, and the salad dressing packaging, ($M_{\text{slim}} = 3.00$, $SD = 1.11$; $M_{\text{medium}} = 4.22$, $SD = 1.16$; $M_{\text{wide}} = 4.84$, $SD = 1.42$), $F(1, 36) = 21.63$, $p < 0.0001$, $\eta^2 = 0.38$.

Interestingly, for both the shape manipulations, none of the contrasts was significant for the expected taste intensity (see Table 1). Thus, a slim vs. wide package shape is associated with healthiness (i.e., expected amount of fat), but does not affect tastiness expectations.

4. STUDY 2: shape and healthiness goals

4.1. Overview

In Study 2, we investigate the extent to which packaging shape affects healthiness perception (H1), and whether these perceptions affect product attitude and product choice under when consumers have a healthiness goal, while not affecting attitude and product choice when consumers have a hedonic goal (H2).

4.2. Participants

One hundred-ninety-six student participants (80% female, $M_{\text{age}} = 22.8$) filled in the questionnaire, and received a financial compensation or a partial course-fulfilment for their participation

afterwards.²

4.3. Design

We adopted a 2×2 mixed design with goal (health-relevant, health-irrelevant) as between subjects factor, package shape (slim, wide) as within subject factor, and product category (drink yoghurt, salad dressing) as between subject replicator factor.³

4.4. Stimuli and procedure

The participants were presented with two brands of drink yoghurt or salad dressing that were designed Using Adobe Photoshop CS6. As in Study 1, width-to-height ratio was manipulated by increasing a typical bottle (medium condition) with 10% in width and decreasing it with 15% in height (wide condition), or the other way around (slim condition). To indicate that all packages contained the same amount of product, we mentioned the volume indication on the right bottom of the packaging (350 ml). The brand names Covent Garden vs. Hidden Valley, Marzetti's vs. Cardini's (salad dressing), and Bonleche vs. Bonlait and Yolait v.s. Yoveve (drink yogurt) were randomly allocated to label either the slim or wide package. Furthermore, product position (left or right) was randomized between subjects.

Goal was manipulated by inducing either a health-relevant goal or a health-irrelevant (hedonic) goal for consumption. As a goal manipulation, participants in the health-relevant goal condition read a scenario that appealed to the functional characteristics of consumption (cf., Chernev, 2004).

“During the holidays you gained weight, and therefore you decided to eat healthier. This means eating no products that make you gain weight, but light products with little calories. You decide to go to the supermarket to buy some yogurt drink / salad dressing. Several types of yogurt drink / salad dressing are sold. You are looking for a healthy product. You walk to the dairy / dressing shelf, and see these two brands of yogurt drink / salad dressing”

Participants in the health-irrelevant, hedonic goal condition read the following scenario, was focused more on short term sensory-pleasure (cf. Chernev, 2004): “After a morning/day of hard work you deserve a break/tasty dinner – you've earned it. You feel like

Table 1
Means and Standard Deviations for amount of fat estimation for different levels of shape. Means sharing the same superscript are not significantly different from each other ($p > 0.05$).

Shape cue	Category	Amount of fat			Taste		
		<i>slim</i>	<i>medium</i>	<i>wide</i>	<i>slim</i>	<i>medium</i>	<i>wide</i>
<i>Hourglass shape</i>	<i>Yogurt drink M</i>	3.24 ^a	3.89 ^b	4.70 ^c	4.41 ^a	4.41 ^a	4.30 ^a
	<i>SD</i>	1.07	0.70	1.31	1.32	1.09	1.31
	<i>Salad dressing M</i>	3.00 ^a	4.22 ^b	4.84 ^c	4.24 ^a	4.57 ^a	4.27 ^a
<i>Width-to-height ratio</i>	<i>SD</i>	1.11	1.16	1.42	1.44	1.39	1.35
	<i>Yogurt drink M</i>	3.30 ^a	4.11 ^b	5.03 ^c	4.49 ^a	4.46 ^a	4.16 ^a
	<i>SD</i>	1.41	0.91	1.42	1.35	0.84	1.30
<i>Salad dressing M</i>	<i>SD</i>	3.49 ^a	4.16 ^b	4.68 ^c	4.57 ^a	4.24 ^a	4.51 ^a
	<i>SD</i>	1.39	0.65	1.53	1.28	0.68	1.47

² As 80% of the sample consisted of female participants, we conducted analyses to test for a possible interaction of gender with our independent variables on healthiness perception, brand choice and product attributes. Since no interactions were found, the effect of gender is not reported further on. Additional data are available upon request.

