Consumers' reactions to unsubstantiated claims about ecological products

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Is it easier to believe than to disbelieve?
An examination of consumers' reactions to unsubstantiated marketing claims about ecological products

Abstract:

Purpose The specific purpose of the present study was to examine the impact of unsubstantiated claims that a product is "ecological".

Method A between-subjects experimental design was used in which the absence versus the presence of an (unsubstantiated) ecological claim regarding a product was a manipulated factor. The design comprised four products, representing non-ingestible/ingestible products and familiar/unfamiliar brands. These two aspects were seen as potentially moderating factors with respect to the impact of ecological claims.

Findings The results show that ecological product claims boosted beliefs that a product is indeed ecological. This influence was not moderated by non-ingestible/ingestible and familiar/unfamiliar product characteristics. Moreover, ecological product claims enhanced conceptually related product beliefs, namely beliefs that the product is natural, environmentally friendly and healthy. Ecological claims also had a positive impact on the attitude towards the product.

Practical and social implications The results imply that influencers who want a receiver to believe that a product is ecological can expect to be successful by merely claiming that a product is ecological. From a societal point of view, however, and in an era in which "alternative facts" and "post-truths" are becoming the subject of increasing concern, the results are problematic, because they underline that customers can be made to believe in claims even though no supporting evidence is provided.

Originality Few previous studies have examined the impact on unsubstantiated claims about product attributes that are related to environment-friendly aspects.

Keywords: Ecological products, unsubstantiated claims, beliefs, product attitudes

1. Introduction

Today, many products are marketed as "green", "ecological", "eco-friendly", "organic", and "natural". These product characteristics can be seen as credence attributes; they are hard for consumers to assess before purchases and through consumption (Van Loo *et al*., 2015). Claims that a product has such characteristics are often made with official labels or marks indicating that a third party has evaluated the product against explicit health and environmental criteria. In a European context, the EU Ecolabel and the EU Organic Logo are examples of such labels. Previous research has shown that official labels of this type may work as a "magic bullet" – their presence can boost consumers' beliefs regarding product attributes such as healthiness (Hoogland, de Boer and Boersema, 2007) and environmental friendliness (Hoogland *et al*., 2007; Larceneux, Benoit-Moreau and Renaudin, 2012), and that they can have a positive influence on perceived product quality (Larceneux *et al*., 2012), preferences, and willingness to pay (Van Loo *et al*., 2015). Fictitious "eco-seals" have been shown to have similar effects on purchase intent (Bickart and Ruth, 2012). Results of this type have also been obtained in research in which participants are exposed to product-related information provided by researchers as a means to produce experimental manipulations, such as information simply stating that a product is "organic" (Caporale and Monteleone, 2004; Lee, Shimizu, Kniffin and Wansink, 2013).

In any event, claims about a product comprising adjectives such as "green", "organic", and "ecological" are often made by firms in such a way that they are *not* backed up by an official label or by evidence regarding what is claimed (cf. Carlson *et al*., 1993). These claims are made in several ways, for example, by including the word "ecological" in a product's name or by stating that ingredients or components are "organic". Such claims are made also for non-ingestible products. For example, today it is possible to buy a "100 % organic" frisbee, and a Google search for "ecological rucksack" results in many specific backpacks that are referred to as "ecological".

In the present study, the focus is on unsubstantiated claims (i.e., the claims are neither backed up with official labels nor with supporting evidence) about one specific product attribute, "ecological", and the purpose is to assess their effectiveness in terms of the impact on consumers' (a) beliefs about the extent to which a product is ecological, (b) beliefs about conceptually related product attributes, and (c) overall product evaluations. To this end, an

experimental approach was used in which claims regarding the "ecological" characteristic of four products were manipulated so that each participant was exposed to a product with either no claim about its ecological characteristics or an unsubstantiated claim that the product is ecological. The findings indicate that the unsubstantiated claims were indeed effective, because they resulted in higher levels of beliefs that the product is ecological, higher levels of related beliefs, and higher levels of product attitudes.

The present study contributes to the literature on green and environmental claims used in marketing (e.g., Bickart and Ruth, 2012; Carlson *et al*., 1993; Chan, 2000; Davis, 1993; Goh and Balaj, 2016; Kong and Zhang, 2014; Luchs *et al*., 2010; Manrai *et al*., 1997; Oyedele and Dejong, 2013; Segev *et al*., 2016) by explicitly examining the hitherto understudied impact of unsubstantiated claims. The study also contributes to the literature on claims in advertising in general (e.g., Burke *et al*., 1988; Xie and Bousch, 2011). With respect to the latter, it should be noted that firms often use unsubstantiated product claims also when stressing other product characteristics than those that are related to ecological aspects. This is the case, for example, when it is claimed that a product is "special", "unique" and "cool". Such usage of unsubstantiated claims is understudied, too. In addition, the present study is an attempt to contribute to the literature on belief formation (e.g., Gilbert, 1991; Mandelbaum and Quilty-Dunn, 2015).

