Extrinsic Information Cues for Mitigating Information Asymmetry in e-Commerce: A German-Chinese Perspective

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“千里之行，始於足下.”

(A journey of a thousand miles begins with a single step.)

Laozi
(Ancient Chinese philosopher and writer)

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Abstract

The emergence of e-commerce opened up various benefits for retailers and consumers alike, including the possibility to purchase products from across the world. However, the information asymmetry inherent to online shopping impedes consumers to entirely inspect these products before they are delivered. To mitigate this information asymmetry and thereby reducing the number of product returns, several information cues can serve as signals indicating higher/lower quality. Such information cues encompass (inter alia) online customer reviews, quality seals, and/or information about products' country of origin, whereby their interaction is assumed to affect their individual importance. Since the way consumers cognitively process such information and their interplay varies based on consumers' cultural background, this dissertation aims at answering the following research question: How are different extrinsic information cues affecting the online purchase of Chinese and German consumers in an e-commerce context? Additionally, this dissertation seeks to provide a methodological contribution by examining a methodology capable of analyzing the impact of multiple information cues on online purchase decisions simultaneously. Hence, the Adaptive Choice-Based Conjoint (ACBC) analysis will be contrasted with its methodological antecedent Choice-Based Conjoint (CBC) analysis to enlighten where the advantages and disadvantages for applying one or the other are situated.

After introducing this dissertation's topic in more detail and providing the theoretical backgrounds for (i) the information cues of interest in an e-commerce context as well as (ii) how different cultural backgrounds affect information processing, a total of six papers intend to answer the research questions. More precisely, paper #1 explores the country of origin effect in an e-commerce context for German low- and high-involvement products from a Chinese consumer's perspective by taking into account recent findings in country of origin research. In paper #2, the impact of one country of origin dimension (country-of-manufacture) is compared to the influence of online customer reviews based on surveying German and Chinese consumers. Moreover, ACBC's advantages and disadvantages are juxtaposed to the ones related with CBC investigations. Making use of the ACBC and two of its major benefits ('summed price' approach and Calibration section), paper #3 is the first to measure the willingness to pay for sustainable clothing by applying this more realistic methodology. Apart from that, the importance of quality seals and country-of-manufacture are analyzed depending on consumers' green orientation. Paper #4 then explores the same information cues for consumers from Generation Z and X. Focusing on online customer reviews, papers #5 and #6 investigate online customer reviews' credibility among German and Chinese consumers. While paper #5 examines the effect of video versus purely textual online customer reviews, paper #6 highlights cultural differences and scrutinizes how online customer review components are cognitively processed between German and Chinese consumers.

In the last chapter, the dissertation concludes with new insights gained and outlines the derived practical implications.

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1 Introduction

While the advent of e-commerce brought along various benefits for consumers and retailers alike (inter alia access to products/customers from across the world), it also entails an information asymmetry between seller and buyer. Since consumers cannot entirely inspect products[1] ordered online before they are delivered (Mavlanova et al., 2012), online shop operators nowadays have to deal with large amounts of product returns (Stöcker et al., 2021), which in turn harm the environment (Dutta et al., 2020). However, several (extrinsic) information cues facilitate gaining intelligence before purchasing products online and thus, may mitigate the information asymmetry inherent to e-commerce. Such information cues encompass multiple indicators ranging from extensively studied ones, such as the country of origin (see e.g., Fong & Burton, 2008; Vendrell-Herrero et al., 2018) – at least in an offline context – as well as more recent cues implying lower/higher product quality, such as online customer reviews (see e.g., Manes & Tchetchik, 2018) and quality seals (see e.g., Plank & Teichmann, 2018).

While these extrinsic information cues are generally already discussed in literature, the vast majority investigated these indicators separately and omitted an intercultural perspective. In contrast to the limited scientific interest in examining such information cues holistically and between different cultures, research revealed information to be cognitively processed differently among Western and East Asian consumers (Nisbett et al., 2001). Accordingly, Westerners tend to apply rather analytical heuristics, whereas East Asians holistically process information and emphasize contextual cues. Hence, the beforementioned indicators might attenuate e-commerce's information asymmetry to varying extents and thus, affect the online purchase decision in disparate ways dependent on consumers' cultural background. As a result, recent research postulates the need to analyze online customer reviews (Lee & Hong, 2019; Thomas et al., 2019) and quality seals (Plank & Teichmann, 2018; Reimers & Hoffmann, 2019) across consumers from different countries. In opposition to online customer reviews and quality seals, the country of origin information cue is almost naturally studied in the light of intercultural contexts.
Originating from the pre-internet era (Schooler, 1965), the focal question concerning country of origin is not about intercultural differences, but rather to what extent this indicator influences purchase decisions in an e-commerce driven world and in relation to more contemporary extrinsic information cues (such as online customer reviews and quality seals). When evaluating products (for instance while shopping online), merging all information about a product can decrease the impact of extrinsic information cues, such as price (Rao & Monroe, 1988; Zeithaml, 1988) or country of origin (Verlegh & Steenkamp, 1999). Even though research realized early on that the country of origin effect might be inflated and thus, less realistic when analyzed in single-cue studies[2] (Bilkey & Nes, 1982), the number of multi-cue

[1] The focus in this dissertation lies not on purchasable services but products, especially clothing and consumer electronics, as these two "have become the most important industries in the B2C e-commerce" (Mangiaracina et al., 2015, p. 583).
[2] The only information cue provided is a product's COO in such studies.

studies decreased significantly in recent years, whereas single-cue studies are found more often in current literature (Lu et al., 2016). Consequently, studies examining the importance of the country of origin besides other extrinsic information cues revealed that such other cues, like store image for instance, exhibit a stronger effect on the purchase decision (Garrett et al., 2017). Therefore, the country of origin should be investigated in multi-cue studies besides others information cues to uncover its ability to dissolve the information asymmetry inherent to e-commerce. As holistically scrutinizing various online purchase factors provides a more accurate picture, recent research (focusing on online customer reviews and brand popularity) concludes that "it is important and necessary to continue investigating consumers' information selection and utilization process when they are faced with different signal combinations" (Luan et al., 2019, p. 200). Additionally, investigations indicating that the interplay between different extrinsic information cues seems to matter dependent on consumers' cultural background request "future research […] to examine the mechanisms behind consumer choice using combinations of extrinsic cues" (Vendrell-Herrero et al., 2018, p. 183). Furthermore, providing enough information cues not only lowers information asymmetry as one of the main barriers before an initial online purchase, but has also been found to represent the essential element for repurchase intentions (Wu et al., 2014). Since country of origin, online customer reviews, and quality seals oftentimes operate simultaneously and thus, their interaction might reduce their impact among one another, research has postulated the need to investigate how various signals might exhibit an interaction effect in mitigating information asymmetries (Wang et al., 2021). Moreover, no other study has yet examined the three extrinsic information cues juxtaposed and from an intercultural perspective.

Summarizing these reflections on current challenges and literature gaps in e-commerce[3] research, the before-mentioned extrinsic information cues should be investigated holistically and between consumers from different cultures. Within this dissertation, the intercultural comparison will be illustrated with reference to China and Germany, since these two nations represent two of the three leading traders of goods and services worldwide (WTO, 2020). Moreover, China constitutes the largest e-commerce market (by sales) and Germany is the second largest one in Europe (eMarketer, 2021). Hence, focusing on consumers from East Asia (China) and Westerners (Germany), the following question arises:

RQ1: How are different extrinsic information cues affecting the online purchase of Chinese and German consumers in an e-commerce context?

Counteracting the predominantly isolated perspective on extrinsic information cues and providing a more realistic view by including multiple indicators affecting the e-commerce purchase decision, this dissertation further aims at putting emphasis on the methodological advancement entitled Adaptive Choice-Based Conjoint (ACBC) analysis. In contrast to the well-established Choice-Based Conjoint (CBC) analysis, the ACBC is especially suitable when illustrating a purchase decision with more than

[3] The focus within this dissertation is on the B2C e-commerce.

just a handful of indicators (Eggers & Sattler, 2011). Therefore, it is intended to provide a methodological contribution besides the research question dealing with the theoretical one. The main question here should be:

RQ2: What are the advantages and disadvantages of ACBC compared to its methodological antecedent CBC?

To answer these questions, the remainder is structured as follows. First, the theoretical background with its two foci (information cues in e-commerce; cultural differences in perceiving information) is elucidated, before a synopsis lays the ground for the research papers of this dissertation. Afterward, the six articles are introduced one by one. In the final chapter, conclusions of this research are provided.

2 Cultural differences in the perception of information cues

2.1 Information cues in the e-commerce context

To illustrate the conception of country of origin, quality seals, and online customer reviews in accordance with this dissertation, this chapter starts with providing a consistent understanding of these extrinsic information cues, elucidates their origins and evinces their current development concerning this dissertations' focus in literature. Subsequently, related subordinated research questions are elaborated and the information cues' interplay – as far as existing – is outlined.

Country-of-origin as extrinsic information cue for online purchases

The country of origin presents the most mature information cue, which has initially been introduced by Dichter (1962), followed by the empirical evidence from Schooler (1965). Research about this extrinsic information cue originally presented by 'made in' claims evolved thereafter and resulted in an understanding of country of origin as a multi-facetted construct. It consists of an affective (symbolic/emotional meanings), normative (societal norms) and cognitive dimension (country of origin as extrinsic information cue for evaluating products' quality), whereas interplays across these dimensions are possible (Verlegh & Steenkamp, 1999). Within this dissertation, the focus lies on the latter one to answer RQ1. Apart from these dimensions, more recent literature indicates that one needs to distinguish between a basic-origin image, the product-country image (Zeugner-Roth & Diamantopoulos, 2010) and the category-origin image (COI; Josiassen et al., 2013), since people from a country (e.g., China including its handling of human rights) might be evaluated differently than this country's products and/or those products from a specific category (consumer electronics with good price-performance ratio). Since the COI offers the closest relation to concrete product categories and thus, the most accurate measure considering the purchase of specific articles in an online shop, this dissertation hereinafter focuses on this country of origin perspective.

When the country of origin was first discussed in literature, it was exclusively expressed by 'made in' labels (Schooler, 1971; Schooler & Sunoo, 1969), which nowadays is known as one dimension of the country of origin construct named country-of-manufacture (Aruan et al., 2018). Due to globalized value chains, today's products (for instance the iPhone) might be manufactured in Country A (China), whereas they are sold under a brand with a headquarter located in Country B (America). Hence defining country of origin simply by products' country-of-manufacture is (in most cases) neither sufficient nor accurate anymore, which also resulted in various studies questioning the importance of country of origin (Liefeld, 2004; Pharr, 2005; Samiee, 2010, 2011; Usunier, 2006). Instead, more recent literature claims that the country of origin embodies the perception of where a brand is rooted regardless of the country in which products are actually manufactured (Andéhn & L'Espoir Decosta, 2016; Balabanis & Diamantopoulos, 2011; Herz & Diamantopoulos, 2013; Magnusson et al., 2011a). Similar to the brand image definition by Keller (1993), brands are considered as a summary of perceived associations and information held in consumers' minds, whereby country of origin is one of these information entailed within brands (Diamantopoulos et al., 2011; Ong et al., 2010). Consequently, Andéhn and L'Espoir Decosta (2016) summarize the country of origin effect as the impact on consumers' product evaluations and purchase intentions, which is deduced from a brand's country association. Hence, the first paper aims at capturing the cognitive dimension of country of origin as realistic as possible in an e-commerce context and thus, conceives country of origin as inherent to brands.