³ As expected, there were no interaction effects between the replicator factor product type (salad dressing vs. drinkyogurt), and the goal and shape manipulations. Thus, the effects applied to both product categories, and therefore are not further reported. Additional data are available upon request.

having something tasty/a tasty salad and decide to go to the super-market to buy some yogurt drink/salad dressing. Several types of yogurt drink/salad dressing are sold. You are looking for a product with a tasty, full flavour. You walk to the dairy/dressing shelf, and see these two brands of yogurt drink/salad dressing”.

Participants were randomly presented with the two brands from one of the product categories, where one brand was always a slim version and the other brand the wide version. Subsequently they indicated their product choice on a 6-pt scale ranging from -2.5 to 2.5 ($-2.5 = \text{almost certainly product X}$; $-1.5 = \text{probably product X}$; $-0.5 = \text{inclination to product X}$; $0.5 = \text{inclination to product Y}$; $1.5 = \text{probably product Y}$; $2.5 = \text{almost certainly product Y}$). The brand with a slim vs. wide packaging was randomly assigned to brand X or brand Y.

Healthiness perception was measured using the items (based on Provencher, Polivy, & Herman, 2009) “How much does this product fit within a healthy eating style?” and “How healthy do you expect product X to be?” (1 = not at all, 8 = very much; Cronbachs Alpha = 0.82). Moreover, calorie estimation was measured using a slider scale, where participants indicated the number of calories that they expected the product to contain, ranging from the realistic amount of 20–60 Kilocalories per 100 Millilitre product.

Product attitude was measured using four items on a 5-pt semantic differential scale, measuring the dimensions *poor-good*, *unappealing – appealing*, *unattractive – attractive*, *uninteresting – interesting* (Chang & Thorson, 2004; Cronbachs Alpha = 0.87).

4.5. Results⁴

4.5.1. Healthiness perception

To test the hypothesis that a slim package shape increased healthiness perception, we conducted a Mixed Model ANOVA with goal (health-relevant, health-irrelevant) as between subject factor and shape (slim, wide) as within subject factor. In line with our predictions, we found a strong effect of shape on expected healthiness. A product was expected to be healthier when it was packed in a slim bottle ($M = 4.80$, $SE = 0.08$) compared to when it was packed in a wide bottle ($M = 3.81$, $SE = 0.08$), $F(1, 194) = 93.80$, $p < 0.0001$, $\eta^2 = .33$. Furthermore, participants expected the amount of calories to be lower when the product was packed in a slim bottle ($M = 40.53$, $SE = 0.69$) than when it was packed in a wide bottle ($M = 47.25$, $SE = 0.80$), $F(1, 194) = 110.79$, $p < 0.0001$, $\eta^2 = 0.36$.

There was also a small, unexpected effect of goal on expected healthiness. $F(1, 194) = 6.82$, $p = 0.01$, $\eta^2 = 0.03$. Participants that had a health-irrelevant shopping goal rated the product as slightly less healthy ($M = 4.14$, $SE = 0.09$) compared to participants who had a health-relevant goal ($M = 4.46$, $SE = 0.09$). This was not the case for the expected amount of calories, and there were also no interaction effects between goal and package shape on these ratings. ($p > 0.05$).

4.5.2. Product choice

An ANOVA with goal (health-relevant, health-irrelevant) and product type (yogurt, salad dressing) as between subject factors showed that, regardless of brand name, goal affected the likelihood that the slim bottle was chosen, $F(1, 192) = 26.19$, $p < 0.0001$, $\eta^2 = 0.12$. As expected, there were no differences between the product types, $p = 0.151$, $\eta^2 = 0.01$. When the goal was health-

relevant, the likelihood that the slim product was chosen was higher ($M = 1.20$, $SE = 0.16$) than when the goal was health-irrelevant ($M = 0.05$, $SE = 0.16$).

