The Challenge of Green Marketing Communication: Consumer Response to Communication Channel in Environmental Friendliness Perceptions and Product Evaluation

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Abstract

Understanding how packaging communication guides consumers in evaluating the environmental performance of a product is essential to promoting sustainable consumption. Previous studies suggest that while consumers are unable to verify the veracity of environmental information and the actual environmental impact of a product, they use packaging communication to evaluate packaging and product quality subjectively. However, few studies focus on the aspects of efficient and credible green marketing communication (GMC) and the role of communication channels used. This situation applies, in particular, consumers who have high environmental consciousness (HEC) but are skeptical, as they must balance the need for reliable product knowledge with a high sensitivity to the often ambiguous references to the environmental compatibility of a product (e.g., environmental motifs).

Three experimental studies were conducted to investigate the challenges of an effective GMC using different communication channels and their combined effects on different environmentally conscious target groups. The first study investigates consumers' responses to nonverbal packaging elements—graphical surface design and packaging material—regarding the perceived environmental friendliness of the product. The results showed that individuals with HEC tended to use packaging material to evaluate environmental friendliness and associated a package's graphical design with greenwashing. This study contributed to the literature by expanding on the knowledge about the effects of nonverbal packaging on (1) different types of environmentally conscious consumers and (2) demonstrating that there are gradations in nonverbal communication channels concerning how strongly consumers are linking these channels to attempts of greenwashing.

Building on these findings, in study 2, the effect of the communication channel specificity (verbal and nonverbal) on consumers' environmental skepticism and attention

during product presentation and effects on conveying product environment was investigated. The results revealed a complex interplay between communication channel specificity and the involvement of the environmental target groups—HEC and low environmental consciousness (LEC)—on consumers' skepticism and the evaluation of environmental friendliness. Study 2 contributes to the literature by providing a framework that may be used to address how channel specificity affects the reception of the marketing message by the intended audience, the ways the marketing message is presented, and how individual perspectives and expectations are formed. Within the elaboration likelihood model (ELM), the role of both verbal and nonverbal communication channels has been tested, revealing a theory-conform demand for elaboration, which depends on consumers' environmental consciousness. That is, when environmental information is provided verbally, text-based communication channels translate it into low skepticism for both HEC and LEC consumers. However, nonverbal, pictorial communication proved to be persuasive only for LEC consumers; HEC consumers exhibited high levels of skepticism, which, in turn, decreased perceived environmental friendliness.

In addition to the direct effect of the differently specific communication channels, the analysis of combined verbal and nonverbal communication channels provides promising starting points for effective GMC, which is addressed in-depth in study 3.

Study 3 explored the combined effects of an associative environmental communication channel when used in conjunction with a content congruent and incongruent specific communication channel. When these effects in the two consumer groups (HEC and LEC) were compared, the results showed that the use of environmental information transmitted via an associative communication channel, along with environmental information presented via a specific communication channel, reduces skepticism among HEC consumers. However, when environmental information presented through the associative communication

channel is presented in isolation, HEC consumers show a high degree of skepticism; that is, HEC consumer responses to nonverbal packaging elements interacted with verbal justification contexts, which is the specific verbal information. In accordance with ELM, this suggests a joint effect of central and peripheral processing of environmental information among HEC consumers. In contrast, this joint effect of elaborated processing revealed no significant impact on LEC consumers' skepticism.

The results of the three studies are relevant for marketing practitioners. Effective marketing strategies for different environmentally conscious target groups and an inclusive approach (i.e., target-group-independent) were deduced, and the implications for future research were presented.

Zusammenfassung

Für die Förderung eines nachhaltigen Konsums ist es wichtig zu verstehen, wovon Konsumenten Urteile zur Umweltfreundlichkeit eines Produkts ableiten. Zentraler Ansatzpunkt für die Vermittlung von Informationen über die Umweltfreundlichkeit eines Produktes ist die Gestaltung der Verpackung, z.B. die Verwendung von Umweltmotiven. So wird die Verpackungskommunikation zur wichtigen Basis, um die Qualität der Verpackungen und des Produktes subjektiv zu bewerten. Tatsächlich ist es Verbrauchern nur schwer möglich, die „echten" Umweltauswirkungen eines Produkts abzuschätzen.

Bislang gibt es nur wenig Forschung zu beeinflussenden Faktoren für eine effiziente und glaubwürdige umweltfreundliche Marketingkommunikation und die Rolle der verwendeten Kommunikationskanäle. Dies gilt insbesondere für die Kommunikation mit umweltbewussten – aber skeptischen – Konsumenten, da diese Zielgruppe das Bedürfnis nach verlässlicher Produktinformation hat und gleichzeitig sehr sensibel auf mehrdeutige oder unspezifische Produkthinweise (z.B. Produktbeschreibungen oder Umweltmotive) zur Umweltverträglichkeit eines Produktes reagiert. Diese führen eher dazu, dass Informationen als „Greenwashing" wahrgenommen werden. Dieser Begriff beschreibt, wie Unternehmen Verbraucher über Umweltpraktiken oder ökologische Vorteile ihrer Produkte oder Dienstleistungen in die Irre führen. Die aus dieser Irreführung resultierenden Reaktionen der Verbraucher könnten sich in einer Skepsis widerspiegeln: Verbraucher neigen in der Folge dazu, den Umweltinformationen, die über das Produkt vermittelt werden, zu misstrauen. Dies stellt eine zentrale Herausforderung für die Kommunikation umweltfreundlicher Produkteigenschaften über die Verpackung dar, da deren Wirksamkeit nicht gewährleistet ist und auch zu kontraproduktiven Effekten führen könnte: Die Umweltkommunikation könnte die Skepsis der Verbraucher gegenüber der Umwelt sogar noch erhöhen, die subjektive Bewertung der Umweltverträglichkeit wird als Greenwashing-Versuch angesehen.

In drei experimentellen Studien wurden die Herausforderungen an eine effektive, umweltfreundliche Marketingkommunikation unter Verwendung verschiedener Kommunikationskanäle und deren kombinierter Effekte auf unterschiedliche umweltbewusste Zielgruppen untersucht.

Die erste Studie untersuchte die Reaktionen der Verbraucher auf nonverbale Verpackungselemente – grafische Oberflächengestaltung und Verpackungsmaterial – im Hinblick auf die wahrgenommene Umweltfreundlichkeit des Produkts. Die Ergebnisse zeigten, dass umweltbewusste Konsumenten dazu neigen, die Umweltfreundlichkeit eines Produktes anhand des Verpackungsmaterials zu bewerten und die grafische Gestaltung einer Verpackung mit einem Greenwashing-Versuch in Verbindung bringen. Studie 1 erweiterte das Wissen darüber, wie sich nonverbale Verpackungskanäle auf (I.) unterschiedlich umweltbewusste Verbraucher auswirken und zeigte (II.), dass es Abstufungen zwischen den nonverbalen Kommunikationskanälen in Bezug darauf gibt, wie stark die Verbraucher diese Kanäle mit dem Versuch von Greenwashing in Verbindung bringen.

Aufbauend auf diesen Erkenntnissen wurde in Studie 2 die Wirkung der Kommunikationskanalspezifität (verbal und nonverbal) bei der Vermittlung der Produktumweltfreundlichkeit sowie die Skepsis und Aufmerksamkeit der Verbraucher mittels Bilder- und Textauswahl in Erinnerungsaufgaben mithilfe von Erhebungsskalen untersucht. Die Ergebnisse zeigten ein komplexes Zusammenspiel zwischen der Spezifität der Kommunikationskanäle und dem Involvement der Zielgruppen. Studie 2 leistet einen essentiellen Beitrag zur bisherigen Literatur. Es wurde ein Modell erstellt, mit dem untersucht wurde, wie die Kanalspezifität die Wahrnehmung einer umweltfreundlichen Marketingbotschaft die Zielgruppe beeinflusst und wie individuelle Bewertungen und Ansprüche an die Marketingbotschaft entstehen. Aufbauend auf dem Elaboration Likelihood Model (ELM) wurde die Rolle verbaler und nonverbaler Kommunikationskanäle getestet.

Dabei zeigte sich ein theoriekonformer Wunsch nach einer elaborierten Verarbeitung der umweltfreundlichen Information in Abhängigkeit vom Umweltbewusstsein der Konsumenten.

Neben der direkten Wirkung der unterschiedlich spezifischen Kommunikationskanäle bietet die Analyse der kombinierten verbalen und nonverbalen Kommunikationskanäle Ansatzpunkte für eine effektive, umweltfreundliche Produktkommunikation. Studie 3 befasste sich eingehend mit den kombinierten Wirkungen eines assoziativen Kommunikationskanals. Dabei wurde der kombinierte Effekt eines assoziativen Umweltkommunikationskanals in Verbindung mit einem inhaltskongruenten und -inkongruenten spezifischen Kommunikationskanal getestet. Ein Vergleich dieser Effekte in zwei Verbrauchergruppen (umweltbewusst vs. umweltunbewusst) zeigte, dass die Verwendung von Umweltinformationen, die sowohl über einen assoziativen als auch über einen spezifischen Kommunikationskanal präsentiert werden, die Skepsis der umweltbewussten Verbraucher verschwinden lässt. Werden Umweltinformationen nur über den assoziativen Kommunikationskanal präsentiert, zeigen sich umweltbewusste Konsumenten sehr skeptisch: Bei ihnen konfligieren die Inhalte der nonverbalen Verpackungselemente mit den verbalen Rechtfertigungen auf der Produktverpackung. In Übereinstimmung mit dem ELM deutet dies auf eine gemeinsame Wirkung der zentralen und peripheren Verarbeitung von Umweltinformationen bei den umweltbewussten Verbrauchern hin. Im Gegensatz dazu zeigte dieser gemeinsame Effekt der elaborierten Verarbeitung keine signifikanten Auswirkungen auf die Skepsis der umweltunbewussten Konsumenten.

Die Ergebnisse dieser Dissertation deuten darauf hin, dass einige Aspekte in der Kommunikation von umweltfreundlichen Produkteigenschaften beachtet werden müssen, um die primäre Zielgruppe der umweltbewussten Konsumenten von der Umweltfreundlichkeit eines Produktes zu überzeugen: Die Verwendung von vagen und assoziativen Kommunikationskanälen (z.B. durch die Verwendung von Motiven, Farben oder

Oberflächengestaltungen) sollte vermieden werden, da diese die Skepsis der

umweltbewussten Konsumenten und wahrgenommene Greenwashing-Intentionen verstärken.

Stattdessen sollten spezifische Kommunikationskanäle (z.B. durch Verwendung von

textbasierten Informationen, Siegeln oder Materialien) gewählt werden, da diese zu einer

geringen Umweltskepsis und damit zu einer hohen Wirksamkeit von Umweltinformationen

führen: Die Verbraucher schreiben dem Produkt ein hohes Maß an Umweltfreundlichkeit zu.

Die Studien zeigten, dass zwei bedeutende Unterschiede zu berücksichtigen sind:

- zwischen nonverbalen und verbalen Informationskanälen

- zwischen dem Grad des Informationsnutzens, der durch die Kommunikationskanäle
  bereitgestellt wird – der Spezifität

Die Unterscheidung zwischen nonverbalen und verbalen Informationskanälen ist sinnvoll in

Bezug auf die Motivation und Reizschwelle, die ein Kommunikationskanal für die

Verarbeitung benötigt. Sie bestimmt, ob eine über einen verbalen Kommunikationskanal

bereitgestellte Information von unterschiedlich motivierten und involvierten Konsumenten

wahrgenommen wird. Nonverbale Informationskanäle bieten den kommunikativen Vorteil,

Umweltinformationen schnell und für alle Verbraucher peripher wahrnehmbar zu

kommunizieren und erzielen dabei mehr Aufmerksamkeit auf Seiten der Verbraucher als eine

aufwändige Verarbeitung verbaler Kommunikationskanäle. Daher sind nonverbale

Kommunikationskanäle geeignet, eine Grundlage für eine schnelle, niedrigschwellige

Zuschreibung von Umweltqualitäten zu schaffen. Die Unterscheidung zwischen

verschiedenen spezifischen Kommunikationskanälen erweist sich als nützlich, da so zwischen

dem Informationsgehalt und der Substantivität der Kommunikationskanäle bei der

Vermittlung von Umweltfreundlichkeit differenziert werden kann. Es wurden außerdem

Unterschiede zwischen nonverbalen und verbalen Informationskanälen in der Hinsicht

festgestellt, inwieweit sich der Kommunikationskanal auf die tatsächliche

Umweltverträglichkeit der Verpackung oder des Produkts bezieht. Je substanzieller,

spezifischer und weniger vage sich ein Kommunikationskanal auf die Umweltauswirkungen

des Produktes oder der Verpackung bezieht, desto weniger wird diese Umweltinformation mit

Skepsis und Greenwashing-Absichten verknüpft.

Aus den Ergebnissen ist zu folgern, dass vage und assoziative

Umweltkommunikationskanäle nicht isoliert, sondern in Kombination mit spezifischen

Kanälen genutzt werden sollten. Die kombinierte Anwendung zeigte, dass der Inhalt des

vagen und assoziativen Kommunikationskanals als gerechtfertigt angesehen und damit

Skepsis ausräumt wird. Assoziative Umweltinformationen werden durch die kongruenten

Informationen des spezifischen Kommunikationskanals unterstützt und beseitigen so die

Skepsis gegenüber der assoziativen Umweltinformation.

Auch wenn umweltunbewusste Konsumenten nicht die primäre Zielgruppe sind,

könnten auch diese in ihrem Alltag nach umwelt- oder umweltbezogenen

Produkteigenschaften (z.B. Gesundheitszuträglichkeit) suchen. Die kombinierte Nutzung von

Kommunikationskanälen mit unterschiedlichen Spezifitäten erwies sich auch in dieser

Verbrauchergruppe als effizient. Für umweltunbewusste Konsumenten sind assoziative

Kommunikationskanäle in erster Linie vorhanden, um die Umweltverträglichkeit des

Produktes oder der Verpackung zu kommunizieren. Umweltunbewusste Konsumenten

beziehen ihre Produktinformationen primär aus peripheren, heuristischen

Verpackungshinweisen und sind weniger aufmerksam gegenüber spezifischen Informationen,

die eine kognitive Verarbeitung erfordern.

Die Ergebnisse der vorliegenden drei Studien sind für Marketing-Praktiker von großer

Relevanz. Es wurden effektive Marketingstrategien für verschieden umweltbewusste

Zielgruppen vorgestellt und ein integrativer, zielgruppenunabhängiger Ansatz abgeleitet

sowie Implikationen für die zukünftige Forschung vorgestellt. Zusammenfassend lässt sich

sagen, dass die vorliegende Dissertation die Basis für einen integrativen Ansatz zur

Effektivität umweltfreundlicher Marketingkommunikation bietet, der verschiedene

Kommunikationskanäle mit den Verarbeitungsanforderungen unterschiedlich

umweltbewusster Verbraucherzielgruppen verbindet.

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List of Abbreviations

CIP	Consumer Involvement Profile
EC	Environmental Consciousness
ELM	Elaboration Likelihood Model
GMC	Green Marketing Communication
HEC	High Environmental Consciousness
LEC	Low Environmental Consciousness
PII	Personal Involvement Inventory
PKM	Persuasive Knowledge Model
RQ	Research Question

1 General Introduction

The "Fridays For Future" phenomenon and the "Extinction Rebellion" protests exemplify the growing concern of consumers about threats associated with climate change, such as environmental degradation and the loss of natural resources (Bundesministerium für Umwelt, Naturschutz [BMUB/UBA], 2018; European Commission, 2013, 2014). Aside from the social and economic dimensions, the ecological dimension of environmental sustainability (i.e., the environment-related aspects) has emerged as a central issue for consumers in their everyday lives (Dirks, Kaiser, Klose, Pfeiffer, & Backhaus, 2010; Wonneberger & Matthes, 2016). In parallel, companies have responded to this trend by expanding the organic product sector and implementing environmental approaches for their products and services. For instance, the global market for organic food sales is estimated to have quintupled from 20 billion US dollars in 2001 to 97 billion US dollars in 2017. Companies such as Procter & Gambler have expanded their product lines and are now offering well-known products, such as the detergent "Tide" in an environment-friendly way (Procter & Gambler [P&C], 2016), and promoting their products with environmental features (e.g., a packaging made from recycled materials). At the same time, for consumers, it is extremely difficult to ascertain the factual environmental friendliness of a product in the sense of a life-cycle analysis that considers the environmental impact of all phases of the product life cycle because environmental friendliness is not visible when looking at the product.

The mission of green marketing is to focus on communicating the environmental friendliness of products and services to consumers to make environmental friendliness visible (Boks & Stevels, 2007; Cone, 2011; Esslinger, 2011; Polonsky, 1994). Green marketing communication (GMC) refers to the communication of the environmental aspects of products, services, and company activities, such as being resource-efficient, organic, or free from chemicals. GMC also includes the communication of these qualities on the product, such as

via packaging or product tags, and communication at the point-of-sale (e.g., via paper stands and posters).

Hence, it is of little surprise that GMC is also misused to greenwash conventional products (i.e., communicating a pro-environmental image through the package), though the product is not. On the contrary, genuinely environmentally friendly products may not always look as such: innovations in processing technologies and packaging material development enable companies to produce factual environmental products and packaging with conventional looks (Hanss & Böhm, 2012), though the environmental innovations are not apparent.

Marketing information that cannot be easily verified by consumers is very likely to be afflicted with skepticism, mistrust, and concerns regarding the credibility of the marketing communication (Forehand & Grier, 2003) and the company's intentions (Miller & Sinclair, 2009). The same problem applies to GMC; ambiguous and unspecific environmental information appears to lead consumers to perceive the information as greenwashing (Baum, 2012; Delmas & Burbano, 2011; Parguel, Benoit-Moreau, & Russell, 2015). For example, TerraChoice (2010) found that 95 % of the product claims investigated in the USA contained at least one greenwashing statement. Consequently, skepticism and mistrust influence the subjective evaluations of environmental friendliness, because consumers are unable to or are only to a limited extent able to assess the actual environmental friendliness of the products (BMUB/UBA, 2015; Chen & Chang, 2013; Paço & Reis, 2012). As a result, actual consumer behavior and market development in the market for environmental products and services lag significantly behind the declared intentions of consumers (Vermeir & Verbeke, 2006).

The fact that the success of GMC is regarded as marginal poses a challenge to the relationship between environmentally conscious consumers, companies that produce and distribute environmental products, and GMC (Hartmann & Apaolaza-Ibáñez, 2006).

Accordingly, a major barrier to a more environmental practice is the lack of knowledge about

how organic products should be designed to effectively communicate environmental qualities

to consumers (D'Souza & Taghian, 2005; Grimmer & Woolley, 2014; Leonidou & Leonidou,

2011). This topic is relevant not only for companies but also for consumers because they

struggle to recognize organic products and to differentiate them from conventional ones

(Brune, 1994).

Figure 1. Relationship between, consumer culture, product, and communication in the

environmental context
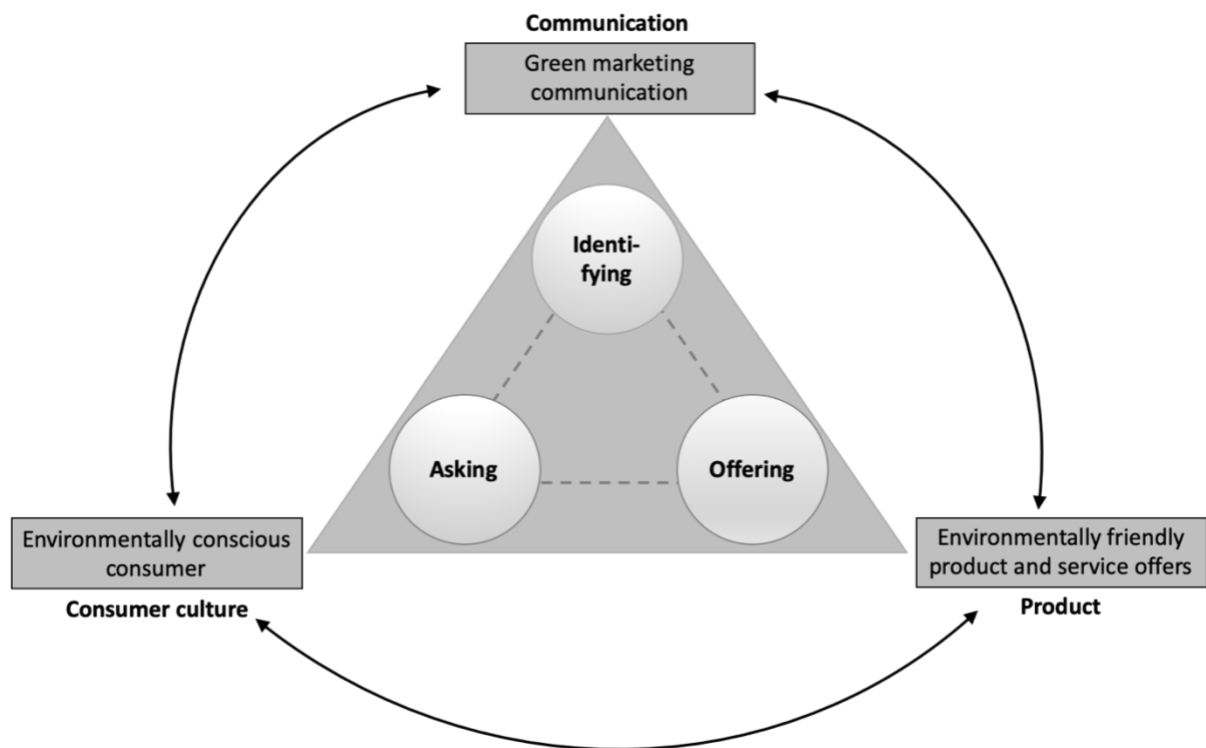
Note. Adapted from Brune (1994)

Surprisingly, companies do not refer to these uncertainties and invest vast amounts of money in green marketing campaigns and product designs without clearly knowing how these affect their audiences. Likewise, there is little research focusing on which aspects constitute an efficient and credible environmental communication (D'Souza, 2004).

Therefore, the design and use of environmental information in marketing communication is a delicate matter that can affect communication effectiveness and the company image. It is particularly important to identify what is necessary to make GMC an entirely understandable and valuable source of information (Carlson, Grove, & Kangun, 1993). However, in the absence of these differentiated insights, the effectiveness of GMC can be compromised. Thus, it is important to understand how the choice of communication channels for communicating environmental content contributes to the effectiveness of GMC. This thesis helps in gaining a better understanding of how different consumers respond, and which communication channels and processes make environmental communication more effective for one target group than another. Consumer evaluations of product environmental friendliness, greenwashing, and related perceptual processes will be investigated, and practical implications for research and practice will be derived.

2 Theoretical Background

2.1 Product

Product environmental friendliness.

One of the success factors of product marketing is the product's attributes (Meyers-Levy & Tybout, 1989). Environmental products are products with environmentally oriented product attributes. This means that they fit into the ecological dimension of sustainability and not the social or economic dimension (Balderjahn, 2004; Furchheim, 2014). Products can be transformed into environmentally oriented alternatives in various ways throughout the stages of the product life-cycle. The stages include addressing the product itself (e.g., being genetically unmodified or free of toxic substances, such as aerosols), the production and handling of the product (e.g., being energy- and water-efficient), the packaging, and, finally, the disposal of the product (e.g., being made from renewable resources or recycled material). Thereby, products achieve their environmental friendliness through the use of environmentally friendly alternatives which add environmental value to the product, compared to conventional products. This definition thus clearly contrasts against definitions in which the environmental friendliness of products is achieved by reducing consumers' consumption level of the products. In other words, when talking about the environmental attributes of a product in this thesis, it is assumed that these incorporate a reduction of waste and environmental pollution; managing renewable resources, or using them only to the extent that they can be reproduced by nature or with human assistance; and managing non-renewable resources, or using them only to the extent that alternative substitutes can be used (Caspers-Merk, 1996).

Evaluation of product environmental friendliness.

In contrast to the previously defined concept of product environmental friendliness, addressing the factual environmental friendliness of a product (e.g., in terms of a life-cycle

analysis), consumers' evaluation of product environmental friendliness describes the degree

to which a (potential) consumer perceives a product as being environmentally friendly. This

subjective evaluation of the customer does not necessarily correspond to the actual, at least

theoretically, objectively determinable environmental friendliness of the product, since

consumers only have limited information about products and often this information is affected

by marketing communication (Hanss & Böhm, 2012). Indeed, prior research has shown that

consumers tend not to ask for more information about the product's factual qualities (e.g.,

environmental friendliness) if the given clues are insufficient or incomplete. Instead,

consumers subjectively evaluate the qualities of a product by extrinsic product attributes

(Ehrich & Irwin, 2005; Kardes, Sanbonmatsu, & Herr, 1990; Olson & Jacoby, 1972). Hence,

if consumers are seeking an environmentally friendly product, their subjective evaluation of

how environmentally friendly they perceive the product is the determining factor. As such,

investigating consumers' evaluations of product environmental friendliness is particularly

important because private households constitute a major proportion of 30% to 50% of the

total environmental impact and thus have a significant influence on the overall environmental

footprint (Wimmer, 2001).

2.2 Green marketing communication (GMC)

GMC encompasses the direct intersection between consumers and products. Through

perceptible cues and information elements, advertising and products attempt to convey

environmental product and service attributes to the recipient (Zeh, 2010). These informational

cues relate the external appearance to the content attributed to the product (Zeh, 2010). One

difficulty in this respect concerns the interpretation and understanding of the communication

features used. Consequently, the aim is to identify environmental communication features that

are suitable for effectively communicating the environmental benefits of products and

services to consumers (Zeh, 2010). In other words, effective GMC is defined as the

communication inducing consumers to attribute environmental friendliness to the product.

The marketing and consumer psychological literature agrees that there is a large amount of research that is concerned with identifying GMC determinants that may affect consumer's purchase decisions (e.g. *environmental involvement:* Albayrak, Aksoy, & Caber, 2013; Barber, Taylor, & Strick, 2009; Biel & Grankvist, 2010; D'Souza, Taghian, & Khosla, 2007; Grimmer & Woolley, 2014; Joshi & Rahman, 2015; Schlegelmilch, Bohlen, & Diamantopoulos, 1996; Schuhwerk & Lefkoff-Hagius, 1995; *charcateristics of individuals:* Cleveland, Kalamas, & Laroche, 2005; Grimmer & Woolley, 2014; Han & Chung, 2014; *product involvemnent:* Barber et al., 2009; Follows & Jobber, 2000; Joshi & Rahman, 2015; *individuals' skepticism and locus of control:* Albayrak et al., 2013; Biel & Grankvist, 2010; Cleveland et al., 2005; *functional and environmental product attributes:* D'Souza et al., 2007; price and financial risk: D'Souza et al., 2007; Han & Chung, 2014; *socio-demographics:* Diamantopoulos, Schlegelmilch, Sinkovics, & Bohlen, 2003; product communication: Grankvist & Biel, 2007; Grimmer & Woolley, 2014; Martinho, Pires, Portela, & Fonseca, 2015; Pickett-Baker & Ozaki, 2008; Rahbar & Wahid, 2011; *manufacturer image:* Pickett-Baker & Ozaki, 2008; *quality trade-off and performance risk/trust:* Han & Chung, 2014; Pickett-Baker & Ozaki, 2008) and those that may affect consumer attitudes toward a product (e.g. *environmental involvement:* Hartmann & Apaolaza-Ibáñez, 2006, 2012; Magnier & Schoormans, 2015; Rana, 2013; Schuhwerk & Lefkoff-Hagius, 1995; Wonneberger & Matthes, 2016; *consumption pattern and experience:* Hartmann & Apaolaza-Ibáñez, 2006, 2008*; product involvement:* Rana, 2013; *brand influence and positioning:* Hartmann & Apaolaza-Ibáñez, 2008; Hartmann, Apaolaza-Ibáñez, & Sainz, 2005; *self-expressive product benefits:* Hartmann & Apaolaza-Ibáñez, 2012; *type and strength of environmental communication:* Hartmann & Apaolaza-Ibáñez, 2009; Magnier & Schoormans, 2015; Schmuck, Matthes, Naderer, & Beaufort, 2018; Searles, 2010; Spack, Board, Crighton,

Kostka, & Ivory, 2012; *pictorial stimuli:* Hartmann & Apaolaza-Ibáñez, 2010; Hartmann,

Apaolaza-Ibáñez & Eisend, 2016; Spack et al., 2012). However, insufficient research has

been done into the effectiveness of GMC (Chamorro, Rubio, & Miranda, 2009; D'Souza &

Taghian, 2005; Leonidou, Leonidou, Palihawadana, & Hultman, 2011; Maignan & Ferrell,

2004; Pickett-Baker & Ozaki, 2008; Rex & Baumann, 2007). However, D'Souza and Taghian

(2005) point out that there is limited knowledge about which influence factors are relevant in

GMC and influence its effectiveness. Thus, starting in parallel to general marketing

communication research, some studies address these calls for research and investigate the

influence of the sender, message, receiver, context, and channel variables for the GMC. An

overview of the factors addressed in these categories can be found in Table 1.

Table 1. Factors influencing the effectiveness of GMC

Influencing factors	Sources
Sender	
Source credibility	(Li, 2013; Swaen & Vanhamme, 2005)
Marketing effort	(Chang, 2011)
Message	
Argument strength of environmental advertising texts	(Chan, 2000a; Chan & Lau, 2004; Chang, 2011; De Vlieger, Hudders, & Verleye, 2012; Manrai, Manrai, Lascu, & Ryans, 1997; Schmuck, Matthes, & Naderer, 2018; Spack et al., 2012)
Framing and content orientation:	
functional vs. environmental	(Rios, Luque Martínez, Moreno, & Soriano, 2006)
emotional vs. functional	(Hartmann et al., 2005; Matthes, Wonneberger, & Schmuck, 2014)
future vs. present environmental orientation	(Bolger, Bolger, Davis, & Rafaeli, 2003; Davis, 1995)
product-related vs. industry-related	(Montoro-Rios, Luque-Martínez, & Rodríguez-Molina, 2008)
company internal vs. external	(Davis, 1994)
consumer vs. company	(Banerjee & Iyer, 1995)

Receiver	
Involvement (environmental consciousness; environmental concern)	(Alves et al., 2016; Bickart & Ruth, 2012; Hartmann & Apaolaza-Ibáñez, 2012; Kinnear & Taylor, 1973; Magnier & Schoormans, 2015; Magnier, Schoormans, & Mugge, 2016; Schuhwerk & Lefkoff-Hagius, 1995)
Ambivalent attitudes about green products	(Chang, 2011)
Attitude towards advertising generally	(MacKenzie & Lutz, 1989)
Skepticism	(Cleveland et al., 2005; Mohr, Eroğlu, & Ellen, 1998; Obermiller, 1995))
Context	
Product presentation (separately vs. jointly)	(Tanner, 2008)
Price	(Bhate & Lawler, 1997; D'Souza et al., 2007)
Channel	
Pictorial cues vs. absence of pictorial cues	(Hartmann, & Apaolaza-Ibáñez, 2009, 2012; Hartmann et al., 2005)
Labels vs. absence of labels	(Hume, 1991; Pancer, McShane, & Noseworthy, 2017; Rios et al., 2006; Spack et al., 2012)

This overview indicates that the limited research on GMC effectiveness is not equally well understood, and, especially, the variables of the sender, the receiver, the context, and the channel require further investigation. Thus, in examining the influence on GMC effectiveness, analysis or manipulation of the individual variables is not sufficient. Instead, the combined effects of these variables should be considered, as found in general marketing communication (Moser, 2015).

Another issue in GMC research is that most of the research done focus on advertisement communication. Only some studies focus on the environmental information used on the product - the packaging (Hartmann & Apaolaza-Ibáñez, 2006; Magnier & Crié,

2015; Magnier & Schoormans, 2015; Pancer et al., 2017; Parguel et al., 2015; Schmuck et al., 2018; Spack et al., 2012). However, exposure to product packaging, especially during the usage period, is crucial in determining which product perceptions, experiences, emotional reactions and images the consumer derives from the product (Cohen & Areni, 1991; Kotler & Rath, 1984; Kroeber-Riel, 1996). Furthermore, a study by Procter & Gamble revealed that packaging communication, in particular, plays an important role regarding the impressions and product attributes the consumer ascribes to the product (Meyer, 2001). The problem, however, is that only "minimal attention has been devoted to understanding how the design of the green claim [cues] itself affects the processing of the message [information] and its effectiveness" (Hartmann & Apaolaza-Ibáñez, 2009, p. 719). The GMC focus of this thesis is to explore the communication options of a traditional marketing element—the packaging communication—for environmental product attributes.

Product packaging as a key component of marketing communication.

Consumers are exposed to products on the shelf that are packaged in their packaging. The packaging acts thereby as a communication vehicle for transmitting symbolism and informational content via its physical elements (Underwood, 2003). Throughout the product development, packaging has played a significant role in communicating information about the product in today's supermarkets despite the constantly growing variety of product (Kuvykaite, Dovaliene, & Navickiene, 2009). Through the product information, consumers can gain the product information needed without having to talk to a retailer (Meinecke, 1996). A special feature of packaging communication is its long-lasting marketing impact. Thus, starting at the point of sale, the product conveys information at the point of use and usually only finishes after the product has been fully consumed (Grösser, 1991; Meyer, 2001). Hence, the packaging of the product is a decisive factor for influencing product and consumer decisions (Bloch, 1995; Crilly, Moultrie, & Clarkson, 2004.; Fenko, Schifferstein, & Hekkert,

2008; Kuvykaite, et al., 2009), and particularly in situations in which intrinsic product

information is not readily available (Olson & Jacoby, 1972). Therefore, packaging acts as an

extrinsic product characteristic, which means that packaging communication is product-

related, but not an element of the physical product itself (Olson & Jacoby, 1972). The

elements of the packaging serve to communicate with the consumer. These stimuli and

information are designed in such a way that they influence the reaction of the recipients and,

at best, influence the desired consumer behavior (Mittal, 2014).

A straightforward way of differentiating between packaging elements is to distinguish

between verbal and nonverbal information elements. Although numerous attempts to

differentiate and categorize packaging communication elements coexist, their core elements

are often very similar. For instance, Rettie and Brewer (2000) refer to the same elements by

naming them verbal and visual elements, or visual and informational elements in the work of

Silayoi and Speece (2004, 2007). A detailed overview of the subcategories falling under

verbal and nonverbal information elements can be found in Figure 2, which is based on

Langner, Esch, and Kühn (2009) and Magnier and Crié (2015). Although other authors

distinguish between various quantities of categories, such as Smith and Taylor (2004)

distinguish between six categories: form, size, color, graphics, material, and flavor, as does

Kotler (2015) with form, size, color, material, text, and brand. Vila and Ampuero (2007), as

well as Underwood (2003), distinguish between graphic elements (images, color, typography,

shapes) and structural elements (form, size, material).