The subsequent text is organized as follows. First, the theoretical framework and the hypotheses are presented. A main assumption is that it is less effortful for the (effort-aversive) human brain to believe than to disbelieve, which represents a main reason why unsubstantiated claims can be successful. Second, the research method, a between-subjects experimental design, is presented. This is followed by a section in which the analysis and the results are presented, and after this the main findings are discussed in terms of existing theory. Implications are also provided.

2. Theoretical framework and hypotheses

2.1. Ecological claims and beliefs that a product is ecological

The point of departure here is a claim (a verbal message conveying material about a product attribute; Xie and Boush, 2011) that one particular product is "ecological" in such a way that

there is no official label or any other evidence to confirm that the product is indeed ecological. Given that an ecological claim is made in this way, the authors of the present study make three assumptions regarding its influence on the receiver's subsequent information processing activities.

First, there are no generally accepted criteria for what is meant by "ecological" as a product characteristic (Moisander, 2007). Similarly, many of the terms used in green advertising (e.g., "environmentally friendly") have no clear meaning (Carlson *et al*., 1993). However, there is no shortage of criteria provided by specific actors. And such criteria are typically complex. For example, for a product to qualify as "ecological" in terms of the EU Ecolabel, it has to comply with criteria comprising the whole product life cycle – from the extraction of the raw materials, to production, packaging, transport, usage, and disposition. In the specific case of footwear, the criteria comprise "limited water pollution during production, a reduction of emissions of volatile organic compounds during production, the exclusion of substances harmful for the environment and health, and limited residues of metals and formaldehyde in the final product" (European Commission, Decision 2009/563/EC). The absence of generally agreed-upon criteria and the abundance of criteria from specific actors can make it cognitively demanding for laypersons to process information about ecological product aspects. Indeed, previous empirical research shows that environmental claims are subject to relatively high levels of consumer confusion, in the sense that the exact meaning of terms such as fair trade, sustainable agriculture, and animal welfare are not always clear (Carrete *et al*., 2012). Previous research also shows that extensive cognitive effort is needed for decision-making involving green alternatives (Young *et al*., 2010). Even "green" consumers, who are likely to have a special interest in ecological characteristics, find that the needed effort is great when it comes to decisions regarding such products (ibid.). It has also been observed that environment-friendly consumption is a complex form of decision making in both intellectual and moral ways, that the dubious nature of ecological information is contributing to the complexity, and that understanding the effects of consuming a product on the environment typically requires specialist knowledge (Moisander, 2007). Consequently, previous research stresses the need for comprehensive education of consumers who are exposed to information about ecological characteristics of products (Teisl, 2002). Therefore, it is assumed here that ecological claims are demanding from a sense-making point of view.

Second, in general, consumers are cognitive misers, in the sense that they want to avoid effort in information processing activities (Liu and Goodhue, 2012). Given the relatively high level of processing needed for understanding ecological product criteria, and given that the share of consumers who are very concerned about environmental issues is relatively low (Kotler, 2011; Young *et al*., 2010), it is assumed here that effort-avoidance tendencies are likely also in the specific situation in which a consumer is presented with eco-related information about a product.

Third, and perhaps the most important assumption, it is assumed that it is more convenient, in general, to believe a claim than to question it (Gilbert, 1991; Gilbert *et al*., 1993; Mandelbaum and Quilty-Dunn, 2015). In other words, believing is easy while doubt is more effortful (Asp *et al*., 2012). This assumption is based on a view of the initial understanding of an object, event or a statement as inseparable from believing it, and that disbelief is an effortful, secondary psychological activity for which there are limited cognitive resources (Asp *et al*., 2013; Gilbert, 1991). One evolution-based reason for this reaction pattern is that it is adaptive; it would be extremely non-adaptive to question every perceptual representation of stimuli (e.g., a roaring lion that comes running towards you) in situations in which important decisions are needed (Asp *et al*., 2013). In a consumer context, the tendency to believe rather than to doubt has been well-documented with respect to consumers' responses to advertising claims (Xie and Boush, 2011).