However in some cases, the 'made in' labels still affect the product evaluation (Zolfagharian et al., 2017), especially when the use or consumption of products is related with some sort of (health) risks or scandals (Andéhn & L'Espoir Decosta, 2016). For example, country-of-manufacture still matters in the preference of dairy products among Chinese consumers (Yang et al., 2018) due to the Infant Milk Formula scandal. Also among the selection of organic cotton clothing country-of-manufacture constitutes an essential purchase driver (Oh & Abraham, 2016). Therefore, papers #2, #3 and #4 deal with country of origin represented by the country-of-manufacture information cue.

While the extrinsic information cue of country of origin exists almost six decades, its actual impact on purchase decisions still does not seem to be thoroughly understood. As indicated in the introduction, the impact of the country of origin on the purchase decision diminishes dependent on how this information cue is measured. Contingent on a study's framing (country of origin measured based on separate product evaluation vs. jointly) a significantly different effect occurs (Semaan et al., 2019). Research also found a decreased importance of the country of origin on the purchase decision when holistically analyzing its effect juxtaposed with other extrinsic information cues (often referred to as multi-cue studies), such as the store image (Garrett et al., 2017) or low brand familiarity when exposed to high-involvement products (Koschate-Fischer et al., 2012). Several researchers criticized that an absence of additional information cues (e.g., price) and neglect of more natural settings have led to an overestimation of the country of origin effect (Pharr, 2005; Usunier, 2006). Pharr (2005) assumed that "either past research has inflated

the influence that country of origin has on consumers' product judgments and behavior (by using experimentally manipulated COO cues in laboratory settings) or that the construct is subject to decreased salience in today's era of global brands" (p. 41). Recent research has not yet reached a consensus on the influence of country of origin in a globalized world with the ubiquitous possibilities to purchase products anytime from anywhere by shopping online. On the one hand, some studies assert the country of origin cue to serve as a short-cut heuristic for choosing the subjectively best product when exposed to the overstraining variety of products from across the world (Kock et al., 2019) or found that online sellers' origin matters (Zhao et al., 2019). On the other hand, some studies "indicate that the mechanics of country image in IOO [international online outshopping] may be unique in that today's online marketplace, whether domestic or international, is more or less homogenous in website design, language, currency of payment, product categories etc., thereby dulling indicators of a different country-of-origin" (Ramkumar & Jin, 2019, p. 195). Similarly, Moriuchi (2021) recently exhibited that the importance of online sellers' country of origin fades when other sellers provide lower product prices. However, questions about the importance of products' country of origin (more precisely their country-of-manufacture or country-of-brand) when shopping online remain unanswered.

In particular literature's more recent non-salient conceivability of country of origin as one part of brands impelled research to question the importance of the country of origin cue. The – in most cases – rather outdated 'made in' claims do not play an essential role in many purchase decisions, whereas brand origin does (Samiee, 2010). Various studies indicate that the influence of country-of-manufacture diminishes when investigated together with brands (Pharr, 2005; Smaoui et al., 2016; Usunier, 2011). Moreover, according to Pharr (2005) "findings suggest that a product's country-of-origin evaluations may be subsumed or neutralized by its brand identity" (p. 41). As a result of these reflections, the subordinated research question arises:

RQ1.1: *To what extent does the country of origin effect actually exist in a more contemporary context of online shopping and as part of a multi-cue setting?*

Answering this question in paper #1 not only provides a high relevance for practitioners, but also contributes to research postulations asking for studies elucidating the consequences of disaggregated global value chains (Buckley et al., 2017) by capturing country of origin as part of brands.

Concerning the interplay of country of origin with other extrinsic information cues (such as quality seals or online customer reviews), van Esch et al. (2018) investigated the effect of "COO information seeking" in e-commerce in relation to online customer reviews. By measuring country of origin as a salient construct, which thus does not accurately display actual consumer perception where country of origin information is part of brands, the authors show that the country of origin information seeking moderates

the relation between homophily (based on online customer reviews read) and product satisfaction. Focusing on food products, Likoudis et al. (2016) found country of origin to be the fourth most important driver (mean=3.9) in the purchase decision after taste, health considerations, and price, whereas quality certification was rated 3.6 on average (representing the eighth most important one) based on a 5-point Likert scale self-report. By compositionally asking about importances of purchase drivers instead of holistically comparing product choices and deriving importances post-hoc, an inflation of demands might occur, which might bias the results. Contradicting these findings, Vendrell-Herrero et al. (2018) demonstrated that country of origin (adapted to Britishness in their study) seem to be more important than other extrinsic cues (such as brand image and cultural distance) when purchasing digital services online. Again, country of origin was measured saliently instead of considering its implicit facet, which is part of the brand.

Quality seals as extrinsic information cues for online purchases

After clarifying the understanding of the country of origin information cue and its (in some contexts still relevant) country-of-manufacture dimension, the extrinsic information cue of quality seals is subsequently presented. While various quality seals exist indicating different facets of quality, the focus within this dissertation is on sustainability quality seals, since global warming represents one of the most important concerns of our time and an understanding of potential drivers for the consumption of sustainable products is needed (Chen et al., 2019). Quality seals (also referred to as 'labels' or 'certificates') can represent such a driving force by constituting an essential vehicle for indicating product quality and sustainable manufacturing processes (de Andrade Silva et al., 2017). By providing information about a companies' environmental and social behavior, some quality seals are able to mitigate the information asymmetry between producers and consumers (Plank & Teichmann, 2018).

Similar to the country of origin cue, quality seals indicating sustainability (in its early stages with a focus on the environmental aspect) attracted researchers' attention for quite some time with a rapid evolvement in the late 1990s (Galarraga Gallastegui, 2002). Early on, such labels were mostly considered as an instrument for dissolving the information asymmetries between companies and consumers (de Boer, 2003; Prakash, 2002; Truffer et al., 2001), whereas other studies questioned their ability to do so (van Amstel et al., 2008). Since higher product quality usually comes along with increased costs, several researchers investigated the willingness to pay (WTP) for products yielding quality seals as well as the oftentimes related importance of quality seals on the purchase decision (inter alia Fotopoulos & Krystallis, 2003; Sammer & Wüstenhagen, 2006). Additionally, multi-attribute decision making contexts exhibited an adequate framework for considering the trade-offs related to sustainability aspects and in comparison to other extrinsic cues such as price (Simpson & Radford, 2014).

Since these early stages of quality seal research, the context in which many products are purchased has steadily shifted to an online environment (Ramkumar & Jin, 2019) and products became more complex (Netzer & Srinivasan, 2011). Taking into account all nowadays relevant impact factors covering both

intrinsic (e.g., various functionalities) and extrinsic information cues (e.g., quality seals; delivery costs) to imitate purchase decisions as realistic as possible, would actually necessitate a methodology capable of including more than just a handful of variables. Instead, several studies still analyze quality seals and their importance by conducting CBC experiments (Klein et al., 2020; Scherer et al., 2018), even though research recommends applying adaptive approaches if more than about six factors shall be incorporated (Eggers & Sattler, 2011). As a result, current investigations examining the rationale behind quality seals concede in their limitations that "the CBCs were not able to cover all aspects that are relevant in a buying situation. This seems natural, as a real buying situation is much more complex than scenarios like the ones we used can possibly depict" (Stöckigt et al., 2018, p. 198). Therefore, paper #2 of this dissertation aims at answering RQ2 (see introduction) by comparing the standard CBC with its methodological advancement entitled ACBC. Additionally, the importance of the information cues online customer reviews and country-of-manufacture are contrasted among Chinese and Germans within this paper. Also containing a methodological discussion about the ACBC, paper #3 compares results derived from choice tasks with those from explicitly inquired WTP questions to overcome the related bias in estimating preferences (O'Donnell & Evers, 2019).

Apart from that, the importance of quality seals in relation to other extrinsic information cues and price as an essential trade-off variable has not yet been examined holistically and in the more contemporary context of online shopping by making use of the ACBC, which allows considering multiple impact factors. Since country-of-manufacture still represents a substantial aspect for the product category of apparel (Oh & Abraham, 2016) and further, the clothing industry represents the most relevant one besides consumer electronics in e-commerce (Mangiaracina et al., 2015), the following question arises:

RQ1.2: *To what extent are quality seals and the country-of-manufacture influencing the purchase decision in an e-commerce context and in relation to other main drivers?*

As products manufactured in China are oftentimes perceived as yielding lower quality – also due to high rates of counterfeits – (Clemons et al., 2016), investigating the trade-off between country-of-manufacture and quality seals is of particular interest. However, except the study by Stöckigt et al. (2018), who explored the main drivers for shopping clothing online by focusing on the operationalized goals behind quality seals (such as ensuring good working conditions and low environmental impact of production), neglecting country of origin as a potential impact factor and applying a CBC experiment, extant literature paid limited attention to this question. In contrast to this study, the dissertation at hand takes advantage of ACBC's benefits, integrates the country-of-manufacture information cue, and applies quality seals instead. Since ACBC seems to illustrate the decision-making process more realistically (Cunningham et al., 2010) and yields more precise results than its methodological antecedent (Bauer et al., 2015; Johnson & Orme, 2007), paper #3 challenges previous assumptions deduced from adjacent applications about the importance of quality seals and country-of-manufacture in e-commerce.

Apart from the nowadays altered context and product complexity, consumers' demand for sustainable products has increased (Lim, 2017; White et al., 2019). While the awareness for e.g. environmental concerns has been persisting since the late 1960s (Galarraga Gallastegui, 2002), disparate generational cohorts exhibit different levels of sustainable consumption (Severo et al., 2018). Since the upcoming generations will have to deal with the consequences of how current society decides about issues such as climate change (Arenas & Rodrigo, 2016), questions about intergenerational differences in the before-mentioned context of online shopping and with regard to different quality seals arise. To enable a direct comparison of the information cues country-of-manufacture and quality seals as investigated in RQ1.2, paper #4 investigates their impact on the purchase decision in the light of an inter- and intra-generational comparison:

RQ1.3: *To what extent are quality seals and the country-of-manufacture influencing the purchase decision in an e-commerce context among consumers of Generation X and Generation Z?*

As part of this investigation, research's postulation to analyze Generation Z and older ones (Dabija & Băbuț, 2019) is addressed, as well as the proposition to examine quality seals separated into ecological and social ones (Reimers & Hoffmann, 2019).

While some studies focus on the interplay between quality seals and country of origin information cues, they either neglect the more contemporary context of e-commerce (e.g., Balcombe et al., 2017; Rashid & Byun, 2018), the intercultural perspective on these cues (e.g., Delmas & Lessem, 2017; Meyerding et al., 2019; Tait et al., 2019) or are conducted with ACBC's predecessor CBC (e.g., Hasanzade et al., 2018; Salnikova & Grunert, 2020), which limits these investigations' ability to holistically consider all essential purchase drivers. For instance, Rashid and Byun (2018) focus on the trade-off between country of origin and quality seals, and found that products from developing countries with quality seals are perceived as preferable compared with products made in the US. However, this study does not contain a connection to e-commerce and measures variables based on separate constructs, whereas conjoint analysis allows taking into account several important purchase drivers simultaneously and thus, depicts consumer behavior more realistically. Regardless of their impact on actual purchases, Murtiasih et al. (2014) explored the indirect effects of country of origin and Word of Mouth (WOM) on brand equity using structural equation modeling. They evinced that WOM's impact is much stronger on brand equity than the one of country of origin. Contradicting these findings for the consumption frequency of food products with quality seals compared to those yielding country of origin information, de Andrade Silva et al. (2017) found similar frequencies for country of origin (31.70%) and organic quality seals (29.40%), whereas products with specific sustainability quality seals were less often consumed (5.60%). In contrast

to these studies, this dissertation aims at exploring country of origin's and quality seals' impact juxtaposed other important purchase drivers with the purchase intentions as the dependent variable, which is more closely related to sales and thus, could be considered to be of higher relevance for companies.