Figure 2. Products as physical carriers of information: elements of communication design.
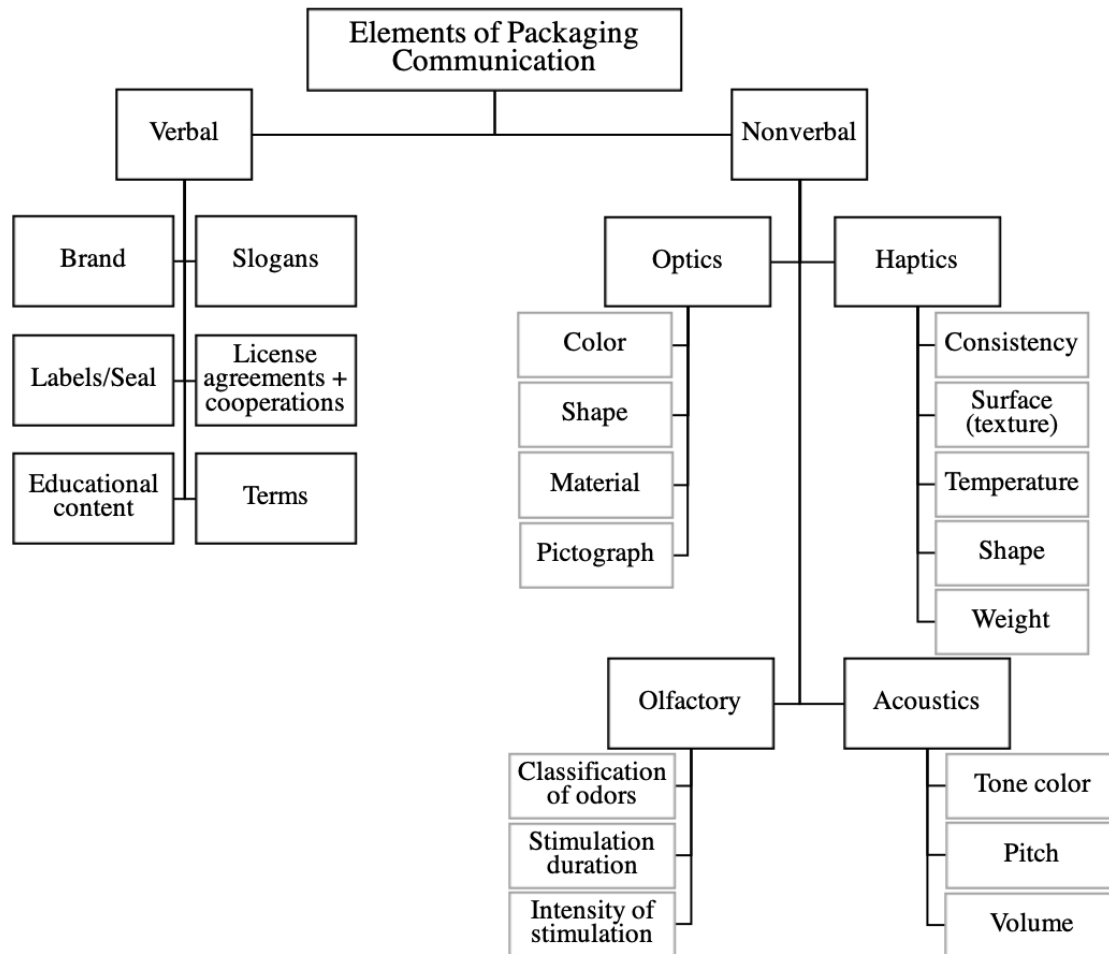
Note. Modification based on Langner et al. (2009, p. 289) and Magnier and Crié (2015).

All of these approaches have in common that the communication elements are incompletely represented and do fall into the category of verbal and nonverbal elements. In this work, the framework of verbal and nonverbal packaging elements is chosen as the basis for evaluation and communication effectiveness.

Channel specificity.

An even more important factor for investigating GMC effectiveness is how these packaging elements convey information. Research into the use of text-argument specificity showed that specific advertising messages are more credible and memorable than vague advertising texts. The high specificity of an advertising text has a positive influence on how consumers judge the objectivity and credibility of the advertising message (Ford, Smith, & Swasy, 1990), which indicates a positive influence on the evaluation of the brand and purchase intentions of consumers (Darley & Smith, 1993). Communication channels differ in their information utility and how they convey meaning (for an overview, see Langner et al., 2009). Channel specificity is a generic term used to describe the informativeness, substantiality, concreteness, quality, and strength of a communication channel to communicate information contents (e.g., environmental friendliness). In this context, this definition means that channel specificity is the extent to which environmental information is communicated via specific and substantive product or process-related information or via a communication channel that requires the viewer to interpret the content shown (Hansen & MacHin, 2013; Parguel, et al., 2015). Thereby, the channel specificity of a packaging communication ranges from providing (I) specific information, such as environmental compatibility to (II) an associative, appealing incentive to buy the product by means of information that looks appealing and stimulating, by explaining the product and its intended use—for a detailed overview see Kaltenbach (1975).

Regarding Ad I, the function of packaging as a medium of specific information aims to meet customers' need for substantial and specific information and provide answers during active information searches, such as an eco-certification of the product. This conscious examination of packaging communication aims to enable orientation and risk assessment in the purchasing decision as viewed from a consumer perspective. Meanwhile, the

communication goal of the company is to achieve market transparency and increase trustworthiness for their products (Kaltenbach, 1975).

Regarding Ad II, the function of packaging as a medium of association, appearance, and stimulation is also used to communicate information; however, it is employed with a more subtle and associative character. The information is vague, and its meaning depends on the consumer's interpretation of the associative elements. This type of packaging communication aims to facilitate product classification, make the product stand out, and foster impulses and suggestions according to which the consumer can classify the product holistically (Kaltenbach, 1975).

The side effect of green marketing communication: Greenwashing.

The difficulty with GMC is that consumers are not or are (only to a restricted extent) able to evaluate the genuine environmental performance of products. Accordingly, consumers evaluate the environmental performance subjectively, which makes them vulnerable to disinformation attempts. This side effect of environmental communication, known under the neologism "greenwashing" (Delmas & Burbano, 2011), describes "the act of misleading consumers regarding the environmental practices of a company or the environmental benefits of a product or service" (TerraChoice, 2010; for an overview see Seele & Gatti, 2017). The wide range of misleading uses and difficulties for consumers is illustrated in the following examples, which address the issue of synthesizing competing environmental impacts of a product and the issue of non-identifiable environmental performance due to conventional product appearance. Supermarkets exchanged disposable plastic carriers for long-life bags marked as "longlife" or "made from renewable raw materials." However, the socially widespread opinion and the scientific assessment of the actual environmental impacts arising from these two bags differ considerably. In contrast to the widely held opinion, cradle to grave analysis (i.e., analysis for assessing the environmental impact throughout all phases of

the product life cycle) shows that long-life bags are more polluting to the environment because they are usually more energy- and water-intensive to produce than disposable plastic bags and take longer to decompose. According to calculations, the use of long-life bags is only more environmentally friendly if the bags are used more than 40 times (Markert, Evers, & Schönfeld, 2016). However, as most consumers are unable or unwilling to synthesize the competing findings of scientists or environmentalists, this results in uncertainty and skepticism about environment-friendly products or marketing communications (BMUB/UBA, 2015; Chen & Chang, 2013; do Paço & Reis, 2012)

Other examples show that truly environmental products may not necessarily be identified as such: organic products are often packaged in conventional packaging that does not reflect the actual environmental performance of the product (ILIA or RMS Beauty). At the same time, innovations in processing and packaging technologies enable manufacturers to produce de facto environmental packaging with a conventional look (Hanss & Böhm, 2012). For example, the water "Biota" is bottled in Nature Works Polylactide that is made from corn, therefore being from renewable resources and commercially compostable (Eilert, 2005; Lingle, 2005). Tomasula and colleagues are currently developing a new packaging material that looks like a thin plastic film. However, this film is composed of milk proteins to help prevent food spoilage American Chemical Society [ACS], 2016). Besides these innovations, manufacturers also reuse and recycle conventional packaging materials. Here too, the portion of the recycled, environmentally friendly benefit is indistinguishable from conventional alternatives.

Earlier work investigating greenwashing effects focused primarily on greenwashing attempts triggered by verbal, text-based environmental information, or its absence. Thus Kangun, Carlson, and Grove (1991) identified three triggers for verbal, text-based greenwashing: (I.) using false environmental information, (II.) omitting relevant information

that could be useful for evaluating environmental friendliness, and (III.) when formulating ambiguous and vaguely environmental information, thus causing unclarity. Later, nonverbal, executional information also became considered as a particularly relevant and frequently occurring source for greenwashing (Parguel et al., 2015). Indeed, the use of executional communications elements in GMC is very prominent. Executional greenwashing refers to the use of eco-designed, environmental-evoking nonverbal elements which intentionally or unintentionally induce a false image of the environmental friendliness of the product, service or company.

Consumers, however, are equally capable of considering possible practices of marketers (that is, regarding the environmental information of a product) in an attempt to persuade consumers (Chang, 2011). This knowledge about marketing tactics can explain consumers' skepticism (Persuasion Knowledge Model; Friestad & Wright, 1994). It raises the question of how consumers' environmental skepticism when receiving a GMC influences its effectiveness (Paço & Reis, 2012; Royne, Martinez, Oakley, & Fox, 2013). Credibility is an important indicator of marketing effectiveness (MacKenzie & Lutz, 1989); thus, the question of how consumers' skepticism toward GMC affects its communicative effectiveness arises. Consumer's environmental skepticism is defined as the tendency of consumers toward disbelief of environmental information made on the product, and it is based on the construct of green claim skepticism introduced by Mohr et al. (1998). By investigating the challenge of GMC effectiveness when used on product packaging, given that the effectiveness of environmental packaging communication is not assured and could even be counterproductive (e.g., perception of greenwashing and increased consumer skepticism), this thesis contributes to the field of psychological market-research. Specifically, by exploring the impact of GMC from a consumer and environmental-psychological perspective, consumer responses, as well as relevant psychological factors (such as skepticism towards the credibility of green

advertising messages) and the reception of information as a function of involvement, are investigated. In the following section, a more detailed description is given.

2.3 Consumer culture

The main target group of environmentally friendly products and GMC are the "green," HEC consumers. These are consumers who base their purchasing decisions at least in part on personal environment-related criteria and are willing to spend more money on the environmental friendliness of a product.

Environmental consciousness (EC).

Environmental consciousness (EC), as a collective term for environmental orientation, is defined in this thesis as the extent of the individual's attitude and willingness to behave in an environmentally relevant manner as well as consumers' actual behavior and consumption patterns with respect to the environment (Küthe, 2013; Schahn & Holzer, 1990, p. 186). In contrast to this, the social understanding of EC often reflects a very global environmental attitude (e.g., "I am in favor of environmental protection") or for describing a global dissatisfaction and worries regarding the deterioration of the quality of the environment (BMUB/UBA, 2015). Although public consciousness in environmental issues is growing, and consumers report mostly positive attitudes toward environmental protection, behavior patterns are not clearly in line with these attitudes (Vermeir & Verbeke, 2006). One of the reasons for this attitude-behavior gap is rooted in the definition and assessment of EC. Based on Maloney and Ward (1973), a wealth of heterogeneous scales has developed in the past 45 years (Amelang, Tepe, Vagt, & Wendt, 1977; Schahn & Holzer, 1990; Schahn, Damian, Schurig, & Füchsle, 1999; Van Liere & Dunlap, 1981; c.f. overview: Diamantopoulos et al., 2003). However, no comparative evaluation of the scales, the differences between the key components, or a standardized scale exists (Sánchez & Lafuente, 2010; Schahn et al., 1999). Despite this lack, environmental psychological research has investigated predictors for actual

environmental consumption behavior. Thereby it was shown that the environmental attitude

and the intentions to buy environmentally friendly products are particularly decisive for actual

environmentally conscious consumption. Other dimensions of the EC, such as environmental

value orientation, knowledge or affect, lacked in predictive value for actual environmental

consumer behavior (Chan & Chan, 2001; Chekima, Chekima, Syed Khalid Wafa, Igaua, &

Sondoh, 2016; Kassarjian, 1971; Roberts & Straughan, 1999; Schahn & Holzer, 1990; Schahn

et al., 1999; Schlegelmilch et al., 1996).

Thus, I base my definition of EC and measurement scale on three concept areas: (I)

environmental attitudes, (II) environmental behavior willingness, (III) and self-reported

environmental behavior. Regarding Ad I, environmental attitude—"attitudes," in the

terminology of Maloney and Ward (1973)—refers to external attitudes toward environmental

protection which includes anxieties, indignation, anger, normative orientations and values

(Grunenberg & Kuckartz, 2003, p. 27). Regarding Ad II, environmental behavioral

willingness ("verbal commitment," Malony & Ward, 1973) is understood in terms of verbally

expressed intention pointing toward future intentions to behave in environmentally friendly

(Grunenberg & Kuckartz, 2003, p. 27). Regarding Ad III, self-reported environmental

behavior ("actual commitment," Maloney & Ward, 1973) refers to behavior as a self-reported

behavior in environmentally relevant everyday situations (Grunenberg & Kuckartz, 2003, p.

27). Thus, consumers' EC is understood in the context of the thesis as the personal

environmental involvement of consumers.

Consumers' involvement level.

Extensive work in the domain of consumer research, and specifically regarding

advertising research, has been devoted to studying the strategic impact of media. A key

determinant in this context affecting the persuasiveness and perception of marketing

information proved to be consumers' involvement level. Particularly, this relates to

understanding how the processing of marketing information influences the evaluation of

brand and product attitudes and memory formation processes at varying levels of consumer

involvement (Lien, 2001).

Involvement is an expression of the individual's participation (Kroeber-Riel &

Weinberg, 2003, p. 345), the degree of activation and the motivational strength a person

employs for object-oriented information search, reception, processing and storage

(Trommsdorff, 1998, p. 50). The involvement is not a model of communication research but

rather a concept used for models in which information processing processes are examined

with a dependence on the involvement of the recipient (Hößl, 2004). While there are different

definitions of the involvement concept—for an overview, see Schenk (2002, pp. 265–267)—

the definition of involvement in terms of stimulus salience seems to be the most important for

consumer responses toward marketing communication and is the definition used for the

elaboration likelihood model presented in the below (Hößl, 2004; Petty & Cacioppo, 1981).

Thus, involvement refers to whether the recipient ascribes a high personal importance to the

object or subject. Hence, it is not essential whether this is, in fact, important, but rather

whether the recipient perceives it as such (involvement is defined as stimulus salience: Hößl,

2004; Schenk, 2002).

The elaboration likelihood model (ELM).

The elaboration likelihood model (ELM; Petty & Cacioppo, 1986; Petty, Cacioppo, &

Schumann, 1989) has emerged as the most widely-cited model in cognitive and social

psychology as well as in consumer research during recent years (Lien, 2001; Rodgers &

Thorson, 2019). The ELM provides a useful framework within consumer involvement and is

used to determine persuasive routes. The model suggests that two different routes of

persuasion can be followed when dealing with marketing communication and its

effectiveness. The first, known as "the central route," refers to the elaborate cognitive

processing of marketing information. This processing mode aims to determine a communication structure, to work out the relationship between the different elements and to evaluate their commonality (Winston & Cupchik, 1992; Zeh, 2010). This high likelihood of elaboration is expected of recipients who are heavily involved. As a consequence, the ELM outlines that attitude changes resulting from a high elaboration of information, the central route of persuasion, are more stable over time. To summarize, the central route of the persuasion can also be regarded as the more objective route of information processing.

The other route of persuasion is known as the "peripheral route" and refers to a superficial, peripheral examination of marketing information. In other words, if the elaboration likelihood is low, the associative and emotional effect of information stimuli is central, while cognitive-analytical processes remain at a minimum. Consequently, the contents of the communication are not subjected to intensive analysis, but rather link the stimuli to specific emotional reactions. The association and generalization of the information are at the center of interest (Winston & Cupchik, 1992; Zeh, 2010). Attitudes resulting from peripheral information processing are less persistent. To summarize, the peripheral route of persuasion can be considered to be the more subjective and associative route of information processing (for review of ELM see: Kitchen, Kerr, Schultz, McColl, & Pals, 2014; Lien, 2001).

These two routes of exploration represent the two extreme positions on a continuum between an elaborate and inspective as opposed to a heuristic and affective mode of perception (Wohlwill, 1981; Zeh, 2010). In the examination and evaluation of marketing information, it can be argued that different communication contents and channels might be more or less suitable for different modes of perception, and thus also for effective communication. In other words, effective marketing communication might depend on whether the information is designed for an elaborated processing and/or a heuristic associative

exploration. Following the reasoning of the philosopher, Marshall McLuhan, in "Understanding Media," where he emphasized that "the medium is the message" and the communication medium should be analyzed to understand the real meaning of a communication, the key to effective GMC might be the communication channel used to transmit environmental information.

However, persuasion strategies attempting to encourage more environmentally friendly consumer behavior have so far had only very limited success (Hartmann & Apaolaza-Ibáñez, 2006). Therefore, it is important to understand how GMC can help to satisfy consumers' EC when they are exposed to environmental packaging information. In other words, environmental packaging information signals to the consumer that he or she has contributed to solving the environmental challenge.

3 Research questions and overview of empirical studies[1]

This dissertation follows the call for research by Chamorro, Rubio, and Miranda (2009) and Rex and Baumann (2007) to conduct a more detailed exploration of the methods and effectiveness of GMC. Thus, to address the three key concepts of the relationship between product, communication, and consumer culture in an environmental context, I will present the challenges resulting from these concepts and the research questions answered in this dissertation. More precisely, the challenges of the product concept area focus on how perceptions of environment-friendly product quality are offered via different packaging channels. Next, the communication concept challenges will focus on the credibility and effectiveness, identification and valuation processes of GMC. The concept of the consumer culture challenge addresses different issues arising from different levels of EC that influence GMC and product attribution.

Specifically, the first challenge deals with product-related impacts of packaging in environmental communication and addresses the issue of the effectiveness of nonverbal packaging channels. In doing so, one of the key issues arises from consumers' inability to evaluate the actual environmental performance of a product or of its packaging. Since the communicative uses of the traditional marketing element—the packaging—needs to be further understood in the context of environmental products, the question arises which packaging channels ultimately support the consumer in assessing the environmental compatibility of products. Following Herbes, Beuthner, and Ramme (2018), this thesis addresses the question of whether consumers rely on their own lay perceptions and use packaging elements subjectively to derive product qualities. In particular, it is questionable whether environmental information from nonverbal packaging channels, which is difficult to grasp and unrelated to the actual environmental friendliness of the product itself, is suitable

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[1] In the research questions and overview section, "I" will be used. However, when referring to a specific study, I will switch to "we," which refers to the co-author Sarah Diefenbach and myself.

for GMC. Understanding how packaging channels guide the consumer in assessing the environmental performance of a product is essential for promoting environmentally conscious consumption and deriving target group-specific communication strategies. In short, environmental communication in the context of product packaging can be regarded as effective if it leads consumers to attribute environmental friendliness to the product. This leads to the following research questions:

Research Question 1: Are nonverbal packaging communication channels effective in communicating environmental product attributes?

The second challenge addresses the potentially counter-productive and even product destructive effect of GMC associated with greenwashing. TerraChoice (2009) identified seven "sins" or misleading GMC, whereby one sin is the sin of vague environmental information. With regard to communication channels, the question arises whether nonverbal communication channels that communicate with associative elements (such as a motif or a color) are less suitable for credible environmental communication. In the context of verbal environmental claims, it was found that the less concrete the environmental claim is in an advertisement, the more manipulative, deceptive, and unethical the advertiser (Davis, 1993) and the environmental information (Carlson, Grove, Kangun, & Polonsky, 1996; Chan & Lau, 2004; Yu, Coulson, Zhou, & Wen, 2013) is perceived.

In contrast, it is reported that objective, factual information, consisting of concrete claims, creates high credibility of the advertiser and the environmental information. Consequently, the question arises as to whether the nature of substantive, verbal communication channels, compared to non-verbal information channels, are better suited for communicating environmental information and cause less skepticism among consumers. The following research questions are used to investigate this challenge.

Research Question 2: Does the specificity of communication channels contribute to the effectiveness of environmental communication?

Research Question 3: How is consumer environmental skepticism related to the perception of environmental product attributes?

The third challenge deals with communicative effects among different consumer groups. Thus, the challenge of effective, target-group-specific, and cross-target communication, regulated by consumer involvement—their EC—is faced. This involves examining whether consumer groups can be formed according to their mode of response. For this purpose, the reactions of consumers to their EC are investigated. The HEC recipient poses a particular challenge of GMC; that is, the main target group for environmentally friendly products. Thus, to effectively address this target group and provide them with environmental information that helps them make environmentally based purchasing decisions, it is particularly important to gain a better understanding of their responses to GMC. Hereby, the HEC consumer represents a special challenge since this consumer is described as very skeptical and difficult to convince consumer in the literature. So, the question arises of how to communicate environmental information to a consumer group that is skeptical about this information? Thus, to design effective and target consumer-oriented GMC, it is important to understand how the underlying processes of perception and evaluation occur and how they may be explained. Especially, with regard to nonverbal communication channels, which have so far been only insufficiently researched, the question arises as to how consumers respond and how this response can be explained. Hence, the thesis examines the following research questions:

Research Question 4: How does the consumer level of EC affect the effectiveness of environmental communication?

Research Question 5: Which environmental communications channels are most effective for which types of EC target audience?

Research Question 6: How can varying skeptical responses to nonverbal packaging communication channels be explained among HEC consumers?

Three independent but interrelated experimental studies are part of this thesis and will be presented in the following chapter. An overview of the research questions assigned to the experimental studies, as well as the main contributions found, are presented in Table 2. As these studies each have a specific focus, each of these has a separate heading, introduction, literature review, and conclusions section. A concluding, cross-study discussion is provided in Chapter 5. The main findings are summarized and related to answer the research questions raised.

Study 1 (Chapter 4.1) focuses on the first (that is, *Are nonverbal packaging communication channels effective in communicating environmental product attributes?)* and fourth (that is, *How does consumer level of EC affect the effectiveness of environmental communication?*) research questions. This study investigated whether nonverbal channels, such as packaging material and graphical interface design, can serve as an effective source of information in environmental product communication while, at the same time, taking into account consumer EC to derive practical implications for the audience. The results revealed no difference in the information utility, but rather in the credibility and availability of the communication channels, which guide product environmental friendliness evaluations between differently environmental conscious consumers.

The focus of study 2 (Chapter 4.2) is on the second, third, fourth, and fifth research questions (*Does the specificity of communication channels contribute to the effectiveness of environmental communication?; How is consumer environmental skepticism related to the perception of environmental product attributes?; How does consumer level of EC affect the*

effectiveness of environmental communication?; Which environmental communications channels are most effective for which types of EC target audience?), respectively. The findings replicated the results of study 1 and show that EC serves as a critical factor in the perception and evaluation of GMC. Next, the effect of communication channel specificity (verbal vs. nonverbal) in communicating product environmental friendliness and consumer skepticism, as well as attention during product presentation, was investigated. Thereby, the results were consistent with the pattern found in study 1. When compared to specific text-based environmental information, associative pictorial environmental information led to increased consumer skepticism and increased perceptions of environmental product attributes. Overall, study 2 provides a framework of how channel specificity might affect the reception of a green marketing message by the intended audience (HEC vs. LEC). Consumers' preferences with regard to the elaboration of GMC manifested as derived from Study 1 and the ELM. The results of both studies integrate seemingly contradictory findings from previous studies regarding the effectiveness of GMC among the main target group, the HEC consumer. By applying the overarching framework of ELM theory, the studies were able to focus on consumer responses to verbal and nonverbal environmental information, thus explaining contradictory results in terms of skepticism and effectiveness. However, an interesting phenomenon has also been discovered: HEC consumers showed to be highly skeptical toward associative environmental information (e.g., environmental motifs). However, when these were presented along with specific environmental information (e.g., an environmental text) their skepticism disappeared. This phenomenon is explored in more detail in study 3.

Study 3 (Chapter 4.3) explores the third, fourth, and sixth research questions (*How is consumer environmental skepticism related to the perception of environmental product attributes?; How does the consumer level of EC affect the effectiveness of environmental communication?*; *How can varying skeptical responses to nonverbal packaging communication channels be explained among EC consumers?*), respectively. Study 3

proposes a framework investigating the idea of an elaborate justification process among HEC consumers; that is, testing whether specific environmental information (e.g., text references) can be used to justify the use of associative environmental information (e.g., motif). Therefore, the combined effects of an environmental motif with congruent and incongruent text communication were investigated. Further, these effects are compared within the two EC consumer groups. Findings revealed that in environmental motif packaging, a congruent text communication accompanying the motif reduces skepticism in HEC consumers, but not in LEC consumers.

As a summary, the first study focuses on the investigation of executional, nonverbal communication channels as a medium for environmental communication, the second study tests derivations of the influence of the specificity of environmental information on consumer skepticism and the effectiveness of environmental communication. The last study addresses the HEC consumers' elaborated justification processing responsible for consumer skepticism in the environmental attribution processes. The hypotheses tested were numbered anew in each study since I focus on slightly different factors and measures, which resulted in different experimental hypotheses. All three studies used experimental designs and questionnaires. Answers to the research questions, the remaining unanswered questions, and the limitations, as well as practical implications, are discussed in Chapter 5.

Table 2. Overview of the research questions assigned to the experimental studies and the main contributions found

Study	RQs	Main contribution
I	RQ 1 RQ 4	Investigation of consumers' responses to nonverbal packaging channels—graphical surface design and packaging material—with regard to the perceived environmental friendliness of both the packaging and the product inside the packaging. Results showed that an individual's EC influenced the perceived environment friendliness. Consumers with high EC inferred environmental friendliness by material and associated a package's graphical design with greenwashing. Consumers with low EC considered both graphical and material channels. Overall, environmental executional communication channels spill over from packaging to the product's perceived quality.
II	RQ 2 RQ 3 RQ 4 RQ 5	Development of a framework addressing how channel specificity (verbal vs. nonverbal) may affect the reception of the marketing message by the intended audience. Building on Study I, findings suggest that a consumer's EC determines the influence the consumer's skepticism has on evaluating the effectiveness of GMC. The role of channel specificity (verbal vs. nonverbal) in the promotion of an environmentally friendly product is highlighted in terms of the consumer's skepticism and, thus, attributed environmental quality and answered how individual perspectives and expectations are formed among different EC consumers.
III	RQ 3 RQ 4 RQ 6	Development of a framework investigating the combined effects of a nonverbal environmental packaging communication (motif) with congruent and incongruent verbal communication (text). Further, these effects were compared in two EC consumer groups, explaining the effect found in study 2: Skepticism decreases and the effectiveness of GMC increases among high EC consumers when an environmental executional packaging element (motif) is accompanied by content congruent verbal communication, as opposed to when there is no verbal justification for the use of the environmental motif.

Note. EC = environmental consciousness. GMC = green marketing communication. RQ = Research Question.

4 Empirical studies

4.1 Study 1: Perceiving and believing:

The subjective persuasiveness of graphical and material environmental packaging

channels depending on individual environmental consciousness[2]

Abstract

Understanding how packaging channels guide consumers in evaluating the environmental friendliness of a product is essential to foster environmentally responsible consumption. Previous research suggests that while consumers are unable to verify the actual environmental impact of packaging, they subjectively utilize the packaging elements to evaluate the packaging and product quality. It is particularly important to understand how consumers evaluate environmental information from nonverbal, executional packaging channels that are elusive and not related to the product's actual environmental friendliness. We used a 2×2 experimental design to investigate how participants (N = 276) infer differences in a product's environmental friendliness and greenwashing tendency using two important nonverbal packaging channels (graphical surface design and packaging material) and by taking their environmental consciousness (EC) into account. The results showed no difference in the information utility, but rather in the credibility and availability of the execution communication channels, which guide product environmental friendliness evaluations. Participants with a high EC level were material highlighters, (that is, they inferred product environmental friendliness by the type of material), while graphical elements induced a strong greenwashing tendency. Participants with a low EC level considered both graphical and material elements, with a tendency toward graphical highlighting. Further effects and

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practical implications are discussed in light of the target consumers' EC.

Keywords: product environmental friendliness, greenwashing, environmental consciousness, graphical packaging design, material packaging design

Introduction

Research on environmentally friendly consumption typically reveals two opposing findings: on one side, consumers generally have an increasingly positive attitude toward environmentally friendly products and intend to purchase them, while, on the other side, the actual consumption behavior is considerably lower than intended (Peattie & Crane, 2005; Rex & Baumann, 2007). One of the proposed reasons for this gap stems from consumers failing to identify environmentally friendly packaging because they lack knowledge of what constitutes environmentally friendly packaging and which aspects should be taken into account (Steenis et al., 2017). From the consumer's perspective, packaging is an important communication channel that helps them derive product characteristics. Exploratory studies indicate that, although consumers are not able to assess the actual environmental performance of packaging, they rely on their own lay beliefs and subjectively utilize the packaging elements to judge packaging quality (Lindh et al., 2016a, 2016b; Magnier & Crié, 2015; Magnier et al., 2016; Steenis et al., 2017). Steenis et al. (2017) conclude that thereby the packaging elements "tend to 'spill-over' to the packaged product as a whole" (p. 294)—for similar reasoning see studies such as Kardes et al. (1990) and Olson & Jacoby (1972). In line with this assumption, the use of the so-called "environmental," "sustainable," and "green" packaging has fueled the increasing interest in research and practice and emerged as a new and widespread packaging characteristic (Herbes et al., 2018). However, as Herbes and colleagues (2018) recently reported, the question of what ultimately guides consumers in using package elements to evaluate product environmental friendliness remains largely unanswered. Knowing about the subjective persuasiveness of different environmental packaging channels is relevant from

several perspectives. In addition to consumers' increasing awareness of, and concern about, environmental pollution stemming from packaging (e.g., the pollution of the oceans by plastic), packaging cues may also serve as an indicator for inferring product quality. However, to use packaging design effectively, detailed insights are needed regarding which packaging elements trigger what kind of quality perceptions, and how this may interact with a consumers' individual EC.

Currently, a wide variety of approaches to environmental packaging can be observed. While some companies have changed their packaging materials to be biodegradable or recyclable (e.g., Nestlé Group, Apple), another new trend in packaging technology is the use of printing effects to create the appearance of a natural, environmental material such as wood or marble. These printing effects advance environmental packaging communication by completely eliminating the appearance of the substrate and thus giving the packaging the appearance of being less processed—for instance, Müller Corner Muesli uses a printed wood pattern on their plastic yogurt cups (Müller, 2017). In sum, it seems that companies are highly motivated to offer consumers natural and environmentally friendly packaging alternatives. Companies invest energy, time, and money in the design of marketing communication that can only be intuitively deduced by consumers. The problem for consumers at the point of sale, however, is that the packaging communication is not necessarily related to the actual environmental performance of the packaging or of the product itself. Thus, even consumers with a high level of EC, who strive to make environmentally friendly purchasing decisions, sometimes unwittingly make environmentally unfriendly consumer decisions instead (Steenis et al., 2017).

The objective of this study was to explore consumers' subjective valuations of product environmental friendliness and greenwashing that depend on different nonverbal packaging channels used to communicate environmental information. Note that the focus was on the

quality perceptions consumers infer from the packaging communication, rather than on the actual environmental performance of the product. In the context of this study, we defined environmental packaging communication as "a packaging design that evokes explicitly or implicitly the eco-friendliness of the packaging" (Magnier & Crié, 2015, p. 361). More specifically, we investigated the interplay of material and surface graphical communication channels as two possibilities for implementing environmental packaging information. To consider valuation differences between participants, EC proved to be a relevant explanatory between-subjects factor (Bickart & Ruth, 2012; Kilbourne & Pickett, 2008; Magnier & Schoormans, 2015; Mohr et al., 1998). These insights enabled us to derive the target group-specific communication strategies in the conclusion.

4.1.1 Theoretical background and hypotheses

Perceived utility and credibility of packaging communication channels.

In the context of environmental communication, Matthes and Wonneberger (2014a) argued that individually perceived information utility can explain differences between consumers regarding skepticism about, and valuation of, advertisements. The utility of information is defined as "the degree to which information can aid individuals in making future decisions" or the communicative value of a cue (Knobloch-Westerwick & Kleinman, 2012, p.171). Regarding product packaging this implies, if the packaging information is perceived as useful and credible, skepticism toward the product information decreases, which consequently affects the overall product evaluation (Matthes & Wonneberger, 2014a). In the present study, we investigated the utility of environmental packaging communication channels as a communication tool for perceived product environmental friendliness. In addition to the perceived environmental friendliness we also looked at the credibility of packaging communication channels in regard to the perceived tendency toward greenwashing. Greenwashing refers to the consumer's perception of whether the product attempts to conceal

negative environmental attributes to convey a misleadingly positive impression (Chen & Chang, 2012; Parguel et al., 2011). Parguel et al. (2015) noted that greenwashing refers not only to verbal packaging elements but also nonverbal, executional packaging elements, such as the material and graphical communication channels.

Material communication as a product environmental friendliness cue.

In evaluating the environmental performance of packaging, consumers tend to overestimate certain environmental aspects (e.g., recyclability) and disregard other aspects—such as transport and production impact (Steenis et al., 2017). Herbes et al. (2018) showed, for example, that in consumers' mental models, packaging environmental friendliness is often linked to end-of-life characteristics such as being recyclable and biodegradable (Nordin & Selke, 2010; Rokka & Uusitalo, 2008). Other studies found that renewable, fiber-based material, glass, and cardboard were rated as environmentally friendly materials by consumers, while plastic and metal scored the lowest (Lindh et al., 2016a, 2016b; Magnier & Schoormans, 2017; Steenis et al., 2017; van Dam, 1996). Magnier et al. (2016) and Magnier and Schoormans (2017) showed a general positive effect of fiber-based materials (vs. plastic) on product environmental friendliness. Using free association and cue perception, Steenis et al. (2017) showed that consumers perceive soup in a glass and bioplastic followed by paper packaging as the most environmentally friendly and the same soup in plastic and metal packaging as the least environmentally friendly. We concluded from these studies that, for material perception, cue availability is the driving factor. In other words, the available cues, such as the environmental impression of the material, affect the evaluation of the product, and cues that are only accessible after elaboration, such as the transport routes of a material, are disregarded.

Graphical communication as a product environmental friendliness cue.

In addition to the choice of material, the graphical communication of the packaging

includes not only pictorial cues but also decorative elements such as the surface design as part

of the communication (van Leeuwen, 2011). This leads consumers to utilize the graphical

packaging channels as indicators from which they derive impressions about product

characteristics, such as the color green (Hoogland et al., 2007; Kreil et al., 2016; Pancer et al.,

2017) and the use of images (Magnier & Crié, 2015) that are associated with environmental

friendliness. Karmasin (2016) and Triebel (1997) suggest that environmental friendliness can

be triggered by elements of nature or elements that appear natural in their craft. In contrast to

the packaging material, which has a genuine impact on the environmental performance of a

product, the graphical cues are merely associative and are therefore less credible than material

packaging communication.