Given these assumptions, it is expected that claiming that a product is "ecological" (even though no particular evidence for this is provided) has a positive impact on beliefs about the extent to which the product is ecological. Hence the following is hypothesized:

H1: When marketing regarding a product comprises the claim that the product is ecological, the claim has a positive influence on beliefs that the product is indeed ecological

2.2 Halo effects

Moreover, given exposure to a claim that a product is ecological, it is expected that beliefs about other (and conceptually related) product attributes can be boosted. Such findings have been obtained in previous research when the ecological claim consists of an official ecological

or organic label indicating that the product has been subject to an assessment by a third party (e.g., Hoogland *et al*., 2007; Larceneux *et al*., 2012). This influence of one attribute on another attribute has been referred to as a halo effect (Larceneaux *et al*., 2012; Luchs *et al*., 2010; Lee *et al*., 2013), a second-order effect (Burke *et al*., 1998), and as "interattribute misleadningness" (Hastak and Mazis, 2011). That is to say, consumers rely on a claim for one attribute to infer other attributes, because they believe that the attributes are correlated (ibid.). This halo pattern can be seen as a heuristic that saves information processing effort for the (effort-aversive) human brain. As a specific example in the context of environment-friendly products, the findings in Larceneaux *et al.* (2012) indicate that the belief that an ingestible product is organic boosts beliefs that it tastes good.

An additional reason why an "ecological" attribute can be used for inferences about other attributes can be seen in the light of priming mechanisms, in the sense that exposure to one particular attribute of an object (a prime stimulus) can activate mental representations regarding associated attributes in such a way that beliefs regarding other product attributes are influenced. Thus, priming has to do with how internal mental processes mediate – in a passive and hidden manner, without an intervening act of will – the influence of one particular attribute on beliefs about other attributes (Bargh and Chartrand, 2000). From a priming point of view, then, a claim that an object is "ecological" can be viewed as a prime stimulus.

Previous research on the effects of official organic and ecological labels has indicated that they can boost beliefs that a product is environmentally friendly (Larceneux *et al*., 2012) and healthy (Hoogland *et al*., 2007). A related belief regarding ecological/organic products is that they are natural (Zanoli and Naspetti, 2002), an attribute associated with both environmentally friendliness and healthiness (Rozin, 2005), so it is expected that also beliefs regarding naturalness would be boosted by explicit ecological claims. When an unsubstantiated ecological claim is made regarding a product, then, the following is hypothesized:

H2: When marketing regarding a product comprises the claim that the product is ecological, the claim has a positive influence on beliefs that the product is environmentally friendly, healthy, and natural

2.3 Effects on the attitude towards the product

It is assumed here that attributes such as environmentally friendly, healthy, and natural are desirable product characteristics, which have a positive charge for most consumers. For example, we humans associate "natural" with what is good, and we have strong preferences for natural food (Rozin, 2005). Therefore, given that an ecological claim boosts beliefs about environmentally friendliness, healthiness, and naturalness, it is expected that the bundle of positively charged attributes implied by "ecological" would have a positive influence on the overall evaluation of the product. This is consistent with, for example, Anderson's (1971) information integration model. Empirical results of this type have been obtained in previous research on the impact of the presence of official organic and ecological labels and in terms of outcome variables such as perceived product quality (Larceneux *et al*., 2012). Here, however, in the present study, overall evaluations are conceptualized as product attitudes. The following is hypothesized:

H3: When marketing regarding a product comprises the claim that the product is ecological, the claim has a positive influence on the attitude towards the product

2.4 Moderation issues

With respect to the first part of the customer's reaction process, the influence of ecological claims on beliefs that a product is ecological (i.e., H1), it is assumed here that this influence may be moderated by two factors.

First, products can be ingestible or non-ingestible. To date, firms' claims that a product is ecological have appeared more frequently in the context of ingestible products, which means that customers' exposure to prior ecological claims is expected to be higher for ingestible products than for non-ingestible products. Moreover, in general, the frequency with which a suggestion or a statement is made increases its believability (Bacon, 1979; Zaragoza and Mitchell, 1996). That is to say, repetition makes a statement more memorable, and when the statement appears again, in a new situation, and is in agreement with what is already stored in memory, its believability is boosted (Begg et al., 1985). Therefore, in the present study, it is expected that the influence of claiming that a product is ecological on beliefs that the product indeed is ecological would be stronger for ingestible than non-ingestible products:

H4: When marketing regarding a product comprises the claim that the product is ecological, the claim has a stronger positive influence on beliefs that the product is indeed ecological when the product is ingestible than when the product is non-ingestible

Second, a product's brand can be unfamiliar or familiar. The familiarity dimension should be seen in potential moderating terms, too. Brand familiarity is assumed to increase brand knowledge, which in turn is a basis for consumer-based brand equity (Keller, 1993), so brand equity-related arguments can be used for predictions about the moderating potential of brand familiarity. More specifically, when brand equity is high, exposure to the brand is expected to trigger more associations than when brand equity is low. That is to say, when brand equity is high, the brand is a carrier of much more information than when it is low (Larceneux *et al*. (2012). It is therefore expected that information about a product's ecological characteristics becomes less salient in the high brand equity case – and it is expected that such information becomes more salient in the low brand equity case (in which the customer may know little else about the product). Therefore, due to differences in the salience of the ecological claim in relation to the information context in which is made, the effect of claiming that a product is ecological on beliefs that the product is ecological is expected to be weaker in the high brand equity case (indirect empirical support for this is provided by Larceneux *et al*., 2012). Given again that brand familiarity is an important aspect of brand equity, then, the following is hypothesized:

H5: When marketing regarding a product comprises the claim that the product is ecological, the claim has a stronger positive influence on beliefs that the product is indeed ecological when the brand is unfamiliar than when the brand is unfamiliar

3. Research method

3.1 General design

A between-subjects experimental design was used in which product claims was a manipulated factor (i.e., a claim that a product is ecological was either absent or present). In addition, to assess also the ingestible/non-ingestible factor and the low/high brand familiarity factor for the moderation hypotheses, the experiment comprised four products that were assumed to vary with respect to the two additional factors. This resulted in the selection of four specific products for the study: bottled water (ingestible/unfamiliar), bicycle tires (non-ingestible/unfamiliar), beer (ingestible/familiar), and boots (non-ingestible/familiar). The factorial design for the tests of H1-H5, then, was as follows: 2 (no claim that a product is ecological vs. a claim that a product is ecological) X 2 (non-ingestible product vs. ingestible product) X 2 (unfamiliar brand vs. familiar brand). From the individual participant's point of view, this design meant that he or she was exposed to one of the four products and was randomly allocated to either the absence or the presence of an ecological claim regarding the product.

It may be noted that it has been argued that (a) the effectiveness of green advertising claims varies between product types, and (b) the relative importance for consumers of environmental attributes vis-à-vis other attributes vary between products (Sriram and Forman, 1993). Therefore, the selected design – with four different products – should be seen as an attempt to make the outcomes less dependent on a single stimulus. That is to say, the use of only one stimulus in an experiment may threaten construct validity, because the unique characteristics of a selected stimulus can confound the characteristics of the stimulus with the broader category it is supposed to represent (Wells and Windschitl, 1999). The use of several stimuli, however, increases extraneous sources of variation, which may result in failure to detect significant relationships between variables (Calder et al., 1981). That is to say, using several stimuli may increase type II error (i.e., retaining a false null hypothesis). For the present authors, however, a setting in which it is harder for relationships to become significant is desirable, because it represents a stronger test – and the stronger the test a hypothesis has survived, the better corroborated it is (Meehl, 1978).

3.2 Stimuli, procedure and participants

For the bottled water product (the ingestible/unfamiliar brand condition), the participants were randomly exposed to one of two version of a bottled water product created for the purpose of this study. It was presented in a glass bottle with a label stating the name of the product (either with or without the word "Ecological" printed in green typeface above the name of the product). In the next step, the participants were asked to taste the product (all bottles, however, had the same water content), and to answer a set of questions designed to measure the variables in the hypotheses. The data were collected individually on a face-to-face basis in such a way that a researcher read the questions (and the response alternatives) and recorded the responses for each participant.

The bicycle tyre product (the non-ingestible/unfamiliar brand condition), a tyre intended for winder conditions, was created for the purpose of carrying out this study. This product ("Rudman Piranha Cyclocross Tyre") was presented to the participants in the same way as such products are typically described on e-retailers' websites. The description, which had the appearance of a screen dump from a website, was printed on paper. The participants, who were instructed to examine the product presentation and to respond to the questionnaire items that followed, were randomly allocated to one of two versions of the description. In the first version, the product was called "Rudman Piranha Cyclocross Tyre" and the description stated that it was made of compound rubber; in the second version the product was called "Rudman Piranha Ecological Cyclocross Tyre" and it was stated that it was made of ecological rubber. It should be observed that the data collection was conducted during one winter day when the temperature was -6 °C and a massive carpet of irregular and slippery ice covered the streets.

For the beer product (the ingestible/familiar brand condition), the participants were exposed to an ad for a well-known beer brand (Carlsberg). The ad was printed in color on glossy paper and appeared in the same package as a paper-based questionnaire with items to measure the variables in the hypotheses. The participants were randomly allocated to one of two version of the ad; in one version it was claimed that the product contained "unique ecological hops", while the other version claimed that it contained "unique aromatic hops".

Finally, the boots (the non-ingestible/familiar brand condition) comprised exposure to a well-known existing brand (Dr. Martens). The boots were presented in the context of an online

shopping site. Two versions of the product presentation were produced, and the participants were randomly allocated to one of these versions. In the first version, the product's name was "Dr. Martens 146 Boot" (and it was stated that it was made of "Dr. Martens Leather"; in the second version, the name was "Dr. Martens Ecological 1460 Boot" (and it was stated that it was made of "Dr. Martens Ecological Leather").