Online customer reviews as extrinsic information cues for online purchases

After introducing two extrinsic information cues, which emerged before the advent of the internet, the upcoming section focuses on online customer reviews, which evolved through internet trading itself. Since consumers purchasing products online lack information about for instance the haptic of products (Lee & Turban, 2001), online customer reviews provide an opportunity to bridge this information asymmetry. Amazon, which nowadays represents the most popular online retail website worldwide (SEMrush, 2020), recognized this opportunity early on and offered writing product comments already in 1995 (Park et al., 2007).

Online customer reviews, as part of electronic Word of Mouth (eWOM), are considered as an important information cue to increase sales (Kim, 2020) and exhibit to reduce the information asymmetry inherent to e-commerce, especially in cases with greater uncertainty (Manes & Tchetchik, 2018). Typically, online customer reviews are illustrated by three characteristics, namely review valence, volume and variance (Kostyra et al., 2016). To counteract the information asymmetry in e-commerce, recent research contrasted review valence in relation to other extrinsic information cues, such as brand popularity (Luan et al., 2019) or branding (Manes & Tchetchik, 2018). Exploring online customer reviews in the hotel industry, Manes and Tchetchik (2018) found that the higher the information asymmetry, the more important online customer reviews become to reduce the related uncertainty. Moreover, Langan et al. (2017) investigated how review valence, review variance and their interplay with additional intrinsic (in their case: product type) and extrinsic cues (brand and source credibility) affect purchase intention in an e-commerce context. Comparing the cues price, the location preferability scores of hotels and review valence, Kim (2020) investigates their effect on sales holistically. Examining different signals in online shops, Mavlanova et al. (2012) analyzed online shoppers' feedback in comparison to other signals intended to reduce the information asymmetry in e-commerce (such as live chats, domain specific seals, etc.). Comparing internal website signals (those provided by the seller himself) with external ones (e.g., online customer reviews or quality seals), Mavlanova et al. (2016) found the latter ones to exhibit stronger and more positive effects from consumers' viewpoint. However, in this study it has not been distinguished between different types of external signals, but they were considered as one single factor. Also treating online customer reviews with an aggregated perspective, research explored how online reviews, price, brand image and online shoppers' characteristics impact the purchase decision (Jiang et al., 2016). Merging online customer reviews, expert-based reviews, and quality seals, Zhou et al. (2018) found these information cues to significantly increase product transparency, which in turn results in higher overall transparency and increased purchase intentions. Similarly, Clemons (2007) assumes that

online customer reviews alone are not sufficiently solving the information asymmetry in e-commerce and thus, proposes to complement them by third-party quality assessments (comparable to quality seals). While some of these studies investigated the importance of online customer reviews together with other (extrinsic) information cues, insights on the interplay of country of origin, quality seals and online customer reviews are yet missing. Moreover, since many of those papers treat multiple information cues on an aggregated level, one can neither derive the importance of the investigated cues separately nor do these studies allow a comparison on their importances from an intercultural perspective. In contrast, Fong and Burton (2008) analyzed Chinese and American eWOM forums concerning the content posted. While they also describe how often country of origin information is mentioned as part of the eWOM forums, no attempt is made to explore the varying importances of online customer reviews compared to country of origin information cues.

In contrast to review valence, volume and variance, which all three received much attention in literature (at least with studies concentrating on the national level), this dissertation targets a more innovative aspect of online customer reviews, which is still understudied: reviews' presentation format. In the emergence of online customer reviews, the only format for consumers to provide feedback about products was purely textual. By the time online shops' server capacities increased and the possibility to shoot photos by the tip on a smartphone arose, various online retailers offered uploading pictures besides the review per se. Meanwhile, this dynamic development resulted in the opportunity to integrate video reviews in some online shops. Current research seems to primarily focus on the second stage of this evolution (see e.g., Bigne et al., 2020; Xia et al., 2020; Zinko et al., 2020), whereas literature has yet only caught a glimpse on video reviews. Since nowadays up to one-third of online customer reviews are estimated to be faked (Zhuang et al., 2018), video reviews should be of particular importance because they might provide a solution to mitigate this unpleasant development. Video reviews require more effort to produce and are harder to fake than textual reviews, which in turn seems to increase the credibility of online customer reviews (Xu et al., 2015). In contrast to Xu et al. (2015), who provide first insights into this phenomenon based on n=110 American students, this dissertation aims at extending current literature by allowing an interrelated perspective to other review factors (e.g., review sidedness; review consistency) and by enabling an intercultural comparison based on more representative samples. Paper #5 therefore applies a 2 (text vs. video) x 2 (two products) between-subject experiment by analyzing data from n=585 Chinese and n=552 German online shoppers. The question to be answered is:

RQ1.4: *How do varying presentation formats (video vs. text) affect the credibility of online customer reviews among Chinese and German consumers?*

Examining these differences from an intercultural perspective seems to be a requisite approach to yield more generalizable results. Often listed as one of the main online shopping advantages is the possibility that it can be accessed from anywhere around the globe – as long as an internet connection is available.

While this opens up the opportunity to serve all consumers from across the world, taking a look at the current e-commerce landscape evinces difficulties in doing so: Amazon, which is dominating the Western online shopping world (Fang et al., 2013), accounts for only 0.7 percent of the gross merchandise volume in the Chinese B2C e-commerce (iResearch, 2017). In contrast, Taobao and Tmall from the Alibaba Group, which represent the prevailing online marketplaces in China (Xia et al., 2020), are still not managing to have a foothold in the European and American market places. To enlighten how the different culture is affecting the online shopping behavior between Eastern and Western consumers, and to fathom the rationale behind how these different consumers process (extrinsic) information cues, the following chapter introduces the intercultural perspective on these issues.

2.2 Cultural differences in the perception of information

In literature, various typologies for cultural differences exist, such as the one introduced by Schwartz (1994), by Hall (1976), the GLOBE study by House et al. (2004) or the cultural dimensions according to Hofstede (1980). Especially the latter one has been predominantly applied in research, even though it contains several limitations (Chu et al., 2019; Hong et al., 2016; Tang, 2017). Accordingly, one of these limitations represents the fact that these dimensions were derived by exclusively enquiring employees from IBM, which actually restricts their generalizability. Another limitation is mentioned by the developer of these cultural dimensions himself: Hofstede summarized that technological advancements might enable former less developed countries, such as China, to leapfrog in their development and thus, shift their cultural values and reduce the validness of the cultural dimensions developed in the 1970s (Hofstede, 2011).

Since the focus within this dissertation is more specifically on extrinsic information cues and their interplay in the online shopping context, the underlying framework will be a more recent one, which is also better suited to this specific context: the Socio-Cognitive Systems Theory (SCST). This theoretical framework describes how consumers from (East) Asian and Western societies differ in their cognitive processes as a result of the socialization within each society (Nisbett et al., 2001). Accordingly, the current European and post-Columbian American society was heavily impacted by ancient Greek's influence. Consequently, ancient Greek's values (tradition of debating), their approaches in epistemology (creating models and trying to categorize its elements to explain the world), and beliefs (influence of gods) affected the way consumers in Western society process information cognitively. Greek philosophers attempted to comprehend the world in a rather *analytical* manner by separating phenomena into sub-objects consisting of attributes and subsequently tried to categorize these attributes in a meaningful way. This approach of breaking down whole things can be exemplified by Western medicine: Executing surgeries to heal one part of the body became common practice in Western societies, whereas East Asians perceived the body more holistically. East Asians rather treat diseases with regard to the energy flow Qi and the intertwined forces of Yin and Yang concerning the body as a whole (Nisbett et al., 2001).

In contrast to the more analytically thinking Westerners, East Asians were largely affected by ancient China. Ancient Chinese attempted to analyze the 'natural world' by following their intuitions and applying empiricism instead of developing models explaining phenomena. In ancient China, individuals were considered as part of a group, which resulted in behavioral patterns that avoided criticism and prevented open debates. Moreover, harmony and balance, as well as Confucianism affected the way East Asians nowadays process information cognitively. Unlike Westerners, East Asians stress the interplay of things and perceive information in a more *holistic* manner, whereby the context of things plays a more important role. As indicated by the feng shui principles for instance (i.e. the way furniture should be placed), objects' interplay as a whole is emphasized (Nisbett et al., 2001).

Summarizing the rationale behind the SCST, Westerners rather process information analytically by breaking down information and categorize its sub-elements independently from each other. In contrast to Westerners, East Asians rather process information more holistically by emphasizing the interdependencies of information elements and by paying more attention to contextual cues. Table 1 briefly recapitulates SCST's essential considerations.

Table 1: Demarcation of analytic (Western) and holistic (East Asian) thinkers (based on paper #6)

	Westerners (e.g., Germans)	**East Asians (e.g., Chinese)**
Epistemological Approaches	Considering objects as a composition of its elements, which are categorized	Explaining phenomena based on the relationship between objects
	Emphasizing on objects itself separated from its context	Emphasizing the interdependencies between objects and their context as a whole
	Using rules about categorization and use formal logic	Higher awareness of the context
Values	Open debates are common practice	Emphasizing harmony
		Trying to avoid confrontations and contradictions

The impact of culture is also mirrored in the way (e-commerce) websites are designed and how information is presented, which is why online shop operators should adapt their websites based on their audience (Moura et al., 2016). Moreover, Nisbett and colleagues' SCST (2001) allowed explaining why information-seeking tasks are executed faster in case websites were created by designers with the same cultural background (Faiola & Matei, 2005). Selling digital services online, culture also affects the perception and evaluation of such products and propels the use of extrinsic cues in the purchase decision (Vendrell-Herrero et al., 2018). More specifically matching the focus of this dissertation, the SCST was applied in adjacent contexts, such as in the light of offline reviews (Aggarwal et al., 2013), as well as to enlighten why the dispersion of review ratings is lower among Westerners than among East Asians (Kim et al., 2018a). However, while SCST provides a fertile ground for examining the impact of online customer reviews' presentation format interculturally, as the way online customer reviews are presented is

related to varying accentuation of contextual cues (receiving more attention among East Asians), extant research has not analyzed this aspect of online customer reviews between cultures yet.

Even though research investigating the influence of culture on online customer reviews has evolved more than ten years ago (e.g., Tsang & Prendergast, 2009; Yun et al., 2008), various questions about how to deal with consumers yielding different cultural backgrounds in the context of online customer reviews remain unanswered (Hong et al., 2016). Therefore, several authors recently postulated the need to examine online customer reviews between consumers from different cultures (Filieri et al., 2018; Lee & Hong, 2019; Lin et al., 2019), and more specifically how antecedents of review credibility vary by culture (Thomas et al., 2019). Since review credibility positively affects the purchase intention, investigating this aspect is also of high managerial relevance. Besides, research revealed antecedents (such as reviewers' perceived expertise) of credibility (Obal & Kunz, 2016) and subsequently credibility itself to be subject of varying perception and varying importance based on cultural background (Tang, 2017). In the light of increased numbers of fake reviews (Munzel, 2016), investigating review credibility as the most important aspect for adopting eWOM information is essential for online retailers to be successful (Baek et al., 2012).