The influence of environmental consciousness on the perception of product

environmental friendliness and greenwashing tendency.

Research investigating the determinants of product environmental friendliness found

no strong relationship with a particular demographic variable, but rather a relationship with

shared interests and preferences of participants (Rokka & Uusitalo, 2008). More specifically,

studies showed that participants' EC is a particularly relevant factor when evaluating a

product and advertising stimuli (e.g., Bickart & Ruth, 2012; Kilbourne & Pickett, 2008;

Magnier & Schoormans, 2015; Mohr et al., 1998). In general, it is found that high-EC (HEC)

consumers are more skeptical about misleading environmentally friendly information—that

is, perceived greenwashing practices (Bickart & Ruth, 2012; Rios et al., 2006; Vermeir &

Verbeke, 2006). Shrum, Mccarty, and Lowrey (1995) observed, moreover, that HEC

consumers are also information seekers when it comes to judging false marketing messages.

This can be explained as HEC consumers being concerned about the environmental impact of

a product to fulfill their consumption preferences (Matthes et al., 2014a). Evidence regarding

the credibility and expected greenwashing intentions of advertising and product claims

already have been provided, taking consumers' EC into account (expert knowledge): HEC consumers perceive verbal eco-statements to be more credible and less greenwashed than low EC (LEC) consumers (Bickart & Ruth, 2012; Chang, 2011; Magnier & Schoormans, 2015). However, research on nonverbal, environmental communication channels is still in its infancy and insight on how EC influences the assessment of greenwashing practices is still scarce (Parguel et al., 2015). In light of our study, we concluded that HEC consumers might derive less information utility from nonverbal environmental packaging communication channels, leading to lower product environmental friendliness perceptions and generally less credibility, resulting in increased greenwashing tendencies. *We hypothesized that in a situation where a product is evaluated on the basis of its packaging, participants with higher individual EC will have lower perceptions of product environmental friendliness (H1) and higher perceptions of attributed greenwashing tendency (H2).*

Matthes et al. (2014b) explored the impact of three types of environmental ads and found that EC moderated the effect only if the advertisement contained verbal environmental product messages but not if the advertisement was based on nature images. The authors reasoned that, according to the ELM, a higher cognitive elaboration is necessary to process a verbal packaging stimulus. However, only consumers with HEC are motivated to do so, as they would like to fulfill their consumption wishes. Compared to LEC consumers, they relied less on the peripheral cues (Hutchinson & Alba, 1991), which resulted in lower nonverbal, executional greenwashing tendencies. Despite this, they also concluded that, in the absence of rational arguments, HEC consumers could also use nonverbal, executional communication channels as indicators. However, differences in how HEC and LEC consumers react to material and graphical environmental communication channels remain unclear.

We suggested that differences between HEC and LEC in product environmental friendliness and greenwashing tendency may be explained by differences between HEC and

LEC in the perceived credibility and, hence, information utility between graphical and material environmental packaging channels. For example, Schahn and Holzer (1990) have shown that HEC consumers pay significantly more attention to waste separation and recycling aspects in product assessments than do LEC consumers. Likewise, we assumed that packaging material plays an important role for HEC consumers in implicitly cueing product environmental friendliness, as it has a direct impact on environmental compatibility. For this reason, the credibility value of environmental packaging material is higher compared to a graphical packaging element, which leads to a lower greenwashing tendency and higher product environmental friendliness. Since the graphical surface design has no direct impact on the environmental performance of the product, the credibility might be low for HEC consumers, resulting in higher perceived greenwashing tendencies and lower perceived product environmental friendliness.

With regard to LEC consumers, we, like Parguel et al. (2015), assumed that graphical cues are easy, peripheral, and implicitly perceptible. Since the motivation and involvement of these consumers is low, we believed that they would make less effort to examine the packaging material and base their assessment of product environmental friendliness on the first visual impression, the graphical channel. Since LEC consumers have no environmentally friendly consumer preferences and a misinterpretation of the product's environmental friendliness has no negative impact for them, we believed that they were generally less skeptical; that is, they perceive fewer greenwashing tendencies. This implied that LEC consumers will not distinguish between the credibility of the packaging communication channels. In their case, the perceived utility of environmental packaging channels depends more on the perceived credibility than on cue availability.

In sum, we hypothesized that the perception of product environmental friendliness (H3) and greenwashing practices (H4), triggered by material and graphical packaging

communication channels varies depending on participants' EC level. LEC consumers use graphical communication channels as a driver for product environmental friendliness while disregarding material communication channels (H3a). HEC consumers use material communication channels as a driver for product environmental friendliness while disregarding graphical communication channels (H3b). HEC consumers perceive greenwashing tendencies in graphical packaging communication channels, but not in material (H4a). No such effects are expected for LEC consumers.

4.1.2 Material and methods

Study design and procedure.

To explore the assumed effects of packaging channels taking into account the EC level of the participants, we used a 2x2 between-subjects experimental design, varying environmental versus conventional content by graphical and material packaging communication channels. The participants were randomly assigned to one of the four packaging conditions. They were handed the corresponding product stimulus and asked to complete a questionnaire containing various measurements of perceived product qualities and other scales as described below.

Stimuli.

The studied product example was rice in four different packages, corresponding to the four experimental conditions. Figure 3 depicts the product stimuli used in the study and their combinations of environmental and conventional packaging communication channels (material and graphical). The environmental design and the conventional design structures were developed in two qualitative material/image-sorting workshops prior to the present study and showed consistent rating results in prior research (Lindh et al., 2016a; Steenis et al., 2017; Van Dam, 1996). The objective of this preliminary study was to evaluate packaging materials and graphical packaging surfaces with regard to their representativeness for perceived

environmental friendliness.

To avoid brand-awareness effects and to control for packaging channel effects, we used a neutral, non-existent brand name ("Arino") and brand logo (Brunner, 2010). In addition, the verbal communication on the packaging was kept constant across all stimuli and attention was paid to the neutrality and objectivity of the verbal information (i.e., "Arino long-grain rice").

Participants.

A convenience sample of 267 participants (132 males, $M_{age} = 46.74$ years, $SD = 18.88$) was recruited from public places (e.g., university campus, waiting areas) and through networking procedures (snowball sampling). Participation was voluntary and there was no incentive. Once all data had been collected, participants were debriefed to the purpose of the study and offered a copy of the study´s results when available. All ethical procedures were aligned with standard practice as outlined in the Declaration of Helsinki and ethical guidelines of the university at which the research was conducted.

Figure 3. Combinations of environmental and conventional packaging communication channels (material and graphical) used in the study.

Fully environemental communication:
Jute material and graphical look

Graphical environmental communication only:
Plastic, PET material
jute fiber graphical look

Material environmental communication only:
Unbleached, kraft-paper material,
aluminum graphical look

Full conventional communication:
Aluminum foil material and
graphical look

Measures.

Product environmental friendliness was surveyed using ten items, based on a literature synthesis by Teufel et al. (2009) on environmentally friendly product characteristics (e.g., preservation of the ecosystem, environmental compatibility of agriculture); Cronbach's $\alpha = .87$. Thereby, participants were asked to subjectively indicate which product characteristics they associate with "Arino" long-grain rice (1 = not at all to 7 = very much).

Perceived product greenwashing tendency was assessed with two items on a 15-point scale (0 = not at all, and 14 = very strong; $r = .58$, $p < .001$); that is, "this product exaggerates its green functionality" and "this product misleads in its environmental features" derived from Chen and Chang (2012).

Participants' environmental consciousness (EC) was measured with fifteen items, which included environment-related attitudes, behavioral willingness, and self-reported actions in the content areas of littering/environmental aesthetics, waste separation and recycling, protection and health, environment-conscious purchasing, water pollution, control and preservation (Schahn et al., 2000), on a 15-point scale (0 = not at all to 14 = very strong; Cronbach's $\alpha = .83$).

Additional product characteristics were assessed on a seven-point scale (1 = not at all to 7 = very much). The individual items of the scale were randomized and presented as filler items between the items measuring perceived environmental friendliness. *Product healthiness* was assessed using nine items (e.g., additive-free and nutrient-rich; Cronbach's $\alpha = .84$) derived from Ruumpol (2014). *Product attractiveness* was measured by four items (e.g., attractive and beautiful; Cronbach's $\alpha = .88$) as suggested by Ohanian (1990). *Product trustworthiness* was assessed using five items (such as reliable and sincere; Cronbach's $\alpha = .74$) derived from Ohanian (1990). *Product price* was assessed by asking participants to indicate the maximum price they were willing to pay for the product.

Control variables: to ensure that product category involvement had no effective influence on the evaluation of product environmental friendliness or greenwashing tendencies, we asked participants how often they ate rice (never, about once a year, once a month, several times a month, several times a week, daily) and checked that product category involvement tendency and sociodemographic variables (age and gender) did not differ between experimental groups.

Manipulation check: to ensure that our communication manipulations appeared as intended, we asked the participants to rate the assessment that "This product has an environmental packaging design" on a 7-point Likert scale (1 = fully disagree, 7 = fully agree).

IBM SPSS Statistics, version 22 (IBM-SPSS, Chicago, IL) was used for all analyses.[3]

4.1.3 Results

Analyses of the demographic variables (age and sex) and the control variable (product category involvement) confirmed that these variables did not differ within the four experimental groups (all $p > .05$). Thus, to test whether the manipulations of environmental graphical and material packaging communication were perceived as intended, an analysis of variance was performed with the self-formulated element, "This packaging is environmentally friendly" as a dependent variable, measured on a 7-point Likert scale (1 = totally disagree, 7 = fully agree) and the graphical and material communication channels as independent variables. A significant main effect of graphical communication appearance ($M_{conventional} = 3.75$, $M_{environmental} = 5.05$, $F(1,273) = 41.46$, $p < .001$, $\eta_{p2} = .13$) and material communication appearance ($M_{conventional} = 3.91$, $M_{environmental} = 4.83$, $F(1,273) = 19.25$, $p < .001$, $\eta_{p2} = .07$) were found, confirming that the environmental packaging communication concepts were perceived as significantly more environmentally friendly than the conventional

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[3] Data availability statement: The data that support the findings of this study are openly available in "Mendeley Data" at http://doi.org/10.17632/mj8hxbsgsf.3.

ones.

Test of hypotheses.

Moderated regression analysis was conducted using the PROCESS macro (model 3) (Hayes, 2013, version 3.2) to test for the assumed moderating effect of participants' EC levels on the between-subjects' relationship of graphical packaging communication and material packaging communication on product environmental friendliness and greenwashing tendency. Dummy variables were assigned to represent the graphical packaging communication channel (0 = conventional and 1 = environmental) and the material packaging communication channel (0 = conventional and 1 = environmental); EC level was mean-centered prior to analysis (M = 9.08; SD = 2.30). The two-way interaction and three-way interaction were regressed on product environmental friendliness and greenwashing tendency. In addition, product category involvement (rice) and the age and sex of the participants were included as covariates.

Effects on perceived product environmental friendliness.

The moderated regression analysis with product environmental friendliness as a dependent variable showed that both graphical and material packaging communication channels were significant and were similarly strong influencing factors on product environmental friendliness (see Table 3 for detailed results of moderated regression analysis). Their interaction was not significant and almost zero, (that is, only additive main effects were present). Covariates only showed a positive effect of the product category involvement on product environmental friendliness. Consumers' individual EC level was a marginally significant predictor of product environmental friendliness (p = .092, CI [-.09, .01]). In line with H1, there was a negative effect of the EC level on the evaluation of product environmental friendliness; as EC increased, the environmental performance attributed to the product decreased. Note, however, that the statistical relationship was only marginally significant. Of the more complex tested relationships between packaging communication

channels and EC levels, only the interaction of graphical packaging channel and EC levels was significant, but there was no interaction between material packaging channel and EC levels; also, the three-way interaction remained insignificant. To investigate the more specific interactions of packaging communication channels for participants with HEC and LEC, we contrasted subgroups of HEC and LEC consumers in parallel to Magnier and Schoormans' study (2015). More specifically, our contrast analysis compared participants showing values more extreme than one *SD* below (*n* = 44, *M* = 5.06) and above the mean (*n* = 37, *M* = 12.12).

We conducted a linear regression in the subgroup of LEC individuals with graphical (conventional, environmental) and material (conventional, environmental) packaging communication channels as independent variables and age, gender and product category involvement as covariates to test the expected graphical highlighting effect and the absence of a material main effect, as formulated in H3a. The results showed a significant main effect of graphical packaging, β = .70, *SE* =.21, *t* = 6.68, *p* < .001, and material packaging, β = .44, *SE* =.22, *t* = 4.15, *p* < .001 in LEC participants. The comparison of the regression coefficients of the graphical and material main effects shows that an environmental graphical packaging channel communicates the perceived product environmental friendliness about 1.6 times more effectively than a material, confirming the hypothesis of a graphical highlighting among LEC consumers (H3a).

To test H3b, we conducted the same linear regression analysis with graphical and material packaging communication channels as independent variables, and covariates (age, gender, and product category involvement) in the subgroup of HEC individuals. In line with the hypothesis, the effect of material channel was significant, β = .45, *SE* =.37, *t* = 2.64, *p* = .013, and the graphical main effect nonsignificant, β = -.11, *SE* =.38, *t* = -.66, *p* = .517. Note, however, that the effect of material design was also small, indicating overall less susceptibility to product packaging cues as an indicator of environmental friendliness among

HEC consumers.

Table 3. Moderated regression analysis

	Product environmental friendliness	Greenwashing practices
Constant	3.52**	4.49**
Graphical	.82**	3.17**
Material	.84**	.47
Graphical x material	-.07	-1.82*
EC_1	-.04•	.19•
Graphical x EC_1	-.14*	.15
Material x EC_1	.01	-.01
Graphical x material x EC_1	-.14	.04
Gender	.01	-.07
Age	.00	.01
Product category involvement	.17*	.34
	$R^2_{adj} = .30$	$R^2_{adj} = .21$
	$F(10,265) = 11.50$, $p < .001$	$F(10,265) = 8.66$, $p < .001$

Note. EC_1 = environmental consciousness. **$p < .01$; *$p < .05$; •$p < .10$. This represents two-ways moderated regression analysis for the package graphical communication channel (dummy), the package material communication channel (dummy), and EC on product environmental friendliness and greenwashing practices.

In summary, LEC consumers rely more heavily on graphical than on material product packaging channels when judging a product's environmental friendliness. For HEC

consumers, results showed a material highlighting effect such that HEC consumers used exclusively material channels to assess product environmental friendliness and not graphics. Therefore, it appears that there could be a difference in graphical and material information channel utility between HEC and LEC consumers, guiding subsequent analysis.

Effects on perceived product greenwashing tendency.

The moderated regression analysis for the greenwashing tendency as a dependent variable in the full sample of participants revealed that only the graphical, but not the material packaging communication channel predicted perceived greenwashing (see Table 3 for detailed results of moderated regression analysis). The interaction was significant and showed that, in addition to environmental graphical communication, the use of a conventional (vs. environmental) material significantly increases perceived greenwashing tendency. Consumers' individual EC level was a marginally significant predictor of greenwashing tendency ($p = .081$, CI [-.02, .40]). In line with H2, the higher the EC of the participant, the more greenwashing tendencies are attributed to a product. Note, however, that the statistical relationship was only marginally significant. The more complex relationships between packaging communication channels and EC showed no significant interactions. Thus, to check whether participants with high and low EC levels differ in the amount of greenwashing practices they infer from environmental graphical communication channels, two linear regression analysis in the subgroup of LEC and HEC were conducted.

The analyses showed that in addition to the two significant main effects of graphical channel, there were considerable differences in regression coefficients. HEC consumers perceive about 1.7 times as much greenwashing tendency, $\beta_{HEC} = .78$, $SE = .96$, $t = 6.10$, $p < .001$, than LEC consumers in graphic environmental packaging, $\beta_{LEC} = .46$, $SE = 1.23$, $t = 3.18$, $p = .003$, supporting a credibility difference between LEC and HEC consumers.

Correlations between perceptions of product environmental friendliness and other product characteristics.

Participants' perceived product environmental friendliness showed a mild correlation to product attractiveness ($r = .16$), an average correlation to willingness to pay ($r = .30$), and strong correlations to product healthiness ($r = .61$) and trustworthiness ($r = .56$); all $p < .05$. This pattern of correlation underlined the relevance of a product's environmental friendliness as being associated with further judgments of quality. The investigation of the mediating influence of the attributed product environmental friendliness in consumers' evaluation of associated product qualities based on environmental packaging information (graphical and material) can be found in Appendix B.

4.1.4 Discussion

General findings on environmental packaging communication channels.

The present investigation of the new packaging trends and tendencies (environmental packaging material and graphical surface communication) showed that when considering the full sample, independent of individual EC, both nonverbal communication channels (graphical, material) are of equal predictive value for product environmental friendliness. The results confirm that the environmental content of communication channel spills over from packaging to the perceived quality of the product. The product's perceived environmental friendliness, in turn, is further associated with other positive product characteristics, such as product attractiveness, healthiness, trustworthiness, and customers' willingness to pay.

The impact of consumers' individual environmental consciousness in evaluating product environmental friendliness and greenwashing.

The main focus of our study was on the relevance of consumers' individual EC in the context of judgments on environmentally friendly product quality. In fact, EC was shown to have a significant influence on how environmentally friendly a product is perceived to be and,

vice versa, how skeptical participants are about greenwashing tendencies. Our findings

suggest a similar pattern as in the studies by Rios et al. (2006) and Vermeir and Verbeke

(2006), who argued that HEC consumers are generally more skeptical than LEC consumers

(here, about products with environmental packaging communication). Although the

interaction of graphical and material packaging communication channels and participants' EC

was not significant in relation to the perceived product environmental friendliness and

greenwashing tendency, the consideration was both a direct predictor and a between-subjects

factor and thus was important and relevant. Interestingly, there was a distinction between the

effect of greenwashing tendencies and product environmental friendliness. Namely, there was

no distinction in perception but rather in valuation, in terms of utility and persuasiveness

between the material and graphical communication channels and dependence on individual

EC levels. A closer look at this difference in valuation revealed that all consumers were aware

that a product could be greenwashed with graphical packaging communication channels.

However, the comparison of the regression coefficients showed that HEC consumers were

much more skeptical than LEC consumers about the credibility of environmental graphical

communication. The valuation of the products' environmental friendliness was, therefore,

more an expression of the perceived utility and credibility of a packaging communication

channel than of different perceptions.

Target group–specific results and communication strategies: LEC.

The product evaluation showed graphical highlighting tendencies for LEC consumers

relative to material effects. This result was as expected because LEC consumers are generally

less involved and less motivated to deal with environmental packaging communication and

their evaluation is not decisive for their consumption wishes. In this respect, the graphic

communication channels offer consumers the possibility of quick peripheral input of

packaging information. This restricted consideration of the packaging communication

channels explains why the perceived greenwashing tendencies of graphical environmental communication did not affect the overall product evaluation. For LEC consumers, we can summarize this in a nutshell: first, graphical communication is an important channel in product environmental friendliness communication and is particularly relevant when environmental packaging materials cannot be quickly and visually identified as such. Second, the packaging material is recognized and also influences the product evaluation. The material (as opposed to graphical) packaging communication channel is not subject to skepticism or greenwashing tendencies.

Target group-specific results and communication strategies: HEC.

The result suggests that in the absence of verbal communication stimuli (which in previous studies were shown to be relevant indicators for HEC; Magnier & Schoormans, 2015; Matthes et al., 2014b), HEC consumers utilize merely nonverbal execution communication channels to infer product environmental friendliness although they are less susceptible to these influences. HEC consumers clearly differentiate between the credibility and, consequently, the utility of nonverbal executional packaging communication channels for communicating product environmental friendliness. As assumed, HEC consumers relied only on materials, (that is, those that can influence the actual environmental performance of the product), and disregard those whose positive impact on environmental performance is not apparent. Therefore, the graphical surface design is not a useful and credible communication channel, which is explained by the strong significant effect on the perceived greenwashing tendency.

These results extend the theoretical insights of consumers' environmentally friendly quality attribution processes (e.g., Magnier & Schoormans, 2015; Matthes et al., 2014a), by demonstrating that the distinction between verbal and nonverbal executional packaging communication channels is relevant, as is the distinction between the utility and credibility of

these nonverbal packaging channels—see Parguel et al. (2015) for a similar reasoning. In sum, in the interplay of graphical and material packaging communication channels, HEC consumers exhibit material highlighting. Thereby, the environmental impression conveyed by the material is considered a credible communication channel. Additionally, graphical elements that are unrelated to the actual product environmental friendliness have no impact on the evaluation of product environmental friendliness and are considered greenwashing practices.

However, for both HEC and LEC consumers, the personal lay impression is what influences their perception of a material being environmentally friendly. Although this impression is not related to the actual environmental performance of the packaging, nor of the product (e.g., plastic packaging made of bioplastics). Here, as in previous works, the environmental friendliness of packaging and products can only be triggered if the material looks as if it has been produced from renewable energies or is biodegradable and recyclable (Herbes et al., 2018; Magnier & Schoormans, 2017; Nordin & Selke, 2010; Rokka & Uusitalo, 2008).

Practical implications.

For the practical application of our results in the context of the technical progress of packaging materials, these results also suggest that innovative, environmentally friendly packaging materials (e.g., bioplastics), which are not easily discernible to the consumer, are highly challenging. An inclusive approach seems not to be a viable possibility from today's point of view. It is conceivable to communicate product environmental friendliness to LEC consumers with the help of graphical packaging communication channels; however, that would lead to strong greenwashing tendencies among HEC consumers. A verbal communication approach could be chosen for HEC consumers (Magnier & Schoormans 2015, 2017), but this would not influence LEC consumers. A combination of these packaging

communication channels, featuring environmental information, would also be possible; however, it is still unknown how the interaction of the individual packaging channels and their corresponding greenwashing intentions and utilities would affect the overall product environmental friendliness.

Limitations and future research.

The present study has several limitations that indicate a need for further research: (a) the restriction to the food product rice; (b) the limited ecological validity; and (c) a small number of participants in the subgroup analyses for LEC and HEC. We chose the low-involvement product, rice, to reduce interindividual differences in product category involvement. Rice represents a typical everyday product, precluding food incompatibilities and intolerances, consumed by individuals independent of their ethnicity, gender, age, or income situation. Despite this, the study showed that product category involvement had a positive impact on the evaluation of product environmental friendliness, but not on skepticism toward greenwashing. This might indicate that environmental communication has not yet been implemented in rice packaging for a highly involved person to especially appreciates environmental communication. For future studies, we, therefore, propose to extend the investigation to other product categories and to high-involvement product categories to investigate the general applicability and possible limitations of environmental packaging communication channels. Thus, the present effects of EC might be stronger (Magnier & Schoormans, 2015) for high-involvement products. For this reason, we suggest an in-depth investigation of product-category sensitivity for environmentally friendly quality perception processes in future studies (Pancer et al., 2017). Second, while the present laboratory study provided a controlled setting for investigating the impact of environmental packaging communication channels, its ecological validity is limited. In particular, consumers are more likely to pay attention to packaging elements in laboratory studies than in a field setting or at

the point of sale (Steenis et al., 2017). An important question for future research is therefore

whether the available results can be replicated in the field. Third, we suggest that studies

should be conducted with a greater number of participants who have the possibility to tighten

the definition of the LEC and HEC subgroups.

Our findings suggest for future research the idea of Matthes and Wonneberger

(2014a). Namely, researchers should consider perceived information channel utility as an

explanatory approach for skepticism in environmental communication that should be

extended from verbal information utility to nonverbal, executional information utility to

produce a more comprehensive picture of packaging channels in the evaluation process of

product environmental friendliness (see Parguel et al., 2015 for a similar research finding and

recommendation).

4.1.5 Interims conclusion

The first study (Chapter 4.1) was designed to provide insights into consumers'

evaluation of the environmental quality and perceived greenwashing tendencies of products

exclusively communicating the environmental arguments through executive nonverbal

communication channels, as commonly found in GMC. In response to research question 1

(that is, *are nonverbal packaging communication channels effective in communicating*

environmental product attributes?), consumers' responses showed two contrasting results

regarding the two dependent variables used to measure the effectiveness of GMC. On the one

hand, both tests of nonverbal communication channels showed equal strength in

communicating the environmental friendliness of the products but differed significantly from

each other in terms of the associated greenwashing practice. A possible explanation for these

different greenwashing ascriptions could be due to the information utility of the

communication channels; that is, how specific or vague an environmental message can be

communicated via the channel. Consequently, it might be inferred that a specific

environmental communication channel contributes positively to the effectiveness of GMC, by reducing consumer skepticism toward the environmental information (*research question 2*). However, the question of how consumer skepticism is related to the perception of product environmental friendliness remains unanswered (*research question 3*).

On the other hand, the consideration of the involvement factor—consumers' EC—showed that this factor was only a marginal influencing factor for the evaluation of environmental friendliness. However, the subsequent investigation of consumers with particularly high and low EC levels showed a differentiation between the two consumer groups with regard to the effectiveness of the two nonverbal communication channels, and provides therefore a preliminary response to research question 4 (that is, *How does consumer level of EC affect the effectiveness of environmental communication?*). Among LEC consumers the graphical packaging channel was about 1.6 times more effective in communicating product environmental friendliness than a material. Among HEC consumers, only the material proved to be an effective communication channel for the product's environmental friendliness. This raises the question of which communication channels are most effective for what types of EC target groups (*research question 5*).

The study design of study 2 (Chapter 4.2) was set up to replicate study 1 conceptually with three important refinements. First, the information utility resulting from a communication channel was experimentally manipulated in terms of its specificity. In this implementation, the specificity of the communication channel was either associative (using a motif), or, specific (using a product text). Second, consumers with more extreme values of high and low EC were surveyed to obtain a clearer picture of divergent consumer responses to GMC. Third, the outcome variable consumers' perception of greenwashing tendency indicated that skepticism is critical in evaluating marketing communications and might explain the varying GMC's effectiveness. Consequently, consumers' environmental skepticism was

surveyed as an explanatory variable.

4.2 Study 2: The challenges of GMC:

Effective communication to environmentally conscious but skeptical consumers[4]

Abstract

Effectively communicating environmental product properties to consumers can be challenging. This especially pertains to consumers who have high environmental consciousness (HEC) yet are skeptical, since this target group must balance the need for reliable product knowledge with a high sensitivity to the often ambiguous, nonverbal cues about a product's environmental friendliness (e.g., environmental pictures). Using a group-specific 2x2x2 repeated measure experimental study, we investigated the effect of communication-channel specificity (verbal and nonverbal) in conveying product environmental friendliness and evaluated consumer environmental skepticism and attention during the product presentation. Environmental information via a verbal, text-based communication channel translates into low skepticism for both HEC consumers and consumers with low environmental consciousness (LEC). However, nonverbal, pictorial communication proved to be persuasive only for LEC consumers; HEC consumers exhibited high levels of skepticism, which, in turn, decreased perceived environmental friendliness. The analysis of combined verbal and nonverbal communication provides promising starting points for effective green marketing communication (GMC).

Keywords: environmental conscious consumer; environmental quality perception; ecological design; nonverbal communication; verbal communication, skepticism toward environmental packaging communication; Elaboration Likelihood Model

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[4] The experimental study presented in this chapter was supervised by Professor Sarah Diefenbach and is the second author of this work. When using the term "we," I refer to Sarah Diefenbach and myself. An adapted version of this chapter has been submitted to Journal of Journal of Environmental Communication.

Introduction

"Green" consumers with high environmental consciousness (HEC) are the main target group for environmentally friendly products. They are willing to pay more for environmental friendliness and, therefore, need to be informed about a product's environmental qualities. However, it is challenging to find the right channel to communicate environmental qualities to consumers. While they need to know about product quality, they are also sensitive to ambiguous, non-distinct information, which is often associated with environmental quality but does not imply clear conclusions (e.g., pictures of green landscapes). Moreover, ambiguous environmental information appears to lead consumers to perceive the information as greenwashing (Parguel et al., 2015). Thus, it begs the question: How can environmental friendliness be communicated to HEC consumers if they are skeptical and may perceive the information as greenwashing? Furthermore, are HEC consumers becoming increasingly skeptical about environmentally friendly (product) information?—regarding challenges for GMC, see Paço and Reis (2012) and Matthes and Wonneberger (2014, p. 115) for an overview. If so, how can communication of environmental qualities be effectively achieved for consumers with different levels of EC? To address these questions, we present recent findings and draw on the ELM as a theoretical framework to develop hypotheses regarding consumer responses to GMC.

4.2.1 Theoretical background and hypotheses

Challenges in addressing environmentally conscious but skeptical consumers.

A major challenge in convincing HEC consumers is that vague environmental arguments, such as phrases or motifs, might be perceived as "greenwashing" (Baum, 2012; Delmas & Burbano, 2011); information is assumed to be "misleading consumers regarding the environmental practices of a company or the environmental benefits of a product or service" (TerraChoice, 2009, p. 1). In practice, greenwashing is often employed through

packaging design (e.g., using motifs of trees), although neither the packaging nor the product considers environmentally friendly aspects. Given that the evaluation of the credibility of environmental information is key for HEC consumers to achieve their consumption objectives, an increase in greenwashing practices may increase those consumers' general concern and skepticism and decrease the credibility of products that are actually environmentally friendly (Dahl, 2010; Peattie & Crane, 2005). Since such concerns are particularly frequent in the HEC consumer segment, the term "skeptical HEC consumer" has been coined (Bhate & Lawler, 1997; Bickart & Ruth, 2012; Chang, 2011; do Paço & Reis, 2012; Sheehan & Atkinson, 2012; Shrum et al., 1995). *From these findings, we hypothesize that, overall, HEC consumers have a more skeptical attitude toward environmental information than consumers with low environmental consciousness (LEC) (H1).* Although the situation poses a serious issue for the communication of environmental information, some studies offer promising approaches for effective environmental communication.

Perceived information utility of environmental information reduces skepticism.

Distinguishing between green advertising skepticism and general advertising skepticism shows that skepticism toward environmental information might depend on the level of perceived information utility (D'Souza & Taghian, 2005; Matthes & Wonneberger, 2014; Mohr et al., 1998). In other words, HEC consumers may not have a more skeptical attitude overall but may be more skeptical if the environmental information utility is regarded as poor. Matthes and Wonneberger (2014) showed that HEC consumers are no more skeptical than LEC consumers when evaluating environmental advertisements. The information utility emerged as the explanatory factor for these results. Accordingly, the authors argue that if HEC consumers believe the utility of environmental information is high, their skepticism about this information decreases. However, the conclusion that HEC consumers derive more information utility from "green ads" than LEC consumers and that this, "in turn, decreased

their green advertising skepticism" (Matthes & Wonneberger, 2014, p. 115) seems too broad and hasty, since the authors only investigated text-based stimuli. Instead, we propose a more detailed discussion of the relationship between consumers' individual information utility and the communication channel that transfers environmental information, while also drawing connections to the ELM and interindividual differences in information processing.

Verbal and nonverbal communication channels for conveying environmental information.

Marketing communication distinguishes between verbal and nonverbal channels to communicate (environmental) information. These channels differ in their information utility and how they convey meaning (for an overview, see Langner et al., 2009). Visual references (e.g., colors, materials, or pictorial motifs) are the most prominent way of nonverbal communication (Spack et al., 2012). In contrast to verbal, text-based communication channels where environmental information is communicated via substantive product or process-related claims, a nonverbal, pictorial communication channel requires the viewer to interpret the content shown (Hansen & MacHin, 2013; Parguel et al., 2015). In pictorial communication, the information about environmental friendliness is conveyed through the use of natural scenes and representations of nature, which trigger the implicit visual association between nature and environmental friendliness in the consumer and thus, function as an "associative claim" (Parguel et al., 2015, p. 110; for similar reasoning, see Fowler & Close, 2012; Hartmann & Apaolaza-Ibáñez, 2009).

Influence of environmental consciousness and the use of communication channels (verbal, nonverbal) on perceiving environmental information.

Studies dealing with the effects of verbal and nonverbal communication channels highlight the importance of environmental involvement to understand consumer responses to GMC. Based on the ELM, we derive hypotheses describing and evaluating attitudinal

differences between the two communication channels for HEC and LEC consumers. Based on

the ELM (Petty & Cacioppo, 1981), the individual involvement level is a decisive factor

influencing the motivation to process incoming information. The formation of attitudes

toward a brand or product takes place either via the central or peripheral route of persuasion,

depending on the recipient's motivation and ability to process the communicated information.

Motivated and/or competent consumers form their attitudes through "active thinking about

either the issue or object-relevant information provided by the message," which is known as

the central route of persuasion (Petty & Cacioppo, 1981, p. 256). In contrast, unmotivated and

less competent consumers use nonverbal, executional elements such as motifs or colors to

form their attitudes. Specifically, the consumer makes inferences about these elements and

categorizes them based on the derived heuristics in a process called the peripheral route of

persuasion (Parguel et al., 2015).

When applied to the field of environmental marketing, consumer EC is key for

determining the response to marketing information (Mohr et al., 1998; Obermiller, 1995).

Likewise, there is empirical evidence for the peripheral route of persuasion: showing that

HEC consumers are less responsive to peripheral cues (e.g., nonverbal information) but have

"superior elaborative ability" (Hutchinson & Alba, 1991, p. 5) in correctly processing and

interpreting product-related verbal cues. For example, Parguel et al. (2015, Study 1) showed

an elaborative difference in the evaluation of environmental motifs (compared to conventional

motifs) between participants with different involvement levels: a low involvement level had a

positive effect on the evaluation of the company's environmental image, while no statistically

significant increase was found among highly involved consumers. Moreover, Ludwig and

Diefenbach (2019a) showed that consumer EC level has a significant influence on the

evaluation of products featuring nonverbal, pictorial environmental communication. A higher

EC implies lower perceived environmental friendliness. However, environmental friendliness

communicated via nonverbal, material-based information, revealed no significant moderating influence of EC.

Providing support for the central route of persuasion among highly involved consumers, Matthes et al. (2014) and Magnier and Schoormans (2015) showed that advertising with argumentative, text-based, environmental information was only persuasive for HEC consumers, but not for LEC consumers. This indicates that, for HEC consumers, environmental text generates a significantly more positive affective attitude and purchase intention than conventional text. Aligned with the ELM, LEC consumers appeared less motivated and capable of processing information with high elaborative content such as text about eco-friendliness. However, brand attitudes and purchasing intentions with nonverbal, pictorial environmental information and with combined environmental communications (text-based and pictorial) did not vary with EC. Schmuck et al. (2018) also find conflicting evidence, concluding that environmental, functional, text-based advertising messages are persuasive for all recipients, regardless of EC. Limiting stimulus-related flaws were, nevertheless, reported as the verbal stimuli were kept very simple (using only a well-known eco-label). Processing this eco-label might not have required high processing motivation or cognitive capacity and therefore, was peripherally perceptible for all consumer groups.