A convenience sampling approach was used, in the sense that participants in business school courses were invited to take part in the study. This resulted in 351 participants (156 men, 189 women, 3 other; M_{age} = 21.62) for the analysis (n = 178 for the no ecological claim condition and n = 173 for the ecological claim condition). Of these, 80 received the bottled water treatment, 90 received the tyre treatment, 82 received the beer treatment, and 99 received the boots treatment.

3.3 Measures

Ecological beliefs were assessed with the item "How ecological do you believe that this product is?", scored on a 10-point scale (1 = not ecological at all, 10 = very ecological). *Naturalness* was measured with the item "How natural do you find this product? (1 = unnatural, 10 = natural) and *environmental friendliness* was measured with the item "How environmentally friendly do you think that the manufacturing of this product is?" (1 = very environmentally unfriendly, 10 = very environmentally friendly). For *healthiness*, two versions of the same measure were used (depending on the non-ingestible/ingestible nature of the product). For non-ingestible products (tyres and boots), this item was used: "How healthy do you believe the manufacturing process is for the employees who are involved in making the product? (1 = unhealthy, 10 = healthy). For the ingestible products (water and beer), this version was used: "How healthy do you perceive this product to be?" (1 = unhealthy, 10 = healthy).

For the *attitude towards the product*, the authors used this item for the bottled water product: "What is your overall evaluation of this product? (1 = bad, 10 = good). For the other three products, for which data were collected with self-administrated questionnaires, the same item stem, and the adjective pairs "bad-good", "do not like it-like it", and "negative impression-positive impression", scored on a scale ranging from 1 to 10, were used. The unweighted

means of the responses to the three items was employed as a product attitude variable (Cronbach alpha > .70 for each of the three products).

4. Analysis and results

4.1 Hypothesis testing

H1 was assessed with a 2 X 2 X 2 ANOVA in which ecological beliefs regarding the product was the dependent variable. This resulted in a significant main effect for the ecological claim factor ($F = 91.02$, $p < .01$). There was also a significant main effect for the ingestible factor ($F = 43.98$, $p < .01$), the familiarity factor was not significant, and no interactions were significant. Since the mean level of ecological beliefs was lower for those exposed to no ecological claim ($M = 4.46$) than for those who were exposed to an ecological claim ($M = 6.79$), H1 was supported. It should be noted that the mean level for the ecological claim group was significantly ($t = 6.76$, $p < .01$) higher than the scale midpoint (i.e., 5.5), thus the level of the ecological beliefs in this group indicates that belief rather than disbelief was at hand. Moreover, the non-significant interactions (i.e., no eco claim/eco claim X non-ingestible/ingestible and no eco claim/eco claim X unfamiliar/familiar) indicate that neither the ingestible factor nor the familiarity factor moderated the impact of the claim factor on ecological beliefs. This means that H4 and H5 were not supported.

For H2, three separate 2 X 2 X 2 ANOVAs were conducted, one for each of the belief variables (i.e., naturalness, environmentally friendly, and healthiness) that were hypothesized to be influenced by ecological claims. First, when *naturalness* was the dependent variable, there was a significant main effect of the ecological claim factor ($F = 8.37$, $p < .01$). In this ANOVA, there were also significant main effects of the ingestible factor ($F = 6.77$, $p = .01$) and the familiarity factor ($F = 7.09$, $p < .01$). No interaction between the factors was significant. The belief that the product is natural were weaker when it was not claimed that the product is ecological ($M = 5.53$) than when it was claimed that the product is ecological ($M = 6.56$), which provides support for an impact on ecological claims on beliefs that the product is natural.

Second, for *environmentally friendliness*, there was a significant main effect of the claim factor ($F = 20.79$, $p < .01$). The ingestible factor was also significant ($F = 31.41$, $p < .01$) and there was a significant three-way interaction involving all three factors ($F = 4.65$, $p < .05$). The belief that the product is environmentally friendly was weaker when it was not claimed that the product is ecological ($M = 4.79$) than when it was claimed that the product is ecological ($M = 5.75$). This provides support for an impact on ecological claims also on beliefs regarding environmental friendliness.

Third, for beliefs regarding *healthiness*, there was a significant main effect of the claim factor ($F = 3.86$, $p < .05$). The other factors influenced the healthiness beliefs, too; both the ingestible factor ($F = 20.10$, $p < .01$) and the familiarity factor ($F = 12.78$, $p < .01$) produced significant main effects. No interaction involving the claim factor, however, was significant. The level of healthiness beliefs was lower for the participants exposed to no ecological claim ($M = 4.80$) compared to those who were exposed to an ecological claim ($M = 5.26$). In sum, then, the results indicate that the ecological claim factor boosted beliefs regarding naturalness, environmental friendliness and healthiness. As an alternative indication of this, the ecological beliefs variable was positively and significantly correlated with beliefs that a product is natural ($r = .43$, $p < .01$), environmentally friendly ($r = .72$, $p < .01$), and healthy ($r = .38$, $p < .01$). H2, then, was supported for each of the three belief types.