Extant research already looked at antecedents of review credibility (Cheung et al., 2009; Cheung et al., 2012; Luo et al., 2013; Thomas et al., 2019), on review credibility's effect on purchase decisions based on pleasantness of online customer reviews (Guo et al., 2020) or its interplay with the three main facets of online customer reviews (Hong & Pittman, 2020). Still, these studies are restricted by the national level perspective, whereas intercultural validations are lacking. Luo et al. (2014) at least provide an intra-cultural view on online customer reviews' information credibility by investigating two Chinese eWOM forums, but no study has examined online customer reviews' credibility from an intercultural viewpoint yet. Therefore, paper #6 scrutinizes:

RQ1.5: *How do Chinese and German consumers differ in their perception of credible online customer reviews?*

2.3 Synopsis and conceptual framework

Based on the outlined research gaps concerning the extrinsic information cues country of origin, quality seals, and online customer reviews, as well as on the expected intercultural differences between German and Chinese online shoppers, the upcoming six papers aim at answering the research questions derived. Besides the specific sub-aspects, it will be examined whether online purchases are more/less likely to take place dependent on products' origin (Chinese/German), different quality seals, and contingent on varying perceptions of credible online customer reviews among Chinese and Germans. As indicated in the introduction, this dissertation's papers are embedded in the e-commerce industry of clothing (paper #2, #3, #4) and consumer electronics (paper #1, #5, #6), since these yield the highest revenue. Here, one might add that information asymmetries in e-commerce vary by product type (Luo et al., 2012; Tu et al.,

2017), consumer groups (Sanak-Kosmowska & Wiktor, 2020) and that the effect of this related uncertainty on purchase intention is moderated by purchase involvement (Pavlou et al., 2007). Additionally, if extrinsic information cues provide a consistent picture, their ability to predict product quality is significantly more accurate (Miyazaki et al., 2005) and thus, decreases the information asymmetry to larger extents.

Summarizing each paper's content from an aggregated viewpoint, paper #1 examines the importance of country of origin in the nowadays more contemporary context of e-commerce by investigating country of origin's implicit facets of German products from a Chinese consumers' perspective. Paper #2 incorporates a more methodological focus and answers RQ2 by comparing the predominantly applied CBC with its antecedent ACBC. Additionally, the importance of online customer reviews and country of origin in the online purchase decision process among Chinese and German consumers is explored. Addressing the intersection between quality seals and country of origin, paper #3 examines the importance of these two extrinsic cues. Moreover, it is assessed which surcharges can be assumed for varying quality seals and different country-of-manufactures (including 'Made in Asia'). Besides its theoretical contributions, paper #3 additionally takes a more methodological position, helps to answer RQ2, examines ACBC's 'summed price' approach and scrutinizes the effect of WTP estimations based on choice task related in contrast to explicitly enquired WTP questions. Paper #4 also explores the influence of country-of-manufacture and quality seals on online purchase decisions. However, in this paper, price-related aspects are of minor importance, whereas the focus is on consumer segmentation based on cohorts and within-generational heterogeneity.

All these four papers pay attention to the context in online purchase decisions by implementing several impact factors (such as delivery options, price, etc.), which prevents an artificially increased awareness for one specific factor (e.g., quality seals only) and diminishes related biases. For analyzing the influence of different online purchase drivers, one could also think of investigating the impact of brands besides price, the extrinsic information cues of interest, and concrete additional drivers within each paper, but research regarding brands represents a broad field in literature and should only slightly be touched. Therefore, paper #1 integrates brands (containing the implicit country of origin facet) juxtaposed price and additional e-commerce related factors, and controls for brand familiarity and brand attitude to prevent biases. In contrast to papers #3 and #4, papers #1 and #2 focus exclusively on extrinsic cues. While this generally might harbor the danger of over-estimated importance of these cues, research evinced that consumers' evaluations of products are mainly driven by extrinsic cues (Richardson et al., 1994), especially for foreign consumers purchasing digital services (Vendrell-Herrero et al., 2018) or those with low levels of familiarity with the corresponding products (Rao & Monroe, 1988).

In dissociation to papers #1 to #4, papers #5 and #6 primarily focus on online customer review factors and purchase intention, whereby contextual factors are illustrated by different facets of online customer reviews (such as review consistency, review sidedness, etc.). More precisely, paper #5 investigates the

impact of varying online customer review presentation formats (textual vs. video) by enquiring German and Chinese consumers. Paper #6 also deals with the perception of online customer review facets and attempts to provide an empirical proof for the SCST in the online customer review setting. Recapitulating each paper's focus, Figure 1 pictures the conceptual overview.

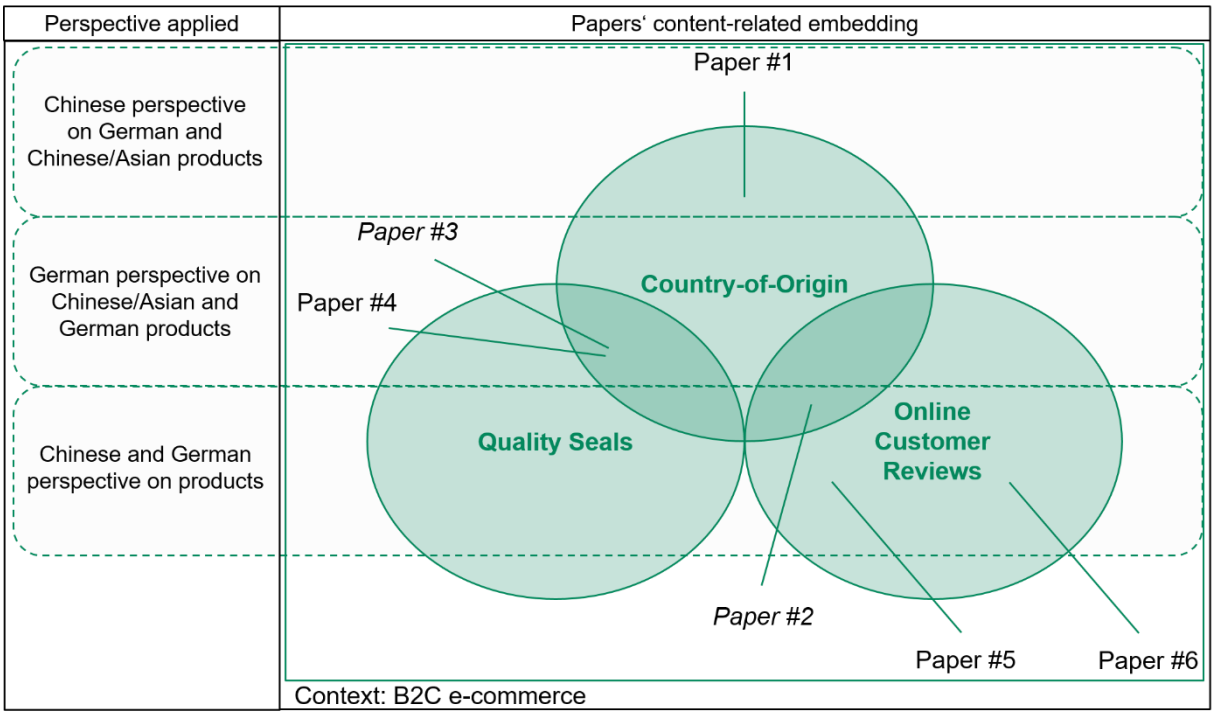


Figure 1: Conceptual overview

Note: Primarily methodological papers highlighted in italic.

Apart from this conceptual overview, table 2 describes each paper's content in a more detailed manner regarding methods applied and sample(s) used. In addition to the six papers outlined before, a supplementary contribution (#7) is listed representing a book chapter. This chapter in the monography "Conjointanalyse - Methoden - Anwendungen - Praxisbeispiele" by Baier and Brusch (2021) is added due to its close thematic fit to this dissertation (especially with regards to RQ2).

Table 2: Detailed overview of papers and their content

Article Num-ber	Title and Content	Method(s)	Sample(s)
1	**Measuring Country of Origin Effects in Online Shopping Implicitly: a Discrete Choice Analysis Approach** ▪ Literature's call for investigating the implicit facets of the country of origin effect is followed. ▪ This paper is representing the first to examine it in the e-commerce context using conjoint analysis. ▪ Country of origin is measured non-saliently to prevent biases through an artificially increased awareness for products' country of origin based on three pre-connected studies. ▪ Product categories Chinese consumers preferably buy from German companies are identified. ▪ A Best-Worst Scaling experiment is detecting the most preferred product categories. ▪ The most known brands for these product categories (one low- and one high-involvement product) are identified and subsequently used in the main study. ▪ The CBC experiment as main study is revealing that the country of origin effect seems not to be existent in an e-commerce context when controlling for brand attitude both for high- and low-involvement products. ▪ The favorability for the selected German products is caused by their brands, but not by their country of origin.	Expert interviews; Best-Worst Scaling; Choice-Based Conjoint analysis	n=23 (expert interviews); n=204 Chinese from Gen. Y (Best-Worst Scaling) n=70 Chinese from Gen. Y; n=402 Chinese from Gen. Y (CBC)
2	**Adaptive CBC: Are the Benefits Justifying its Additional Efforts Compared to Traditional CBC?** ▪ The ACBC is introduced based on CBC's theoretical disadvantages. ▪ ACBC's advantages and disadvantages are contrasted based on extant literature. ▪ An empirical example for contrasting ACBC with its theoretical counterpart (concerning time for completion, number of attribute levels excluded as unacceptable features, use of conjunctive decision heuristics, stimuli considered to represent a possibility to be purchased) is illustrated. ▪ The results for Chinese and German consumers (based on two-step cluster sampling) are showing that country-of-manufacture and online customer reviews appear to be less relevant compared to the main purchase drivers (methods of payment, warranty options and contact possibilities).	Adaptive Choice-Based Conjoint analysis	n=54 Chinese sportive online shoppers n=151 Germans sportive online shoppers
3	**Examining sustainability surcharges for outdoor apparel using Adaptive Choice-Based Conjoint analysis** ▪ Various purchase drivers for purchasing sustainable clothing online (including quality seals, country-of-manufacture) are analyzed. As a result, an ACBC is introduced as a solution to overcome issues related to CBC investigations. ▪ Extant literature concerning the WTP for sustainable products is summarized. ACBC experiments showed to be largely neglected in research. No other study has made use of ACBC's Calibration section for yielding more precise WTP estimations. ▪ An ACBC including its 'summed price' approach and its Calibration section is conducted based on an expert interviews. ▪ WTP and surcharge for specific features are estimated (based on consumers' ecological orientation). ▪ The integration of the none-option value is derived from ACBC's Calibration section, and seems to attenuate the bias related to the estimation purely based on choice tasks. ▪ ACBC is capturing larger parts of the buyer decision process and hence, is more realistically than CBC.	Expert interviews; Adaptive Choice-Based Conjoint analysis	n=5 (expert interviews); n=215 Gen. Y

Article Num-ber	Title and Content	Method(s)	Sample(s)

4	**The importance of sustainability aspects when purchasing fashion online: comparing Generation X and Generation Z**
	▪ Extant literature comparing generational cohorts is analyzed and evinces methodological skewness with a focus on salient measurements of sustainability aspects, which might result in misleading insights.
	▪ An ACBC is proposed to compare Generation X and Z to investigate the varying effect of purchase drivers of sustainable clothing (inter alia quality seals, country-of-manufacture) and hence, to counteracte this development.
	▪ An ACBC is conducted among consumers from both generations founded on a focus group pre-study.
	▪ An ANOVA is revealing observed heterogeneity based on consumers' ecological and social sustainability orientation and gender, before a clustering uncovers unobserved heterogeneity within each generation.
	▪ Both generations are compared and results are indicating Generation Z to consume more sustainably.
		Focus group;
		Adaptive Choice-Based Conjoint analysis;
		ANOVA;
		Clustering
			n=7 (focus group);
			n=305 Gen. X;
			n=305 Gen. Z