Effects of the communication channel and environmental consciousness on attention to environmental information.

Studies examining the impact of visual and verbal arguments on preference formation show that images (nonverbal, pictorial information) are not only easier to remember than words (verbal, text-based information), but can also change consumer attitudes (Fitzgerald & Russo, 2001; Kisielius & Sternthal, 1984). Edell and Staelin (1983, p.46) find that "pictures are more attention-getting, pleasant, and easier to process than is verbal text." While a general "picture superiority effect" over text-based information when memorizing product

information is well acknowledged in the literature (Childers & Houston, 1984; Hockley & Bancroft, 2011; Paivio, 1991), processing text-based information strongly depends on the motivational level (Kisielius & Sternthal, 1984). Pictorial communication is used as a heuristic shortcut for product evaluation, while elaborate processing of verbal product information requires a more motivated and capable consumer. Following the ELM, we suggest that consumer attention to nonverbal, pictorial (versus verbal, text-based) environmental information varies as a function of EC (i.e., consumer motivation to process environmental information). *We, thus, hypothesize that, compared to LEC consumers, HEC consumers tend to pay less attention to nonverbal, pictorial information and more attention to verbal, text-based information (H2).*

Relationship between consumer environmental skepticism and communication channels (nonverbal versus verbal).

Parguel et al. (2015) were the first to identify specific differences in consumer environmental skepticism triggered by the different environmental information communication channels. This suggests that there is a difference in environmental skepticism toward verbal and nonverbal communication channels. Thus far, perceived environmental skepticism and consumer perception of greenwashing have been considered in terms of "claim greenwashing." However, Parguel et al. (2015) introduced the concept of "executional greenwashing," which describes how executional elements (nonverbal elements such as motifs or colors) function as communication sources, while simultaneously arousing the feeling of being greenwashed. Here, the feeling of being greenwashed is more subjective than objective. This differentiation is important to enable accurate environmental communication and thereby, create "effective, transparent, verifiable, non-misleading and non-discriminatory consumer information tools to provide information relating to sustainable consumption and production" (United Nations Environment Programme [UNEP], 2002).

The advertising literature distinguishes between the specificity of communication channels. Communication channels can be substantive, concrete, and specific in (environmental) communication, for example, verbal, text-based communication channels (packaging text) (Chan, Leung, & Wong, 2006; Ottman, 1993), or vague and associative in (environmental) communication, such as nonverbal, pictorial communication channels (motif on packaging) (Chan, 2000; Chan et al., 2006). Regarding environmental skepticism, the less vague or associative the environmental information is, the more credible this information will be, and, therefore, the less skeptical consumers will be (Matthes & Wonneberger, 2014). *Accordingly, we hypothesize that environmental skepticism and product environmental friendliness depend on the information channel used to communicate environmentally friendly information (H3). Consumers are less skeptical about verbal, text-based environmental information than about nonverbal, pictorial information (H3a). Consequently, consumers attribute more environmental friendliness to a product with environmental information communicated via a verbal, text-based communication channel than when communicated via a nonverbal, pictorial communication channel (H3b).*

Relationship between skepticism, communication channels (nonverbal versus verbal) and consumers environmental consciousness levels.

Parguel et al. (2015) distinguish between claim and executional greenwashing and highlight that EC is key for the effective communication of environmental information. However, how consumers' EC shapes skepticism toward GMC remains an open question. To address this gap, we draw on the ELM and integrate the conceptual approach of perceived information utility to show how communication channel choices may influence skepticism toward environmental information for HEC versus LEC consumers.

Based on the theoretical postulation that, if the specificity of an information channel is high, then HEC consumers can derive high information utility from that channel, we assume

that in this case, skepticism is reduced and the evaluation of product environmental friendliness is high. In contrast, if the specificity of the information channel is low (that is, the environmental information is vague and associative), the information utility is low, resulting in more skepticism and a lower evaluation of the product's environmental friendliness. In line with Matthes and Wonneberger (2014), while HEC consumers prefer verbal, text-based communication channels to gain information and form a reliable opinion about the environmental quality of a product, LEC consumers have a different approach to persuasive product communication. Namely, product information that involves no elaborate cognitive processing and can be heuristically and peripherally perceived is the basis for attitude formation and evaluation of products and advertisements. Accordingly, we assume that LEC consumers are neither skeptical of nonverbal, pictorial nor of verbal, text-based environmental information. LEC consumers probably lack the motivation and attention for elaborate processing of verbal, text-based environmental information. In contrast, nonverbal, pictorial, environmental information refers to easily perceptible references that create an implicit visual association with the product's environmental quality. *From these considerations, we hypothesize that consumer environmental skepticism, triggered by verbal and nonverbal packaging information, depends on the EC level (H4). Specifically, HEC consumers are less skeptical about verbal, text-based information than LEC consumers (H4a). On the other hand, HEC consumers are more skeptical about nonverbal, pictorial information than LEC consumers (H4b).*

Experimental testing and modeling of the relationships between the specificity of communication channels and EC in environmental communication regarding the consumer's environmental skepticism are at the heart of this study. The other focal point is to understand how skepticism and the evaluation of environmental friendliness are related so that the potential Conflict involved in environmental communication can be uncovered.

Figure 4. Model for the first stage moderated and moderated mediation analysis
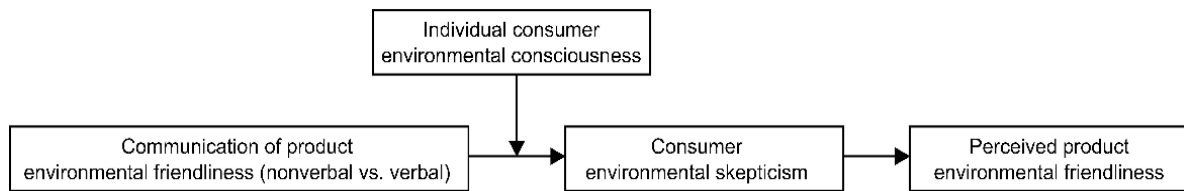
Note. Control variables (age, gender, and product category involvement), fixed effect (participant), direct effects, and interactions between all independent variables on the dependent variables, consumer environmental skepticism, and product environmental friendliness were omitted from depiction for clarity reasons.

Thus, we hypothesize that skepticism mediates the relationship between verbal, text-based versus nonverbal, pictorial information and the attributed product environmental friendliness; as skepticism increases, perceived environmental friendliness decreases (H5). Taken together, the relationship between verbal versus nonverbal communication channels, as drivers of consumers' perception of product environmental friendliness, can be explained by the consumer's environmental skepticism toward the product, moderated by the consumers' EC (Figure 4).

4.2.2 Materials and Methods

Participants.

A convenience sample of $N = 560$ participants (male = 282, $M_{age} = 50.95$ years, $SD = 14.15$) were recruited via crowdsourcing. Participants received a link to the online survey from the Respondi AG survey website to access the panel's research institution. The study was carried out in German. As an entry criterion for HEC and LEC levels using the SEU-3 short-scale for EC, we used a reference study to define the cut-off values for HEC consumers with values greater than 82.51% and LEC consumers with values less than 51.84%. These correspond to values $> = 5.78$ points and $= < 3.63$ points on a 7-point scale. This resulted in the final sample of $n = 210$ in the LEC consumer group ($M = 3.08$, $SD = .46$)

and $n = 350$ in the HEC consumer group ($M = 6.21$, $SD = .26$). Participation was voluntary and anonymous in exchange for a cash incentive (0.75€).

Study design.

The overall design is a 2x2x2 mixed design. EC (low, high) was realized as a between-subject factor. The specificity type of the communication channel was investigated by two within-subject factors, resulting in four different products: The first within-subject factor was the information communicated via the verbal, text-based information channel (environmental, conventional) while the second was the information communicated by the nonverbal, pictorial information channel (environmental, conventional). Each participant received the full set of four resulting products in random order, and we controlled for possible order effects. This resulted in $N_{obs} = 2,240$ total observations. Participants were instructed to pay attention to the featured products as if they were considering purchasing them. Furthermore, the participants were told to respond to some associative questions about the products. Spontaneous associations with given product statements were surveyed during product evaluations. In addition to items for the two dependent variables—environmental skepticism and product environmental friendliness—several other items were presented to the participants that were intended to conceal the study objective by addressing, for example, other product qualities and the perceived product effectiveness. Finally, after the participants evaluated all products, they completed the attention task for verbal versus nonverbal information. In addition, for each participant, general skepticism about environmental information and an attention value for nonverbal, visual (versus verbal, text-based) information was calculated. Therefore, for each of the products shown beforehand, we presented three variations of the product, two of which differed in one feature (that is, either another text or another motif) and one of which differed in two features (another text and another motif). Participants were asked to indicate which of the products they thought they

had seen before (see Figure 5).

Figure 5. Study procedure
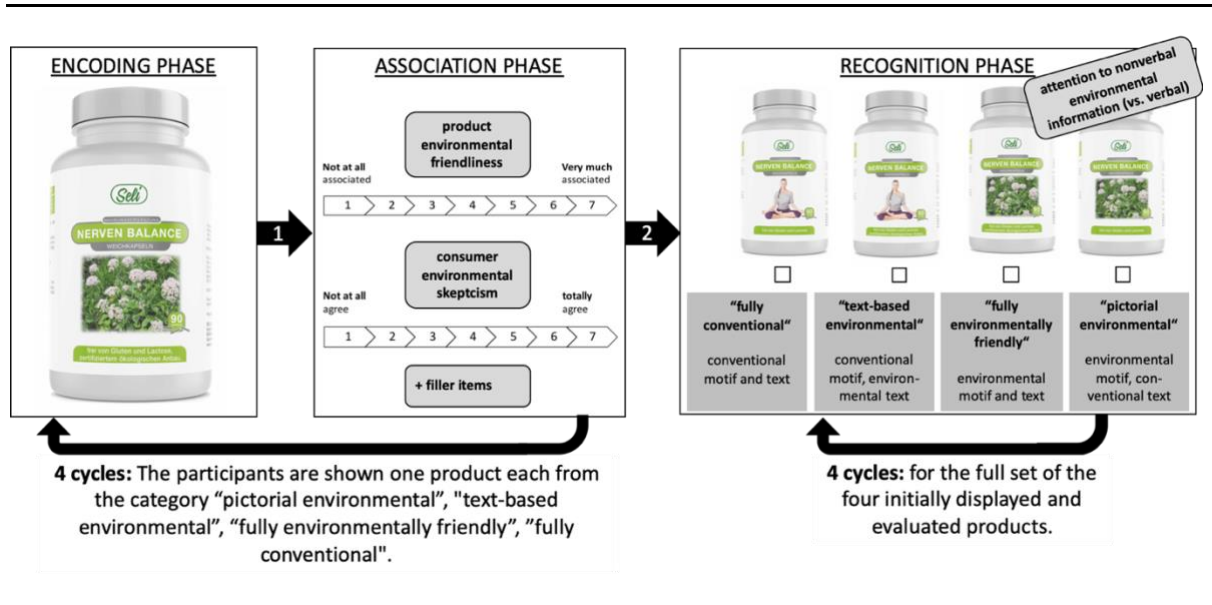
Stimuli.

The product stimuli belong to the product category of dietary supplements. The

stimuli were designed according to the four test conditions in four different packaging

designs. The implementation of environmental and conventional nonverbal, pictorial

information was selected from a pool of 25 motifs, pre-tested by an independent sample of 37

participants (29 women, average age $= 25.20$ years, $SD = 9.02$). Participants evaluated the

motifs in terms of expressed environmental friendliness. Both the motif pool and the product

text used were based on previous studies (Löbach & Fiedler, 1995; Magnier & Crié, 2015;

Magnier & Schoormans, 2017; Orth & Malkewitz, 2008; Triebel, 1997). To control for

confounding brand familiarity effects and packaging communication effects, we used a

neutral, non-existent brand name ("Seli") and brand logo (Spomer, 2013; Winter, 2009).

Furthermore, the packaging shape, color, and materials and the verbal on-package

communication were kept constant across all stimuli, thus taking the neutrality and customary

design of the packaging into account.

Measures.

We now describe the theoretical background and sample items for the measures.

Environmental consciousness. Fifteen items measured participant EC, including environment-related attitudes, willingness, and self-reported actions in the content areas of littering/environmental aesthetics, waste separation and recycling, protection and health, environmentally conscious purchasing, water pollution, control, and preservation [Schahn et al. (2000) on a 7-point agreement scale: 1 (not at all) to 7 (very strong); $\alpha = .78$].

Attributed environmental friendliness was surveyed using two items that have shown high correlation with the product environmental friendliness scale by Ludwig and Diefenbach (2019a) [that is, "associated with environmental sustainability," "associated with environmental friendliness," 1 (not at all) to 7 (very strong); $r = .82$, $p < .001$].

Consumer environmental skepticism. This value was measured using two items on a 7-point approval scale [1 (not at all) to 7 (very strong); $r = .89$, $p < .001$], namely, "this product exaggerates how its green functionality actually is" and "this product misleads in terms of environmental features" as described in Chen and Chang (2012) and Ludwig and Diefenbach (2019a).

Attention to environmental nonverbal information (versus verbal) was conceptually adapted from (Childers & Houston, 1985). The attention value represents the total value calculated for each product shown per participant, whereby a correctly recognized motif was scored +1 point, and each correctly recognized text was scored -1 point. Thus, participants could attain scores from -4 to $+4$ on the differential scale across the four products, with higher values indicating attention to nonverbal rather than verbal information.

Overall skeptical attitude toward environmental information is defined as the negatively-valued attitude of consumers toward advertising motifs and statements (Obermiller & Spangenberg, 1998) within the green marketing sector. The scale was adopted by Mohr et

al. using four items on a 7-point agreement scale [1 (not at all) to 7 (very strong); α = .82], such as: "I do not believe most environmental cues made on package labels or in advertising." The items were adapted following Mohr et al. (1998) and Matthes and Wonneberger (2014), who restricted the item formulation to verbal marketing communication (claims). However, to investigate consumers' overall skeptical attitude toward environmental information, not restricted to verbal communication, the term "claim" has been altered to "cue" or "information" to be unspecific regarding communication channels.

The modified Personal Involvement Inventory (PII) was adapted from Mittal (1995), who examined and modified Zaichkowsky's (1985) PII using 5 items on a 7-point agreement scale [1 (not at all) to 7 (very strong); α = .94].

The modified Consumer Involvement Profile (CIP) was adapted from Mittal (1995) who examined and modified Laurent and Kapferer's (1985), CIP using 6 items on a 7-point agreement scale [1 (not at all) to 7 (very strong); α = .89].

4.2.3 Results

Statistical analysis was conducted using R 3.4.4 (R Core Team, 2017) and the *lmerTest* (Kuznetsova, Brockhoff, & Christensen, 2017), *lme4* (Bates, Mächler, Bolker, & Walker, 2015), *knitr* (Xie, 2015), *kableExtra* (Zhu, 2019), *r2glmm* (Edwards, Muller, Wolfinger, Qaqish, & Schabenberger, 2008), and *mediation* (Tingley, Yamamoto, Hirose, Keele, & Imai, 2014) packages.

Manipulation check.

To check our manipulation, we ran two one-way ANOVAs, testing the effects of nonverbal, pictorial packaging communication, as well as verbal, text-based packaging information on perceived product environmental friendliness. As intended, there was an effect of nonverbal, pictorial packaging communication, $F_{motif}(1,2238) = 36.90$, $p < .001$, $\eta 2 = .02$, whereby the conventional motif was perceived as less environmentally friendly than the

environmental motif ($M_{conventional}$ = 3.49, SD = 1.70, $M_{environmental}$= 3.93, SD = 1.74). Likewise,

there was an effect of verbal, text-based packaging communication, F_{text}(1,2238) = 174.20,

p < .001, η_2 = .07), whereby the conventional text was perceived as less environmentally

friendly than the environmental text ($M_{conventional}$ = 3.24, SD = 1.61, $M_{environmental}$ = 4.18,

SD = 1.74.).

Hypothesis testing.

Differences in the overall skeptical attitude toward environmental information.

We first tested if HEC consumers have a more skeptical attitude toward environmental

information than LEC consumers overall, using a one-way analysis of variance with EC

levels as the between-subjects factor. The ANOVA results showed a significant effect of EC

levels, F(1, 558) = 75.63, p < .001, η_2 = .12. Planned contrasts indicate that HEC consumers

(M_{HEC} = 4.03, SD = 1.52) are significantly more skeptical toward environmental information,

compared to LEC consumers (M_{LEC} = 2.95, SD = 1.25), supporting *H1*.

Differences in attentiveness to verbal versus nonverbal information.

To investigate attention differences between communication channels, we tested

participants' attention scores on environmental nonverbal, pictorial information compared to

verbal, text-based information regarding EC differences. A one-way ANOVA with EC levels

as a between-subjects factor showed that differences in attentiveness between EC levels were

significant, F(1, 558) = 65.55, p < .001, η_2 = .11. Specifically, HEC consumers are less

attentive to nonverbal, pictorial (versus verbal, text-based) information (M_{HEC} = .54,

SD = 1.22 than LEC consumers (M_{LEC} = 1.47, SD = 1.46) and, therefore, more attentive to

verbal, text-based information, supporting *H2*. This also held true when taking into account

the picture superiority effect of the four products across all consumers, namely, consumers are

generally more attentive to motifs than to text, t(2239) = -15.74, p < .001, M_{motifs} = .76,

SD = .43; M_{text} = .54, SD = .50.

Effect of communication channels and consumers' environmental consciousness levels

on consumer environmental skepticism and product environmental friendliness

evaluation.

To account for subject-specific variations, linear mixed models were used for

mediation (outcome: consumer environmental skepticism) and observation (outcome: product

environmental friendliness). Both models include the following fixed effects: nonverbal,

pictorial information; verbal, text-based information; EC levels and the covariates product

category involvement (PII and CPI); age; and gender. The mediator, consumer environmental

skepticism, was also included as a fixed effect in the observation model. For the first stage

moderated, moderated mediation model (Hayes, 2018), the binary variables were coded as

follows: (1) nonverbal, pictorial information: 0 = conventional, 1 = environmental; (2) verbal,

text-based information: 0 = conventional, 1 = environmental; (3) EC level: 0 = LEC,

1 = HEC). The main effects, as well as the two- and three-way interactions between

nonverbal, pictorial information, verbal, text-based information, and EC levels, were modeled

as fixed effects. Subject-specific variation was modeled using the participant ID with a

random effect for the intercept. Another random effect for the intercept was used for the order

factor (of the stimuli represented).

For both models, the standard deviation of the random intercept for the order effect

did not differ significantly from zero (Likelihood-Ratio test; mediation model: Chisq = .58,

$df = 1$, $p = .446$; observation model: Chisq = .001, $df = 1$, $p = .999$). This agrees with our

expectation that no order effect of the stimuli is visible because the sequence of stimuli was

counterbalanced between participants. Subsequently, this random effect was removed from

the models. The standard deviations of the random intercepts of the participant ID, however,

significantly differed from zero (Likelihood-Ratio test; mediation model: Chisq = 980.73,

$df = 1$, $p < .001$; observation model: Chisq = 618.28, $df = 1$, $p < .001$). Therefore, considering

subject-specific variation using random intercepts is necessary.

Table 4 summarizes the results of the first stage moderated, moderated mediation. We summarize the results of the linear mixed model next and discuss hypotheses testing and other results in the discussion section.

Effects of communication channels on environmental skepticism and environmental friendliness.

The analysis shows that environmental information significantly increases environmental skepticism compared to conventional information. If environmental information is communicated via nonverbal, pictorial communication, the skepticism is about 1.8 times stronger than if communicated via verbal, text-based communication, supporting *H3a* (Table 4). Their interaction is significant and shows that the skepticism triggered by nonverbal environmental stimuli can be significantly reduced when the environmental motif is supported by an environmental product text justifying the environmental motif.

As the manipulation check showed, environmental information significantly increased the perceived environmental friendliness compared to conventional information for both communication channels. Hence, a picture is about four times as effective in communicating environmental friendliness as a verbal cue, contradicting *H3b*. The two-way interaction between both communication channels is not significant, so the effect of nonverbal and verbal information seems to be additive, in accordance with previous results.

Effects of environmental consciousness levels on consumer environmental skepticism and product environmental friendliness.

HEC consumers are more skeptical across all four products than LEC consumers. This result cross-validates those concerning the overall skeptical attitude of HEC and LEC consumers in *H1*. The same applies to the environmental friendliness evaluation of products. Consumers' EC levels are a significant predictor of the evaluation of product environmental

friendliness: HEC consumers generally rate products as less environmentally friendly than do LEC consumers.

Effects of communication channels as a function of environmental awareness on consumer environmental skepticism and product environmental friendliness.

While HEC consumers were generally more skeptical, regardless of communication channels, there were significant differences among the communication channels (nonverbal, pictorial and verbal, text-based), depending on the EC levels (HEC, LEC), as formulated in *H4.* Linear mixed regression analysis found significant results for the proposed interaction between nonverbal, pictorial information and consumer EC levels (HEC, LEC) and three-way interactions between communication channels (verbal, nonverbal) and EC levels (HEC, LEC). The results confirm *H4a*, namely, HEC consumers are significantly more skeptical about nonverbal environmental information than LEC consumers. However, there was no difference in skepticism in the assessment of environmental verbal information between HEC and LEC consumers, so *H4b* is not supported (as depicted in Figure 6).

For the outcome variable of "environmental friendliness evaluation," there were significant effects on the two-way interactions, also indicating that HEC and LEC consumers attribute different degrees of environmental friendliness to a product, depending on the information channel (nonverbal, verbal) through which environmental information is communicated. HEC consumers evaluate products with an environmental text on the packaging with a high product environmental friendliness, that is, they show verbal highlighting in comparison to LEC consumers. On the other hand, HEC consumers rate a product with an environmental motif as low in environmental friendliness compared to LEC consumers, which suggests that LEC consumers are pictorial highlighters.

Figure 6. Effect of nonverbal, pictorial (left) and verbal, text-based (right) information and environmental consciousness on consumer environmental skepticism.
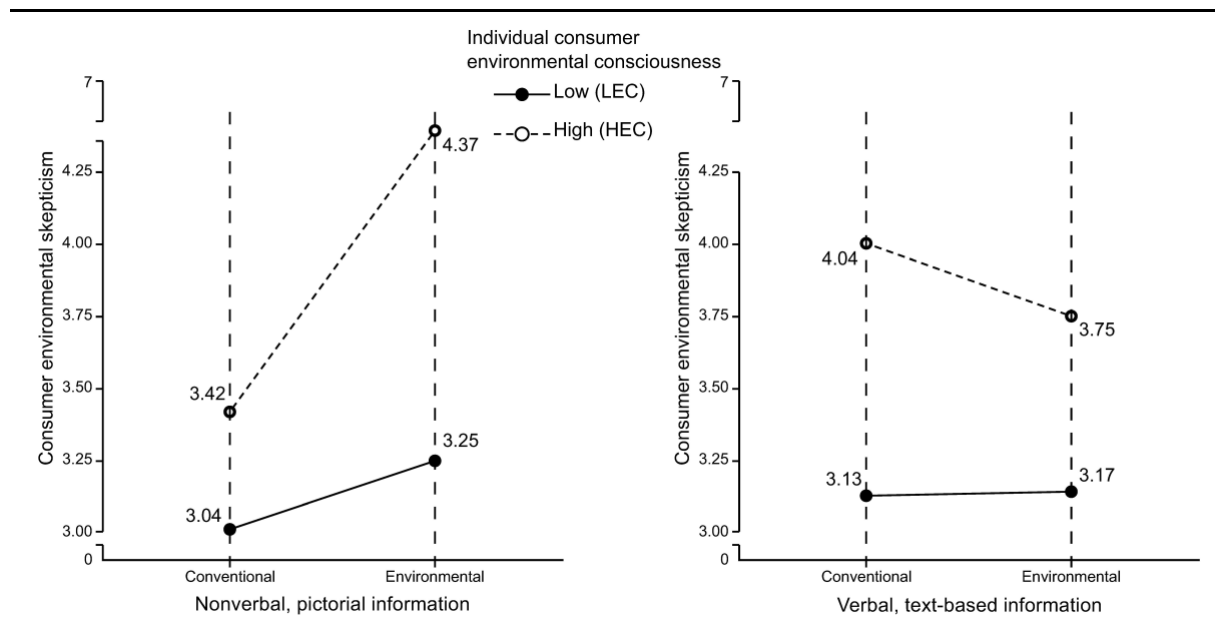
While the three-way interaction term is not significant for environmental friendliness, the visual presentation and post hoc linear regression analyses with the four product combinations and consumer EC level as independent variables showed an interaction effect between HEC and LEC when environmental information is communicated through only one communication channel (products: "pictorial environmental" and "text-based environmental"); $\beta = -1.72$, $SE = .13$, $t = -13.54$, $p < .001$. If environmental or conventional information is communicated via two specifically different channels ("fully environmentally friendly" and "fully conventional"), there is no difference in the product environmental friendliness evaluation between HEC and LEC consumers; $\beta = .21$, $SE = .12$, $t = 1.79$, $p = .074$ (as depicted in Figure 7).

Figure 7. Effect of packaging design and environmental consciousness on attributed product environmental friendliness.
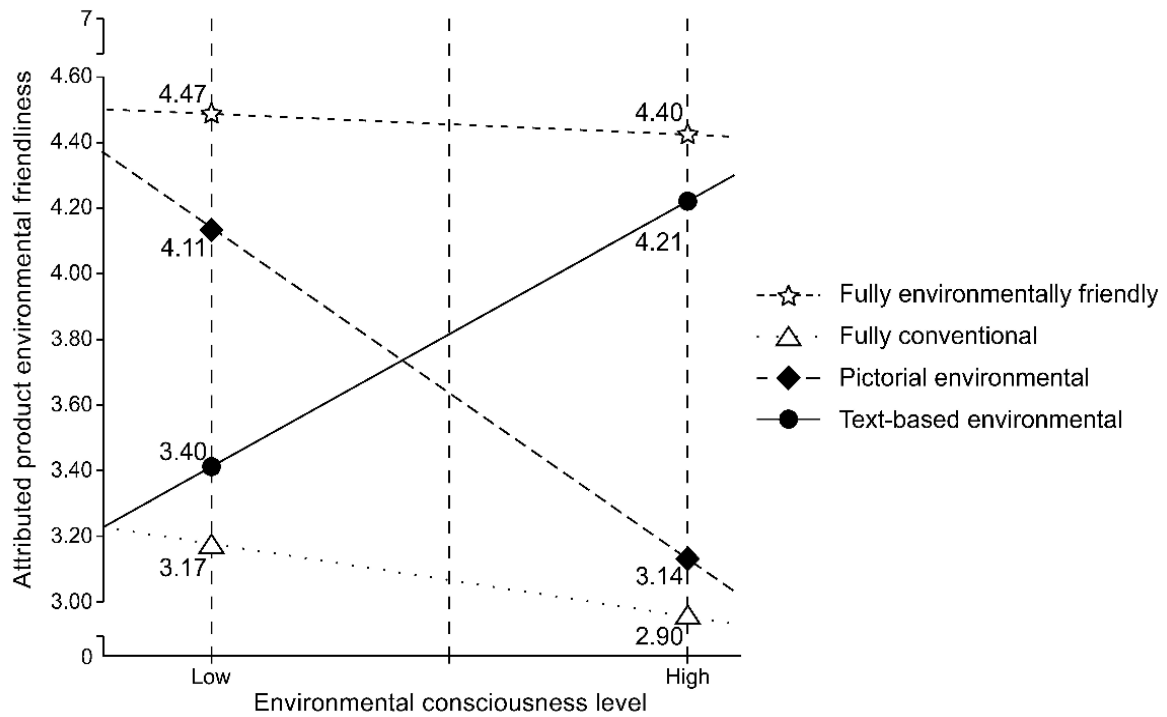
Covariates.

Among the covariates, only the product category of involvement in dietary supplements proved to have a significant effect on consumer environmental skepticism and evaluation of environmental friendliness. The greater the involvement, the less skeptical the consumers were and the higher the environmental friendliness evaluation was.

Table 4. First stage moderated, moderated mediation model estimation. Independent variables: nonverbal and verbal packaging information and EC level. Dependent variables: consumer environmental skepticism and environmental friendliness.

	Consequence					
	Mediator (consumer environmental skepticism)			Outcome (attributed product environmental friendliness)		
Antecedent	β	SE	p	β	SE	p
Fixed Parts						
Residuals	4.10	.31	< .001	2.41	.29	< .001
Nonverbal, pic. comm.	.39	.10	< .001	.94	.09	< .001
Verbal, text-based comm.	.22	.01	.024	.23	.09	.010
EC	.53	.16	.001	-.38	.15	.009
Nonverbal x verbal	-.36	.14	.009	.14	.13	.279
Nonverbal x EC	1.03	.12	< .001	-.70	.11	< .001
Verbal x EC	-.04	.12	.755	1.09	.11	< .001
Nonverbal x verbal x EC	-.59	.18	.001	-.19	.16	.233
Consumer environmental skepticism	NA	NA	NA	-.10	.02	< .001
Gender	-.17	.12	.157	.08	.11	.456
Age	.00	.00	.241	-.00	.00	.669
CIP	-.09	.05	.081	.09	.05	.064
PII	-.26	.05	< .001	.24	.04	< .001
Antecedent	SD	N_{grp}	ICC	SD	N_{grp}	ICC
Random Parts						
Residuals	1.00			.91		
Person ID	1.30	560	.56	1.17	560	.56

$R^2 = .28$

$F(11,2227) = 77.13, p < .001$[1]

$R^2 = .37$

$F(12,2227) = 108.59, p < .001$[1]

Note. EC = consumer environmental consciousness. CIP = consumer involvement profile. PII = Personal involvement inventory.

[1] R^2 and Omnibus F-test follow Edwards et al., 2008 using the r2glmm R package.

Effect of consumer environmental skepticism on the evaluation of product environmental friendliness.

Hypothesis *H5* indicates that consumer environmental skepticism indirectly explains the relationship between communication channels and the evaluation of environmental friendliness. The first stage moderated, moderated mediation analysis showed that: (1) the main effect of consumer environmental skepticism had a significant, negative effect on perceived product environmental friendliness; (2) the relationship between communication channels taking consumer type and perceived environmental friendliness into account can be explained indirectly through consumer environmental skepticism. So, $\beta_{indirect} = .06$, *SE* = .02, BCa CI [.02, .11], supports our choice for the first stage moderated, moderated mediation model**.**

4.2.4 Discussion

This study addresses various conflicting results and shortcomings in the communication of environmentally friendly product qualities to its main target group, HEC consumers. We investigated the role of EC in consumer perception of various combined environmental and conventional product information using texts and motifs. We examined effects on consumer environmental skepticism and on the evaluation of a product's environmental friendliness.

By bridging the gap between previous conflicting results, we define a clearer image of the HEC consumer. In accordance with hypotheses H1, H3a, and H4a, we find that (1) the skeptical nature of the HEC consumer is confirmed; (2) there is a difference in skepticism triggered by the communication channels used, that is, text reduces skepticism while a motif increases skepticism; and (3) there is a difference in skepticism between HEC and LEC consumers. This difference depends on the communication channel of the environmental information. Although the HEC consumers' skepticism is significantly reduced by text-based

information, it is interesting to note that there was no difference in the skepticism between

HEC and LEC consumers regarding environmental text-based information (H4b). With regard

to H2 and the interesting result of H3b, we also conclude (4) that the attitudinal picture

superiority effect occurs in the environmental context and affects the communicative

effectiveness of on-package motifs. Finally, to support H5 and the comprehensive model, the

results showed (5) that skepticism mediates the relationship between the communication

channels and the perception of product environmental friendliness, conditional for HEC and

LEC consumers. More detailed discussions of findings, the resulting practical implications,

future research, and limitations are discussed below.

Skepticism and environmentally conscious consumerism.

As described in the literature, HEC have a more skeptical attitude toward

environmental information (Bhate & Lawler, 1997; Bickart & Ruth, 2012; Chang, 2011; do

Paço & Reis, 2012; Sheehan & Atkinson, 2012; Shrum et al., 1995). In contrast to many

marketers, who believe that an overall more skeptical attitude leads to the negative

interpretation of marketing communication, this more skeptical attitude is an expression of

HEC consumers' demand for products with credible and specific communication about the

environmental benefits to identify which environmental aspects a company or product has

committed itself to. Given that a side-effect of increased levels of environmental

communication is the entry of black sheep, who try to boost their image and sales through

greenwashing, into the marketplace, our results are particularly relevant because they show

that companies with environmental products need to formulate strategies for effective

communication.

The importance of communication channels in environmental communication.

The results show that attention, consumer environmental skepticism, and product

environmental friendliness varied according to the communication channel through which the

environmental information was communicated. We found that an environmental motif increases consumer environmental skepticism by a factor of 1.8, but at the same time the communicative effects of the environmental motif were four times stronger than for an environmental text. Thus, to understand this effect, it is important to recall that consumers generally pay more attention to nonverbal, pictorial information than to verbal, text-based information (picture superiority effect). This effect may be at play here, positively contributing to the perceived environmental friendliness of the product.

A closer look at the consumer types reveals attention differences for different communication channels, as derived theoretically from ELM. HEC consumers were less attentive to nonverbal, pictorial information and more attentive to verbal, text-based information than LEC consumers. This pattern also appeared in the environmental skepticism of nonverbal, pictorial environmental information. Indeed, HEC consumers were much more skeptical about nonverbal, pictorial environmental information than LEC consumers. However, the same cannot be said about evaluations of verbal, text-based information. This result may indicate that the text is, as assumed, a precise and substantive source of information that does not increase skepticism among HEC or LEC consumers. Alternatively, it is conceivable that this argument only applies to HEC consumers, while LEC consumers, due to their lack of involvement and motivation, did not elaborately process the verbal information (attention H2 results). Consequently, we might conclude that if environmental information is not perceived, it cannot cause skepticism. As skepticism proved to be a relevant mediator for product environmental friendliness, the results showed that increased skepticism is accompanied by a lower product evaluation, namely, less efficient environmental communication.

Practical implication.

Companies must first have a clear idea of the product characteristics they intend highlighting and their target group to allow them to address consumers through the most effective communication channels and thus, minimize product skepticism. HEC consumers should receive environmental information through a specific information channel (e.g., product text), while LEC consumers should receive environmental information via a peripheral, easily perceptible information channel (e.g., choice of motif).

Inclusive approach to effective environmental communication.

While our conclusions suggest that environmental communication should be target-oriented to be effective, the analysis of the four product stimuli showed that an integrative approach to GMC is effective for both skeptical HEC consumers and LEC consumers. Indeed, the communication of environmental information via the two different communication channels explored here proved to be very effective, allowing the environmental skepticism of the vague peripheral stimulus (motif) among HEC consumers to disappear. A possible explanation may be that the use of the pictorial information is "justified" by verbal cues, thus rendering pictorial information as a more trustworthy source of information. As a result, the perceived environmental friendliness increases.