Finally, with respect to H3, the same 2 X 2 X 2 ANOVA as above was used with the attitude towards the product as the dependent variable. In this analysis, there was a main effect of the claim factor ($F = 6.48$, $p < .05$) as well as a main effect of the ingestible factor ($F = 11.43$, $p < .01$) and the familiarity factor ($F = 9.08$, $p < .01$). No interactions were significant. Since the mean product attitude was lower for those participants who were not exposed to an ecological claim ($M = 6.21$) than for those who were exposed to an ecological claim ($M = 6.71$), H3 was supported.

4.2 Mediation analysis

The reasoning behind H1-H3 suggests that the impact of ecological claims on product attitudes is mediated by beliefs. To assess this explicitly, the authors of the present study used Hayes' (2012) approach to serial mediation analysis (i.e., Hayes' Model 6). More specifically, in this analysis, the three mediation chains in the Appendix were assessed (for each such

chain, the independent variable was coded as 1 = no ecological claim and 2 = ecological claim).

For the chain involving beliefs that a product is *natural*, the result was a significant indirect effect from the bootstrap analysis of 0.16 (95% CI [0.09, 0.27]) on the attitude towards the product. In this analysis, however, there was also a significant (and stronger) indirect effect for the chain "claim that the product is ecological–beliefs that the product is ecological–product attitude" ($b = 0.72$, $p < .01$). The direct effect of the claim factor on the attitude towards the product was not significant.

For the chain with *environmental friendliness*, the result was a non-significant indirect effect from the bootstrap analysis of 0.10 (95% CI [-0.07, 0.28]). Also in this analysis, however, there was a significant (and stronger) indirect effect for the chain "claim that the product is ecological–beliefs that the product is ecological–product attitude" ($b = 0.85$, $p < .01$) as well as a non-significant direct effect.

Finally, for the causal chain comprising *healthiness*, the result was a significant indirect effect from the bootstrap analysis of 0.18 (95% CI [0.02, 0.17]). In addition, there was again a significant (and stronger) indirect effect for the chain "claim that the product is ecological–beliefs that the product is ecological–product attitude ($b = 0.85$, $p < .01$) and a non-significant direct effect.

Taken together, then, these outcomes suggest that beliefs indeed mediated the influence of ecological claims on the attitude towards the product. The outcomes also indicate that the strongest influence of ecological claims on the product attitude was obtained for a simple mediation model with only ecological beliefs as the mediator. Serial mediation, however, could also be established for healthiness and naturalness (but not for environmental friendliness).

5. Discussion

5.1 Summary of main results

When products were presented with claims suggesting that they were "ecological", without any proofs for this, such unsubstantiated claims boosted beliefs that a product is indeed ecological. Moreover, the ecological claims enhanced conceptually related beliefs, in the sense that an ecological claim fostered stronger beliefs that the product is natural, environmentally friendly, and healthy. Finally, an ecological claim also had a positive impact on the overall attitude towards the product. This impact was mainly mediated by ecological beliefs, but beliefs that a product is natural and healthy contributed, too.

5.2 The results and the existing literature

The results regarding the impact of a claim that a product is "ecological" on ecological beliefs indicate that this type of claim is causally potent. This is at odds with arguments that consumers in general have a strong tendency toward disbelieving advertising claims (Darke and Ritchie, 2007; Obermiller and Spangenberg, 2000) and that they are becoming increasingly distrustful of green advertising (Segev *et al*., 2016) and green products (Goh and Balaji, 2016). It is also at odds with Carlson *et al*. (1993) and Moisander (2007), who argue that the frequent use of unsubstantiated environmental claims in green advertising has produced high levels of consumer skepticism. Similarly, the results with respect to an impact of ecological claims on ecological beliefs are in conflict with the Bickart and Ruth (2012) argument that advertising claims that are difficult for consumers to verify are likely to prompt skepticism.

Results indicating an impact of (unsubstantiated) ecological claims on ecological beliefs, however, are not surprising in the light of (a) arguments stressing that it is easier and more convenient for the mind to believe than to disbelieve (Asp *et al*., 2013; Gilbert, 1991) and (b) findings in previous research suggesting that we humans are often subject to a truth bias, in the sense that we tend to conclude that others are telling the truth when they are not (Gilbert *et al*., 1993; Street and Masip, 2015). The results are also in tune with empirical evidence showing that consumers can be highly susceptibility to deceptive advertising claims (Xie and Boush, 2011).