5	**Cultural differences in the perception of credible online reviews – The influence of presentation format**
	▪ A literature review over recent studies including cultural aspects in the online review context is provided. It is revealed that review credibility has not yet been investigated interculturally.
	▪ The hypothetical framework is inferred based on the Socio-Cognitive Systems Theory (SCST), Hall's low- and high-context categorization, and the value theory by Schwartz.
	▪ A 2 (text vs. video) x 2 (tablet vs. digital camera) experiment among Chinese and German consumers is conducted based on an eye-tracking pre-study.
	▪ Presentation format of video reviews is increasing online reviews' credibility and moderates online reviews' argument quality for specific consumer segments.
		Eye-Tracking experiment;
		2 x 2 between subjects experiment (using Structural Equation Modelling)
			n=15 German and n=12 Chinese (eye-tracking);
			n=585 Chinese consumers of Gen. Y;
			n=552 German consumers of Gen. Y

6	**Cultural differences in processing online customer reviews: holistic versus analytic thinkers** ▪ Intercultural studies in the context of OCRs are summarized based on different cultural frameworks applied. ▪ The Socio-Cognitive Systems Theory (SCST) is introduced and it is revealed that SCST (as a more appropriate framework to investigate intercultural differences) has yet largely been neglected by OCR research. ▪ An empirical study about factors impacting the credibility of OCRs with Chinese and German consumers is outlined. ▪ An empirical proof of SCST's assumption in the context of OCRs is provided.	Structural Equation Modelling	n=585 Chinese consumers of Gen. Y; n=552 German consumers of Gen. Y
7	**Adaptive Choice-Based Conjointanalyse** ▪ The ACBC is introduced by demonstrating CBC's shortcomings. ▪ A practical guideline for setting up ACBC investigations is provided. ▪ The dis-/advantages of CBC and ACBC are contrasted. ▪ ACBC applications in the marketing context are outlined. ▪ A practical example is used to illustrate how to conduct ACBC studies.	(conceptual with empirical example)	n.a.

Note: The contribution with article number #7 represents a chapter in the monography "Conjointanalyse - Methoden - Anwendungen - Praxisbeispiele" by Baier and Brusch (2021).

After introducing the conceptual overview and each paper's content, table 3 illustrates the current publication status, the related journals and the authorship structure respectively. While all papers resulted from joint efforts, it might be pointed out that this dissertation's author provided a substantial contribution for all these articles and thus, represents the first author listed in all papers. Apart from elucidating the authorships, it should be declared that Paper #2 is founded on two conference contributions from 2019. One of them was held at the RARCS (Recent Advances in Retailing and Services Science) conference, the other one at the ECDA2019 (European Conference on Data Analysis).

Table 3: Papers' publication status and authorship attribution

#	Short-title	Authors	Journal	Status
1	Measuring Country-of-Origin Effects in Online Shopping Implicitly	Benedikt M. Brand, Daniel Baier	International Marketing Review*	Under Review (2nd round)
2	Adaptive CBC: Are the Benefits Justifying its Additional Efforts?	Benedikt M. Brand, Daniel Baier	Archives of Data Science, Series A	Published
3	Examining sustainability surcharges for outdoor apparel	Benedikt M. Brand, Theresa M. Rausch	Journal of Cleaner Production*	Published
4	The importance of sustainability aspects when purchasing fashion online	Benedikt M. Brand, Theresa M. Rausch, Jannika Brandel	Journal of Cleaner Production*	Submitted
5	Cultural differences in the perception of credible online reviews	Benedikt M. Brand, Riccardo Reith	Decision Support Systems*	Under Review (3rd round)
6	Cultural differences in processing online customer reviews	Benedikt M. Brand, Cristopher S. Kopplin, Theresa M. Rausch	Electronic Markets*	Revised & Resubmitted
7	Adaptive Choice-Based Conjointanalyse	Benedikt M. Brand, Daniel Baier	(in Monography)	Published

Note: * ranked as "*B*" according to the VHB-JOURQUAL 3.

The remainder is structured as follows: First, the oldest information cue country of origin and its implicit facet are investigated in the more contemporary context of e-commerce. Applying a CBC experiment, its effect juxtaposed to other purchase drivers, such as price and e-commerce related ones, is analyzed from a Chinese perspective about German and Chinese products. Second, the focus is widened by incorporating online customer reviews and introducing the ACBC as the methodological advancement of the predominantly used CBC (which meanwhile represents a chapter "Adaptive Choice-Based Conjointanalyse" in the well-known monography "Conjointanalyse"). Besides condensing ACBC's advantages and disadvantages, the importance of online customer reviews and country-of-manufacture are exam-

ined from a Chinese and German consumers' perspective about German/Chinese products. Third, country-of-manufacture is put in relation to quality seals by making use of the ACBC and two of its major benefits (Calibration section and 'summed price' approach). By exploring the potential WTP and surcharges for certain product features, German consumers are exposed to products from Asia and Germany. Fourth, country-of-manufacture is juxtaposed to different quality seals by investigating consumers from different generational cohorts. Using ACBC, the preference of German consumers about products made in Asia and Germany is revealed. Fifth, the credibility of online customer reviews is investigated by interviewing Chinese and German consumers by contrasting textual versus video online customer reviews. Sixth, an empirical proof of the SCST in the context of credible online customer reviews is provided. Here, East Asians (exemplified by Chinese) and Westerners (Germans) are analyzed with regard to the way they perceive credible online customer reviews. Lastly, chapter 4 provides conclusions based on the six papers presented, answers the research questions raised, and provides practical implications based on the insights gained.

3 Research papers

3.1 Measuring Country of Origin effects in online shopping implicitly: a discrete choice analysis approach

Benedikt M. Brand and Daniel Baier

Journal: International Marketing Review

Abstract

To examine if the country of origin (COO) effect actually exists in an e-commerce context, we intend to contribute to this current ongoing debate by measuring the effect through a series of connected studies. Drawing on cue utilization theory, we emphasize the urge to investigate COO effects in multiple cue settings to reveal a more realistic picture about its actual effect size. In contrast to In contrast to the vast majority of prior research, which often lacks analyzing COO through methodological plurality and neglects important contextual factors, we employed a four-staged research design attempting to trigger and measure COO's implicit effect size in today's more common context of online shopping. The importance of brands (inhering the COO) is decompositionally calculated relatively to other extrinsic cues by applying a Hierarchical Bayes estimation, whereby the COO impact is extracted afterwards. Our results intensify the concerns that the COO effect actually does not exist, particularly not in the more contemporary context of online shopping. To the best of the authors' knowledge, this study is the first to capture the importance of COO in the nowadays more contemporary context of online shopping. Moreover, a more realistic and less biased way of measuring the importance of COO is enabled by building upon three pre-connected studies. The findings allow a generalization for both high- and low-involvement products.

Keywords: Country of origin, implicit Country of Origin facet, multi-cue context, online shopping, decompositional measurement, Discrete Choice Analysis

Table of contents

1 Introduction

The topic of country of origin (COO) has attracted researchers' attention for many years resulting in a large body of literature (Lu et al., 2016; Verlegh & Steenkamp, 1999). However, in recent years several articles were questioning the relative importance of COO compared to other informational cues involved in the buying decision (Garrett et al., 2017; Samiee, 2011; Usunier, 2006). The related criticism is rooted in a variety of different facets, whereby one of the most important aspects might be found in the way the majority of articles are measuring COO (Eroglu & Machleit, 1989; Magnusson et al., 2011b). Firstly, the most COO studies treat COO as a salient concept measuring it explicitly, resulting in artificially increased importance (Diamantopoulos et al., 2017; Magnusson et al., 2011b; Pharr, 2005). Instead, the COO effect should rather be measured implicitly to cover its emotional and non-verbally captured aspects (Herz & Diamantopoulos, 2013). Recently, Herz and Diamantopoulos (2017) have even started to distinguish between "self-reported" and the "actual (true)" influence of COO. Especially, the cognitive dimension of COO revealing a decomposing effect (Wang et al., 2012) can better be measured by decomposing measurements. Secondly, COO needs to be measured in multi-cue environments in order to reveal its true effect size (compared to the importance of other driving factors when evaluating/purchasing products), as the effect size is otherwise inflated (Bilkey & Nes, 1982). Measuring COO by including multiple cues results in a more realistic, but reduced effect size (Verlegh & Steenkamp, 1999). Especially when focusing on purchase decisions and thereby comprising the extrinsic cue of price, the COO effect size decreases (Koschate-Fischer et al., 2012; Wall et al., 1991). Here, it is essential to extend multiple cue settings by a more contemporary context: while previous research mostly investigated the COO effect by creating scenarios of consumers buying offline (or not including an online context), consumers nowadays will be much more likely to evaluate and purchase products online (Ramkumar & Jin, 2019). In this more realistic, more recent context, other extrinsic cues (besides COO), such as delivery costs or delivery time, become important influential factors and might reduce the actual COO effect size as well.

Meanwhile, research has reached consensus that in a world of globalized value chains COO is no longer an unidimensional construct, where 'made in' claims used to be considered as equivalence to "the" COO (Kim & Park, 2017), and thus, should be operationalized differently. Since the COO construct became more complex with the impact of brands taking a central role (Diamantopoulos et al., 2011), authors focusing on COO as one association related to brands even propose the COO effect to rather be declared as 'country-of-association effect' (Andéhn & L'Espoir Decosta, 2016). Additionally, several recent investigations corroborate that the COO effect to diminishes when measured together with other important information cues, such as sustainability aspects (Stöckigt et al., 2018) or store image (Garrett et al., 2017). As a result, there currently is still no consensus on the (potential) COO effect on product evaluations: while some authors emphasize the usage of COO cues as short-cut heuristic to deal with the overwhelming variety of products from all over the world (Kock et al., 2019), where online sellers' origin seems to matter (Zhao et al., 2019), others report contrary findings. Accordingly, the importance

of online sellers' COO fades when taking into account the information cue of price (Moriuchi, 2021). Similarly, research summarized that "the mechanics of country image in IOO [international online out-shopping] may be unique in that today's online marketplace, [...] is more or less homogenous in website design, language, currency of payment, product categories etc., thereby dulling indicators of a different country-of-origin" (Ramkumar & Jin, 2019, p. 195).

When shopping online, consumers apply a decision-making process concerning different products with varying attributes (such as price, brand, etc.), where the COO is implicitly affecting the decision. To mimic this setting more realistically a Discrete Choice Analysis (DCA; also referred to as Choice-Based Conjoint analysis in the marketing literature) could be used to measure COO implicitly by systematically varying impact factors, such as brands and prices. In contrast to surveys neglecting the context, focusing on one product only, and measuring COO as a salient variable, the influence of COO on the overall decision in favor for or against one product alternative can decompositionally be calculated – without asking explicitly about the COO importance. Since measuring COO based on separate product evaluations versus jointly leads to different results (Semaan et al., 2019), the aim is to depict the purchase decision as realistically as possible by applying DCA. Moreover, applying a conjoint analysis prevents biases related to fixed-point (Likert) scale item investigations (Woodside, 2013), as self-report bias by directly asking about COO constructs is avoided (Veale & Quester, 2009).