The results also show that environmental information communicated through two communication channels of different specificity is as effective for LEC consumers as a single associative peripheral stimulus. Hence, the combined use of communication channels differing in their specificity to communicate environmental information has an impact across all consumer groups, regardless of their EC. The use of combined channels provides a promising inclusive approach to the challenge of GMC. Higher quantity communication does not result in higher perceived product environmental friendliness. However, communication via two channels with different specificities has the ability to inform LEC consumers via their

preferred nonverbal communication channel, with the verbal stimulus receiving little attention. Meanwhile, HEC consumers use the verbal stimulus as a credible source of information with the nonverbal stimulus interpreted in accordance with the text-based cue.

Limitations and further research.

The generalizability of our results may be affected by several factors. Stimuli, packaging designs, communication, and brand names were based on actual products but were artificially created to avoid brand and product awareness effects and minimize possible attitudinal effects on skepticism and product evaluation. In addition, the online study setting may have induced participants to examine and evaluate the products less critically than in a real shopping situation.

Dietary supplements were chosen as a low-involvement product category as there is no additional background knowledge or expertise required to evaluate them (as opposed to what a high-involvement product would require). However, future work should consider high-involvement products. Perhaps LEC consumers exhibit different perceptual and evaluation patterns for high-involvement products and consider verbal, text-based information with greater attention. In the context of environmental communication, LEC consumers could conceivably show a comparable product evaluation pattern as HEC consumers for high-involvement products.

Finally, in this study, we addressed perceived specificity using different packaging communication channels, rather than asking participants to evaluate the specificity on existing products. To draw in-depth inferences on reduced skepticism toward a product with combined, text-based, and pictorial environmental information and the dynamics of environmental product evaluation processes for skeptical HEC consumers, future research should consider perceived specificity and perceived justification effects as explanatory factors.

4.2.5 Interims conclusion

Building on the results of study 1, study 2 used three important refinements to address the influence of the specificity of communication channels, consumer EC levels and the relationship between credibility—that is, consumer environmental skepticism—and the effectiveness of GMC. In answering research question 3 (that is, *how is consumer environmental skepticism related to the perception of environmental product attributes?*), consumer environmental skepticism turned out to be a negative influencing factor for the ascribed product environmental friendliness.

Moreover, based on the results of study 1, it was assumed that consumers' EC could determine the extent to which consumer skepticism influences the evaluation of product environmental friendliness. Study 2 tested this effect and showed that (I) consumers' EC level is related to consumers' overall skeptical attitude toward environmental information and (II) the evaluation of the environmental quality and skepticism toward a product. Therefore, in response to research question 4 (that is, *How does consumer level of EC affect the effectiveness of environmental communication?*), it can be summarized that consumers' overall skeptical attitude toward environmental information is highly dependent on their EC level, and this confirms the image of a critical green consumer (Bhate & Lawler, 1997; Bickart & Ruth, 2012; Chang, 2011; do Paço & Reis, 2012; Sheehan & Atkinson, 2012; Shrum et al., 1995).

Thus, focusing on the effects of the communication channels, study 2 verified the findings of study 1 and showed that a substantive, specific communication channel for transmitting environmental information was less afflicted with consumers' environmental skepticism. However, an answer to research question 2 (that is, *Does the specificity of communication channels contribute to the effectiveness of environmental communication*) is more complex. Although the conclusion is correct, in terms of a positive effect of channel

specificity on consumers' reduced skepticism, the findings in terms of attributed environmental friendliness showed a conflicting result, namely associative communication channels (that is, motifs) were more effective. In conclusion to this research question, study 2 confirmed what had already been suggested in study 1, that the effectiveness of GMC does not depend solely on the specificity of the communication channel used for the environmental information. Rather, the conclusion can be drawn, that there is an interaction between information channels and the EC of consumers, accounting for different product environmental friendliness evaluations. Moreover, by modeling the evaluation process, it was possible to show that consumers EC level moderates the credibility and thus the evaluation process of GMC.

Throughout both studies, different communication strategies manifested for HEC and LEC consumers, in response to research question 5 (i.e., *Which environmental communications channels are most effective for which types of EC target audience?*). Accordingly, environmental information for HEC consumers should be specifically communicated (for instance, study 1: via material; study 2: via verbal and text-based communication channels), while for LEC consumers these should be peripherally perceptible and of associative nature (e.g., study 1: via surface design; study 2: via nonverbal motifs) to be effective.

The product-specific analysis in study 2 additionally revealed an interesting phenomenon: While HEC consumers were very skeptical about a product whose environmental information was solely communicated via an associative communication channel (that is, a motif on the packaging), HEC consumers' skepticism disappeared when the product featured an additional environmental information communicated via a specific, text-based communication channel.

The aim of study 3 (Chapter 4.3) is to understand this evaluation process of products

featuring environmental information transmitted via a nonverbal communication channel,

among HEC consumers. In contrast to the first two studies, the focus is on investigating how

an additional specific communication channel affects consumers' responses (and in particular

HEC consumers) to nonverbal environmental information (*research question 6*).

4.3 Study 3: Responses to environmental motifs depending on environmental

consciousness[5]

Abstract

Environmental motifs, used in green marketing, can be both a blessing and a curse. Compared to text, they quickly communicate an environment-friendly quality, without requiring much effort to decode the environmental information. However, environmental motifs tend to generate greater skepticism about the credibility of green products, particularly among consumers with high environmental consciousness (HEC; a primary target group of green advertising). This skepticism might be reduced if additional environmental text justifies the on-package environmental motif. This study used a 2x2 design ($N = 427$), with consumers' *environmental consciousness levels* (low, high), and *text content* (environmental, conventional), to investigate whether consumers' skepticism and evaluations of a product's environmental friendliness (featuring an environmental motif) depends on whether the additional product text is environmental (motif congruent) or conventional (motif incongruent). Further, the study clarified whether the relationship was explained via the perceived content congruence and justification for using the environmental motif. Results showed that an environmental motif combined with text reduced HEC consumers' skepticism, while additional environmental text made no difference to low environmental consciousness consumers (LEC). Among HEC consumers, perceived congruence between the environmental motif and text justified the use of on-package environmental motifs, reducing their skepticism, and they evaluated the product's environmental friendliness as high. This study models consumers' responses and justification processes, explaining consumers' opinion on the use of environmental motifs as sometimes justified and sometimes not.

Introduction

Visually appealing natural sceneries have become omnipresent in product packaging and advertising (Banerjee & Iyer, 1995; Matthes & Wonneberger, 2014). With the general trend of green marketing communication (GMC), many companies make use of executional elements such as motifs or colors to convey the impression of naturalness, organic ingredients, sustainable manufacturing, or recycling features that are effective and salient green marketing techniques (Banerjee & Iyer, 1995; Ludwig & Diefenbach, 2019b; Matthes & Wonneberger, 2014; Segev, Fernandes, & Hong, 2016). These motifs use visual associations with nature to create an impression of environmental friendliness through images of pristine, unspoiled landscapes and natural elements (Hartmann & Apaolaza-Ibáñez, 2009). Environmental motifs in advertising and product communication can trigger emotional responses in consumers, similar to those that consumers experience in nature (Hartmann & Apaolaza- Ibáñez, 2012; Hartmann et al., 2013). Furthermore, the superiority of executional elements—pictures and motifs—over verbal, text-based information is well established (Childers & Houston, 1984; Hockley & Bancroft, 2011; Paivio, 1991), especially in green advertising communications (Hartmann et al., 2013; Ludwig & Diefenbach, 2019b).

However, initial research has found that environmental motifs could prompt undesirable greenwashing perceptions (Ludwig & Diefenbach, 2019a,b; Parguel et al., 2015). Such executional elements are referred to as "associative claims," that is, associative and intangible advertising and product information that requires interpretation by the recipient (Carlson et al., 1996). This nonspecific claim leads consumers with high environmental consciousness (HEC) to view an environmental motif as unconvincing; consumers feel "greenwashed" or misled about the environmental performance of the product or service

(Parguel et al., 2011). This creates a serious problem for GMC when environmental motifs serve as a counterproductive communication channel to HEC consumers, the primary target group.

Green marketing rarely uses environmental cues in isolation; instead, environmental motifs are often presented along with a product and an advertising text. Previous research suggested that these text arguments may influence the interpretation and evaluation of the motif. Congruent text arguments might reduce skepticism for products featuring environmental motifs among HEC consumers, while incongruent conventional text arguments might sustain skepticism (Ludwig & Diefenbach, 2019b).

Despite the practical relevance for the use of environmental motifs, knowledge is scarce regarding how text content affects different consumer groups' skepticism toward products featuring these motifs, along with the consequences of that skepticism, that is, the evaluation of a product's environmental friendliness and, ultimately, a purchasing decision. This study filled these gaps by examining the distinct and combined effects of environmental and conventional text content when presented with a product featuring an environmental motif. In addition, the study systematically tested the moderating role of high and low levels of EC (HEC and LEC) on consumers' skepticism by developing an explanatory mediation model to clarify HEC and LEC consumers' responses to text content and its influence on their evaluations of environmental friendliness.

4.3.1 Theoretical background and hypotheses

Application of environmental motifs in GMC.

The success of environmental motifs in GMC is related to their favorable influence on cognitive message elaboration, memory, and positive emotional effects (Hartmann et al., 2013). Environmental motifs in product advertising and sales induce a positive emotional experience similar to that experienced when exploring real nature (the "virtual-nature

experience"; Hartmann & Apaolaza- Ibáñez, 2012; Hartmann et al., 2013). Advertising links

the positive emotional responses of actual experiences in nature with an imaginary natural

experience, resulting in more favorable consumer attitudes toward the brand (Hartmann &

Apaolaza-Ibáñez, 2008, 2009, 2010, 2012; Parguel et al., 2015; Schmuck et al., 2018a;

Schmuck et al., 2018b; Searles, 2010).

In addition, environmental motifs prompt positive cognitive effects on marketing

effectiveness. Nonverbal communication media, including motifs, are quickly and

peripherally perceptible, rendering them well suited for communication at the point-of-sale. In

situations where consumers must process multiple parallel information streams and have time

constraints and limited capacity in processing information, pictorial information serves as a

perceptual shortcut. Previous research has shown environmental motifs to be about four times

more effective than text for communicating environmental friendliness (Ludwig &

Diefenbach, 2019b).

The established superiority of pictures over text also applies to environmental motifs

versus environmental text, demonstrating that consumers are generally more attentive to

pictorial information (Ludwig & Diefenbach, 2019b). Hartmann and colleagues (2013)

showed that environmental motifs increased fixation on an advertising text and attracted

consumers' attention toward the advertising argument. This increased attention to pictorial

communication appeals to consumers in ways that text-based communication cannot.

Limitations of environmental motifs in GMC.

The downside of environmental motifs has prompted ongoing discussion regarding

"executional greenwashing" (Parguel et al., 2015). Banerjee et al. (1995) showed that most

green marketing campaigns focus on a green corporate image rather than on the

environmental benefits of products and services. Carlson et al. (1993) showed that pictorial

information linking products, images, and manufacturing processes to environmental issues

were perceived to cause the most ambiguity and perception of misleading marketing claims. Ludwig and Diefenbach (2019b) confirmed what Carlson et al. (1996) postulated earlier, specifically that the perceived information utility depends on the communication medium or channel through which an environmental message is communicated. Their study showed that environmental motifs produced a high degree of skepticism, whereas verbal environmental information caused little skepticism among consumers. These negative evaluation effects of environmental motifs are associated with the problematic credibility and skepticism that arises from a vague and associative communication channel. These findings are supported by the Persuasion Knowledge Model (PKM), which states that consumers have intuitive theories about how marketers try to persuade them (Friestad & Wright, 1994). "Consumers' persuasion-coping knowledge enables them to recognize, analyze, interpret, evaluate, and remember persuasion attempts," and based on this they form their attitudes and evaluations (Friestad & Wright, 1994, p. 3).

In line with the ELM, the PKM also holds that consumer involvement is a decisive determinant of the degree to which the persuasive attempts are considered.

Environmental involvement in processing incoming environmental information.
Environmental consciousness (EC).

Consumers' involvement in protecting the environment varies. The social understanding of high-level EC often reflects a very global environmental attitude (e.g., "I am in favor of environmental protection"). Environmental psychology research more precisely defines the dimensions for measuring EC. Specifically, consumers' EC comprises environmental knowledge, environmental concern, environmental experience, environmentally relevant behavioral intentions, environmentally relevant behavior, and environmental value orientation (Maloney & Ward, 1973; Matthes & Wonneberger, 2014; Mohr et al., 1998; Schahn & Holzer, 1990; Schahn et al., 1999)

Elaboration likelihood model (ELM).

Dual-process models such as the ELM (Petty & Cacioppo, 1986; Petty et al., 1989) emphasize individual involvement as a key determinant of individuals' motivation to process incoming advertising and product information. Involvement influences consumers' ability and motivation regarding how much cognitive elaboration is involved in the attitude formation process. Highly involved consumers are very motivated to process and elaborate complex information and messages, while less involved consumers lack this motivation and capacity. Peripheral persuasion processes take place more often among these consumers.

Perceptual processes of consumers with high and low environmental consciousness

Consumers with high environmental consciousness (HEC).

Previous research has found that HEC is associated with greater ability and motivation to process verbal environmental advertising messages, diminishing the persuasiveness of environmental motifs, which were more critically evaluated (Bickart & Ruth, 2012; Ludwig & Diefenbach, 2019b; Magnier & Schoormans, 2015). Schwaab and Sorg (2004) showed that individuals' EC influenced their ability to recognize the extent to which external effects, such as inefficient use of natural resources or environmental goods, can be detected. This ability extended HEC consumers' insights from processing environmental product features (Ludwig & Diefenbach, 2019b) to attributing actions to the product manufacturer, which, in turn, influenced product evaluation (Küthe, 2013). Regarding the communicative effectiveness of environmental information, associative motifs presented in isolation generated high skepticism and perceived greenwashing in HEC consumers. Consequently, they had little influence on product evaluations, while specific product text exerted strong credibility and influence (Ludwig & Diefenbach, 2019b).

Conversely, a recent study by Schmuck et al. (2018a) challenged findings that HEC consumers are immune to nonverbal, pictorial environmental communication. They argued

that HEC consumers could be especially persuaded by nature imagery. However, they only tested the combined use of pictorial and verbal environmental information; thus, the persuasive effects of nature imagery were not tested independently. Further studies suggested that using environmental motifs in isolation generated higher skepticism among HEC consumers (Baum, 2012; Parguel et al., 2015). Systematic manipulation of the product stimuli showed that associative motifs presented alone generated high skepticism and perceived greenwashing; consequently, they had little influence on environmental product evaluations among HEC consumers (Ludwig & Diefenbach, 2019a; b).

Consumers with low environmental consciousness (LEC).

In contrast to HEC consumers, LEC consumers focus on peripheral cues and heuristics. LEC consumers give little attention to packaging elements and verbal arguments because they lack interest in the subject (Ludwig & Diefenbach, 2019b; Matthes et al., 2014). Further, LEC consumers were less skeptical and based product evaluations on the overall impression of nonverbal packaging communication channels, such as environmental motifs, without considering more specific information, such as verbal arguments (Ludwig & Diefenbach, 2019b).

This study hypothesized that *skepticism and the environmental friendliness evaluation triggered by environmental motifs vary depending on consumers' EC levels; HEC consumers are more skeptical (H1) about products with environmental motif packaging than LEC consumers and evaluate the products as less environmentally friendly (H2).*

Perceived content congruence, justification, and effects on skepticism.

Pancer et al. (2017) examined how a text-based justification affected the communication effectiveness of the color green as a nonverbal environmental packaging cue. A product was presented with an environmentally green product color, along with a justification for the choice of color, a product label stating that the product uses apple scent.

Because of the text, the green color was no longer associated with environmental friendliness, compared to a green product featuring no justification for color use. The authors posited that consumers reinterpreted the color cue. Instead, the green color was understood as a representation of the apple ingredient. Similarly, Ludwig and Diefenbach (2019b) argued that an environmental text cue might affect HEC consumers' skeptical evaluation of a product featuring an environmental motif. An additional environmentally congruent text might justify using the environmental motif and thus reduce skepticism. However, this was not tested.

Cognitive psychological research proposes an interplay in which text processing influences picture processing. The text cue directs the recipient's focus to certain parts of the image (Carney & Levin, 2002; Rummer et al., 2011; Schmidt-Weigand et al., 2010a, 2010b; Schwonke et al., 2009). Furthermore, the integration of two distinct information sources (e.g., text and motif) enhances understanding when two different sources provide high content congruence (Folker et al., 2005).

The present study hypothesized that *HEC consumers' skepticism would decrease if the environmental motif was supported by additional environmental product text (P2), and it would not decrease if the environmental motif was presented without supporting environmental text, that is, the product featured conventional product text along with the environmental motif (P1). No effect on skepticism was expected for LEC consumers (H3).*

Content congruence enhances perceived justification for motif use.

The theory of associative learning provides a supportive framework for understanding the links between different concepts (Klein, 2019; Martindale, 1991), using associative network structures (Anderson, 1976, 1983). The "belongingness, relatedness, fit, or similarity" (Till & Busler, 2000, p. 3) between two concepts (e.g., text and motif information) determines how easily an associative connection is established. In this framework, concepts are integrated into an associative network based on similarity (e.g., Garcia & Koelling, 1966;

Rozin & Kalat, 1971; Till & Busler, 2000).

In a marketing context, research under the heading "match-up effect" focused on associative connections between different communication elements (e.g., sender and message, or the communication channel). As in associative learning theory, congruence between two information sources creates an associative link and has a positive effect on information persuasion (Berger & Mitchell, 1989; Fazio et al., 1989; Judd et al., 1991; Loken et al., 2008). Specifically, high perceived congruence improved consumers' attitudes toward a product, advertisement, and brand because the action and communication were considered to be consistent (Aaker, 1990; Till & Busler, 2000). Studies examining non-congruent appeals revealed that they negatively affect consumers' beliefs about the products, attitudes, and behavioral intentions of the manufacturer because they prompt consumers to question the company's motives, triggering skepticism and a negative attitude (Becker-Olsen & Hill, 2005; Boush et al., 1994; Ford et al., 1990; Forehand & Grier, 2003). When explicitly asked, consumers can assess the congruence of an environmental motif and text-based information (environmental or conventional). Hence, this current study hypothesized that *if the content of the text matches the environmental content of the motif (P2), a high content congruence is perceived. If the content of the text does not match the environmental motif (P1), then the perceived content congruence is low (H4).*

The study further hypothesized that *text content can modify the interpretation and justification of a motif, proposing that if consumers perceive the product text and motif to be congruent, then the text serves as a framework for interpreting the motif. Consequently, using an environmental motif might be justified by the environmental text (H5).*

How perceived justification for an environmental motif use reduces skepticism among HEC consumers.

The perceived justification could explain why consumers are differentially skeptical

and evaluate the environmental performance of products differently when presented with either congruent or incongruent text featuring an environmental motif. Past studies have found that there are differences in how strongly the rational arguments (e.g., perceived justification for environmental motif use) influence the evaluation of greenwashing intentions and skepticism (e.g., Ludwig & Diefenbach, 2019a,b; Magnier & Schoormans, 2015; Matthes et al., 2014; Schmuck et al., 2018a). Thus, the degree of recipient involvement, corresponding to consumers' EC in our context, proved to be an important moderator. Consequently, and in accordance with the ELM, LEC consumers were less involved in elaborate evaluations and perceptions of product stimuli that are not heuristically perceptible, such as text-based information (see also H3). Conversely, HEC consumers were drawn to mechanisms of rational cognitive persuasion and therefore expected to be involved in justification processes. HEC consumers compare and gauge the various communication elements, which, in turn, influence their critical evaluation of the product. Hence, the current study hypothesized that *the perceived justification for environmental motifs is an explanatory factor for HEC consumers, but not for LEC consumers, regarding consumers' environmental skepticism (H6).*

Effects of consumers' skepticism on product environmental friendliness evaluation.

Advertising and green marketing research have long recognized that consumer skepticism influences reactions to environmental marketing statements and product evaluations (Mohr et al., 1998; Obermiller et al., 2005). Strong empirical evidence suggests that consumers' skepticism (and thus, perceived greenwashing) has a negative impact on their evaluation of advertisements (Nyilasy et al., 2013; Schmuck et al., 2018a) and of products (Ludwig & Diefenbach, 2019a,b). Thus, consumers' environmental skepticism is a decisive factor for the effectiveness of GMC and product evaluation processes because environmental friendliness is based on trust. The possibility that any given packaging properties are

greenwashing attempts cannot be sufficiently verified at the point-of-sale. Given previous

studies showing consumers' skepticism as a mediating factor for evaluation and purchase

intentions (Ludwig & Diefenbach, 2019b), the current study hypothesized that *with*

increasing skepticism the evaluation of a product's environmental friendliness decreases

(H7).

The theoretical model showing all hypotheses is depicted in Figure 8. For the resulting

moderated mediation model, we expected that the perceived content congruence between an

environmental motif and text information would have a positive effect on the perceived

justification for using the environmental motif, reducing skepticism and increasing product

environmental friendliness. We also expected the indirect effect to be significant only for

HEC consumers, not for LEC consumers.

Figure 8. Conceptual diagram for mediated moderation model.
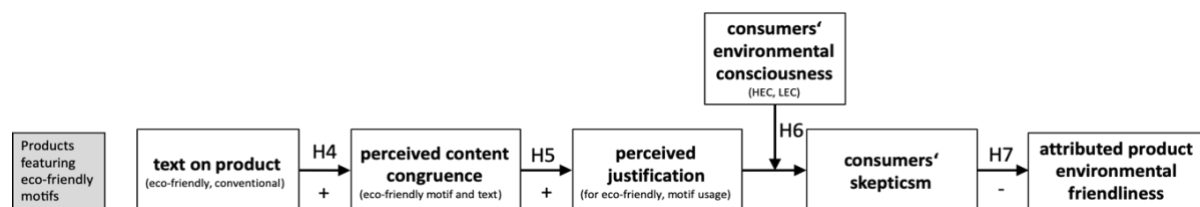
Note. The control variable (product category involvement) and direct effects and

interactions between variables were omitted from the depiction for clarity reasons.

HEC = high environmental consciousness. LEC = low environmental consciousness.

4.3.2 Materials and methods

Study design.

The 2x2 experimental design used *environmental consciousness* (low, high), and

content of product text (environmental, conventional) as the two between-subjects factors.

Figure 9 shows the two product stimuli featuring environmental motifs plus content-

incongruent (conventional) text and content-congruent (environmental) text. Each participant

was randomly assigned to one of the two product categories. Prior to presenting the stimuli

and asking them to respond to corresponding product associations, participants were

instructed to give as much attention to the stimuli as if they intended to buy them. The

associative product task aimed to assess the dependent variables' effects on consumers'

skepticism and attributions of product environmental friendliness. Participants responded to a

series of filler items designed to conceal the study objective. Subsequently, they were shown

the product a second time and asked explicitly about the perceived content congruence

between the motif and product text and how justified the motif was. Product category

involvement and demographic data were also collected. The scales and items used in this

study are described below. A complete list of items is available upon request.

Figure 9. Experimental stimuli in the two packaging conditions
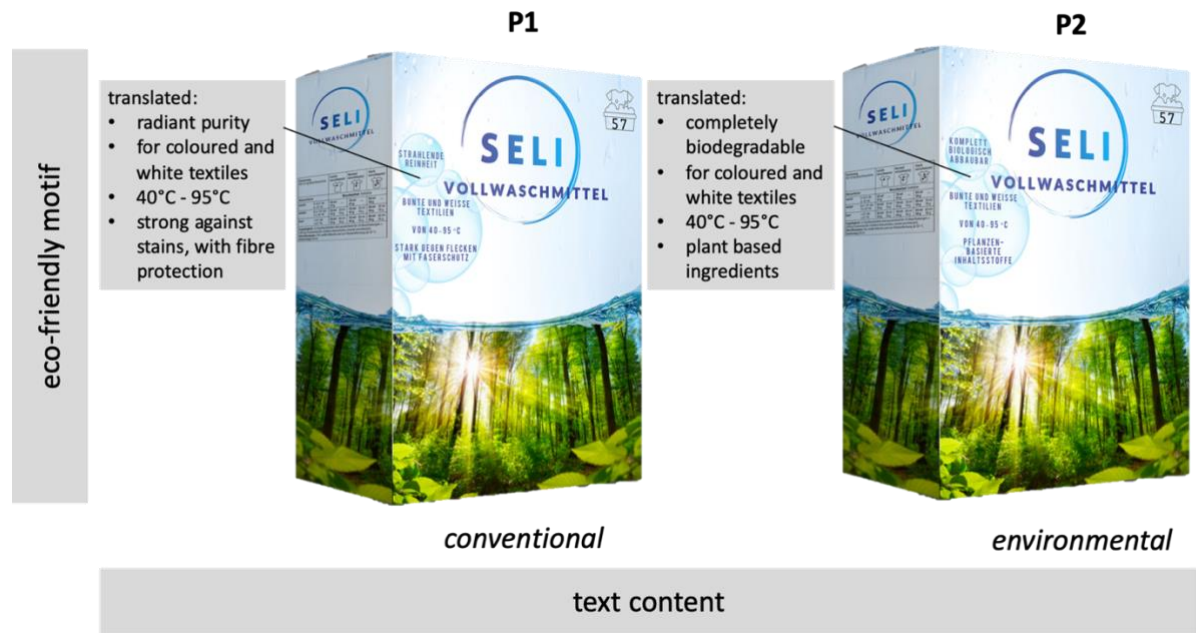
Note. P1 = Product 1, featuring an environmental motif and a content incongruent, conventional text. P2 = Product 2, featuring an environmental motif and a content congruent, environmental text.

Stimuli.

The effectiveness of green marketing varies by product category. This study used washing detergent as the product category to learn more about the effects of low interest and degree of potential harm from the products. Kong and Zhang (2012) found that advertisements with an environmental appeal were more effective for more harmful products. The German Federal Environment Agency, however, stated that functionality—the product's achievement of the desired effect—is the primary factor. This appears to explain why low-interest products such as detergents, which make a decisive contribution to the ecological footprint of consumers, are not very effective in communicating environmental friendliness via product design and communication approaches (BMUB/UBA, 2019).

A typical rectangular carton package was designed for the study. The environmental motif was selected based on the results of a preliminary study of independent participants

(N = 276) who rated environmental motifs in terms of environmental expressiveness. The results showed that participants rated detergent packaging with the chosen environmental motif to be significantly more environmentally friendly ($M = 5.25$, $SD = 1.44$) than the same packaging with a conventional motif (typical presentation of laundry and a washing machine; $M = 3.73$, $SD = 1.51$, $t(274) = -8.56$, $p < .001$). To control for confounding brand familiarity effects and packaging communication effects, we used an emotionally neutral, non-existent brand name ("Seli") and brand logo (Spomer, 2013; Winter, 2009). The product text designs (conventional, environmental) were adapted from existing advertisements and product descriptions of laundry detergents. This ensured that the text-based on-package communication and the color of the packaging were kept constant across all stimuli to maintain neutrality and consistency while creating a realistic packaging design.

Participants.

A convenience sample of 427 participants (238 males, $M_{age} = 47.15$ years, $SD = 14.29$) was used. Participants were invited to the online survey via crowdsourcing (Respondi Research Institute AG). The inclusion criteria for participation were German language skills (since the study and product stimuli were presented in German) and a high or low level of EC. To be qualified as HEC, participants had to exceed the cut-off value of 82.51% on the SEU-3 environmental consciousness scale as used in previous studies; to be qualified as LEC, consumers had to score below 51.84% on the EC scale (Ludwig & Diefenbach, 2019a. An equal distribution of HEC and LEC participants was sought, with $n = 219$ participants ($M = 6.14$, $SD = .29$) in the HEC subgroup and $n = 208$ participants ($M = 3.06$, $SD = .53$) in the LEC subgroup. Participation was voluntary and anonymous in exchange for a monetary incentive (0.75€). Once all data had been collected, participants were debriefed about the purpose of the study. All ethical procedures were aligned with standard practice as outlined in the Declaration of Helsinki and the ethical guidelines of the university at which the research

was conducted.

Measures.

All measures used 7-point Likert scales (1 = not at all to 7 = very strong).

Environmental consciousness. Participants' EC was measured with fifteen items: environment-related attitudes, behavioral willingness, and self-reported actions in the content areas of littering/environmental aesthetics, waste separation and recycling, protection and health, environment-conscious purchasing, water pollution, environmental control and preservation (Schahn et al., 2000) (Cronbach's α = .94.).

Attributed environmental friendliness was measured with two items that showed high correlations with the product environmental friendliness scale items: "associated with environmental sustainability" and "associated with environmental friendliness," as used in a previous study by Ludwig and Diefenbach (2019b); r = .89, $p < .001$.

Consumers' environmental skepticism was assessed with two items: "this product exaggerates its actual green functionality," and "this product misleads in its environmental features," derived from Chen and Chang (2012) and Ludwig and Diefenbach (2019b); r = .77, $p < .001$.

Perceived content congruence was explored using two items that indicate how similar and appropriate the participants rated the "content of the motif to the text" (r = .64, $p < .001$).

Perceived justification was surveyed with two items that show "how adequately" and "how justifiably" consumers "perceive the choice of motif for the product" *(r = .91, $p < .001$).*

The modified Personal Involvement Inventory (PII) was adapted from Mittal (1995) using five items; α = .90.

4.3.3 Results

Statistics were conducted with IBM SPSS Statistics, version 25, and the *Process* package, version 3.2 (Hayes, 2013).

Manipulation check.

T-tests on perceived product environmental friendliness were used to assess text manipulation (conventional, environmental) for communicated environmental friendliness and to compare the environmental friendliness evaluations of the products, P1 (featuring conventional text) and P2 (featuring environmental text). Consistent with the manipulation, the product featuring the environmental text (P2; $M = 5.02$, $SD = 1.69$) was perceived as significantly more environmentally friendly than the product with the conventional text (P1; $M = 4.51$, $SD = 1.62$); $t_{test}(425) = 3.22$, $p = .001$.

Hypothesis testing.

Consumers' environmental consciousness account for differences in skepticism toward products featuring environmental motifs.

Independent-samples t-tests were used to test whether HEC consumers were significantly more skeptical toward products featuring environmental motifs on packaging (P1 and P2) than LEC consumers. HEC consumers were significantly more skeptical ($M = 3.82$, $SD = 1.60$) than LEC consumers ($M = 3.41$, $SD = 1.58$, $t(425) = -2.66$, $p = .008$), supporting H1.

Consumers' environmental consciousness levels account for differences in ascribed product environmental friendliness among products featuring environmental motifs.

Independent-samples t-tests were used to determine whether HEC consumers ascribed less environmental friendliness than LEC consumers to products featuring an environmental motif (P1 and P2). Confirming H2, the results showed that HEC consumers ascribed significantly less environmental friendliness to products featuring an environmental motif ($M = 4.20$, $SD = 1.70$) than LEC consumers ($M = 5.35$, $SD = 1.44$, $t(419.51) = 7.61$, $p < .001$).

Consumers' skepticism varies as a function of consumers' environmental consciousness and the text content used.

A two-way ANOVA with *text content* (environmental, conventional) and *consumers' EC level* (HEC, LEC) as between-subjects factors, was used to examine whether consumers' skepticism of products featuring environmental motifs depended on the two text alternatives. The results showed a significant effect of EC levels ($F(1, 423) = 7.02$, $p = .008$, $\eta_2 = .02$) on consumers' skepticism. The text content was not a significant influencing factor for consumers' skepticism, $F(1, 423) = 2.37$, $p = .125$. However, the two-way interaction of text content and consumers' EC level showed a significant effect on consumers' skepticism, $F(1, 423) = 5.15$, $p = .024$, $\eta_2 = .01$. Planned contrasts in the LEC consumers indicated no significant differences in skepticism between environmental (P2; $M = 3.46$, $SD = 1.48$) versus conventional (P1; $M = 3.35$, $SD = 1.67$, $t(205.91) = -.51$, $p = .610$) text content. Among HEC consumers, a significant difference in consumer skepticism was found between the environmental and conventional text ($t(217) = 2.74$, $p = .007$). HEC consumers were less skeptical about a product with an environmental motif if additional environmental text was presented (P2; $M = 3.52$, $SD = 1.50$), compared to when additional conventional text (P1; $M = 4.10$, $SD = 1.64$), confirming H3.

Justification model.

A moderated mediation model was used to examine the underlying processes of consumer environmental friendliness evaluations that cause HEC consumers to be highly skeptical about a product featuring a stand-alone environmental motif, but that reduce skepticism significantly if an environmental text accompanies the motif (see Figure 8). Moderated regression analysis was conducted using the *Process* macro (Hayes, 2013, version 3.2), with binary variables coded as follows: (1) content of product text: 0 = conventional, 1 = environmental; (2) EC level: 0 = LEC, 1 = HEC). A complete listing of direct effects,

interactions, and covariate effects is shown in Table 5.

Influence of the environmental motif presented with conventional vs. environmental text contents on perceived content congruence.

The results showed that consumers perceived the content congruence of an environmental motif and environmental text (P2) as significantly higher than the content congruence of an environmental motif and conventional text (P1), $\beta_{text} = 1.15$, $SE = .17$, $t = 7.91$, $p < .001$, supporting H4.

Effects on perceived justification.

The perceived content congruence of an environmental motif and the text content had a significant positive effect on the perceived justification for using the environmental motif, $\beta_{congruence} = .75$, $SE = .04$, $t = 19.52$, $p < .001$. In support of H5, this suggests that the higher the perceived content congruence of an environmental motif and the additional text, the more justified consumers consider the use of the environmental motif. The text content had no direct influence on the perceived justification for environmental motif use; only an indirect effect emerged via perceived content congruence.

Table 5.

Model coefficients for the moderated mediation model with products featuring environmental motifs and environmental *vs.* conventional text content on attributed product environmental friendliness and via perceived congruence, perceived justification, and consumers' skepticism, conditional for environmental consciousness levels.

	Consequent											
	Mediator 1 (perceived congruence)			Mediator 2 (perceived justification for environmental motif usage)			Mediator 3 (consumers' skepticism)			Outcome (attributed product environmental-friendliness)		
Antecedent	b	SE	p	b	SE	p	b	SE	p	b	SE	p
Residuals	2.68	.27	< .001	.83	.24	< .001	4.50	.38	< .001	3.65	.39	< .001
Text	1.15	.15	< .001	-.16	.12	.197	.20	.23	.373	.32	.16	.048
Perceived congruence	-			.75	.04	< .001	-.00	.10	.995	.00	.07	.982
Perceived justification	-			-			-.16	.09	.073	.19	.07	.003
Consumers' skepticism	-			-			-			-.19	.05	< .001
Environmental consciousness level (EC)	-			-			1.42	.48	.003	-		
text x EC	-			-			-.60	.32	.059	-		
Perceived congruence x EC	-			-			.18	.14	.189	-		
Perceived justification x EC	-			-			-.26	.13	.042	-		
PII	.25	.05	< .001	.11	.04	.014	-.12	.06	.034	.15	.06	.007
	$R^2 = .17$			$R^2 = .53$			$R^2 = .12$			$R^2 = .14$		
	$F(2,424) = 43.64, p < .001$			$F(3,423) = 156.77, p < .001$			$F(8,418) = 6.88, p < .001$			$F(5,421) = 13.76, p < .001$		

Effects on consumers' skepticism.