Moreover, the assumption that one particular belief can influence other (and conceptually related) beliefs (Burke *et al*., 1998; Larceneaux *et al*., 2012; Luchs *et al*., 2010; Lee *et al*., 2013) received some support in the present study, in the sense that the ecological beliefs were positively and significantly correlated with the other belief variables. In other words, an accepted belief can function as a premise in inferences about other beliefs (Mandelbaum and Quilty-Dunn, 2015). It should also be noted that the ecological claims in the present study can be seen as relatively vague in relation to specific claims providing detailed information that is backed up by facts. Davis (1993) and Oyedele and Dejong (2013) have presented results indicating that the latter type of claims in advertising produce more positive attitudes towards the advertised products. The results in the present study, however, indicate that even relatively vague and unspecific ecological claims can boost overall product attitudes.

5.3 Implications

One main task of marketers is to influence consumers in the pre-purchase part of their decision-making processes, and this task involves making claims that can influence customers' beliefs about a product (Burke *et al*., 1988). The results of the present study suggest that even unsubstantiated claims that a product is ecological can have a positive influence on customers beliefs that the product indeed is ecological, which in the next step have a positive impact on the product attitude (an important downstream variable, in the sense that it can influence purchase decisions). The results are thus encouraging for marketers with ecological products; given that they claim that their products are ecological, which requires little effort (i.e., the claims can be unsubstantiated), positive downstream effects can be expected.

However, the results have sinister implications if they encourage the use of unsubstantiated ecological claims also for marketers of products with questionable ecological characteristics. Making ecological claims in such cases is deceptive, which is problematic per se, but it becomes even more problematic if it results in beliefs that are not true (and in consumer purchases based on invalid beliefs). This is a highly unsettling outcome when, according to many observers, serious action is needed to mitigate human activities with a negative impact on the environment (e.g., Carrete *et al*., 2012; Larceneaux *et al*., 2012). The potency of unsubstantiated ecological claims is unsettling also for those that argue that (a) it is beneficial if consumers are able to process information about products in an informed way, (b)

consumers should be skeptical with respect to what marketers claim about products, and (c) it is beneficial, in general, with a critical mindset in relation to various messages and statements.

5.4 Limitations and suggestions for further research

The present study comprised products that were subject to variation with respect to being non-ingestible/ingestible and brand familiarity. Obviously, there are many other specific products of these types than those that were included here, so further research is needed to examine the impact of ecological claims also for other products. Moreover, the present study comprised unsubstantiated claims about *products*. Unsubstantiated claims, however, can also be made in terms of the *processes* by which a product is produced (Carlson *et al*., 1993). More research is needed to identify if claims of the latter type would result in the same pattern as in the present study.

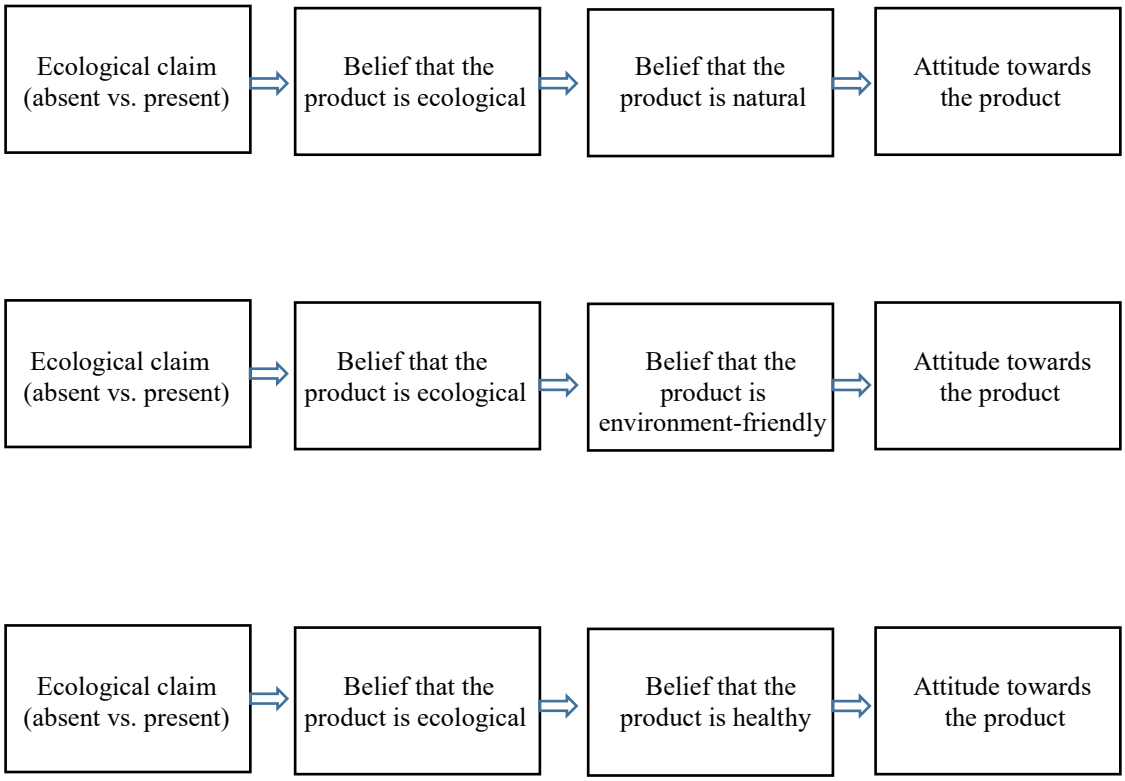
With respect to claims about a product being ecological, it was assumed in the present study that beliefs about the ecological nature of a product would influence beliefs about other product characteristics – an assumption that was supported. However, other beliefs than those that were included here may also be influenced by ecological claims (and such beliefs may serve as additional mediating variables in relation to overall product evaluations). For example, many consumers seem to believe that ecologic/organic/green products are more expensive (Young *et al*., 2010). Indeed, such products *are* typically more expensive (Luchs *et al*., 2010), which may have a negative impact on overall evaluations (and actual purchases). In addition, consumers are often aware that firms operate under various constraints. This means that the belief that a product has one particular attribute may result in the inference that it *cannot* have also another attribute (Luchs *et al*., 2010). More specifically, it has been indicted that green attributes typically are associated with gentleness (ibid.). Such associations, however, are in a potential conflict with attributes related to strength. That is to say, a product can be either gentle or strong, but not both (ibid.). In a situation in which a product is believed to be "ecological", then, there is a possibility that this results in beliefs that the product lacks strength. And if strength is a desirable product characteristic, the lack of strength is unlikely to boost the overall attitude towards the product. Thus the impact of ecological claims on cost-related beliefs and beliefs about gentleness/strength (and the mediating potential of such beliefs in relation to overall product evaluations) needs to be addressed in further research.