To investigate whether choice was affected in the relevant goal and irrelevant goal conditions separately, two t-tests were conducted for each goal condition. When the goal was irrelevant, shape did not affect product choice, $p = 0.70$. When the goal was relevant however, shape did affect product choice, $p < 0.001$. Thus, in line with our expectations, width-to-height ratio affected choice when consumers had a health-relevant goal, and not when they had an irrelevant, hedonic goal (Fig. 2).

4.5.3. Product attitude

A mixed model ANOVA with goal (health-relevant, health-irrelevant) as between subject factors, and shape (slim, wide) as within subject factor revealed, as expected, a significant interaction effect between shape and goal, $F(1, 194) = 5.61$, $p = 0.019$, $\eta^2 = 0.03$, indicating that the attitude towards slim vs. wide was dependent on the shopping goal (Fig. 3). A simple slopes analysis showed that, while a slim shape positively affected product attitude in the health-relevant condition ($M_{slim} = 3.40$, $SD_{slim} = 0.09$, $M_{wide} = 2.66$, $SD_{wide} = 0.09$, $p < 0.001$), shape affected attitude far less in the health-irrelevant goal condition ($M_{slim} = 3.35$, $SD_{slim} = 0.08$; $M_{wide} = 3.00$, $SD_{wide} = 0.08$, $p = 0.002$). There was also an unexpected main effect of shape on attitude $F(1, 194) = 44.40$. $p < 0.001$, $\eta^2 = 0.19^5$.

5. Study 3: shape and healthiness goals on the shelf

5.1. Overview

In Study 3, we increased the practical relevance by using larger choice sets in a virtual environment that closely represents a real-life shopping environment. Furthermore, we increased external validity by using population samples that are representative of consumers in general. Besides replicating results from Study 2 (H1 and H2), we measured whether on-shelf product recognition increased for slim packs when consumers had a health-relevant goal (H3).

5.2. Participants

Two-hundred-eleven consumers who had bought drink yogurt in the past three months and ranged from 18 to 60 years (53% female) participated via a professional participant recruitment company. Participants received a small financial compensation for participation.

5.3. Design

We adopted a 2×2 between subjects design with goal (health-relevant, health-irrelevant) and package shape (slim, wide) as between subjects factors, and brand (brand A, brand B) as between subject replicator factor.

⁵ Compared to a health-irrelevant goal, a health-relevant goal only affected attitude for brands with a wide bottle ($p < 0.001$, $B = 0.20$). This suggests that particularly the decreasing attitude towards the wide packaging may affect product choice (i.e., an avoidance of wider packaging). This was investigated with a mediation analysis (Hayes, model 4). Indeed, goal affected choice through a decreased attitude towards the wide packaging, $CI = [0.09 - 0.48]$, $B = 0.26$, and not via an increased attitude towards the slim packaging, $CI = [-0.14 - 0.18]$.

⁴ As expected, there were no interaction effects between the replicator factor product type (salad dressing vs. drink yogurt), and the goal and shape manipulations. Thus, the effects applied to both product categories, and therefore are not further reported.