To examine the COO effect in an online shopping context by applying DCA, we build upon the cue utilization theory. Since consumers take into account several information cues to evaluate a product's quality (Cox, 1962), this theoretical framework enables analyzing the importance of the COO cue compared with other main purchase drivers. This approach will be complemented by assumptions of the consumer-based brand equity (Keller, 1993), which takes into account all associations related to brands including the COO cue. By controlling for other components of the consumer-based brand equity (e.g., brand attitude), we intend to extract the importance of COO inherent to brands. To the best of the authors' knowledge, this study is the first to measure the importance of the implicit COO facet in the more contemporary context of online shopping. We thereby follow suggestions from extant literature that calls for exploring the consequences of geographically disaggregated value chains (Buckley et al., 2017), and call for the reconsideration of previous beliefs in international business research (such as the COO effect), since digitalization has disrupted several established assumptions (Banalieva & Dhanaraj, 2019). More specifically, we address the postulation by Diamantopoulos et al. (2017) asking for implicit measures in the context of COO to satisfy the implicit nature of COO perceptions. Founded upon three pre-connected studies to prevent any priming effects, the COO effect is effectively triggered and then measured in the main study. We thereby challenge the before-mentioned criticism and answer the research questions: (1) Does the COO effect exist in an e-commerce setting and (2) if so, how strong does it affect the purchase decision?

2 Literature review on Country of Origin studies using discrete choice analysis

In contrast to opinion or attitude surveys, where consumers evaluate "on country of origin alone, in isolation from the rest of the attributes that typically define a product" (Ettenson et al., 1988, p. 87), conjoint analysis or especially DCA experiments enable a more realistic purchase environment (Ku et al., 2017). DCA experiments require respondents to choose their preferred product (consisting of multiple attributes/cues) out of several different options, including the option none should be bought. In line with the meta-analysis by Verlegh and Steenkamp (1999) where COO is described as summary information affecting purchase intentions and perceived quality when consumers need to choose among different product options (as simulated in DCAs), further support for investigating COO in the context of online shopping and DCA is conveyed.

Ettenson et al. (1988) were among the first to examine the COO effect on purchase decisions using DCA. In their study, they found a relatively small COO effect and explained the discrepancy compared with earlier findings by the different, but more realistic method used. Besides Ettenson et al. (1988), some researchers have recognized the great fit between the non-salient construct of COO and the measurement of conjoint analysis in the 90's (Bruning, 1997; d'Astous & Ahmed, 1999; Diamantopoulos et al., 1995; Ettenson, 1993; Okechuku, 1994). Since then, not only the method and algorithms for estimating the part-worth utilities have improved (Wlömert & Eggers, 2016), but also the way consumers (in industrialized countries) are searching, comparing and buying products (Cui et al., 2019). Nowadays, consumers would most likely consider buying products from another country while shopping online (Ramkumar & Jin, 2019). Therefore, extrinsic cues such as delivery costs, delivery time, etc. have become essential aspects when choosing one product over another (Kim et al., 2017a; Kim et al., 2017b), which is why multiple cue investigations need to be extended by these new influential factors.

Table 1: Recent investigations analyzing COO by applying conjoint analysis

Authors (Year)	COO investigation	Limitations
Ahmed et al. (2004)	Investigating the relative influence of *COO (explicitly)*, brands and price with n=236.	• Measuring COO separately from brand • Focusing on low-involvement products only • (potential occurrence of number of levels effect)
Speece and Nguyen (2005)	Investigating the relative influence of COO for different brands from varying countries with n=100 (*not including COO explicitly*).	• Minimum sample size for yielding stable results for estimating path-worth utilities not reached • Focusing on high-involvement products only • (Potentially) biased results due to the number of levels effect (Currim et al., 1981)
Veale and Quester (2009)	Investigating the relative influence of COO (*explicitly*), price and acid on the purchase decision for wine with two separated groups (n=263; n=274).	• Measuring COO separately from brand • Focusing on wine only (potentially low- or high-involvement product)
Ong et al. (2010)	Investigating the relative influence of brands, *Country-of-Manufacture (explicitly)*, price, quality, technological development and warranty with n=426.	• (Potentially) biased results due to the number of levels effect (Currim et al., 1981) • Focusing on high-involvement products only

Authors (Year)	COO investigation	Limitations
deMeulenaer et al. (2015)	Investigating the relative influence of globalization vs. localization of varying cues on the purchase decision with n=100 per product category (high and low-involvement product; *not including COO explicitly*).	• Minimum sample size for yielding stable results for estimating path-worth utilities not reached
Aruan et al. (2018)	Investigating the relative importance of relative importance of Country-of-Brand (*COB, expressed by brand name*), Country-of-Person (COP) and Country-of-Service-Delivery (COSD) in consumer evaluation of three hybrid services with n=350, n=361 and n=360.	• Focusing solely on decomposed COO aspects without relating any product information cues • Focusing on high-involvement products only

Note: Explicit vs. implicit measurement of COO information cues highlighted in italic.

Although some more recent studies investigating the COO effect using forms of conjoint analysis exist in established journals, none has shed light on the influence of the COO effect in online shopping yet. Aside from studies examining consumer preferences by applying conjoint analysis with COO playing a subordinate role (inter alia Brand & Rausch, 2021; García-Gallego & Chamorro Mera, 2017), those focusing on COO suffer from methodological and content-related limitations (see table 1). As Ahmed et al (2004) focused on low-involvement products only, one cannot derive results generalizable to high-involvement products where the COO effect has proven to be increased (Balabanis & Siamagka, 2017; Kim & Park, 2017). In contrast, other studies focused on high-involvement products only. However, for providing a direct comparison of the COO effect size between high- and low-involvement products, both should be included. Furthermore, some studies configured their conjoint experiment with relatively large variations in the number of levels per attribute. However, this can artificially inflate the calculated average importance of the related attribute of those with relatively more levels resulting in a bias called "number of levels effect" (Currim et al., 1981; Eggers & Sattler, 2011). As the COO effect appears to be already relatively small, it becomes crucial to prevent such biased weighting of influential factors. Most recently, Aruan et al. (2018) compared different decomposed aspects of COO, namely Country-of-Brand, Country-of-Person and Country-of-Service Delivery in the evaluation of hybrid services. However by focusing on the evaluation and purchase of products, this study does not consider any product-related factors (e.g., price) in relation to the COO aspects mentioned.

While all investigations listed are analyzing COO using conjoint analysis, some included COO by explicitly labeling it (Ahmed et al., 2004; Veale & Quester, 2009) or one of its decomposed aspects, such as COM (Ong et al., 2010), others aligned with the more recent understanding of COO as part of brands and thus, only implemented brands for measuring COO (Aruan et al., 2018; deMeulenaer et al., 2015; Speece & Nguyen, 2005).

3 Theoretical framework & conceptual development

3.1 Cue utilization theory and DCA for measuring factors implicitly

According to the cue utilization theory, consumers are using different information cues about a product (e.g., package, price, manufacturer) depending on their perceived contribution to the prediction of a product's quality (predictive value), as well as on the confidence value (Cox, 1962). Since the COO effect with its impact on product evaluations and purchases has predominantly been explained by enlightening how different intrinsic and extrinsic information cues affect consumers' decision making as a cognitive process (Magnusson et al., 2011a), the cue utilization theory constitutes a very suitable framework to examine this effect (also used in Eroglu & Machleit, 1989; Koschate-Fischer et al., 2012; etc.). Several studies dealing with the cue utilization theory confirmed that consumers combine multiple information cues and evaluate product quality based on the sum of information available (Olson, 1972), whereby merging all information about one product might even result in reduced importance of the extrinsic cue of price (Rao & Monroe, 1988; Zeithaml, 1988). In COO research, the use of multiple information cues has been supported (inter alia Bilkey & Nes, 1982; Wall et al., 1991), also because this might lead to reduced but more realistic importance of COO (Thorelli et al., 1989; Verlegh & Steenkamp, 1999) and impacts the willingness-to-pay (Koschate-Fischer et al., 2012). Therefore, investigations focusing on COO isolated from other information cues should be scrutinized, as they seem to overestimate the true COO effect (Johansson et al., 1985; Magnusson et al., 2011b). Although technological improvements have made it much easier to deal with vast amounts of information when analyzing data, the number of COO articles including multiple cues has significantly decreased in the last decade, while single cue information investigations have increased (Lu et al., 2016). In contrast to this development, Bilkey and Nes (1982) criticized studies that only include one (extrinsic) single cue (such as the COO) instead of incorporating multiple cues that might compensate the COO effect. They postulated that COO research must include multiple cue experiments in order to imitate more realistic scenarios. Following the cue utilization theory, the main study will thus make use of a DCA experiment to take into account several information cues simultaneously (i.e. comparing different products consisting of different characteristics). Especially in the e-commerce context, other purchase drivers than commonly used ones (e.g., price, brands) essentially affecting the shopping decision (Kim et al., 2017b). According to the cue utilization theory, these online shop specific factors (e.g., delivery time, delivery costs) should be incorporated to measure the COO impact juxtaposed other factors.

According to the cue utilization theory, the predictive value of an (information) cue "is the degree to which consumers associate a given cue with product quality" (Richardson et al., 1994, p. 29). This assumption translates well with current COO research stating that the COO effect should be considered as "the influence on consumers' attitudes and purchase behavior derived from a brand's perceived association with a country" (Andéhn & L'Espoir Decosta, 2016, p. 851), whereby this association varies by degree. Hence, the COO cue inherent to brands can indicate varying degrees of lower/higher product quality in the product evaluation and thus, impacts purchase behavior. In contrast to initial COO research,

several authors nowadays claim that COO represents consumers' perception of where a brand is rooted, regardless of where the related products are actually manufactured or assembled (Balabanis & Diamantopoulos, 2011; Herz & Diamantopoulos, 2013 ; Kim et al., 2017a; Magnusson et al., 2011a). Recent research further "reinforces the notion that country-of-association, as subjectively perceived by the consumer, is the relevant conditional antecedent that determines where a brand is 'from' in terms of the COO effect" (Andéhn & L'Espoir Decosta, 2016, p. 860). To align with cue utilization theory and measure the COO effect in online shopping as realistically as possible to reveal its true effect size, COO should therefore not be included as a salient variable, but instead treated as one part out of all consumer perceived associations with a brand.

To capture the varying degree of COO's influence ('predictive value') on the purchase decision, DCA enables measuring the relative importance of COO post-hoc compared to other most relevant purchase factors and thereby accesses the COO effect implicitly. Measuring the non-salient construct of COO in this manner seems more appropriate to explore its actual influence strength. In line with the assumptions of the cue utilization theory, multiple cues can be involved in consumers' decision making when evaluating products by using conjoint analysis (Green & Srinivasan, 1978). To imitate a realistic online shopping scenario, consumers are exposed to several (product) stimuli and asked to select their preferred option or none if applicable. Additionally, we intend to trigger the maximum COO effect size by analyzing consumers' preferences from a country less renown for a specific product towards this product from a country renown for this specific product. Following findings from other multi-cue environment investigations (Erickson et al., 1984; Ettenson et al., 1988; Johansson et al., 1985), it is assumed that the COO effect rather is an artefact resulting from the methodologies used or studies where the effect size is artificially increased (e.g., by emphasizing that a study focuses on COO). While we assume the COO effect not to matter (especially in an online shopping context) when measured in a multi-cue context (Garrett et al., 2017; Pharr, 2005; Samiee, 2011), the hypotheses align with the majority of literature (examining the COO effect mostly in offline context), which assumes the effect to be existing. Each hypothesis should further be examined for low- and high-involvement products to increase findings' generalizability, as the majority of literature indicates the COO effect to vary between low- and high-involvement products (deMeulenaer et al., 2015; Kim & Park, 2017).