In line with previous studies, consumers' EC showed a significant influence on their skepticism when evaluating products with environmental cues. HEC consumers were significantly more skeptical than LEC consumers, $\beta_{EC} = 1.42$, $SE = .48$, $t = 2.99$, $p = .003$. Perceived justification for using an environmental motif had no significant direct influence on consumers' skepticism ($\beta_{justification} = -.16$, $SE = .09$, $t = -1.80$, $p = .073$).

In line with H6, a significant interaction was observed for perceived justification of the environmental motif with skepticism evaluations, depending on whether participants were HEC or LEC consumers. The spotlight analysis of this interaction at values of the moderator (LEC and HEC) showed that perceived justification was only a significant predictor of skepticism among HEC consumers $\beta_{HEC} = -.42$, $SE = .09$, $t = -4.61$, $p < .001$, but not among LEC consumers $\beta_{LEC} = -.16$, $SE = .09$, $t = -1.80$, $p = .073$. Thus, the perceived justification mediated skepticism among HEC consumers.

Effects on perceived product environmental friendliness.

The hypothesized negative relationship between consumers' skepticism and their evaluation of product environmental friendliness (H6) was confirmed, $\beta_{skepticism} = -.19$, $SE = .05$, $t = -3.88$, $p < .001$. Furthermore, there was a more positive effect of an environmental text content, compared to a conventional text content ($\beta_{Text} = .32$, $SE = .16$, $t = 1.98$, $p = .048$), and a positive effect of the perceived justification for using the environmental motif ($\beta_{justification} = .19$, $SE = .07$, $t = 2.96$, $p = .003$) was evident when participants evaluated the product's environmental friendliness. No significant influence of the perceived content congruence emerged.

Effects of product category involvement.

Product category involvement added as a covariate showed significant effects on all mediators and the outcome, the evaluation of product environmental friendliness (*p*s ranging

from <.001 to .034).

Indirect, mediating effects.

The EC level significantly moderated whether or not the perceived justification for environmental motif use had an impact on perceived skepticism. The indirect path of the elaborated and comparative processes in the processing and evaluation of (1) content congruence; and, (2) inferred from this, the perception as to whether the use of the environmental motif is justified; and, therefore (3) the consumer may not be skeptical about potential greenwashing attempts, was significant for HEC consumers: $\beta_{indirect\ (HEC)}$ = .07, SE = .03, BCa CI [.024, .133]. This indirect effect was not significant for LEC consumers; that is, the perceived justification for using an environmental motif did not influence LEC consumers' skepticism: $\beta_{indirect\ (LEC)}$ = .03, SE = .02, BCa CI [-.005, 076].

4.3.4 Discussion

While the majority of communication and green advertising research underlines the importance and persuasiveness of nonverbal, pictorial communication (Hartmann & Apaolaza-Ibáñez, 2009; Hartmann et al., 2016; Matthes et al., 2014), these are often associated with greenwashing attempts, misleading behavior, and skepticism (Ludwig & Diefenbach 2019a,b; Parguel et al., 2015). This study investigated how environmental motifs, despite their prevalence in green marketing practices, evoke consumers' skepticism and influence their product evaluations when presented in conjunction with congruent or incongruent text content. In line with previous studies, specific text-based environmental information exerted a negative effect on skepticism and a positive effect on the evaluation of the given product's environmental friendliness.

The model shows that the justification processes (that is, the consumer's evaluation of whether the use of an environmental motif on product packaging is justified), explain the differences in the evaluations of HEC consumers as to why they sometimes perceive a

product with an environmental motif with less or more skepticism and as an effective or ineffective source of environmental product qualities. As in previous studies, specific text-based environmental information reduced skepticism and enhance positive evaluations of the product's environmental friendliness among HEC consumers.

The pattern found in previous studies was confirmed for LEC consumers, namely that more complex perceptual and justification processes are of minor interest. The established picture that LEC consumers are neither very skeptical of GMC in general nor of the executional, environmental motifs, in particular, was replicated. Verbal, text-based information demonstrated little communicative effect on the environmental product ascription. Overall, whether the use of environmental motifs can be recommended or not depends on the specific consumer group.

This study adopted the construct of "congruence" from associative learning as a potentially useful mechanism for understanding HEC consumers' response to combined environmental motifs and textual information. The findings suggest that perceived congruence plays an important role in the justification process. Congruence (or lack thereof) can explain why HEC consumers sometimes find the use of environmental motives justified and highly effective in product communication.

Notably, the results support the hypotheses. Consistent with previous findings, HEC consumers were more skeptical and therefore indicated lower environmental friendliness for products with environmental motifs on their packaging. This effect was investigated in more detail in H3, where results showed that, for HEC consumers but not LEC consumers, skepticism toward a product with an environmental motif was significantly reduced if the motif was presented next to a congruent text, but not if the text was incongruent. The main contribution of this study was that text-based cues play an important role in effective and credible environmental communication. In particular, a high environmental friendliness

evaluation of a product with an environmental motif could be explained as the perception of high congruence between a motif and text, indicating that the environmental motif was justified. This reasoning reduced the skepticism of HEC consumers. Consequently, the content of the environmental product communication spilled over from the packaging onto the product itself and affected the evaluation of the product as being environmentally friendly.

Limitations and further research.

This study has several limitations that may affect its generalizability. First, the definition and social understanding of EC is limited. Contrary to popular understanding, scientific definitions of EC are broad, including behavioral intentions, attitudes toward environmental protection, and behavioral intentions. Regarding HEC consumers (according to the scientific, operational definition adopted here), consumers whose actual attitude did not correspond to their desired attitude and behavior were excluded. While much is known about how people's attitudes influence motivated evaluation of information, attention, and attitude toward information, relatively little is known about how desired attitudes and behavioral intentions impact these processes in an environmental context (DeMarree et al., 2017). In light of a general increase in consumers' EC (e.g., the "Fridays for Future" phenomenon and the "Extinction Rebellion" protests), future research should investigate interactions between environmental consumers' desired attitudes and behavioral intentions with the world around them (e.g., evaluation of GMC).

Second, the interpretation of the effect of environmental motifs is limited by the implementation of only one environmental motif. We used representations of nature that were not based on the environmental benefits of the product but rather were intended to trigger implicit visual associations between the depictions and any environmental friendliness. Following Banerjee's (1995) findings, future research should test whether skepticism toward environmental motifs might lessen when the motifs depict content that is directly related to

the product, for example, product manufacturing or ingredients, instead of environmental

mood pictures. Further, the qualitative comments on the preliminary study provided

references indicating that there might not be an equally good environmental motif in terms of

environmental expressiveness, which may be an important direction for future research. For

example, there was a tendency for an environmental motif in isolation, such as a tree, to be

perceived as less environmentally friendly and artificially torn out of nature, as opposed to a

picture of a forest. Another issue was that a perfect depiction of nature caused some pilot-

study participants to feel that the motif was an exaggerated and unrealistic depiction, and

therefore not effective for environmental communication. Additionally, the preliminary study

also indicated that the degree of the motif's abstraction (i.e., whether the environmental motif

is a photograph, a digitalized animation, or hand drawing), could influence the

communicative effect.

Third, it should be noted that the effect of verbal environmental information is limited

to specific environmental claims. Given other research findings (e.g., Schmuck et al., 2018a),

future studies should examine the justification effects found in this study for the use of

environmental motifs with different claim types (e.g., vague and false claims or different eco-

labels) to obtain a more comprehensive picture.

Green marketing implications.

These results are particularly important for companies planning to integrate

environmental themes into their products and services and thus design green advertising

campaigns or product communication. Design strategies often use environmental motifs for

communication media such as television, online advertising, magazine advertisements, and

billboard advertising to project an environmental image where text-based information is not at

the center of creative design. However, consumer and marketing specialists should be aware

that the effects of environmental motifs go beyond the aesthetic and attention-catching impact

of the motifs. Utilizing these motifs can induce skepticism and perceived greenwashing attempts, which have been shown in previous studies to be destructive to GMC's credibility, consumer purchasing, decisions, and attitudes to products and brands among the target audience, the HEC consumers. This study examined the perceptual processes of HEC consumers in evaluating GMCs and revealed the role of fit or congruence between the different communication elements. Providing an environmental text cue induces in HEC consumers processes of comparison that can justify the choice of otherwise potentially misleading environmental motifs. Green marketing should therefore always consider that specific cues, such as textual information, influence the interpretation and evaluation of the environmental motif. Highly involved HEC consumers are strongly motivated to elaborately process the individual components and compare them to derive justifications, which, in turn, influences the credibility of environmental communication.

5 General Discussion[6]

Previous studies have recognized the importance of researching consumer processing of GMC (Bickart & Ruth, 2012; Kronrod, Grinstein, & Wathieu, 2012; Luchs, Swan, & Creusen, 2016; Magnier & Schoormans, 2015). The studies conducted for this thesis aimed to examine important challenges arising from the conceptual fields of product, communication, and consumer culture, to gain a better understanding of consumer responses to GMC. The resulting challenges for the product indicated that the specificity of the communication channels and the information utility emanating from those channels determine how much environmental friendliness is attributed to the product itself. Consumer skepticism showed to be a key factor influencing the credibility and effectiveness of the GMC and, thus, on the attributed product environmental friendliness. While HEC consumers strive to fulfill their environmental consumption goals without being misled by greenwashing attempts, companies strive to communicate the environmental friendliness of their products credibly and effectively. Focusing on target groups, the concept area of consumer culture manifested as an important moderator explaining consumer demands of and responses to GMC. Addressing consumers varying demands and needs regarding GMC is an important issue for practitioners. The thesis suggests that the isolated use of environmental information in packaging communication can have harmful effects on consumers' evaluation of product environmental friendliness; that is, it increases consumer skepticism toward environmental information. Specifically, an isolated application showed varying effects on GMC effectiveness and skepticism for the different EC consumer groups—HEC and LEC. I present two models for the interaction of different specified communication channels used in GMC; in particular, environmental motif and text, and the effects on consumer skepticism and product evaluation. The findings of this thesis indicate a complementary and not alternative use of different specific communication channels to

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[6] In the discussion section I will use the term "I." However, when I refer to a specific study, I will switch to the term "we," which refers to the co-author Sarah Diefenbach and myself.

facilitate an inclusive; that is, target group independent and effective GMC.

The challenges addressed in this thesis are an important step toward supporting long-term changes in consumer attitudes and behavior toward more environmentally responsible consumption by helping practitioners understand how consumers respond to GMC. Detailed insights into the findings addressing the research question are presented below and discussed within the context of the three experimental studies.

5.1 Discussion of the research questions

An overview of the findings addressing the research questions, grouped by the assigned studies, can be found in Table 6.

The effectiveness of nonverbal environmental communication.

To answer research question 1 (*Are nonverbal packaging communication channels effective in communicating environmental product attributes?),* the results of the three studies provide empirical support for the argument that nonverbal communication channels can serve independently as environmental cues even if these are not explicitly intended to do so (for instance, packaging materials and graphical surfaces). This result establishes a clear empirical link between the tested nonverbal communication channels and evaluations of product environmental friendliness. Thus*,* a global statement can be made: nonverbal packaging communication channels are well suited as communication channels for the environmental friendliness of a product. Thereby, the environmental content of the packaging affects the entire product.

Table 6. Overview of the findings addressing the research questions, grouped by assigned studies.

RQs	Study	Findings addressing the RQ
RQ 1	I	Both nonverbal packaging communication elements tested (material and graphical surface) showed a significant (and equally strong) effect on the evaluation of the product's environmental friendliness.
	I	The graphic surface, as a communication channel for environmental information, was afflicted with greenwashing perceptions, while the material communication channel was not.
RQ 2	II	Both communication channels used to transmit environmental information influenced the evaluation of the product's environmental friendliness positively. The associative motif showed to be four times more effective than the specific text.
	II	Both communication channels used to transmit environmental information increased consumer environmental skepticism. The associative motif induced 1.8 times more skepticism than the specific text.
RQ 3	II + III	Consumer environmental skepticism negatively influences the evaluation of the product's environmental friendliness.
RQ 4	I	Consumers' EC was (marginally significant) negatively related to the evaluation of the product's environmental friendliness.
	I	Consumers' EC was (marginally significant) positively related to the evaluation of the product's greenwashing.
	II	HEC consumers showed an overall more skeptical attitude toward environmental information than LEC consumers.
	II + III	HEC consumers showed to be significantly more skeptical about environmental characteristics, compared to LEC consumers, during product evaluation.
	II +III	HEC consumers showed a significantly lower evaluation of product environmental friendliness

		compared to LEC consumers, during product evaluation.
	I	Environmental friendliness is higher for specific material environmental communication channels than for associative graphical ones, among HEC.
	I	Environmental friendliness is higher for associative graphical environmental communication channels than for specific material ones, among LEC.
	II + III	HEC consumers evaluate less product environmental friendliness to associative, nonverbal environmental motifs, than LEC consumers.
RQ 5	II + III	HEC consumers are more skeptical about associative, nonverbal environmental motifs than LEC consumers.
	II + III	HEC consumers evaluate more product environmental friendliness to specific environmental texts than LEC consumers.
	II +III	There is no difference between HEC and LEC consumers as to how much environmental skepticism they ascribe to specific environmental texts.
	II	HEC consumers pay less attention to associative, nonverbal environmental motifs and more attention to specific environmental texts than LEC consumers.
	II + III	The use of nonverbal elements presented in isolation generated high skepticism in HEC consumers.
RQ 6	III	The perceived justification for using a nonverbal communication element is related to HEC consumers' skepticism. The more justifiable the use of the executional nonverbal element is perceived, the less skeptical the HEC consumer is.
	III	The presence (vs. absence) of an additional specific environmental text justifies the use of the nonverbal element and thus reduces skepticism among HEC consumers.
	III	Consumers' perception of content congruence (vs. incongruence) positively influences their evaluation of how justified the use of nonverbal information is.

Note. EC = environmental consciousness. GMC = green marketing communication. HEC = high environmental consciousness. LEC = low environmental consciousness. RQ = Research Question.

In particular, both nonverbal packaging channels (material and graphical surface design) tested in study 1 were found to be equally predictive of the environmental friendliness attributed to the product. Likewise, study 2 showed that nonverbal motifs are effective in communicating the environmental friendliness of a product and, accordingly, attract a great deal of consumer attention.

However, in terms of effectiveness, the credibility factor of nonverbal communication channels has been considered as well, showing that these channels were generally afflicted with a high degree of skepticism and expectations of greenwash. A direct comparison of the information channel utility showed that consumers subjectively evaluate how useful and specific the informative value of environmental information is perceived through the nonverbal communication channel used. A distinction in information utility and persuasiveness was found between the two nonverbal communication channels. The environmental impressions conveyed by the material proved to be a credible means of communication, while the graphical surface design was affected by high expectations of greenwashing. On a more abstract level, these findings suggest that communication channels that are more specific and directly linked to the environmental performance of a product (e.g., the used packaging material) trigger fewer greenwashing perceptions than vague and associative communication channels (*research question 2*). Consumer EC groups conducted a more detailed investigation that provides a breakdown of these supposedly conflicting results into terms of effectiveness results (*research questions 4 and 5*).

The effectiveness of communication channel specificity.

Derived from study 1, in response to research question 2 (*Does the specificity of communication channels contribute to the effectiveness of environmental communication*), study 2 showed that the specificity of the communication channel has a direct influence on the effectiveness of environmental communication. In other words, consumers' attention,

environmental skepticism, and the environmental friendliness of a product vary according to the communication channel through which the environmental information was communicated.

However, the results are conflicting regarding the dependent variables: consumer skepticism and attributed environmental friendliness. On the one hand, both communication channels increased consumers' environmental skepticism; namely, environmental information communicated via an associative communication channel nearly doubled consumers' environmental skepticism (by a factor of 1.8) as compared to a specific communication channel. On the other hand, an associative communication channel conveyed more strongly the environmental friendliness of a product as compared to a specific communication channel, as shown in study 2. For instance, the communicative effect of the associative channel, using an environmental motif, was about four times stronger than that of the specific channel, using an environmental text. This effect was also observed in consumers' attention to associative as against specific communication channels. Here as well, consumers were generally more attentive to the associative channel (motif) as compared to a specific channel (text) (such as the picture superiority effect).

Consequently, a global answer to this research question cannot satisfactorily be provided. Rather, it turned out that in addition to the effects of the communication channels, the involvement of the consumers—that is, their EC levels—is a decisive factor in providing a differentiated and coherent answer to the influence of the specificity of the communication channels (see *research question 4*).

Consumers environmental skepticism influence on GMC effectiveness.

In response to research question 3 (*How is consumer environmental skepticism related to the perception of environmental product attributes?*), consumers' environmental skepticism showed across two studies (Studies 2 and 3) to be a decisive predictor of how much

environmental friendliness consumers attribute to a product. The more skeptical consumers are about the environment information, the less environmental friendliness was ascribed to the product. Thus, the image of a generally skeptical green consumer was confirmed in the field of GMC.

Consumers EC influence on GMC effectiveness.

Answering research question 4 (*How does consumer level of EC affect the effectiveness of environmental communication?*) was a key theme across all three experimental studies. Specifically, a consumer's EC level was found to be related to an overall skeptical attitude toward environmental information and also to the evaluation of a product's environmental quality and the skepticism toward it. In study 1, at first, only a marginal negative influence of consumers' EC levels on GMC was found. Based on the PKM and ELM framework, the consumer's EC is a crucial factor in determining how much consumer skepticism influences product environmental friendliness evaluations. For this purpose, the subgroups of consumers having more extreme EC values (HEC and LEC) were used. In the subsequent analyses and the follow-up studies (Studies 2 and 3) we found that the differentiated examination of HEC and LEC consumers explains the differences in consumer responses toward GMC. Thus, in studies 2 and 3, it was found that consumers' EC influenced the extent to which consumer skepticism affected the evaluation of the product's environmental friendliness.

Target group related effects of communication channels.

Based on the findings of research questions 2 and 4, different EC target groups were found to favor different communication channels when evaluating the effectiveness of GMCs. In response to research question 5 (*Which environmental communications channels are most effective for which types of EC target audience?)* across all studies HEC consumers were found to clearly differentiate between the credibility and, consequently, the utility of

communication channels used for communicating product environmental friendliness; LEC consumers were shown to be generally less suspicious.

Specifically, study 1 found that when comparing two executional nonverbal communication channels with varying specificity, HEC consumers were more skeptical than LEC consumers about the credibility of associative, nonverbal communication channels (graphical surface). HEC consumers relied solely on the communicated content of the specific, nonverbal communication channel (material) while disregarding the associative, graphical surface. In contrast, LEC consumers used both the specific and the associative nonverbal communication channels to deduce product environmental friendliness, but the associative graphical communication channel showed to be more effective.

In studies 2 and 3, the information utility resulting from a communication channel was experimentally manipulated to investigate the notion that the specificity of communication channels accounts for differences in consumer responses. In both studies, HEC consumers were more skeptical and rated the environmental friendliness of products featuring associative, nonverbal environmental information to be lower than LEC consumers did. Regarding substantive, verbal environmental information, there was no difference in the assigned skepticism between HEC and LEC consumers. However, there was a difference in the evaluation of product environmental friendliness. The effectiveness of environmental communication channels was additionally investigated regarding consumer attention to the communication channels as part of study 2. Consistent with the pattern of attributed environmental friendliness, HEC consumers showed less attention to associative, nonverbal communication channels and more attention to specific, verbal communication channels in GMC than LEC consumers.

Accordingly, the study can conclude that, for HEC consumers, environmental information should be transmitted via specific and substantial communication channels (e.g.,

study 1: using packaging material; study 2: using verbal, text-based communication

channels), while for LEC consumers, environmental information should be peripherally

perceptible using associative communication channels (e.g., study 1: using surface design;

study 2: using nonverbal motifs) to be effective.

The product-specific analysis in study 2, exploring the communication of

environmental information via two different specific communication channels, showed a

particularly interesting effect among HEC consumers. While HEC consumers were very

skeptical toward a product whose environmental information was solely communicated via an

associative communication channel; that is, a motif on the packaging. Their skepticism

disappeared when the product featured environmental information transmitted via a specific,

text-based communication channel in addition to the environmental motif.

Explanatory insights into how HEC consumers respond to nonverbal communication

channels.

To examine research question 6 (*How can varying skeptical responses to nonverbal*

packaging communication channels be explained among HEC consumers?), study 3 focused

on the notion of an elaborate justification process among HEC consumers. Thereby a specific

communication channel (e.g., text references) was examined as to whether this channel could

justify the use of vague and associative environmental information (e.g., motif).

The central concept of the ELM (that is, highly involved consumers have a high

elaboration likelihood), was confirmed. In this elaborated processing, HEC consumers

evaluated the commonality between the different communication channels and the content.

This elaborated processing could explain the persuasive success of environmental information

transmitted via an associative communication channel among HEC consumers.

The model proposed in study 3 showed three main findings: (I) Consumers' perception

of content congruence (as against incongruence) positively influences their evaluation of how

justified the use of environmental information via associative communication channels is; (II) this perceived justification for using an associative communication channel is related to HEC consumers' skepticism. For example, the more justifiable the use of the associative communication channels in GMC is perceived, the less skeptical the HEC consumer is. (III) This elaborated processing and justification processes of environmental information applies only to HEC consumers and is not significant among LEC consumers.

5.2 Unanswered Questions: Limitations and further research

The studies presented in this thesis yielded some promising findings that contribute to consumer marketing, GMC research, and practice. However, the studies conducted have some limitations and generalization issues that should be addressed in future research.

Socio-demographic influences on GMC effectiveness.

All studies presented were conducted in Germany. The results found might, therefore, be limited to the socio-demographic interpretation of environmental cues in Germany. Especially for associative communication channels, socio-demographic influences might affect the associations and, thus, the effectiveness of the communication channels. Future research should necessarily include a cross-country analysis of the effectiveness of GMC and the interpretation of associative communication channels used for transmitting environmental information.

Ecological validity.

All studies presented in this thesis are laboratory studies conducted within a controlled setting to investigate the impact of communication channels without distortion. Although participants were instructed to give as much attention to the stimuli as if they intended to buy them, the ecological validity of the results is limited. In laboratory studies, consumers tend to pay more attention to packaging communication than in the field or at the point of sale (Steenis et al., 2017). Thus, an important question for future research is whether the results

found can be replicated in practice or field studies.

Evaluation effects during phases of interaction.

One point that should be considered, alongside the communicative effect of packaging at the POS, or, as simulated in the three studies presented, at the first product contact, is the effect duration. Thus, the question of how long-lasting the GMC effect is regarding the product phases of use and disposal emerges. Furthermore, the question of whether evaluation effects are different in these phases arises since consumers have more capacity and motivation to engage with the product and react differently to GMC elements and channels. Future research should, therefore, investigate whether substantial and specific environmental information might become more persuasive among LEC consumers in these use phases.

Product category involvement.

The three studies of this thesis investigated products in low-involvement product categories—nutriments (rice), dietary supplements, and detergents—as in these categories no expert knowledge or background information is needed to evaluate the products (in contrast to high-involvement products). Therefore, the results are limited to low-involvement consumer products. For future studies, I propose to extend the investigation to other product categories and high-involvement product categories to investigate the general applicability and possible limitations of GMC. This proposition is especially relevant considering that the product category involvement, included as covariates, is shown to be a significant influencing variable throughout all three studies. Thus, for future research, the question of whether the attention and evaluation patterns found between HEC and LEC consumers also appear among high-involvement products emerges. Alternatively, the product category involvement might also overwrite the effect of consumers' EC levels. In other words, LEC consumers may engage in elaborated processing and compare the specific information if the product category involvement is high. Contrarily, as suggested by Magnier and Schoormans (2015), the found

effects of EC could be even stronger for high-involvement products. Future research should investigate the sensitivity of the product category for GMC effectiveness in more detail (Pancer et al., 2017).

Definition of environmental consciousness.

Consumers' EC was analyzed in the present thesis according to scientific definitions of EC, which comprises behavioral intentions and attitudes toward environmental protection (Maloney & Ward, 1973; Matthes & Wonneberger, 2014; Mohr et al., 1998; Schahn & Holzer, 1990; Schahn et al., 1999). However, the social understanding of EC reflects a very global environmental attitude (e.g., "I am in favor of environmental protection"). Therefore, when interpreting the results, it should be noted that the barriers to achieving a scientifically defined HEC are considerably high. Regarding the attitude-behavior gap in environmental attitude and consumption, and in light of increasing environmental movements such as the "Fridays for Future" phenomenon and the "Extinction Rebellion" protests, future research should investigate how a desired global environmental attitude and behavioral intentions perform in comparison to the GMC effectiveness effects found here (DeMarree et al., 2017).

Product stimuli tested.

In addition to the implementations of nonverbal communication channels tested in this thesis, future research should examine other implementations and investigate whether these results confirm our findings that nonverbal communication channels spillover from the packaging and influence the evaluation of the product environmental friendliness (Medeyros, 1982; Triebel, 1997; Lang, 2015). When using environmental motifs, future research should also examine whether skepticism toward environmental motifs might diminish if the motifs represent content that is directly related to the product, such as product manufacturing or ingredients, rather than environmental moods (Banerjee et al., 1995). The qualitative comments made in the pre-studies indicate that those environmental motifs might be less

expressive in communicating environmental impacts. Another approach might appear from the use of motifs embedded in the background as against a cut-out. For example, consumers might tend to perceive an isolated environmental motif, such as a tree, as less environmentally friendly and artificially torn from nature when presented as a cut-out of a forest, as opposed to an image where the tree is imbedded in a forest.

It should be noted that the effect of verbal environmental information in this thesis is limited to specific environmental claims. Given other research findings (e.g., Schmuck et al., 2018a), future studies should examine the justification effects found for the use of nonverbal and associative communication channels in GMC combined with different claim types (e.g., vague and false claims or different eco-labels) to obtain a more comprehensive picture.

Influence of source variables.

While previous research has acknowledged the influence of source variables (Li, 2013: Swaen & Vanhamme, 200), we have kept these constant and used emotionally neutral and non-existent brand names and logos. Future research, however, should also consider the influence of source variables in the interplay with associative and specific communication channels regarding GMC effectiveness. For instance, associative and vague communication channels, if used from a source with high environmental trustworthiness, might not cause skepticism and greenwashing tendencies among consumers. Thus, the source variable might take on the role of a specific communication channel.

Use of joint environmental information.

While the thesis found that a higher quantity of communication does not result in higher GMC effectiveness but wider dissemination of the environmental information to different EC consumers, future research should address the question of how additional channels communicating environmental information affect GMC effectiveness. Saturation or contradictory persuasiveness effects might occur from information overload (Chen, Shang, &

Kao, 2009; Lee & Lee, 2004).

Consumer education.

The results of this thesis show that future research should urgently develop concepts on how consumers can be informed about the effects of environmental packaging and how to foster environmental education for consumers. With increasing environmental education, the EC of the participants might rise (BMUB/UBA, 2018; Schahn, 2003). As a result, specific and substantial GMC approaches could attract the attention of more consumers.

5.3 Implications for research and practice

Research.

The results of this thesis expand on the findings of previous studies dealing with the effectiveness of GMC; in particular, the specificity of the packaging channels used for communicating environmental product information on consumer environmental skepticism and perception of product environmental friendliness. The research presented in this thesis supports, to a large extent, the persuasiveness theory regarding consumer knowledge, which marketers try to influence (Friestad & Wright, 1994; Loken et al., 2008; Rodgers & Thorson, 2019) and, in particular, the theoretical model of the ELM (Petty & Cacioppo, 1986; Petty et al., 1989).

In earlier studies, it was found that the usefulness of information reduced consumer environmental skepticism. Our results confirm this finding using various operationalizations of communication channel specificity. Specifically, the results show that specific and substantial environmental information is less afflicted with consumers skepticism and greenwashing. Building upon the findings of Matthes et al. (2014) and investigating the influence of the information utility of verbal environmental arguments on consumers' environmental skepticism, we found that a high level of information utility (that is, specific environmental information) reduced the skepticism of consumers. However, the influence of

channel specificity fails to predict the effectiveness of the attributed product environmental friendliness.

For the effective communication of environmentally friendly product attributes, the results of the three studies presented suggest a differentiated approach for GMC referring to consumers' EC level. Thereby, the ELM presented a useful framework for testing how consumers' involvement (i.e., their EC) can moderate the influence of different communication channels on the effectiveness of GMC. Our empirical studies and their findings provide important theoretical implications. Based on the ELM, our model of GMC effectiveness (study 2) is the first to look at the environmental friendliness evaluations of a product as a response to different specific communication channels used to transmit environmental information, emerging from a complex interplay of elaborated and peripheral persuasion processes. By considering the mediator (consumer environmental skepticism), the model enables a more nuanced, comprehensive examination of the complex interplay. Specifically, our results model how consumers' evaluation of product environmental friendliness is derived from their environmental skepticism. Depending on the communication channel specificity and the involvement of the environmental target groups (HEC and LEC), those skeptical attitudes are beneficial or harmful to the evaluation of product environmental friendliness.

Based on the results of Studies 2 and 3, the combined interaction of two different communication channels showed interesting effects between the two consumer groups. Especially among HEC consumers, consumer skepticism and product evaluation were attributed to highly interrelated processes of elaborated and peripheral perceptual processes. In line with the ELM, the elaborated perceptual and peripheral processes are based on the motivational level and the capacity of consumers, which is regulated by their involvement. Study 2 and, in particular, study 3 were able to describe this theoretical deviation. HEC

consumers showed that peripheral information stimulus is also considered as a persuasive source of communication if an additional specific information stimulus reinforces its content. In line with the ELM, these elaborate and comparative justification processes of informational content and congruence were only found in highly involved HEC consumers. Building on the idea of "Cue Diagnostics" (Aaker & Maheswaran, 1997; Pham, 1996) this study proposes the term "Channel-Diagnostics" to describe the interplay between elaborated and peripheral processes that occur when different communication channels are observed to determine a communication structure and their commonalities. Similarly, Petty, Kasmer, Haugtvedt, and Cacioppo (1987) argue that the ELM also allows multi-channel processing of information and considers both routes of persuasion to be used in attitude formation and product evaluation. However, the multi-channel processing of the GMC was only observed among HEC consumers. Consequently, for the theoretical implications on GMC effectiveness, associative and specific communication channels are proposed to be used as complementary and not as an alternative. Complementary effects in the use of multiple channels should be considered in ELM in the context of the effectiveness of GMC in future research.

Practice.

The findings of this thesis are important for marketers and designers who are planning to include GMC in their product packaging. In the following sections, the study discusses (I) the implications for addressing the primary target group of environmental products—the HEC consumers, (II) effective ways of using packaging channels in GMC, and (III) the effects associated with the choice of communication channels. Finally, the study summarizes the practical implications in a GMC recommendation.

The skeptical HEC consumer. Targeting the HEC consumer, a practitioner should keep in mind that these consumers have a generally more skeptical attitude toward environmental information (Studies 2 and 3; Bhate & Lawler, 1997; Bickart & Ruth, 2012;

Chang, 2011; do Paço & Reis, 2012; Sheehan & Atkinson, 2012; Shrum et al., 1995). In the eyes of most advertisers, the HEC, skeptical consumer presents a serious dilemma (Zinkhan & Carlson, 1995), as GMC may not lead to lasting market success. However, this skeptical environmental attitude constitutes the fundamental necessity for HEC consumers to achieve their environmental consumption goals by purchasing environmentally friendly products.

Though most scholars accept the skeptical green consumer as a given factor in GMC effectiveness (Royne et al., 2013), this thesis revealed factors that influence HEC consumers' environmental skepticism. Since environmental friendliness of a product is difficult to verify, consumers use the packaging information to determine the environmental impact of packaging and product subjectively. Thus, consumers must reconcile the demand for reliable product information with a high understanding of the often occurring greenwashing references on a product (Baum, 2012; Delmas & Burbano, 2012; Seele & Gatti, 2017). This insight shows that the generally more environmental skeptical attitude of HEC consumers is not an expression of reluctance to receive marketing information but, rather, an expression of HEC consumers' demand for products with credible and specific communication about the environmental benefits of a product. In practice, the derivation is both simple and moral: Do good and make it known.

Environmental packaging. In green marketing, the packaging is often regarded as a necessary evil because it protects products from destruction and damage and provides them with an attractive and communicative appearance while accounting for a significant proportion of the environmental impact and consumption of resources (Paine, 2002). The environmental impact of private consumption accounts for an immense contribution of 30% to 50% of the total environmental impact ((BMUB/UBA, 2009; Wimmer, 2001). The Sustainable Packaging Coalition (2011) provides eight useful criteria[7] to help companies

1.   [7]Beneficial, safe, and healthy for individuals and communities throughout its life cycle;
2.   Meets market criteria for both performance and cost;

design their packaging in a more environmentally responsible manner. The implementation of these criteria in business activities undoubtedly fosters environmentally sound consumption in an area with an unusually high impact and is a central component of social transformation and an opportunity for sustainable development. However, despite efforts to optimize the factual environmental friendliness of packaging, the fact that environmental friendliness may not always be recognized remains to be considered; that is, it is invisible (such as recycled material and film made of milk proteins). This situation highlights the need for GMC.

Information utility derived from communication channels. Focusing on how well different communication channels are suited to communicate environmental information effectively showed that the specificity of the communication channels used to convey environmental information is crucial. By selecting the appropriate communication channels, on the one hand, the customers can be educated (e.g., by expanding their knowledge of the actual environmental impact), and, on the other hand, credible product characteristics can be conveyed. Therefore, it is essential for marketers and designers working on GMC to consider the information utility of the communication channels; that is, considering how specific or associative environmental information transmission can take place via a communication channel. Study 1 showed clearly that although packaging communication differentiates between nonverbal and verbal packaging elements, this classification is not conclusive as to how much information utility emanates from the communication channel used for environmental communication. Thus, the information channel utility varies not only between verbal and nonverbal communication channels but also within those. For instance, study 1 showed that consumers distinguish between reliable and unreliable nonverbal communication

3. Is sourced, manufactured, transported, and recycled using renewable energy;
4. Optimizes the use of renewable or recycled source materials;
5. Is manufactured using clean production technologies and best practices;
6. Is made from materials healthy throughout the life cycle;
7. Is physically designed to optimize materials and energy;
8. Is effectively recovered and utilized in biological or [and] industrial closed loop cycles. (Sustainable Packaging Coalition, 2011, p. 1).

channels (graphical surface as against material). From this, it can be concluded that

perceptible characteristics that could potentially contribute to the actual environmental

friendliness of the product or its packaging, such as a supposedly environmental jute

packaging material, serve as a credible nonverbal communication channel (Triebel, 1997, p.