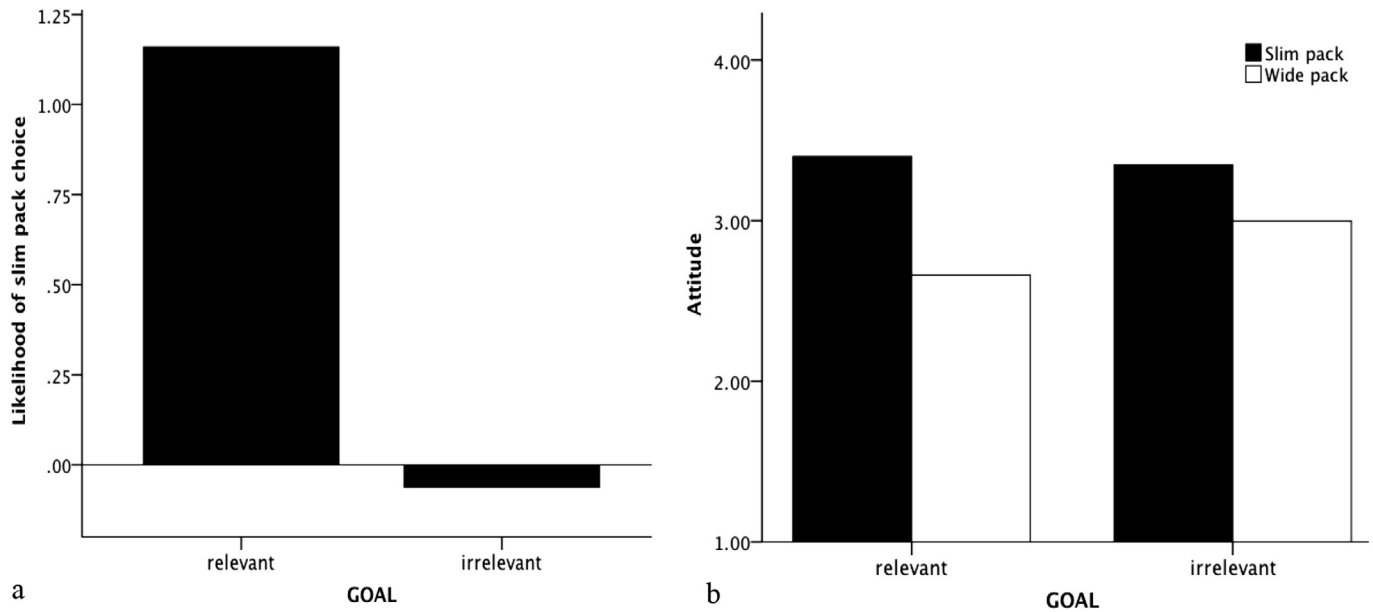


Fig. 2. a) Likelihood of slim pack choice in Study 2, where -3 indicates certain choice for a product with a wide package, while 3 indicates certain choice for a product with a slim package. Package shape only affected product choice when the goal was health-relevant, $p < 0.001$. b) Attitude towards the product (5-pt scale) for Study 2. When the goal was health-relevant, attitude towards the product with a slim pack was more positive compared to attitude towards the product with a wide pack. This effect was far less pronounced in the health-irrelevant condition, $p_{(goal \times shape)} = 0.019$.



Fig. 3. Product stimuli used in Study 3. The target product (“Yoggi Banana Mango Orange” or “ICA Drink yogurt Peach”) was presented between subjects as either a slim or wide version, after participants received the goal manipulation. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

5.4. Stimuli and procedure

The experiment was conducted using Simstore 360° software, a professional software program that is used by many consumer goods brands to test (new or changed) package designs in a realistic environment. The software allowed us to visualize a very realistic point of sale interface, using product shelves.

In the first part of the task, participants received the goal manipulation by being presented with a product slogan that appealed to either healthiness or hedonic related qualities of a drink yogurt brand (cf. Belei et al., 2012). In the health-relevant condition, participants read the slogan “[Brand] is a lovely light dairy drink with a minimum amount of sugar and fat” while participants in the health-irrelevant condition read “[Brand] is a lovely sweet dairy drink with a creamy and full flavour”. Subsequently they were asked to “find and buy this brand of drink yogurt (the ‘target product’) on the product shelf as fast as possible by clicking on it”. The target brand (Yoggi Banana Mango Orange or Ica Peach) was randomized between subjects.