Based on previous literature, it is assumed that industrial countries known for their high quality performance and their strong brands are favored by consumers from less developed countries (Balabanis et al., 2019). Similarly, Andéhn and L'Espoir Decosta (2016) showed that the COO effect primarily matters for specific products for which a country yields a strong reputation. However, it needs to be controlled for brand attitude which might bias this preference patterns (Moon & Oh, 2017). Since the cue utilization theory assumes consumers to combine all information cues available in a (online) shopping situation and evaluate products based on the sum of these information to choose one product over another, the first hypothesis focuses on product selection related to the COO effect. Summarizing these aspects, the following null hypotheses are proposed:

H1a: Consumers from a country with a *low reputation* for a specific high-involvement product (with a neutral brand attitude toward the renown foreign brand) will prefer this product from a country with a *high reputation* for this specific high-involvement product.

H1b: Consumers from a country with a *low reputation* for a specific low-involvement product (with a neutral brand attitude toward the renown foreign brand) will prefer this product from a country with a *high reputation* for this specific low-involvement product.

To cross-validate the DCA results, we not only control for brand attitude, but additionally analyze the findings contingent on three COO-related constructs. These are the COO favorability stated for the corresponding country as a whole, products from this country and a country's image within the specific product category. Here, we are referring to the basic-origin image, the product-origin image (also referred to as 'product country image' (Diamantopoulos et al., 2020; Jin et al., 2015) and the category-origin image (COI) (Maier & Wilken, 2017; Roth & Romeo, 1992; Wang et al., 2012). Detailed overviews can be found in the review by Roth and Diamantopoulos (2009) or the model by Josiassen et al. (2013).

Since the basic-origin image refers to a rather aggregated perspective of an overall COO image, and the product-origin image measures the image of products from a certain country in general (Josiassen et al., 2013; Roth & Diamantopoulos, 2009), COI allows capturing differences in the quality of certain product groups from a specific country the most precise. For example, one might hold negative stereotypes about China due to accusations regarding human rights (basic-origin image) and might perceive products from China generally as less reliable (product-origin image), but consumer electronic products might still be preferred due to their attractive price-performance ratio (COI). As this construct provides the closest relationship to specific products themselves (Jin et al., 2015; Magnusson et al., 2011a; Pappu et al., 2007), it might therefore serve as a moderator regarding the preferences (Ahmed & d'Astous, 2008). The following null hypotheses therefore test H1a and H1b by additionally taking into account the COI stated.

H1c: An increasingly positive COI stated from consumers from a country with a *low reputation* for a specific high-involvement product and a neutral brand attitude towards the foreign brand, will result in an increased preference for this product from a country with a *high reputation* for this specific high-involvement product.

H1d: An increasingly positive COI stated from consumers from a country *with a low reputation* for a specific low-involvement product and a neutral brand attitude towards the foreign brand, will result in an increased preference for this product from a country a *high reputation* for this specific low-involvement product.

3.2 Consumer-Based Brand Equity

Based on the work of Keller (1993), current COO research understands consumer-based brand equity as "the sum of associations to a brand held in minds of the consumers" (Andéhn & L'Espoir Decosta,

2016, p. 851). Accordingly, brands could be considered as a set of different assets including brand attitude and (differently strong) brand associations (Pappu et al., 2007), such as a product's COO. Keller (1993) assumed attributes as one type of brand associations to be composed of non-product related attributes (comparable to extrinsic cues, such as COO) and product-related attributes (comparable to intrinsic cues). As shown by Diamantopoulos et al. (2011, p. 508) "brand image evaluations already encapsulate consumers' COI [country-of-origin image] perceptions". In a similar vein, it has been stated that "brand names carry some of the information usually associated with country of origin, with their implicit reference to corporate headquarters" (Ong et al., 2010, p. 508). Other authors summarized that brands may substitute the COO information due to their association with a certain country, and that consumers tend to infer a product's COO from the brand (Godey et al., 2012). Since the relationship between consumer-based brand equity and brands' COO varies by product category (Pappu et al., 2007), measuring the COO effect in online shopping will be cross-validated by COI.

As it is essential to implement the brand (and not any explicit COO labels) for the experiment to keep it as realistic as possible and in line with recent COO research (Magnusson et al., 2011b), the results will reveal the relative influence of brands per se. However, this includes not only the COO component, but also other associations with the brand. Building upon the consumer-based brand equity, the COO impact on the purchase decision thus could be understood as one component of all associations related with brands. To extract the influence of COO out of brands, and to cross-validate the DCA results, we again control for brand attitude and examine the findings dependent on COI.

Based on the findings by Magnusson et al. (2011a), one would assume that the more favorable the product country image, the more favorable is the brand attitude and thus, its impact on the purchase decisions. In line with these considerations, local and global origin associations were found to function as one out of several brand associations (Iversen & Hem, 2011). Since COI significantly affects brand equity, which represents all brand associations (Andéhn & L'Espoir Decosta, 2016), a more positive COI can be assumed to result in an increased impact of brands and thus, the COO association inherent to brands. Following the predominant assumption of an existing COO effect, one would expect the null hypotheses:

H2a: A higher positively stated COI from consumer from a country *less renown* for a specific high-involvement product, will result in a *higher influence* of COO (incorporated in brands) for this high-involvement product.

H2b: A higher positively stated COI from consumer from a country *less renown* for a specific low-involvement product, will result in a *higher influence* of COO (incorporated in brands) for this low-involvement product.

Apart from that, we intend to extend the before-mentioned studies (Ahmed et al., 2004; Aruan et al., 2018; Ong et al., 2010) by allowing a direct comparison between low- and high-involvement products. Previous research demonstrated that the COO effect is more likely to evince for high-involvement products (Kim & Park, 2017). Comparing typewriters with beer brands, Eroglu and Machleit (1989) found no significant COO impact for the quality evaluation of the latter (low-involvement) products, whereas

the COO influence was higher for typewriters (high-involvement products). Moreover, research shows that brand names, which carry the brand association of a product's COO, are more important for high-involvement products (deMeulenaer et al., 2015). Therefore, the COO impact is expected to be higher for high-involvement products:

H3: The influence of COO (incorporated in brands) is higher for high-involvement products compared to the influence of COO (incorporated in brands) for low-involvement products.

Furthermore, ethnocentrism might bias the results of measuring COO's effect size. Literature revealed ethnocentrism to significantly affect the purchase of products (Balabanis & Siamagka, 2017). Moreover, ethnocentrism seems to evince a positive effect on domestic brands in an online shopping context (Sun et al., 2020). Since the COO effect interacts with ethnocentrism in some cases (Zolfagharian et al., 2017), we will control for ethnocentric patterns. Ethnocentrism also affects the preference depending foreign- vs local-owned global brands in favor for domestically owned brands of both for utilitarian and hedonic products when prices are equal (Winit et al., 2014), whereby we concentrate on global brands regardless of ownership structure. We hereinafter focus on the explicitly stated ethnocentrism, which appears to be stronger than the implicit facet (Tseng et al., 2018).

H4a: The higher the ethnocentrism stated, the more likely consumers prefer the brand from their home country among high-involvement products.

H4b: The higher the ethnocentrism stated, the more likely consumers prefer the brand from their home country among low-involvement products.

Based on recent findings and addressing the criticism on COO stated above, this investigation aims at challenging the COO effect and measuring its strength in an online shopping setting. Hence, we intend to find out (1) whether the COO effect exists and (2) the maximum of its effect size, when applying a DCA experiment and treating COO as part of brands in the multi-cue environment. For extracting the pure COO effect from the influence of the brand itself, we control for brand attitude, and further by cross-validating our results with established COO constructs from literature.

4 Method

To challenge the COO effect size in online shopping, we focused on the biggest e-commerce market worldwide, which is the one of China with more than 700 million online users, still comprising the potential to grow by 100% (Akram et al., 2018). Following recent international business literature, we concentrate on the specific context of online shopping and a distinct sample of consumers as an starting point for deriving theoretical contributions (Aguinis et al., 2020). Here, we aimed for having a closer look at the product categories that are preferably bought from German companies, because many products 'made in Germany' (or rather from German brands) are still considered to be of high quality (Aichner, 2014; Kabadayi & Lerman, 2011; Kim et al., 2018b; Magnusson et al., 2019). Our overall procedure consisted of four studies that built on one another to counteract the recently identified declined variety of applied methods (Nielsen et al., 2020), and to follow the postulation of mixed methods approaches

for increasing the findings' trustworthiness (Cuervo-Cazurra et al., 2016). Following this four-stage approach, we overcome the major concern in measuring COO of ensuring similar product associations hold in consumers' mind (Kock et al., 2019).

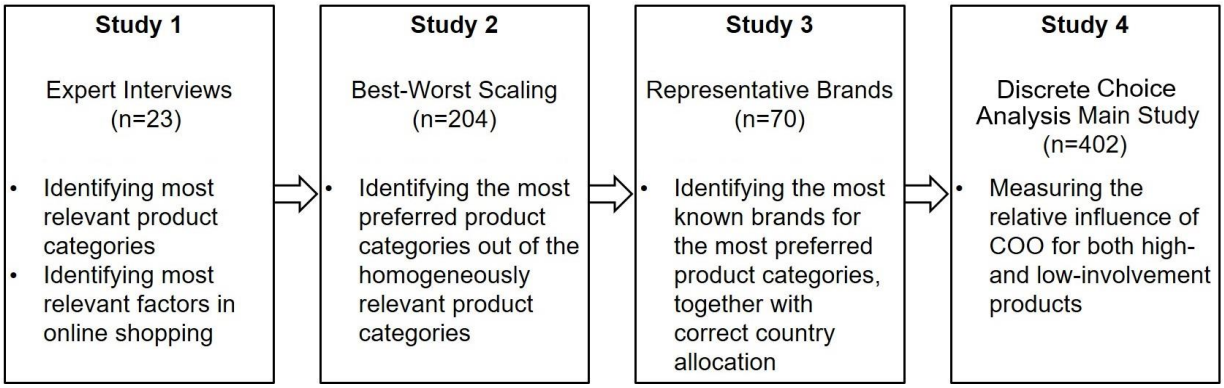


Figure 1: Research design

Expert interviews

We started with qualitative (semi-structured) expert interviews because of two reasons. On the one side, we intended to identify the most relevant factors when shopping online to constitute appropriate attributes for the DCA main study. One the other side, we were interested in the product categories that Chinese consumers preferably buy from German companies. For covering all relevant perspectives about which those product categories might be, we were conducting interviews with experts (n=23) not only from the prevailing online shop companies in China, Germany and the most successful American online shop, but also from the German-Chinese chambers of commerce, German manufacturers selling to China and agencies working as intermediary between China and Germany. Achieving this heterogeneity of experts enabled us to provide a good triangulation of the acquired data.

Summarizing the results, the most frequently mentioned factors when shopping online were price (100%), brand (87%), delivery time (78%), delivery costs (83%), volume of product range (87%) and website usability (83%). While the first four can be found in any online shops, the latter two vary by shop. As these cannot be influenced directly, we focused on the first four for generating generalizable results. The interviews further revealed that Chinese consumers preferably buy milk/dairy products, household appliances, beauty products/cosmetics, fashion/apparel, health-related products, maternal products, baby/infant products, pharmacy products, automobiles and nutrition supplements from German companies. As some product categories show overlaps with others, we further distinguished between health-related nutrition, health-related products (except nutrition, e.g., blood pressure meter), and nutrition supplements (except health-related nutrition, e.g., protein powder). Additionally, beauty products were split into cosmetics for face, hair and the body as a whole, resulting in a list of 13 product categories.