166).

When applied, the success of "longlife" or "made from renewable raw materials" bags

in supermarkets can be explained. Here, too, the decisive factor is not whether a product is

environmental, but whether the consumers' impression is environmental (Lang, 2015;

Medeyros, 1982; Triebel, 1997). Thus, the results revealed that ascribed environmental

friendliness can only be triggered if the material looks as if it has been produced from

renewable energies or is biodegradable and recyclable (Herbes et al., 2018; Magnier &

Schoormans, 2017; Nordin & Selke, 2010; Rokka & Uusitalo, 2008).

Moreover, other studies investigating the use of verbal communication channels

showed clearly that the strength of the argument is in favor of the effectiveness of GMC (e.g.,

Chan, 2000a; Chan & Lau, 2004; Chang, 2011; De Vlieger et al., 2012; Manrai et al., 1997;

Schmuck et al., 2018; Spack et al., 2012). According to the content analysis by Carlson et al.

(1993) verbal environmental advertising information can be either specific or associative.

Following the reasoning of the PKM, it was confirmed in the environmental context that

consumers are aware that environmental information on a product can be used for

greenwashing purposes and the choice of used communication channels affects how much

environmental skepticism the consumers exhibit.

Communication channel specificity. The specificity of the communication channels

depends not on their classification into verbal or nonverbal communication channels and

processing, but rather how much information utility a channel offers in environmental

communication and consequently influences the skepticism of consumers. However, a

distinction between verbal and nonverbal information channels is relevant from the viewpoint of how much motivation and capacity consumers need to process environmental information. In general, consumers were demonstrated to be more attentive to nonverbal communication channels than to verbal, transmitting environmental information. Thus, taken together, it can be derived as a recommendation that environmental information should be communicated at a low threshold level, such as via nonverbal communication channels. When selecting the exact type of nonverbal communication channel, care should be taken to ensure that this channel is as specific as possible and substantially linked to the environmental friendliness of the packaging of the product (e.g., the packaging material).

   The combined use of communication channels. A further solution for how marketers can avoid the misleading and negative effects related with associative communication channels, such as motifs, surface designs or colors, can be achieved by combining them with environmental information from substantial and specific communication channels. Companies which supports their products, featuring associative environmental packaging information, with specific environmental information, provide their consumers with necessary credible environmental information. This initiative can contribute not only to educating the consumer but also to justify the environmental information provided by the associative communication channel. Based on Studies 2 and 3, the findings reveal that environmental information communicated through two communication channels of different specificity is very effective for both skeptical HEC consumers and LEC consumers. In particular, the combined use of communication channels was demonstrated to be as effective as a single associative communication channel among LEC consumers. This situation might be explained by the limited motivation and attention of LEC consumers to elaborate on specific environmental information. That is, the specific information has (if at all) only a minor influence on the product environmental friendliness evaluation. Even more interesting

is the combined effect among HEC consumers, which eliminates the environmental skepticism triggered by the vague communication channel. Study 3 showed that HEC consumers utilize specific and substantial information to justify the use of associative and vague environmental information, thus rendering it as a more trustworthy source of information. As a result, the perceived environmental friendliness increases. In line with previous results that apply the ELM, this study suggests that substantive and peripheral information channels affect HEC consumers in their combination, thus influencing their skeptical attitudes and product environmental friendliness evaluations in GMC (Lord, Lee, & Sauer, 1995).

However, a higher quantity of communication does not result in higher GMC effectiveness. Communication via two channels with different specificities can inform LEC consumers via their preferred associative and peripheral communication channel, while HEC consumers use the specific stimulus as a credible source of information with the associative stimulus interpreted following the contentment of the specific cue.

GMC recommendation for consumer. Individual statements about a company's environmentally friendly practices are usually correct when taken in isolation. However, these relate often to only a small part of the company's activities or the product manufacturing process. The fact that the environmentally friendly aspects of a product are often only marginal is generally not disclosed. The results of the thesis show that, for consumers, nonverbal communication channels are fast and attention-grabbing channels for communicating environmentally friendly product characteristics to consumers at a low cognitive threshold level. However, how can consumers differentiate between appearance and reality? The question is, where does honest advertising end and where does consumer deception begin? Consumers who are interested in finding out more about the actual environmental performance of products are encouraged to inform themselves before and

during purchase. Manufacturers of environmentally sound products are increasingly relying

on verbal and specific information, such as using Cradle to Grave Analysis or Ecological

Footprint statements. Apart from the educational initiative, HEC consumers should question

global environmental statements like "climate-neutral," "environmentally friendly," and

"climate-friendly." Moreover, supposedly environmentally friendly characteristics should be

questioned; for instance, a long-life bag can turn out to be misleading, as these are very

energy- and water-intensive to produce. Thus, HEC consumers should carefully consider and

compare the specific product information and offers. As a guideline for consumers, the

triggers for verbal greenwashing can also be listed, following Kangun et al. (1991): (I.) using

false environmental information, (II.) omitting relevant information that could be useful for

evaluating environmental friendliness, and (III.) when formulating ambiguous and vaguely

environmental information, thus causing unclarity.

For products featuring nonverbal and unspecific environmental information,

additionally, the following applies: (IV.) lack of specific environmental information, (V.) the

nonverbal information is incongruent with the verbal information on the product, and (VI.)

the environmentally friendly nonverbal information does not contribute to the environmental

friendliness of the product; it is even associated with negative environmental impacts (e.g.

artificial colors and overpackaging).

GMC recommendation for practitioners.

- Use factual environmental packaging solutions.

  Companies should strive to implement factual environmental aspects into their

  product packaging design, for instance, following the guidance of the Sustainable

  Packaging Coalition (2011).

- Do good and make it known.

  Regardless of which communication channels were used, GMC demonstrated its

positive effect across consumers on the ascribed environmental friendliness of the product and also positively influenced associated product qualities such as healthiness, attractiveness, and willingness to pay.

- Know your target group well.

  Do you want to primarily address HEC or LEC consumers? Or do you strive for an integrative, comprehensive consumer approach to product communication? This knowledge is the most effective way to design the GMC.

- Choose your communication channels carefully.

  - Pay attention to the information utility and the substantivity of the information channels in transmitting environmental friendliness. Vague environmental information channels are afflicted with skepticism and greenwashing.

  - Pay attention to how much motivation and threshold a communication channel requires for processing. Keep in mind that consumer capacity at the point-of-sale is usually limited. Therefore, communication channels with a lower attention and processing threshold are to be preferred.

- Use different communication channels together to transmit environmental information to reach more consumers.

  Communication via two channels with different specificities can inform LEC consumers via their preferred peripheral communication channel; consumers use the specific stimulus as a credible source of information with the associative stimulus interpreted following the contentment of the specific cue.

5.4 Conclusion

"Green" consumers with high environmental consciousness (HEC) are the primary target group of products offering environmentally friendly product attributes. However, the present findings indicate that several aspects have to be considered to convince these consumers in green marketing communication (GMC): the use of vague and associative communication channels (e.g., using motifs, colors, surface design) should be avoided, as these increase HEC consumers' environmental skepticism and perceived greenwashing intentions. Instead, specific communication channels (e.g., using text-based information, seals, material) should be chosen since these lead to a low level of skepticism and high effectiveness of environmental information; that is, consumers attribute a high degree of environmental friendliness to the product.

The studies showed that two important distinctions have to be made, first, between nonverbal and verbal information channels and, second, between the level of information utility provided by the communication channels—the specificity. The distinction between nonverbal and verbal information channels is useful in terms of how much motivation and threshold a communication channel is required for processing and, thus, determines whether the information provided through a verbal communication channel is perceived differently by motivated and involved consumers. Thus, nonverbal information channels offer the communicative advantage of communicating environmental information quickly, and it is peripherally perceptible to all consumers; therefore, it attracts more consumer attention than the elaborated processing of specific communication channels. Consequently, nonverbal communication channels are suitable to open the door for a fast, low-threshold, environmental quality ascription.

The distinction between differently specific communication channels is useful because it distinguishes between the information utility and the substantivity of the communication

channels in transmitting environmental friendliness. Thus, differences were found between nonverbal and verbal information channels in how substantial and specific the communication channel refers to the actual environmental friendliness of the packaging or the product. The more substantial and specific a communication channel is regarding the environmental impact of the product or packaging, the less it is associated with skepticism and greenwashing intentions.

Hence the key point is that associative environmental communication channels should not be used in isolation but, rather, in combination with specific channels. The combined application showed that the content of the associative communication channel is regarded as justified and, thus, causes the elimination of skepticism, as the associative information is supported by the congruent information provided by the specific communication channel.

Even though "non-green" LEC consumers are not the primary target group, those consumers still might look for environmental or environmental-related product attributes (e.g., healthiness) in their everyday life. The combined use of communication channels with varying specificities is shown to be efficient also among this consumer group. For LEC consumers, associative communication channels are primarily efficient and only slightly afflicted with skepticism and greenwashing tendency. LEC consumers draw their product inferences based on peripheral, heuristic cues while being less attentive to specific information that requires cognitive elaboration.

In summary, the present thesis provides an advanced basis for an integrative approach to GMC effectiveness, which matches different communication channels with the elaboration requirements of specific consumer target groups.

References

Aaker, D. (1990). Brand extensions: The good, the bad, and the ugly. *Sloan Management Review*, *31*(4). Retrieved from https://search.proquest.com/openview/dc29a8916e6f4e69e86ffe29d1f435a4/1?pq-origsite=gscholar&cbl=26142

Aaker, J. L., & Maheswaran, D. (1997). The effect of cultural orientation on persuasion. *The Journal Of Consumer Research*, *24*(3), 315–328. doi:10.1287/mksc.1060.0223

Albayrak, T., Aksoy, Ş., & Caber, M. (2013). The effect of environmental concern and scepticism on green purchase behaviour. *Marketing Intelligence and Planning*, *31*(1), 27–39. doi:10.1108/02634501311292902

Alves, H., Shiel, C., Paço, A., Alves, H., Shiel, C., & Filho, W. L. (2016). Development of a green consumer behaviour model. *International Journal of Consumer Studies*, *37*, 414-421. doi:10.1111/ijcs.12009

Amelang, M., Tepe, K., Vagt, G., & Wendt, W. (1977). Mitteilung über einige Schritte der Entwicklung einer Skala zum Umweltbewußtsein (Notification of some steps towards the development of a scale of environmental consciousness). *Diagnostica*, *23*, 86–88.

American Chemical Society. (2016). *Edible food packaging made from milk proteins* [video file]. Retrieved from https://www.acs.org/content/acs/en/pressroom/newsreleases/2016/august/edible-food-packaging-made-from-milk-proteins-video.html

Anderson, J. R. (1976). *Language, memory, and thought*. Oxford, England: Lawrence Erlbaum. Available at https://psycnet.apa.org/record/1977-07130-000

Anderson, J. R. (1983). A spreading activation theory of memory. *Journal of Verbal Learning and Verbal Behavior*, (22), 1-35. doi:10.1016/S0022-5371(83)90201-3

Balderjahn, I. (2004). *Nachhaltiges Marketing-Management: Möglichkeiten einer umwelt- und sozialverträglichen Unternehmenspolitik (Sustainable marketing management:*

opportunities for an environmentally and socially compatible corporate policy).

Germany: Lucius & Lucius.

Banerjee, S., Gulas, C. S. & Iyer, E. (1995). Shades of green: a multidimensional analysis of environmental advertising, *Journal of Advertising*, *24*(2), 21-31. doi:10.1080/00913367

Barber, N., Taylor, C., & Strick, S. (2009). Wine consumers' environmental knowledge and attitudes: Influence on willingness to purchase. *International Journal of Wine Research*, *1*(May), 59–72. doi:10.2147/IJWR.S4649

Bates, D., Mächler, M., Bolker, B., & Walker, S. (2015). Fitting linear mixed-effects models using lme4. *Journal of Statistical Software*, *67*(1). doi:10.18637/jss.v067.i01

Baum, L. M. (2012). It's not easy being green...or is it? A content analysis of environmental claims in magazine advertisements from the United States and United Kingdom. *Environmental Communication*, *6*(4), 423–440. doi:10.1080/17524032.2012.7

Becker-Olsen, K. L., & Hill, R. (2005). The impact of perceived corporate social responsibility on consumer behavior. *UC Berkeley: Center for Responsible Business*. Retrieved April 7, 2019, from https://escholarship.org/uc/item/98f4n4fr

Berger, I. E., & Mitchell, A. A. (1989). The effect of advertising on attitude accessibility, attitude confidence, and the attitude-behavior relationship. *Journal of Consumer Research, 16*, 269-279. doi:10.1086/209213

Bhate, S., & Lawler, K. (1997). Environmentally-friendly products: Factors that influence their adoption. *Technovation*, *17*(8), 457–465. doi:10.1016/S0166-4972(97)00006-0

Bickart, B. A., & Ruth, J. A., 2012. Green eco-seals and advertising persuasion green eco-seals and advertising persuasion. *Journal of Advertising*, *41*(4), 51–67. doi:10.1080/00913367.2012.10672457

Biel, A., & Grankvist, G. (2010). The effect of environmental information on professional

purchasers' preference for food products. *British Food Journal*, *112*(3), 251–260. doi:10.1108/00070701011029129

Bloch, P. H. (1995). Seeking the ideal form: product design and consumer response. *Journal of Marketing*, *59*(3), 16–29. doi:10.2307/1252116

Bundesministerium für Umwelt, Naturschutz (BMUB). (2015). Umweltbewusstsein in Deutschland 2014. Ergebnisse einer repräsentativen Bevölkerungsumfrage *(Environmental conciousness in Germany 2014).*1–84. Retrieved from http://www.umweltbundesamt.de/sites/default/files/medien/378/publikationen/ umweltbewusstsein_in_deutschland_2014.pdf

Bundesministerium für Umwelt, Naturschutz (BMUB). (2018). *Umweltbewusstsein und Umweltverhalten in Deutschland 2016 (Environmental conciousness in Germany 2016)*. Retrieved from https://www.umweltbundesamt.de/publikationen/umweltbewusstsein- umweltverhalten-in-deutschland-1

Bundesministerium für Umwelt, Naturschutz (BMUB). (2019). *Nachhaltige Produkte – attraktiv für Verbraucherinnen und Verbraucher? (Sustainable products - appealing to consumers?)*. Retrieved from https://www.umweltbundesamt.de/sites/default/files/medien/1410/publikationen/2019- 02-19_texte_11-2019_nachhaltige-produkte.pdf

Boks, C., & Stevels, A. (2007). Essential perspectives for design for environment. Experiences from the electronics industry. *International Journal of Production Research*, *45*(18–19), 4021–4039. doi:10.1080/00207540701439909

Bolger, N., Bolger, N., Davis, A., & Rafaeli, E. (2003). Diary methods : capturing life as it is lived.*Annual Review of Psychology,* 54,579-616. doi: 10.1146/annurev.psych.54.101601.145030

Boush, D. M., Friestad, M., & Rose, G. M. (1994). Adolescent skepticism toward TV advertising and knowledge of advertiser tactics. *Journal of Consumer Research*, 21(1), 165-175. doi:10.1086/209390

Brune, G. (1994). Ökologie - Produkt - Kommunikation: Zur Kommunikation im Rahmen einer ökologischen Produktpolitik (Ecology - Product - Communication: Communication within the framework of an ecological product policy). In S. Hellenbrandt & F. Rubik (Eds.), *Produkt und Umwelt: Anforderungen, Instrumente und Ziele einer ökologischen Produktpolitik*. Marburg: Metropolis-Verlag.

Brunner, C. B., 2010. *Portfolio-Werbung als Technik des Impression-Management eine Untersuchung zur gegenseitigen Stärkung von Dachmarke und Produktmarken in komplexen Markenarchitekturen (Portfolio Advertising as an Impression Management Technique an investigation into the mutual strengthening of umbrella brands and product brands in complex brand architectures)*. Wiesbaden: Springer Gabler.

Carlson, L., Grove, S. J., & Kangun, N. (1993). A content analysis of environmental advertising claims: A matrix method approach. *Journal of Advertising*, 22 (3), 27-39. doi:10.1080/00913367.1993.10673409

Carlson, L., Grove, S. J., Kangun, N., & Polonsky, M. J. (1996). An international comparison of environmental advertising: Substantive versus associative claims. *Journal of Macromarketing*, *2*, 57-68. doi:10.1177/027614679601600205

Caspers-Merk, M. (1996). Enquête-Kommission „Schutz des Menschen und der Umwelt" berichtet regelmäßig in der UWSF (Enquête commission "protection of humans and the environment" regularly reports in the UWSF). *Umweltwissenschaften und Schadstoff-Forschung*, 8(1), 1-2. doi: 10.1007/BF02937559

Carney, R. N., & Levin, J. R. (2002). Pictorial illustrations still improve students' learning

from text. *Educational Psychology Review*, *14*(1), 5-26.

doi:10.1023/A:1013176309260

Chamorro, A., Rubio, S., & Miranda, F. J. (2009). Characteristics of research on green

marketing. *Business Strategy and the Environment*, *18*(4), 223–239.

doi:10.1002/bse.571

Chan, R. Y. K. (2000). The effectiveness of environmental advertising: the role of claim type

and the source country green image. *International Journal of Advertising*, *19*(3), 349–

375. doi:10.1080/02650487.2000.11104806

Chan, R. Y. K., Leung, T. K. P., & Wong, Y. H. (2006). The effectiveness of environmental

claims for services advertising. *Journal of Services Marketing*, *20*(4), 233–250.

doi:10.1108/08876040610674580

Chan, R., & Chan, R. Y. K. (2001). Determinants of chinese consumers' green purchase

determinants of chinese consumers' green purchase behavior. *Psychology and

Marketing*, *18*(4), 389–413. doi:10.1002/mar.1013

Chan, R. Y. K., & Lau, L. B. Y. (2004). The effectiveness of environmental claims among

chinese consumers: influences of claim type, country disposition and ecocentric

orientation. *Journal of Marketing Management*, *20*(3–4), 273–319.

doi:10.1362/026725704323080425

Chang, C. H. (2011). Feeling ambivalent about going green. *Journal of Advertising*, *40*(4),

19–32. doi:10.2753/JOA0091-3367400402

Chekima, B., Chekima, S., Syed Khalid Wafa, S. A. W., Igaua, O. A., & Sondoh, S. L.

(2016). Sustainable consumption: The effects of knowledge, cultural values,

environmental advertising, and demographics. *International Journal of Sustainable*

Development and World Ecology, *23*(2), 210–220.

https://doi.org/10.1080/13504509.2015.1114043

Chen, Y. S., & Chang, C. H. (2012). Greenwash and green trust: The mediation effects on

green consumer confusion and perceived risk. *Journal of Business Ethics*, *114*(3),

489–500. doi:10.1007/s10551-012-1360-0

Chen, Y. C., Shang, R. A., & Kao, C. Y. (2009). The effects of information overload on

consumers' subjective state towards buying decision in the internet shopping

environment. *Electronic Commerce Research and Applications*, *8*(1), 48–58.

doi:10.1016/j.elerap.2008.09.001

Chen, Y., & Chang, C. (2013). Towards green trust: The influences of green perceived

quality, green perceived risk, and green satisfaction. *Management Decision*, *51*(1),

63–82. doi:10.1108/00251741311291319

Childers, T. L., & Houston, M. J. (1984). conditions for a picture-superiority effect on

consumer memory. *Oxford University Press*, *11*(2), 643–654.

Childers, T. L., Houston, M. J., & Houston, E. H. S. (1985). Measurement of individual

differences in visual versus verbal information processing. *Journal of Consumer

Research*, *12*(3), 125–134.

Cleveland, M., Kalamas, M., & Laroche, M. (2005). Shades of green: linking environmental

locus of control and pro-environmental behaviors. *Journal of Consumer Marketing*,

22(4), 198–212. doi:10.1108/07363760510605317

Cohen, J. B., & Areni, C. S. (1991). Affect and consumer behavior. In T. S. Robertson & H.

H. Kassajian (Eds.), *Handbook of consumer behavior* (pp. 188–240). Englewood

Cliffs: Prentice Hall.

Cone (2011). *Green Gap Trend Tracker—Cone Communications | Cone | Cone PR | Cone Inc | PR Agency | Boston | NYC. (n.d.)*. Retrieved from http://www.conecomm.com/research-blog/2011-green-gap-trend-tracker

Crilly, N., Moultrie, J., & Clarkson, P. J. (2004). Seeing things: consumer response to the visual domain in product design. *Design Studies*, *25*(6), 547-577. doi:10.1016/j.destud.2004.03.001

D'Souza, C., & Taghian, M. (2005). Green advertising effects on attitude and choice of advertising themes. *Asia Pacific Journal of Marketing and Logistics*, *17*(3), 51–66. doi:10.1108/13555850510672386

D'Souza, C. (2004). Ecolabel programs: a stakeholder (consumer) perspective. *Corporate Communications: An International Journal*, *9*(3), 179–188. doi:10.1108/13563280410551105

D'Souza, C., Taghian, M., & Khosla, R. (2007). Examination of environmental beliefs and its impact on the influence of price, quality and demographic characteristics with respect to green purchase intention. *Journal of Targeting, Measurement and Analysis for Marketing*, *15*(2), 69–78. doi:10.1057/palgrave.jt.5750039

Dahl, R. (2010). Greenwashing: Do you know what you're buying? *Environ Health Perspectives*, *118*(6), A246–A252. doi:10.5840/bemag19948672

Darley, W. K., & Smith, R. E. (1993). Advertising claim objectivity: antecedents and effects. *Journal of Marketing*, 57(4), 100–113. doi:10.1177/00222429930570040

Davis, J. J. (1993). Strategies for environmental advertising. *Journal of Consumer Marketing*, *10*(2), 19–36. doi:10.1108/07363769310039102

Delmas, M., & Burbano, V. C. (2011). California management review. *California Management Review*, *38*. doi:10.1016/0737-6782(88)90039-2

Delmas, M. A., & Burbano, V. C. (2012). The drivers of greenwashing. *California*

Management Review, *54*(1), 64–87. doi:10.1525/cmr.2011.54.1.64

DeMarree, K. G., Clark, C. J., Wheeler, S. C., Briñol, P., & Petty, R. E. (2017). On the pursuit
of desired attitudes: Wanting a different attitude affects information processing and
behavior. *Journal of Experimental Social Psychology*, *70*, 129-142.
doi:10.1016/j.jesp.2017.01.003

De Vlieger, L., Hudders, L., & Verleye, G. (2012). The impact of green appeals on
credibility: A mixed-method approach. In 11th international conference on research in
advertising (pp. 1–9). Stockholm. Retrieved from
https://biblio.ugent.be/publication/2967845/file/2967854

Diamantopoulos, A., Schlegelmilch, B. B., Sinkovics, R. R., & Bohlen, G. M. (2003). Can
socio-demographics still play a role in profiling green consumers? A review of the
evidence and an empirical investigation. *Journal of Business Research*, *56*(6), 465–
480. doi:10.1016/S0148-2963(01)00241-7

Dirks, H. E., Kaiser, S., Klose, G., Pfeiffer, I., & Backhaus, M. (2010).
*Verbrauchermonitoring Perspektiven der Verbraucher zum Klimaschutz: Mobilität &
Ernährung (Consumer monitoring consumer perspectives on climate protection:
mobility & nutrition)*. Retrieved from
https://www.prognos.com/fileadmin/pdf/publikationsdatenbank/Prognos_Verbraucher
monitoring_Endbericht.pdf

do Paço, A. M. F., & Reis, R. (2012). Factors affecting skepticism toward green advertising.
Journal of Advertising, *41*(4), 147–155. doi:10.2753/JOA0091-3367410410

Edell, J. A., & Staelin, R. (1983). The information processing of pictures in print
advertisements. *Journal of Consumer Research*, *10*(1), 45. doi:10.1086/208944

Edwards, L. J., Muller, K. E., Wolfinger, R. D., Qaqish, B. F., & Schabenberger, O. (2008).
An R2 statistic for fixed effects in the linear mixed model. *Statistics in Medicine*,
27(29), 6137–57. doi:10.1002/sim.3429

Ehrich, K. R., & Irwin, J. R. (2005). Willful ignorance in the request for product attribute
information. *Journal of Marketing Research*, *42*(3), 266–277.
doi:10.1509/jmkr.2005.42.3.266

Eilert, S. J. (2005). New packaging technologies for the 21st century. *Meat Science*, *71*(1),
122–127. doi:10.1016/j.meatsci.2005.04.003

Esslinger, H. (2011). Sustainable design: beyond the innovation-driven business model.
Journal of Product Innovation Management, *28*(3), 401–404. doi:10.1111/j.1540-
5885.2011.00811.x

European Commission. (2013). *Attitudes of Europeans towards building the single market for
green products. Flash Eurobarometer 367* (Vol. 367). Retrieved from
https://ec.europa.eu/commfrontoffice/publicopinion/flash/fl_367_en.pdf

European Commission. (2014). *Attitudes of European citizens towards the environment.
Special Eurobarometer 468* (Vol. 468). doi:10.2779/25662

Fazio, R. H., Powell, M. C., & Williams, C. J. (1989). The role of attitude accessibility in the
attitude-to-behavior process. *Journal of Consumer Research, 16*(3), 280-288.
doi:10.2307/2489509

Fenko, A., Schifferstein, H. N., & Hekkert, P. (2008). *Which senses dominate at different
stages of product experience?* Undisciplined! Design Research Society Conference
2008, Sheffield Hallam University, Sheffield, UK.Retrieved from
http://shura.shu.ac.uk/466/

Fitzgerald, B. P., & Russo, F. K. (2001). Package graphics and consumer product beliefs.
Journal of Business and Psychology, *15*(3), 467–489. doi:10.1023/A:1007826818206

Folker, S., Ritter, H., & Sichelschmidt, L. (2005). Processing and integrating multimodal material – the influence of color-coding. *Proceedings of the 27th Annual Conference of the Cognitive Science Society*, 690-695.

Follows, S. B., & Jobber, D. (2000). Environmentally responsible purchase behaviour: a test of a consumer model. *European Journal of Marketing*, *34*(5/6), 723–746. doi:10.1108/03090560010322009

Ford, G. T., Smith, D. B., & Swasy, J. L. (1990). Consumer skepticism of advertising claims: testing hypotheses from economics of information, *Journal of Consumer Research*, *16*(4), 433-441. doi:10.2307/2489454

Forehand, M. R., & Grier, S. (2003). When is honesty the best policy? The effect of stated company intent on consumer skepticism. *Journal of Consumer Psychology*, *13*(3), 349-356. doi:10.1207/S15327663JCP1303_15

Fowler, A. R., & Close, A. G. (2012). It ain't easy being green. *Journal of Advertising, 41*(4), 119–132. doi:10.2753/JOA0091-3367410408

Friestad, M. & Wright, P. (1994). The persuasion knowledge model: How people cope with persuasion attempts, *Journal of Consumer Research*, *21*(1), 1-31. doi:10.1086/209380

Furchheim, P. (2014). *Grüner Materialismus: Eine Überprüfung der Vereinbarkeit von Materialismus und grünem Konsum (Green materialism: A review of the compatibility of materialism and green consumption)*. (C. Zanger, Ed.). Chemnitz: Springer Gabler.

Garcia, J., & Koelling, R. A. (1966). Relation of cue to consequence in avoidance learning. *Psychonomic Science*, *4*(1), 123–124. doi:10.3758/bf03342209

Grankvist, G., & Biel, A. (2007). Predictors of purchase of eco-labelled food products: A panel study. *Food Quality and Preference*, *18*(4), 701–708. doi:10.1016/j.foodqual.2006.11.002

Grimmer, M., & Woolley, M. (2014). Green marketing messages and consumers' purchase

intentions: Promoting personal versus environmental benefits. *Journal of Marketing Communications*, *20*(4), 231–250. doi:10.1080/13527266.2012.684065

Grösser, H. (1991). *Markenartikel und Industriedesign: das Stereotypik-Konzept, Ursachen, Ausprägungen, Konsequenzen (Branded goods and industrial design: the stereotypical concept, causes, characteristics, consequences)*. München: Kyrill & Method. Retrieved from https://opacplus.bsb-muenchen.de/metaopac/search?isbn=3927527505&db=100

Grunenberg, H., & Kuckartz, U. (2003). *Umweltbewusstsein im Wandel: Ergebnisse der UBA-Studie Umweltbewusstsein in Deutschland 2002 (Environmental consciousness in change: Results 143ft he UBA study on environmental consciousness in Germany 2002)*. Opladen: Leske + Budrich. doi:10.1007/978-3-322-97605-5

Han, T.-I., & Chung, J.-E. (2014). Korean consumers' motivations and perceived risks toward the purchase of organic cotton apparel. *Clothing and Textiles Research Journal*, *32*(4), 235–250. doi:10.1177/0887302X14538116

Hansen, A., & MacHin, D. (2013). Researching visual environmental communication. *Environmental Communication*, *7*(2), 151–168. doi:10.1080/17524032.2013.785441

Hanss, D., & Böhm, G. (2012). Sustainability seen from the perspective of consumers. *International Journal of Consumer Studies*, *36*(6), 678–687. doi:10.1111/j.1470-6431.2011.01045.x

Hartmann, P., & Apaolaza-Ibáñez, V. (2012). Consumer attitude and purchase intention toward green energy brands: The roles of psychological benefits and environmental concern. *Journal of Business Research*, *65*(9), 1254-1263. doi:10.1016/j.jbusres.2011.11.001

Hartmann, P., & Apaolaza-Ibáñez, V. (2008). Virtual nature experiences as emotional

benefits in green product consumption. *Environment and Behavior*, *40*(6), 818–842.

doi:10.1177/0013916507309870

Hartmann, P., & Apaolaza-Ibáñez, V. (2009). Green advertising revisited: Conditioning

virtual nature experiences. *International Journal of Advertising*, *28*(4), 715-739.

doi:10.2501/S026.S048709200837

Hartmann, P. & Apaolaza-Ibáñez, V. (2010). Beyond savanna: An evolutionary and

environmental psychology approach to behavioral effects of nature scenery in green

advertising. *Journal of Environmental Psychology*, *30*(1), 119-128.

doi:10.1016/J.JENVP.2009.10.001

Hartmann, P., Apaolaza-Ibáñez, V., & Alija, P. (2013). Nature imagery in advertising.

International Journal of Advertising, *32*(2), 183-210. doi:10.2501/ija-32-2-183-210

Hartmann, P., Apaolaza-Ibáñez, V., & Eisend, M. (2016). Nature imagery in non-green

advertising: The effects of emotion, autobiographical memory, and consumer's green

traits. *Journal of Advertising*, *45*(4), 427-440. doi:10.1080/00913367.2016.1190259

Hartmann, P., & Apaolaza-Ibáñez, V. (2006). Green value added. *Marketing Intelligence &*

Planning, *24*(7), 673–680. doi:10.1108/02634500610711842

Hartmann, P., Apaolaza-Ibáñez, V., & Forcada Sainz, F. J. (2005). Green branding effects on

attitude: functional versus emotional positioning strategies. *Marketing Intelligence &*

Planning, *23*(1), 9–29. doi:10.1108/02634500510577447

Hayes, A.F. (2018). Partial, conditional, and moderated moderated mediation: Quantification,

inference, and interpretation. *Communication Monographs*, *85*(1), 4–40.

doi:10.1080/03637751.2017.1352100

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process*

analysis: A regression-based approach. Guildford Press, New York.

Herbes, C., Beuthner, C., & Ramme, I. (2018). Consumer attitudes towards biobased packaging – A cross-cultural comparative study. *Journal of Cleaner Prod*uction. *194*, 203–218. doi:10.1016/j.jclepro.2018.05.106

Hockley, W. E., & Bancroft, T. (2011). Extensions of the picture superiority effect in associative recognition. *Canadian Journal of Experimental Psychology*, *65*(4), 236–244. doi:10.1037/a0023796

Hoogland, C. T., de Boer, J., & Boersema, J. J. (2007). Food and sustainability: Do consumers recognize, understand and value on-package information on production standards? *Appetite*, *49*(1), 47–57. doi:10.1016/j.appet.2006.11.009

Hößl, T. (2004). *Das Elaboration Likelihood Model*. Retrieved May 5, 2017, from https://www.hoessl.eu/2004/12/das-elaboration-likelihood-model/

Hume, S. (1991). Green labels good, but confusing. *Advertising Age*, *62*(52), 43.

Hutchinson, J. W., & Alba, J. W. (1991). Ignoring irrelevant information: situational determinants of consumer learning. *Journal of Consumer Research, 18*(3), 325. doi:10.1086/209263

Joshi, Y., & Rahman, Z. (2015). Factors affecting green purchase behaviour and future research directions. *International Strategic Management Review*, *3*(1), 128–143. doi:10.1016/j.ism.2015.04.001

Judd, C. M., Drake, R. A., Downing, J. W., & Krosnick, J. A. (1991). Some dynamic properties of attitude structures: Context-induced response facilitation and polarization. *Journal of Personality and Social Psychology*, *60*(2), 193-202. doi:10.1037/0022-3514.60.2.193

Kaltenbach, H. G. (1975). *Die Rolle von Produkt und Verpackung in der Marktkommunikation (The function of product and packaging in market communication)*. Essen: Girardet.

Kangun, N., Carlson, L., & Grove, S. J. (1991). Environmental advertising claims: a preliminary investigation. *Journal of Public Policy & Marketing*, *10*(2), 47–58. doi:10.1177/074391569101000203

Kardes, F. R., Sanbonmatsu D., & Herr, P. (1990). Consumer expertise and the feature-positive effect: implications for judgment and inference. In Goldberg, M.E., Gorn, G., Richard, W. (Eds.), *NA - Advances in Consumer Research Volume 17* (pp. 351–354). Utah: Association for Consumer Research.

Karmasin, H. (2016). *Verpackung ist Verführung (Packaging is seduction)*. München: Haufe-Gruppe.