The search task started immediately after participants clicked on a start button in the lower middle of the screen. Participants were presented with the product shelf containing 26 genuine, foreign brands of drink yogurt, including the target brand (Fig. 3). We chose for foreign brands to rule out the possibility that participants were already familiar with the products, which could affect their evaluations of the target product. The shape of the target product on the shelf was manipulated between subjects by altering the width-to-height ratio of the bottles, while keeping the corresponding volume constant. A high width-to-height ratio represented a slim body shape, while a low width-to-height ratio represented a wide body shape. Participants selected the product for purchase by clicking on it, which revealed a ‘buy’ button where participants clicked on to purchase the product. After participants purchased the product, they were directed to the second part of the experiment, where they answered several questions. Healthiness perception was measured using the items (based on Provencher et al., 2009) “How much does this product fit within a healthy eating style?” and “How healthy do you expect product X to be?” (1 = not at all, 8 = very much; Cronbach’s Alpha = 0.84). Moreover, calorie estimation was measured by letting participants type in the number of Kilocalories that they expected the product to contain, within the realistic 20 to 60 Kcal per 100 mL interval. Subsequently product attitude was measured using four items on a 7-pt semantic differential scale, measuring the dimensions poor-good, unappealing – appealing, unattractive – attractive, uninteresting – interesting (Chang & Thorson, 2004; Cronbach’s Alpha = 0.92).

5.5. Results

5.5.1. On-shelf recognition of the target brand

We were interested whether package shape would be an intuitive cue that helps consumers to select healthy products. Therefore, we investigated whether consumers use width-to-height ratio as a metaphoric cue to identify healthy products. We measured this as on-shelf product recognition: the time it takes participants to identify the target brand by clicking on it. Note that lower values of this variable indicate higher on-shelf recognition. To correctly measure on-shelf recognition, we only included participants from our sample that correctly selected the target product in their first attempt, resulting in a sample of 144 participants. Furthermore, we removed four participants with unusual long response times ($ZRE > 2.5$) from the sample. This did not change the significance of the results.

Unexpectedly, participants took longer to identify a product when the package was wide ($M = 40.11$) opposed to slim

($M = 35.43$) and longer when they had a healthiness goal ($M = 40.29$) opposed to a hedonic goal ($M = 35.25$). More important for our hypothesis, a between subjects ANOVA indicated that these main effects were driven by an expected interaction effect between shape and goal, $F(1, 140) = 8.95$, $p = 0.003$, $\eta^2 = .06$. As expected, compared to wide packages ($M = 46.41$), slim packages ($M = 34.17$) decreased the time it took participants to identify the healthy target product, and thus increased the on-shelf recognition, $p = 0.001$. When the goal was to buy the health-irrelevant product, shape did not affect on-shelf recognition, $p = 0.43$.

5.5.2. Healthiness perception

Explicit healthiness perception was measured using the variables estimated healthiness and estimated number of calories. A between subjects ANOVA did not indicate an effect of package shape on explicit healthiness perception, $p = 0.58$ or expected caloric value, $p = 0.61$. Furthermore, there was no effect of goal, and no interaction effect between goal and shape on expected caloric value.

Interestingly, participants did not explicitly report that they found products in slim packages healthier, while a behavioural measurement (i.e., on-shelf recognition) indicated that package shape was, perhaps unconsciously, used as a cue to identify healthy products. To investigate whether there is a relation between the explicit perception and the behavioural measurement on-shelf recognition, we tested whether participants’ explicit healthiness judgments moderated the extent to which they used package shape as a cue to identify the healthy product. A simple slopes (spotlight) analysis (Spiller, Fitzsimons, Lynch Jr., & McClelland, 2013) showed that participants were faster to identify the healthy brand when its package was slim opposed to wide, even when participants self-reported healthiness perception was low (See Appendix A). However, the effect of package shape of healthy products on on-shelf recognition was relatively stronger for participants who afterwards indicated that the product looked healthy. These findings suggest that, although participants may not be explicitly aware of the association between package shape and healthiness, they do use shape as a cue to identify healthy products.

5.5.3. Product attitude

As expected, a between subjects ANOVA indicated a significant interaction effect between shape and goal on attitude, $F(1, 207) = 4.69$, $p = 0.032$. A brand with a slim package was evaluated more positive ($M = 4.04$) than a brand with a wide package ($M = 3.39$) when participants had a health-relevant goal, $p = 0.010$, while packaging shape did not affect attitude when participants had a health-irrelevant goal, $p = 0.65$. In line with our expectations, we found no significant main effects of shape, $F(1, 207) = 2.28$, $p = 0.133$, or goal, $F(1, 207) = 0.22$, $p = 0.64$, on attitude. Fig. 4.