As for additional mediating variables, and given the assumption that what is meant by "ecological" is likely to be difficult to understand for laypersons, the extent to which a message is easy or difficult to understand may affect consumers' information processing, thus message comprehension should be included as an explicit variable in further research (cf. Manrai *et al*., 1997). Such research should also make attempts to explicate how consumers interpret "ecological" – particularly in terms of attributes versus abstract information that summarizes a product's characteristics (Pham and Muthukrishnan, 2002). That is to say, does the claim that a product is "ecological" result in perceptions of a product feature or a benefit from the consumer's point of view (cf. Fuchs and Diamantopoulos, 2010)? In the present study, "ecological" was viewed as one among several product attributes, but the complexity of this attribute, in terms of many potential benefits, means that it may have more in common with abstract information rather than attributes. The attribute-abstract information distinction has been shown to influence information processing (Pham and Muthukrishnan, 2002), so variables that capture this distinction may serve as mediators with respect to beliefs about the extent to which one particular product is ecological. Moreover, consumers may perceive ecological arguments not only as hard do understand, but also as deceptive (Carrete *et al*., 2012). Hence explicit measures of perceived deceptiveness should be included in further research.

When it comes to moderating variables, an attempt was made in the present study to assess if the influence of ecological claims on ecological beliefs was conditioned by two factors (ingestible versus non-ingestible products, and products with different levels of brand familiarity). There was not much evidence of any interaction between the claim factor and the other two factors, so they appear to be relatively unimportant as moderating variables. A by-product of the present study, however, was that the two factors (particularly the ingestible factor) produced significant main effects on several variables in the hypotheses. That is to say, ingestible products generated higher scores than non-ingestible products for all belief variables – and for the overall product evaluations. One possible reason is that ingestible products have hitherto been subject to more frequent ecological claims by firms than non-ingestible products, which may have fostered a higher level of fluency in the information processing regarding ingestible products (and this in turn may have boosted their scores).

In any event, there are other potentially moderating variables that should be assessed. It has been suggested, for example, that high involvement purchases may represent a condition in which consumers are less likely to be influenced by attributes related to products' environmental performance (Young *et al*., 2010). Several other person-related variables may also affect the impact of ecological claims on consumers' reactions. For example, it has been argued that younger consumers, as well as consumers with higher levels of education, are likely to be more sensitive to environmental issues (Carrete *et al*., 2012). It has also been argued, however, that older age is associated with a higher vulnerability for misleading information (Asp *et al*., 2012; Xie and Boush, 2011). Moreover, a high level of the individual's environmental concern has been shown to boost the impact of environment-related clues in ads (Bickart and Ruth, 2012). It is also likely that the individual's level of trust – in general (i.e., general trust), overall trust in what firms claims, or trust with respect to one particular sender of messages – would influence the extent to which he or she believes in claims made by the sender. Further research, then, should examine the impact of unsubstantiated ecological claims in such a way that it allows for an explicit assessment of the extent to which product involvement, age, education, environmental concerns, and trust are moderating variables.

Appendix:
The mediation assessments



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