Kassarjian, H. H. (1971). Personality and consumer behavior: a review. *Journal of Marketing Research*, 8(4), 409-418. doi:10.2307/3150229

Kilbourne, W., & Pickett, G. (2008). How materialism affects environmental beliefs, concern, and environmentally-responsible behavior. *Journal of Business Research, 61*(9), 885–893. doi:10.1016/j.jbusres.2007.09.016

Kim, M., & Lennon, S. (2008). The effects of visual and verbal information on attitudes and purchase intentions in internet shopping. *Psychology and Marketing*, *25*(2), 146–178. doi:10.1002/mar

Kinnear, T. C., & Taylor, J. R. (1973). The effect of ecological concern on brand perceptions. *Journal of Marketing Research*, *10*(May), 191. doi:10.2307/3149825

Kisielius, J., & Sternthal, B. (1984). Detecting and explaining vividness effects in attitudinal judgments. *Journal of Marketing Research*, *21*(2), 54–64. doi:10.2307/3151792

Kitchen, P. J., Kerr, G., Schultz, D. E., McColl, R., & Pals, H. (2014). The elaboration likelihood model: review, critique and research agenda. *European Journal of Marketing*, *48*(11/12), 2033–2050. doi:10.1108/EJM-12-2011-0776

Klein, S. B. (2019). *Learning: principles and applications*. Los Angeles: Sage

Knobloch-Westerwick, S., & Kleinman, S. B. (2012). Preelection selective exposure: Confirmation bias versus informational utility. *Communication Research*, *39*(2), 170–193. doi:10.1177/0093650211400597

Kong, Y., & Zhang, L. (2012). When does green advertising work? The moderating role of product type, *Journal of Marketing Communications*, *7266*, 1-17. doi:10.1080/13527266.2012.672335

Koppelmann, U. (2001). *Produktmarketing: Entscheidungsgrundlagen für Produktmanager (Product marketing: Decision bases for product managers* (5.edt.). Heidelberg: Springer-Verlag.

Kotler, P., & Rath, G. A. (1984). Design, a powerful but neglected strategic tool. *Journal of Business Strategy*, *5*, 16–21.

Kotler, P. (2015). *Marketing management*. New Jersey: Prentice-Hall.

Kreil, A., Ludwig, C., & Niess, J. (2016). *Ist Grün gleich Grün? Die Wirkung der Farbe Grün als Verpackungselement auf die wahrgenommene ökologische Nachhaltigkeit von Produkten (Is green equals green? The effect of the colour green as a packaging element on the perceived environmental sustainability of products)* (Unpublished bachelor's thesis*)*. München: Ludwig-Maximilians Universität.

Kroeber-Riel, W. (1996). *Bildkommunikation: Imagerystrategien für die Werbung (Image communication: Imagery strategies for advertising)*. München: Vahlen. Retrieved from https://opacplus.bsb-muenchen.de/metaopac/search?isbn=3800620405&db=100

Kroeber-Riel, W., & Weinberg, P. (2003). *Konsumentenverhalten (Consumer behavior)*. München: Vahlen. Retrieved from https://opacplus.bsb-muenchen.de/metaopac/search?isbn=3800629313&db=100

Kronrod, A., Grinstein, A., & Wathieu, L. (2012). *Go Green! Should environmental messages be so assertive? Journal of Marketing*, *76*(1). doi:10.1509/jm.10.0416

Küthe, S. (2013). *Neuer Luxus als konsequente Form nachhaltigen Konsums: Ursachen seiner Entstehung und Merkmale seiner Produkte (New luxury as a systematic form of sustainable consumption: causes of ist creation and characteristics of ist products).* Hamburg: Kovac. Retrieved from https://opacplus.bsb-muenchen.de/metaopac/search?isbn=9783830071761&db=100

Kuvykaite, R., Dovaliene, A., & Navickiene, L. (2009). Impact of package elements on consumer's purchase decision. *Economics and Management*, *14*, 441–447. doi:10.5755/j01.em.0.14.9405

Kuznetsova, K. A., Brockhoff, P. B., & Christensen, R. H. B. (2017). lmerTest Package: Tests in linear mixed effects models. *Journal of Statistical Software*, *82*(13). doi:10.18637/jss.v082.i13

Langner, T., Esch, F.-R., & Kühn, J. (2009). Produktverpackung: Das fünfte Element im Marketing-Mix (Produktverpackung: Das fünfte Element im Marketing-Mix). M. Bruhn, F.-R. Esch, & T. Langer (Eds.), *Handbuch Kommunikation* (pp. 285–314). Wiesbaden: Gabler. doi:10.1007/978-3-8349-8078-6_15

Laurent, G., & Kapferer, J.-N. (1985). Measuring consumer involvement profiles. *Journal of Marketing Research*, *22*(1), 41. doi:10.2307/3151549

Lee, B.-K., & Lee, W.-N. (2004). The effect of information overload on consumer choice quality in an online environment. *Psychology and Marketing*, *21*(3), 159–183. doi:10.1002/mar.20000

Leonidou, L. C., Leonidou, C. N., Palihawadana, D., & Hultman, M. (2011). Evaluating the green advertising practices of international firms: A trend analysis. *International Marketing Review*, *28*(1), 6–33. doi:10.1108/02651331111107080

Li, C. Y. (2013). Persuasive messages on information system acceptance: A theoretical extension of elaboration likelihood model and social influence theory. *Computers in*

Human Behavior, *29*(1), 264–275. doi:10.1016/j.chb.2012.09.003

Lien, N. H. (2001). Elaboration Likelihood Model in consumer research: a review.

    Proceedings of the National Science Council, *11*(4), 301–310. doi:

    10.1.1.197.7986&rep=rep1&type=pdf

Lindh, H., Olsson, A., & Williams, H. (2016a). Consumer perceptions of food packaging:

    contributing to or counteracting environmentally-sustainable development? *Packaging*

    Technology and Science, 29(1), 3–23. doi:10.1002/pts.2184

Lindh, H., Williams, H., Olsson, A., & Wikström, F. (2016b). Elucidating the indirect

    contributions of packaging to sustainable development: A terminology of packaging

    functions and features. *Packaging Technology and Science, 29*, 225–246.

    doi:10.1002/pts.2197

Lingle, R. (2005). BIOTA's high-water mark in sustainable packaging. *Packaging World*, (8),

    62–64. Retrieved from

    https://www.packworld.com/article/applications/beverage/bottled-water/biotas-high-

    water-mark-sustainable-packaging

Löbach, B., & Fiedler, E.A. (1995). *Design und Ökologie. (Design and ecology)*. Cremlingen:

    Designbuch Verlag.

Ludwig, C., & Diefenbach, S. (2019a). Perceiving and believing? the subjective

    persuasiveness of graphical and material environmental packaging design elements

    depending on individual environmental consciousness. *(in review).*

Ludwig, C., & Diefenbach, S. (2019b). The challenges of green marketing communication:

    Effective communication to environmentally conscious but skeptical consumers. *(in*

    review).

Loken, B., Barsalou, L.W. and Joiner, C. (2008). Categorization theory and research in

    consumer psychology: Category representation and category-based inference. In

Haugtvedt, C.P., Herr, P. and Kardes, F.R. (Eds.), *Handbook of Consumer Psychology*, 1273, New York: Lawrence Erlbaum.

Langner, T., Esch, F.-R., & Kühn, J. (2009). Produktverpackung: Das fünfte Element im Marketing-Mix. (Product packaging: the fifth element in the marketing mix). In M. Bruhn, F.-R. Esch, & T. Langer (Eds.), *Handbuch Kommunikation*, 285–314. Wiesbaden: Gabler.

Lord, K. R., Lee, M.-S., & Sauer, P. L. (1995). the combined influence hypothesis: central and peripheral antecedents of attitude toward the ad. *Journal of Advertising*, *24*(1), 73–85. doi:10.1080/00913367.1995.10673469

Luchs, M. G., Swan, K. S., & Creusen, M. E. H. (2016). Perspective: A review of marketing research on product design with directions for future research. *Journal of Product Innovation Management*, *33*(3), 320–341. doi:10.1111/jpim.12276

MacKenzie, S. B., & Lutz, R. J. (1989). An empirical examination of the structural antecedents of attitude towards the ad in an advertising pretesting context. *Journal of Marketing*, *53*, 48–56.

Magnier, L., & Schoormans, J. (2017). How do packaging material, colour and environmental claim influence package, brand and product evaluations? *Packaging Technology and Science, 30*(11), 691–753. doi:10.1002/pts.2318

Magnier, L., & Schoormans, J. (2015). Consumer reactions to sustainable packaging: The interplay of visual appearance, verbal claim and environmental concern. *Journal of Environmental Psychology, 44*, 53–62. doi:10.1016/j.jenvp.2015.09.005

Magnier, L., Schoormans, J., & Mugge, R. (2016). Judging a product by its cover: Packaging sustainability and perceptions of quality in food products. *Food Quality Preference*, *53*, 132–142. doi:10.1016/j.foodqual.2016.06.006

Magnier, L., & Crié, D. (2015). Communicating packaging eco-friendliness: An exploration of consumers' perceptions of eco-designed packaging. *International Journal of Retail and Distribution Management*, *43*(4–5), 350–366. doi:10.1108/IJRDM-04-2014-0048

Maignan, I., & Ferrell, O. C. (2004). Corporate social responsibility and marketing: an integrative framework. *Journal of the Academy of Marketing Science*, *32*(1), 3–19. doi:10.1177/0092070303258971

Maloney, M. P., & Ward, M. P. (1973). Ecology: Let's hear from the people: An objective scale for the measurement of ecological attitudes and knowledge. *American Psychologist*, *28*(7), 583–586. doi:10.1037/h0034936

Manrai, L. A., Manrai, A. K., Lascu, D. N., & Ryans, J. K. (1997). How green-claim strength and country disposition affect product evaluation and company image. *Psychology and Marketing*, 14(5), 511–537. doi: 10.1002/(SICI)1520-6793(199708)14:5<511::AID-MAR5>3.0.CO;2-B

Markert, S., Evers, J., & Schönfeld, S. (2016). Zahlen, bitte! Tragende Alternativen (Numbers, please! Supporting alternatives). *Waiblinger Kreiszeitung*, p. A4.

Martindale, C. (1991). *Cognitive psychology: A neural-network approach.* Belmont, CA: Thomson Brooks/Cole Publishing Company. Retrieved from https://psycnet.apa.org/record/1990-98844-000

Martinho, G., Pires, A., Portela, G., & Fonseca, M. (2015). Factors affecting consumers' choices concerning sustainable packaging during product purchase and recycling. *Resources, Conservation and Recycling*, *103*, 58–68. doi:10.1016/j.resconrec.2015.07.012

Matthes, J., & Wonneberger, A. (2014). The skeptical green consumer revisited: Testing the relationship between green consumerism and skepticism toward advertising. *Journal of Advertising, 43*(2), 115–127. doi:10.1080/00913367.2013.834804

Matthes, J., Wonneberger, A., & Schmuck, D. (2014). Consumers' green involvement and the persuasive effects of emotional versus functional ads. *Journal of Business Research.*, *67*(9), 1885–1893. doi:10.1016/j.jbusres.2013.11.054

Meyer, S. (2001). *Produkthaptik: Messung, Gestaltung und Wirkung aus verhaltenswissenschaftlicher Sicht (Product haptics: measurement, design and effect from the point of view of behavioural science)*. Wiesbaden: Dt. Univ.-Verl. [u.a.]. Retrieved from https://opacplus.bsb-muenchen.de/metaopac/search?isbn=3824472252&db=100

Meyers-Levy, J., & Tybout, A. M. (1989). Schema congruity as a basis for product evaluation. *Journal of Consumer Research*, *16*(1), 39. doi:10.1086/209192

Mittal, B. (1995). A comparative analysis of four scales of consumer involvement. *Psychology and Marketing*, *12*(7), 663–682. doi:10.1002/mar.4220120708

Mittal, M. (2014). The psychology of product packaging: Digital packaging experiences. Retrieved from https://medium.com/digital-packaging-experiences/the-psychology-of-product-packaging-29bf52ad6220

Mohr, L. A., Eroğlu, D., & Ellen, P. S. (1998). The development and testing of a measure of skepticism toward environmental claims in marketers' communications. *Journal of Consumer Affairs*, *32*(1), 30–55. doi:10.1111/j.1745-6606.1998.tb00399.x

Montoro-Rios, F. J., Luque-Martínez, T., & Rodríguez-Molina, M.-A. (2008). How green should you be: can environmental associations enhance brand performance? *Journal of Advertising Research*, *48*(4), 547. doi:10.2501/S0021849908080

Moser, K. (2015). *Wirtschaftspsychologie* (2nd ed.). Berlin: Springer. doi:10.1007/978-3-662-43576-2

Müller (2017). *Product details: Müller Website*. Retrieved from
https://www.muller.co.uk/nc/our-brands/muller-yogurt-desserts-brands/muller-yogurt-desserts-brands/products/product/show/382/

Nordin, N., & Selke, S., (2010). Social aspect of sustainable packaging. *Packaging Technology and Science*, *23*(6), 317–326. doi:10.1002/pts.899

Nyilasy, G., Gangadharbatla, H., & Paladino, A. (2013). Perceived greenwashing: The interactive effects of green advertising and corporate environmental performance on consumer reactions, *Journal of Business Ethics*, 125 (4), 1-15. doi:10.1007/s10551-013-1944-3

Obermiller, C. (1995). The baby is sick/the baby is well: a test of environmental communication appeals. *Journal of Advertising*, *24*(2), 55–70. doi:10.1080/00913367.1995.10673476

Obermiller, C., & Spangenberg, E.R. (1998). Development of a scale to measure consumer scepticism toward advertising. *Journal of Consumer Psychology, 7*(2), 159 – 186.

Obermiller, C., Spangenberg, E., & MacLachlan, D. L. (2005). Ad skepticism: The consequences of disbelief, *Journal of Advertising*, *34*(3), 7-17. doi:10.1080/00913367.2005.10639199

Ohanian, R. (1990). Construction and validation of a scale to measure celebrity endorsers' perceived expertise, trustworthiness, and attractiveness. *Journal of.Advertising, 19*(3), 39–52. doi:10.1080/00913367.1990.10673191

Olson, J. C., & Jacoby, J. (1972). Cue utilization in the quality perception process. In Venkatesan, M. (Ed.), *Proceedings of the Third Annual Conference of the Association for Consumer Research* (pp. 167-179). Chicago: Association for Consumer Research

Orth, U. R., & Malkewitz, K. (2008). Holistic package design and consumer brand impressions. *Journal of Marketing*, *72*(3), 64–81. doi:10.1509/jmkg.72.3.64

Ottman, J. A. (1993). *Green marketing: challenges and opportunities for the new marketing age* (1st edition). Lincolnwood, IL: Ntc Pub. Group.

Paço, A. M. F. do, & Reis, R. (2012). Factors affecting skepticism toward green advertising. *Journal of Advertising*, *41*(4), 147–155. doi:10.2753/JOA0091-3367410410

Paine, F. (2002). Packaging reminiscences: some thoughts on controversial matters. *Packaging Technology and Science*, *15*(4), 167–179. doi:10.1002/pts.593

Paivio, A. (1991). *Images in mind: The evolution of a theory.* Hertfordshire, HP2 7EZ, England: Harvester Wheatsheaf.

Pancer, E., McShane, L., & Noseworthy, T. J., (2017). Isolated environmental cues and product efficacy penalties: The color green and eco-labels. *Journal of Business Ethics*, *143*(1), 159–177. doi:10.1007/s10551-015-2764-4

Parguel, B., Benoît-Moreau, F., & Larceneux, F., (2011). How sustainability ratings might deter "greenwashing": a closer look at ethical corporate communication. *Journal of Business Ethics*, *102*(1), 15–28. doi:10.1007/s10551-011-0901-2

Parguel, B., Benoit-Moreau, F., & Russell, C.A., (2015). Can evoking nature in advertising mislead consumers? The power of 'executional greenwashing. *International Journal of Advertising*, *34*(1), 107–134. doi:10.1080/02650487.2014.996116

Peattie, K., & Crane, A. (2005). Green marketing: Legend, myth, farce or prophesy? *Qualitative Market Research: An International Journal*, 8(4), 357–370. doi:10.1108/13522750510619733

Petty, R. E., & Cacioppo, J. T. (1981). *Attitudes and persuasion: classic and contemporary approaches*. Dubuque, IA: W.C. Brown Co. Publishers.

Petty, R., & Cacioppo, J. (1986). The elaboration likelihood model of persuasion, *Advances in Experimental Social Psychology*, *19*, 123–205. doi:10.1558/ijsll.v14i2.309

Petty, R., Cacioppo, J., & Schumann, D. (1989). Central and peripheral routes to advertising effectiveness: The moderating role of involvement, *Journal of Consumer Research*, *16*, 335–343.

Petty, Richard E., Kasmer, J. A., Haugtvedt, C. P., & Cacioppo, J. T. (1987). Source and message factors in persuasion: A reply to stiff's critique of the elaboration likelihood model. *Communication Monographs*, *54*(3), 233–249. doi:10.1080/03637758709390229

Pham, M. T. (1996). Cue representation and selection effects of arousal in persuasion. *The Journal of Consumer Research*, *22*(4), 373–387.

Pickett-Baker, J., & Ozaki, R. (2008). Pro-environmental products: marketing influence on consumer purchase decision. *Journal of Consumer Marketing*, *25*(5), 281–293. doi:10.1108/07363760810890516

Polonsky, M. J. (1994). An introduction to green marketing. *Electronic Green Journal*, *1*(2), 1091. Retrieved from https://escholarship.org/uc/item/49n325b7

Procter & Gambler (2016). *tide launches new eco-friendly detergent, tide purclean: first usda certificated biobased detergent with the trusted cleaning power of tide*. Retrieved May 6, 2019, from https://news.pg.com/press-release/pg-corporate-announcements/tide-launches-new-eco-friendly-detergent-tide-purclean

Rahbar, E., & Wahid, N. A. (2011). Investigation of green marketing tools' effect on consumers' purchase behavior. *Business Strategy Series*, *12*(2), 73–83. doi:10.1108/17515631111114877

Rana, S. (2013). Consumer response to green advertising: investigating the moderating impact of product involvement. *International Journal of Management and Development Studies*, *2*(9), 1–23. Retrieved from http://www.ijmds.in/journalfile/1Komal%20Nagar-881119.pdf

Rettie, R., & Brewer, C. (2000). The verbal and visual components of package design. *Journal of Product & Brand Management*, *9*(1), 56–70. doi:10.1108/10610420010316339

Rex, E., & Baumann, H. (2007). Beyond ecolabels: What green marketing can learn from conventional marketing. *Journal of Cleaner Prod*uction, *15*(6), 567–576. doi:10.1016/j.jclepro.2006.05.013

Rios, F. J. M., Martínez, T., Moreno, F. F., & Soriano, P. C. (2006). Improving attitudes toward brands with environmental associations: An experimental approach. *Journal of Consumer Marketing* , *23*(1), 26–33. doi:10.1108/07363760610641136

Roberts, S., & Straughan, R. (1999). Environmental segmentation alternatives: a look at green consumer behavior in the new millennium. *Journal of Consumer Marketing*, *16*(6), 558–575. doi:10.1108/07363769910297506

Rodgers, S., Shelly L., & Thorson, E. (2019). *Advertising theory* (2nd ed.). Upper Saddle River: Routledge.

Rokka, J., & Uusitalo, L. (2008). Preference for green packaging in consumer product choices – Do consumers care? *International Journal of Consumer Studies, 32*(5), 516–525. doi:10.1111/j.1470-6431.2008.00710.x

Royne, M. B., Martinez, J., Oakley, J., & Fox, A. K. (2013). The effectiveness of benefit type and price endings in green advertising. *Journal of Advertising*, *41*(4), 85–102. doi:10.2753/JOA0091-3367410406

Rozin, P., & Kalat, J. W. (1971). Specific hungers and poison avoidance as adaptive specializations of learning. *Psychological Review*, *78*(6), 459–486. Retrieved April 4, 2019, from http://www.ncbi.nlm.nih.gov/pubmed/4941414.

Rummer, R., Schweppe, J., Fürstenberg, A., Scheiter, K. & Zindler, A. (2011). The perceptual basis of the modality effect in multimedia learning. *Journal of Experimental Psychology: Applied*, *17*(2), 159-173. doi:10.1037/a0023588

Ruumpol, J. G. (2014). *In the eye of the consumer: The influence of package shape and package color on perceived product healthfulness* (Master's thesis). Enschede, Netherlands: University of Twente.

Sánchez, J.M., & Lafuente, R. (2010). Defining and measuring environmental consciousness. *Revista Internacional de Sociología*, *68*(3), 731–755. doi:10.3989/ris.2008.11.03

Schahn, J., Damian, M., Schurig, U., & Füchsle, C. (2000). Konstruktion und Evaluation der dritten Version des Skalensystems zur Erfassung des Umweltbewußtseins (SEU-3) (Design and evaluation of the third version of the scale system for environmental consciousness (SEU-3)). *Diagnostica, 46*(2), 84–92. doi:10.1026//0012-1924.46.2.84

Schahn, J., & Holzer, E. (1990). Konstruktion, Validierung und Anwendung von Skalen zur Erfassung des individuellen Umweltbewusstseins (Design, validation and application of scales to measure individual environmental consciousness. *Zeitschrift Für Differentielle Und Diagnostische Psychologie, 11*(3), 185–204.

Schahn, J. (2003). *Umweltbewusstsein und Soziodemografie: Zur Bedeutung von Geschlechtsunterschieden (Environmental Consciousness and Sociodemography: The Importance of Gender Differences).* Heidelberg: Universität, Psychologisches Institut.

Schenk, M. (2002). *Medienwirkungsforschung (Research on media effects).* Tübingen: Mohr Siebeck. Retrieved from https://opacplus.bsb-muenchen.de/metaopac/search?isbn=3161467558&db=100

Schlegelmilch, B. B., Bohlen, G. M., & Diamantopoulos, A. (1996). The link between green purchasing decisions and measures of environmental consciousness. *European Journal of Marketing*, *30*(5), 35–55. doi:10.1108/03090569610118740

Schmidt-Weigand, F., Kohnert, A., & Glowalla, U. (2010a). A closer look at split visual attention in system- and self-paced instruction in multimedia learning, *Learning and Instruction*, *20*(2), 100-110. doi:10.1016/J.LEARNINSTRUC.2009.02.011

Schmidt-Weigand, F., Kohnert, A., & Glowalla, U. (2010b). Explaining the modality and contiguity effects: New insights from investigating students' viewing behavior. *Applied Cognitive Psychology*, *24*(2), 226-237. doi:10.1002/acp.1554

Schmuck, D., Matthes, J., & Naderer, B. (2018). Misleading consumers with green advertising? an affect–reason–involvement account of greenwashing effects in environmental advertising. *Journal of Advertising*, *47*(2), 127–145. doi:10.1080/00913367.2018.1452652

Schmuck, D., Matthes, J., Naderer, B., & Beaufort, M. (2018). The effects of environmental brand attributes and nature imagery in green advertising. *Environmental Communication*, *12*(3), 414–429. doi:10.1080/17524032.2017.1308401

Schuhwerk, M. E., & Lefkoff-Hagius, R. (1995). Green or non-green? Does type of appeal matter when advertising a green product? *Journal of Advertising*, *24*(2), 45–54. doi:10.1080/00913367.1995.10673475

Schwaab, J.A. & Sorg, F. (2004). Wahrnehmungseffekte in der Umweltpolitik (Perception effects in environmental policy). In Ipsen, D. and Schmidt, J.C. (Eds.), *Dynamiken der Nachhaltigkei* (pp. 277), Marburg: Metropolis-Verlag.

Schwonke, R., Berthold, K., & Renkl, A. (2009). How multiple external representations are used and how they can be made more useful. *Applied Cognitive Psychology*, *23*(9), 1227-1243. doi:10.1002/acp.1526

Searles, K. (2010). Feeling good and doing good for the environment: The use of emotional appeals in pro-environmental. *Applied Environmental Education and Communications*, *9*(3), 173-184.

Seele, P., & Gatti, L. (2017). Greenwashing revisited: in search of a typology and accusation-based definition incorporating legitimacy strategies. *Business Strategy and the Environment*, *26*(2), 239–252. doi:10.1002/bse.1912

Segev, S., Fernandes, J., & Hong, C. (2016). Is your product really green? A content analysis to reassess green advertising. *Journal of Advertising*, *45*(1), 85-93. doi:10.1080/00913367.2015.1083918

Sheehan, K., & Atkinson, L. (2012). Special issue on green advertising: revisiting green advertising and the reluctant consumer. *Journal of Advertising*, *41*(4), 5–7. doi:10.2753/JOA0091-3367410400

Shrum, L.J., Mccarty, J. & Lowrey, T.M. (1995). Buyer characteristics of the green consumer and their implications for advertising strategy. *Journal of Advertising*, *24*(2), 71–82. doi:10.1080/00913367.1995.10673477

Silayoi, P., & Speece, M. (2004). Packaging and purchase decisions. *British Food Journal*, *106*(8), 607–628. doi:10.1108/00070700410553602

Silayoi, P., & Speece, M. (2007). The importance of packaging attributes: A conjoint analysis approach. *European Journal of Marketing*, *41*. doi:10.1108/03090560710821279

Smith, P. R., Paul R., & Taylor, J. (2004). *Marketing communications: an integrated approach*. Kogan Page. Retrieved from https://books.google.de/books/about/Marketing_Communications.html?hl=de&id=rmKoO0U30x8C&redir_esc=y

Spack, J. A., Board, V. E., Crighton, L. M., Kostka, P. M., & Ivory, J. D. (2012). It's easy being green: The effects of argument and imagery on consumer responses to green product packaging. *Environmental Communication*, *6*(4), 441–458. doi:10.1080/17524032.2012.706231

Spomer, O. (2013). *Mental Convenience bei Produktlinien: Kognitiv entlastende Gestaltung der Informationsdarbietung auf Produktverpackungen (Mental convenience in product portfolios: reducing the cognitive impact of information display on product packaging)*. Gießen: Springer-Verlag.

Steenis, N. D., Van Herpen, E., Van Der Lans, I. A., Ligthart, T. N., & Van Trijp, H. C. M. (2017). Consumer response to packaging design: The role of packaging materials and graphics in sustainability perceptions and product evaluations. *Journal of Cleaner Production*, *162*, 286–298. doi:10.1016/j.jclepro.2017.06.036

Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology*, *29*(3), 309–317. doi:10.1016/j.jenvp.2008.10.004

Sustainable Packaging Coalition (2011). *Definition of sustainable packaging*. Renewable Energy.

Swaen, V., & Vanhamme, J. (2005). The use of corporate social responsibility arguments in communication campaigns: does source credibility matter? *Advances in Consumer Research*, *32*(1), 590–591. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=buh&AN=18937245&site=eh ost-live

Tanner, C. (2008). Context effects in environmental judgments: Assimilation and contrast effects in separate and joint evaluation modes. *Journal of Applied Social Psychology*, *38*(11), 2759–2786. doi:10.1111/j.1559-1816.2008.00413.x

R Core Team (2017). *R: A language and environment for statistical computing*. Vienna, Austria: R Foundation for Statistical Computing. Retrieved from https://www.R-project.org/.

TerraChoice. (2009). Environmental claims in consumer markets summary report: north america. *Environmental Claims in Consumer Markets*, *26*. Retrieved from http://sinsofgreenwashing.com/index3c24.pdf

Teufel, J., Rubik, F., Scholl, G., Stratmann, B., Graulich, K., & Manhart, A. (2009). *Untersuchung zur möglichen Ausgestaltung und Marktimplementierung eines Nachhaltigkeitslabels zur Verbraucherinformation (Investigation on the possible design and market implementation of a sustainability label for consumer information). Project report of the Öko-Institut.* Freiburg: Öko-Institute.

Till, B. D., & Busler, M. (2000). The match-up hypothesis: Physical attractiveness, expertise, and the role of fit on brand attitude, purchase intent and brand beliefs, *Journal of Advertising*, *29*(3), 1-13. doi:10.1080/00913367.2000.10673613

Tingley, D., Yamamoto, T., Hirose, K., Keele, L., & Imai, K. (2014). Mediation: r package for causal mediation analysis. *Journal of Statistical Software*, *59*(5), 1–38. doi:10.18637/jss.v059.i05

Triebel, D. (1997). *Ökologisches Industriedesign: Rahmenfaktoren - Möglichkeiten – Grenzen (Ecological industrial design: framework factors - possibilities – limits).* Wiesbaden: Deutscher Universitäts-Verlag.

Trommsdorff, V. (1998). *Konsumentenverhalten (Consumer behavior).* Stuttgart [u.a.]: Kohlhammer.

Underwood, R. L. (2003). The communication power of product packaging: creating brand identity via lived and mediated experience. *Journal of Marketing Theory A*, *4*, 62–76.

United Nations Environment Programme (2002). *Eco-labelling*. Retrieved April 4, 2019, from https://www.unenvironment.org/pt-br/node/1576

van Dam, Y. K. (1996). Environmental assessment of packaging: The consumer point of view. *Environmental Management*, *20*(5), 607–614. doi:10.1007/BF01204134

van Leeuwen, T. (2011). The semiotics of decoration. In O'Halloran, K.L., Smith, B.A.

(Eds.), *Multimodal studies: Exploring Issues and Domains* (pp. 115-131). London:

Routledge.

Van Liere, K. D., & Dunlap, R. E. (1981). Environmental Concern: Does it make a difference

how it's measured? *Environment and Behavior*, *13*, 651–676.

Vermeir, I., Verbeke, W. (2006). Sustainable food consumption: Exploring the consumer

"attitude - behavioral intention" gap. *Journal of Agricultural and Environmental

Ethics*, *19*(2), 169–194. doi:10.1007/s10806-005-5485-3

Vila, N., & Ampuero, O. (2007). The role of packaging in positioning an orange juice.

Journal of Food Products Marketing, *13*(3), 21–48. doi:10.1300/J038v13n03_02

Wimmer, F. (2001). Forschungsüberlegungen und empirische Ergebnisse zum nachhaltigen

Konsum (Research considerations and empirical results on sustainable consumption).

In U. Hansen & U. Schrader (Eds.), *Nachhaltiger Konsum: Forschung und Praxis im

Dialog* (pp. 77–102). Campus-Verlag. Retrieved from https://www.beck-

shop.de/schrader-hansen-nachhaltiger-konsum/product/280864

Winston, A. S., & Cupchik, G. C. (1992). The evaluation of high art and popular art by naive

and experienced viewers. *Visual Arts Research*, *18*(1), 1–14.

Winter, K. (2009). *Wirkung von Limited Editions für Marken theoretische Überlegungen und

empirische Überprüfung (Impact of limited editions on brands theoretical

considerations and empirical testing)* (1. Aufl.). Wiesbaden: Gabler Verlag/GWV

Fachverlage GmbH, Wiesbaden. Retrieved from: https://opacplus.bsb-

muenchen.de/metaopac/search?isbn=9783834916808&db=100

Wohlwill, J. F. (1981). A conceptual analysis of exploratory behavior. In *Advances in

Intrinsic Motivation and Aesthetics* (pp. 341–364). Boston, MA: Springer US.

doi:10.1007/978-1-4613-3195-7_14

Wonneberger, A., & Matthes, J. (2016). Grüne Werbung: Inhalte und Wirkungen ökologischer Werbebotschaften (Green advertising: contents and effects of ecological advertising messages). In G. Siegert, W. Wirth, P. Weber, & J. A. Lischka (Eds.), *Handbuch Werbeforschung* (pp. 741–760). Wiesbaden: Springer.

Xie, Y. (2015). *Dynamic documents with R and knitr*. Chapman and Hall/CRC.

Yu, J., Coulson, K. R., Zhou, J. X., & Wen, J. (2013). Substantive and associative claims in environmental communication: a study of fortune 500 websites. *Journal of Promotion Management*, *19*(2), 211–223. doi:10.1080/10496491.2013.769476

Zaichkowsky, J. L. (1985). Measuring the involvement construct. *Journal of Consumer Research*, *12*(3), 341. doi:10.1086/208520

Zeh, N. (2010). *Erfolgsfaktor Produktdesign (Determinant of success: product design)*. Köln: Fördergesellschaft Produkt-Marketing e. V.

Zhu, H. (2019). Construct complex table with "kable" and pipe syntax. Retrieved from https://cran.r-project.org/web/packages/kableExtra/index.html

Appendix: Table of Contents

Appendix A

Ethics Statement

      All study participants were asked to give informed consent once they were informed of their role, confidentiality, anonymity, and the right to withdraw at any time without detriment. The anonymity of participants was ensured; thus, respondents IP's were controlled to avoid possible multiple participations. Data and other participant information were saved electronically in a password-protected file on a private hard drive; it was only accessible to myself and the project supervisor. All collaborators were trained in matters of confidentiality and had only access to the primary data when necessary for discussion and analysis. All studies followed the "ethical principles of psychologists and code of conduct" of the American Psychological Association and were aligned with standard practice as outlined in the Declaration of Helsinki and the guideline of the Ludwig Maximilian University.

Appendix B

Investigation of the mediating influence of the attributed product environmental friendliness in consumers' evaluation of associated product qualities.

To explore the mediating influence of the attributed product environmental friendliness in consumers' evaluation of associated product qualities based on environmental packaging information (graphical and material), eight mediation analysis, following Hayes (2013) (PROCESS Model 4, version 2.15) were conducted (see Table 7).

The results indicate that only graphical environmental packaging information has a direct influence on consumers' perception of product healthiness. Moreover, the results of the mediation analysis revealed significant mediation effects, via attributed pro-environmental friendliness perceptions, for both graphical and material communication predictors on all tested product qualities. These include indirect effects for healthiness, $B_{vis.} = .36$, $SE = .07$, [.23, .51]; $B_{mat.} = .47$, $SE = .08$, [.33, .63]; trustworthiness, $B_{vis.} = .43$, $SE = .08$, [.28, .58]; $B_{mat.} = .48$, $SE = .09$, [.32, .67]; attractiveness, $B_{vis.} = .15$, $SE = .07$, [.03, .32]; $B_{mat.} = .15$, $SE = .07$, [.04, .31]; and consumers' willingness to pay, $B_{vis.} = 10.59$, $SE = 3.89$, [4.10, 19.42]; $B_{mat.} = 12.13$, $SE = 4.29$, [5.41, 22.37].

Table 7. Direct and mediation effects of visual and material packaging semantics on perceived pro-environmental product quality.

Outcome variable	Graphical packaging design			
	$X \rightarrow M$	$M \rightarrow Y$	$X \rightarrow Y_1$	$X \rightarrow Y_2$
Healthiness	.70***	.52***	.47 ***	.83***
Trustworthiness	.76***	.56***	.12 ns	.55***
Attractiveness	.77***	.19*	.10ns	.24ns
Price	.71***	15.00***	5.55ns	16.14*
	Material packaging design			
Healthiness	.78***	.60***	-.09 ns	.38**
Trustworthiness	.78***	.61***	-.19 ns	.29*
Attractiveness	.80***	.19*	.11ns	.26ns
Price	.76***	15.90***	-.26ns	11.87ns

Note. X = predictor variables; dummy coded and assigned representing the graphical packaging design element (0 = conventional and 1 = environmental) and the material packaging design element (0 = conventional and 1 = environmental). M = mediator: attributed environmental friendliness. Y_1 = outcome effect of comparison on associated product qualities without attributed environmental friendliness in the model (direct effect), Y_2 = outcome effect of comparison on associated product qualities with attributed environmental friendliness in the model (total effect). *$p < .05$. **$p < .01$. ***$p < .001$. ns = not significant ($p > .05$).