6. General discussion

The results of three studies support the notion that packages that simulate body shape act as a symbolic cue for healthiness (H1). Our results strongly suggest that slimmer packages result in increased healthiness perception because consumers associate those packages more with healthy human body shapes. When choosing between two products, participants chose more often for a brand with slim package, and showed a more positive attitude towards these products. This was only the case, however, when the shape cue was goal relevant (i.e., when the goal was to buy a healthy product, and not a tasty product; H2). Furthermore, when a brand was first framed as healthy, participants were afterwards faster to identify this brand on the shelf when its package was slim, compared to when it was wide. When the slogan appealed to the

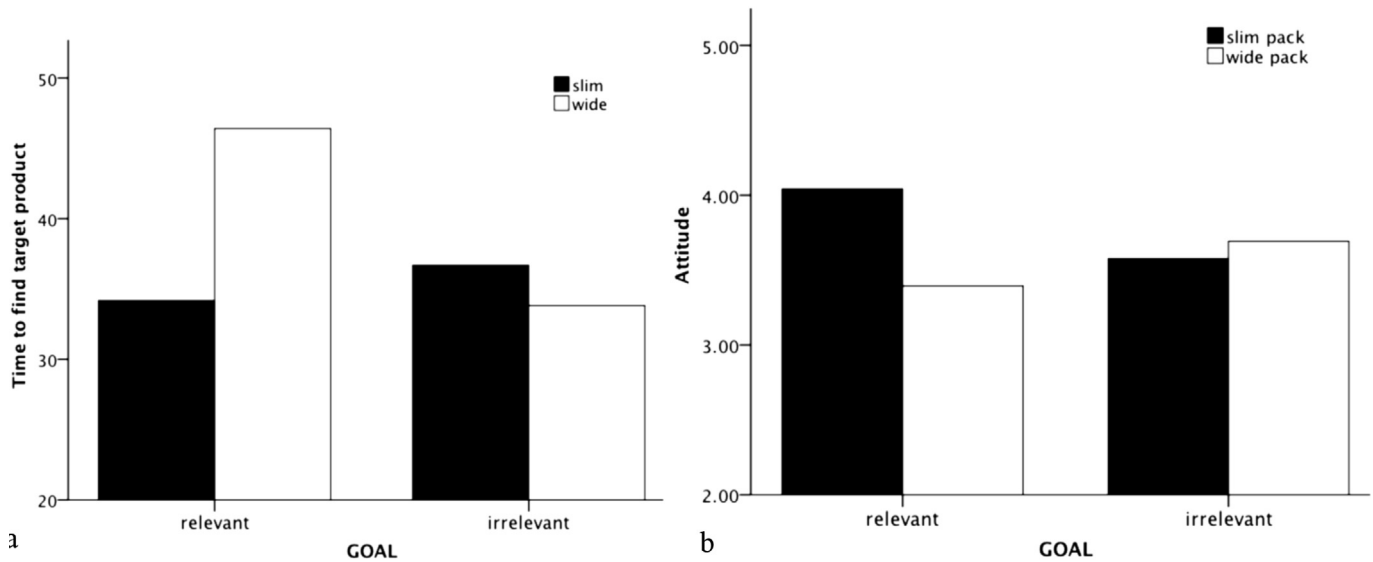


Fig. 4. a) Target identification time on the shelf in seconds. Participants identified products faster when packaging was slim compared to wide when the goal was health-relevant, and not when it was irrelevant, $p_{(goal \times shape)} = 0.038$. b) Attitude towards the product (7-pt scale) for study 3. A slim pack relatively increased product attitude compared to a wide pack, but only when the goal was health-relevant, $p_{(goal \times shape)} = 0.032$.

hedonic qualities of the product however, package shape did not affect on-shelf recognition – the cue was not relevant here (H3). The same effect applied to the attitude that consumers had towards the advertised product.

These effects also hold when consumers do not make a direct comparison between products with different shapes, but evaluate a single (slim vs. wide) product, as shown in Study 3, although it should be noted that package shape did not have an effect on explicit measures of healthiness (this aspect of our findings will be addressed further in our limitations section).

This is the first study that investigates how package shape can be used to promote healthy products by increasing healthiness perceptions. As such, this study has important implications for food brands, NGOs and policy makers who seek to nudge consumers toward choosing more healthy options. Our findings show that choosing a packaging shape that implicitly communicates a product's health benefits (i.e., a “slim” package for a product with less fat) helps convey these benefits to consumers.

Second, in line with research on goal dependent automaticity (Bargh, 1989) we show that these effects are dependent on the goal of the consumer in a retail context. While simulations of body shape are effective package cues when health related qualities of a product are evaluated, these cues are uninformative when hedonic qualities of a product are assessed. Our results show that simulating a healthy body shape is only a relevant cue for product evaluation when consumers have a health-relevant shopping goal. Moreover, we found that slim package shapes also affect behavioural outcomes such as evaluations and on-shelf recognition of products when consumers have a health-relevant goal, but not when they have a hedonic goal. The goal-dependency of our effect has important implications for their practical application: although we demonstrate that implicit health cues in packaging design may enhance product attitude and help consumers to find healthy products on the shelf, we only find these effects for consumers who have an active goal to eat more healthy. This means that our findings are most helpful in influencing consumers who are looking to improve their health by eating healthier. Implicit packaging cues seem less appropriate for nudging consumers to a healthier lifestyle. Our findings therefore suggest that these cues should be used

in addition to other, more general campaigns that inform consumers about the benefits of a healthy lifestyle and persuade them to choose foods that are healthier. Implicit packaging cues can then help consumers to act according to these changed views, and realize their health goals.

From a theoretical perspective, our results are interesting because they counter a number of other studies that demonstrate a negative relationship between healthiness and tastiness (Laran & Wilcox, 2011; Liem et al., 2012; Raghunathan et al., 2006). While these studies found that explicit health information decreased expected or perceived tastiness of a product, the results of our study support the notion that relatively implicit (i.e., shape-) cues that communicate healthiness do not affect product evaluations when consumers have a hedonic consumption goal (i.e., focused on taste). In other words, our results indicate that there might not be a relationship between communicated healthiness and perceived tastiness when the healthiness cue is implicit. While explicit (healthiness) information may activate a wider semantic network that includes concepts that are indirectly related to healthiness, such as tastiness (Collins & Loftus, 1975), this may not be the case for metaphoric (healthiness) cues. As also argued by Landau, Meier and Keefer (2010), the perceptual symbols framework (Lakoff & Johnson, 1980) places constraints on the extent to which activation spreads to related concepts. This entails that although packaging shape may be a metaphor for bodily healthiness, it may be metaphorically unrelated to the concept tastiness. Further research should address to what extent a relationship exists between hedonic consumer goals and responsiveness to more metaphoric healthiness cues.

Interestingly, while package shape affected on-shelf recognition and product attitudes, it did not affect self-reported, explicit healthiness perception in Study 3. In other words, package shape affected on-shelf recognition and product evaluation for consumers who are looking for healthy products, but this was not reflected in increased explicit, conscious perceptions of healthiness. Slim packaging increases product recognition on the shelf and increases product attitude only when consumers have a healthiness goal, however consumers may not consciously attribute healthiness to the packaging when healthiness is measured explicitly. This

possibility was supported by a post-hoc analysis, in which we found that a slim packaging shape affected on-shelf product recognition and product attitude when a product was framed as healthy, regardless of explicit healthiness perception. Moreover, these results are supported by the Associative Propositional Evaluation model (Gawronski & Bodenhausen, 2006), which states that different processes constitute the formation of implicit and explicit evaluations. Implicit processes, such as goal-directed attention towards packaging do not require an intention to evaluate the object and are activated irrespective of whether the person considers the evaluation to be accurate. Propositional processes, such as conscious elaboration about a product's healthiness, are concerned with the validation of such beliefs. In the case of slim product packaging, consumers may falsify their initial association with healthiness after conscious elaboration that is caused by self-report measures (see also Strack & Deutsch, 2004). These findings may reflect the importance of unconscious processes that play a role in consumer behaviour, in particular for unobtrusive cues such as packaging design.

Other studies have indicated that package shape can automatically affect consumer judgment in other domains than healthiness. For instance, the more elongated a product container is, the higher consumers tend to estimate container volume, and the lower is consumption on a subsequent occasion (Raghubir & Krishna, 1999; Wansink & Van Ittersum, 2003). In the present study, we controlled for volume by clearly indicating product volume in Millilitre. Therefore, it is unlikely that differences in perceived volume are responsible for the effects on product evaluation in this study.

In the present study, we investigated the effects of slim packaging design on consumers' healthiness perceptions and behaviour in a virtual environment with realistic product shelves, using actual brands and products. Since our goal was to focus on the effects of package shape, we used actual brands without additional product information and claims on their packs. Product claims and product information however, are important and often used package cues – especially for healthy and functional foods. Therefore, future research should extend our research by investigating how implicit product cues (i.e., shape) and explicit product cues (i.e., claims, nutrient information) interact to create product expectations and evaluations. This would be also relevant in the light of possible misuse of package shape to increase the false perception that a product is healthy, while it actually contains much sugar or fat. Perhaps, the effect of package shape on healthiness perception is moderated by the nature of other, explicit cues on the package (i.e., health vs. taste related claims). It could, for example, be the case that a slim package shape enhances the effect of explicit health- or nutrition claims, while a wide package shape decreases the effect of such claims (see Miyazaki, Grewal and Goodstein (2005) for an example on the effect of multiple (in) incongruent product cues on product evaluation). Addressing such questions is important, as packaging shape may moderate the extent to which explicit cues are effective.

Another limitation of our studies concerns the behavioural measurements. Although product preference and on-shelf recognition of products were measured, we measured no actual product purchase. Therefore, future research should examine how packaging shape affects actual purchase behaviour, or even product consumption (i.e., the amount of consumed product) under healthiness and hedonic consumer goals. It could be that case, for instance, that consumers drink less of a product when it is packed in a wider (versus slimmer) bottle, when those consumers have healthiness goal.

Also, only two product categories – drink yogurt and salad dressing – were used as stimuli in these studies. In general, these types of products are available in low-calorie variants as well as

high calorie variants. Hence, these product types may be more ambivalent regarding existing healthiness associations, which may increase the role of packaging as a cue for healthiness. Therefore, a next step would therefore be to examine how packaging shape affects healthiness perception for products that are generally perceived as high or low in calories.

Our results show how unobtrusive shape cues can affect product perception, choice and evaluation, as well as recognition of healthy products on the shelf. Hence, these results stress the importance of cue relevance, which may have been recognized in psychology, but does not seem to be as salient in the package design process. Whereas some package cues may have detrimental effects on product purchase for some consumer segments (e.g., a wider product container for consumers who prefer low-fat products), this may not be the case of other consumer segments. Therefore, where prior research on packaging cues has often focused on how packaging cues affect quality perception as a general evaluative measure (i.e., regardless of consumer goals), the increased interest in healthy and functional products may ask for a shift towards a tailored approach in the package design process for healthy products in particular.

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APPENDIX A

Table A1

Effects of the goal × shape interaction on on-shelf product recognition, for values of explicit healthiness perception at the 10th, 25th, 50th, 75th, and 90th percentiles. Explicit healthiness perception was measured on an 8-pt scale.

Explicit Perception	PCTL	B	se	t	p	LLCI	ULCI
3.0	10 th	-9.89	5.37	-1.84	0.041	-20.60	0.82
3.5	25 th	-11.08	4.15	-2.67	0.003	-19.36	-2.80
4.0	50 th	-12.27	3.62	-3.39	0.003	-19.49	-5.05
4.5	75 th	-13.46	4.06	-3.32	0.007	-21.55	-5.36
5.0	90 th	-14.64	5.23	-2.80	0.043	-25.07	-4.21

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