Best-Worst Scaling

Knowing that Chinese consumer are generally like purchasing these 13 product categories from German companies, we intended to detect the most preferably bought ones out of these homogeneously preferred product categories to trigger the COO effect at its maximum. Consequently, a Best-Worst Scaling (BWS) investigation was performed among Chinese online shoppers. This comparably novel method invented by Finn and Louviere (1992) is rooted in the discrete choice experiments and based on the random utility theory (Louviere et al., 2013). It asks respondents about the best (or most preferred) and worst (or least preferred) item out of a choice set, including multiple rounds. As a result, BWS is capable of overcoming response biases included in rating scales and difficulties in interpreting the quasi-interval scaled ranges (Auger et al., 2007), and exposes maximum differences among items (which it why it is in a specific case referred to as 'MaxDiff'). Moreover, it is easier for respondents to make judgements about the best and the worst option without having information overloads for respondents resulting in biases due to cognitive limitations (Louviere et al., 2013). Still, the method highlights only relative, but not the absolute importances of items. Hence, if all items were evaluated negatively, results would only illustrate the best option out of all negative ones. However, having conducted interviews about generally preferred options before, we resolved this issue.

The questionnaire started with manipulation check questions about the overall frequency of buying each of the 13 items, as well as how likely they would buy products from Germany compared with those from other foreign countries in general. Afterwards, respondents were exposed to twelve sets of four items each, asking them to choose the product category they were most and least like to buy online from German companies. For the design of the twelve sets 300 different versions were automatically generated enabling a randomized, balanced design regarding frequency balance and positional balance, as well as to avoid psychological order and context effects. The order of choice sets was randomized as well. The survey concluded with questions about sociodemographic information and whether besides the already mentioned product categories, others are preferably bought from German companies.

The study was fielded using a panel aiming for online shoppers representatively spread all over China that are aged between 18 and 40 years ("Generation Y"). We focused on this consumer segment because of two reasons: First, this it defines itself through enormous purchasing power and advanced technological skills growing up with the beginnings of the internet (Ladhari et al., 2019). Second, interviewees revealed that consumers born between 1980 and 2000 are the segment shopping online most frequently, while the older part of Generation Y represents those with the highest spendings.

Out of 263 responses, 204 could be used as completes with 57% females and an average age of 31 years. Discarding those not belonging to the target group, 201 respondents were taken into consideration. The majority of respondents (91.5%) is shopping several times per month or more often. Concerning the online purchase frequency per product category, it should be stated that except the health products, nutrition/supplements, baby/infant products, pharmacy product and maternal products all product categories are generally bought often to sometimes (mean < 3). Besides, most respondents are likely or very

likely to purchase products from Germany (79%) or from foreign countries in general (80%). Regarding the BWS, the scores for each respondent were calculated using Hierarchical Bayes estimation with 30,000 iterations (including 20,000 preliminary iterations). The root likelihood (RLH) indicating the model fit (Ku et al., 2017) represents the improvement compared to random choices (1/k with k stimuli; Kalwani et al., 1994). Implementing four items per choice set, the RLH would be .25 in a naïve model, instead the estimations provided a RLH=.423. Table 2 illustrates the results:

Table 2: Average probability of all 13 items of being chosen and purchase frequency

Average Probability Scales (0 to 100 scaling) and Purchase Frequency				
Product Category	Average	95% Lower CI	95% Upper CI	Purchase Frequency
Car/automobiles	*13.30*	*12.12*	*14.48*	-
Face cosmetics	7.26	6.62	7.90	2.38 [1,03]
Body cosmetics	6.03	5.51	6.56	2.62 [1.04]
Hair cosmetics	6.33	5.73	6.93	2.59 [1.04]
Fashion/apparel	7.88	7.04	8.71	2.35 [0.97]
Milk/dairy products	*8.75*	*7.86*	*9.63*	2.55 [1.17]
Health-related products (except nutrition)	8.02	7.36	8.67	3.17 [1.14]
Health-related nutrition	6.43	5.92	6.94	3.07 [1.10]
Nutrition supplements (except health-related nutrition)	5.15	4.58	5.72	3.09 [1.16]
Household appliances	*13.35*	*12.45*	*14.26*	2.76 [1.02]
Maternal products	5.91	5.19	6.64	3.16 [1.34]
Baby/Infant products	6.49	5.62	7.37	3.25 [1.27]
Pharmacy products	5.10	4.59	5.61	3.36 [1.07]

Notes: Purchase Frequency from 1=”Very often” to 5=”Not at all” [SD]; Cars are generally not purchased on a high-frequency basis; Top three product categories are highlighted in italic.

The probability scales display the transformed raw weights summed to 100 indicating each items likelihood of being chosen (for further information, see Sawtooth Software (2020)). Results evince the product categories of automobiles (13.30%), household appliances (13.35%) and dairy products (8.75%) to be most likely bought from German companies. As cars are commonly nor bought online, neither very frequently and are not affordable for everyone, we focused on dairy products as low-involvement product and household appliances as high-involvement product for the main study.

Representative brands

Having identified one low-involvement product category purchased on a rather frequently basis, as well as one more expensive high-involvement with the opposite characteristic, we aimed for identifying which products and related brands from Germany (examining COO) and China (examining ethnocentrism) should be chosen for representing each product category. Analyzing the transcripted expert interviews, the experts were referring to milk powder for milk/dairy products (78%), which serves as the usual substitute to full-cream milk. Especially due to the Infant Milk Formula scandal in 2008, Chinese consumer strongly distrust the quality of milk powder (Parsons et al., 2012), which might be the reason

why they prefer ordering it from countries with high quality reputations (Clemons et al., 2016), such as Germany. Besides the mentions from our expert interviews, the relevance of milk powder in the context of COO literature could also be substantiated by other studies (Chen et al., 2011; Phan et al., 2020; Yang et al., 2018). Regarding household appliances some interviewees were referring to food processors (65%), while others mentioned washing machines (74%). As the majority of interviewees were referring to the later one, we selected washing machines for representing the high-involvement product category. Analogous to MP, further evidence for selecting this specific product can also be observed in previous COO literature (Balabanis & Siamagka, 2017; Johnson et al., 2016), due to its importance as part of the Chinese brand Haier (Fetscherin & Toncar, 2010; Magnusson et al., 2011a; Roy et al., 2019), and as postulated to be investigated in the light of COO (Riefler, 2012).

Subsequently, we intended to determine which brands should be used for each product. Therefore, we've been searching for both products on Tmall (Mandarin 天猫), which represents the biggest B2C online shop in China (Lin, 2014) and can be compared to Amazon. Based on the brands listed most often, we conducted a short preliminary study asking Chinese students (n=70, which a part of Generation Y) to elucidate which brands should represent the German products, the Chinese products and products from two other countries (enabling comparisons). The procedure in the survey remained equal for both products: First, we asked for brand familiarity requiring respondents to select all brands that would come to their mind thinking of milk powder (13 brands listed) and washing machines (9 brands listed) allowing multiple choice. Since decreasing brand familiarity increases the COO influence on brand attitude (Bluemelhuber et al., 2007), focusing on brands familiar to respondents was essential. In case we did miss an important brand for these products, we enabled a related free text question afterwards. Second, we reviewed respondents' knowledge of the correct country-of-brands by letting respondents assign the brands to the country they belong to, including one option in case respondents don't know. Third, we controlled for brand attitude through rating the brands on a 5-point scale including an "I don't know/can't judge" option. The order of the brands in each step was randomized to prevent any positioning bias. We applied the back-translation, as it was found to be the most commonly used one (Chidlow et al., 2014). We thus first translated the survey, then it was revised by a native speaker (comparing it with the original text) and then sent to another four native speakers to review language's comprehensibility and reconcile any substantial differences. Results favored Aptamil (German), Mengniu (蒙牛, Chinese), A2 (New Zealand) and Nestlé (Swiss) as milk powder brands and Siemens (German), Haier (Chinese), LG (Korean) and Panasonic (Japanese) as washing machine brands.

CBC main study

For the main study a DCA experiment (concretely a CBC) was selected, first, because it allows to depict the purchase decision realistically (Cohen, 1997), and further, imitates the online shopping setting the most suitable, and second, because this conjoint variant presents the predominant used one (Voleti et al.,

2017). In DCA experiments, it is assumed that the sum of the attribute-related partworthes of the presented option (e.g., price, brand) are representing the utility of this option. Based on respondents' selections, these partworthes are decompositionally estimated for all attribute levels. Creating a DCA design, one of the most important steps is to identify the most influential factors on the consumers' purchase decision (Steiner et al., 2016). We therefore deduced the most important factors in online shopping with a consumer's perspective from the conducted expert interviews and complemented it by an extensive literature review (see table 3). As a result, we incorporated price, delivery time, delivery costs, and brands for both DCA's (high- and low-involvement product; an exemplary choice task can be seen in Appendix A). While studies 1-3 primarily serve for triggering the COO effect by identifying the most preferred German brands out of the most favored German product category from a Chinese consumer's viewpoint, the main study aim is to measure the potential COO effect and to check the hypotheses.

Table 3: Manipulated attributes and attribute levels

Attributes	Attribute Levels washing machine	Attribute Levels milk powder	Source(s)
Brands (COO inherent)	Haier (China), Siemens (Germany), Panasonic (Japan), LG (South Korea)	Mengniu (China), Aptamil (Germany), A2 (New Zealand), Nestlé (Switzerland)	Andéhn & L'Espoir Decosta, 2016; Kim et al., 2017a; Magnusson et al., 2011a; Expert interviews
Price	¥1,547 (200€), ¥3,095 (400€), ¥4,642 (600€), ¥6,190 (800€)	(per Kilo): ¥77 (10€), ¥155 (20€), ¥232 (30€), ¥309 (40€)	Chiu et al., 2014; Koschate-Fischer et al., 2012; Expert interviews
Delivery time	1 day, 3 days, 5 days, 7 days	1 day, 3 days, 5 days, 7 days	Guo et al., 2011; Kim et al., 2017b; Stöckigt et al., 2018; Expert interviews
Delivery costs	¥0 (0€), ¥24 (3€) , ¥48 (6€), ¥72 (9€)	¥0 (0€), ¥12 (1.50€), ¥24 (3€), ¥36 (4.50€)	Liu et al., 2008; Nguyen et al., 2019 Stöckigt et al., 2018; Expert interviews

We applied the same number of attribute levels for each attribute to prevent the number of levels effect (Currim et al., 1981). By including two additional brands, we prevent respondents to exclusively focus on the German and the Chinese brand, which might result in an inflated importance of those brands. The composition of both DCAs were generally identical, even though the prices and delivery costs were adapted based on actual prices found on Tmall to provide a realistic scenario and to avoid range effects (Eggers & Sattler, 2011). The range between each attribute level (for price, delivery time/costs) was equal to increase comparability. Before each DCA, a brief and rather generic description of each of the product characteristics was provided evoking a concrete product in the consumers' mind. Additionally, we explained that all other product characteristics are identical, as keeping other potential factors constant allows respondents to focus on the four before-mentioned extrinsic cues. This approach is not only

in line with Richardson et al. (1994, p. 28) stating “consumers' evaluations […] are driven primarily by the extrinsic cues that these products display rather than intrinsic characteristics”, but also with research claiming that online marketplaces nowadays are more or less homogenous (Ramkumar & Jin, 2019).

The survey’s welcoming page emphasized that the survey deals with washing machines and milk powder to prevent priming towards COO and related biases. Afterwards, respondents chose to start either with the DCA about milk powder or WM, or in a randomized order, as allowing them to familiarize with the DCA procedure for their more preferred product might result in an increased validity of the following DCA. Before the DCA started, we asked for brand familiarity on a 7-point Likert scale (Andéhn & L’Espoir Decosta, 2016). If respondents were completely unfamiliar with the German and the Chinese brand (point 1 of 7), they were dropped from the survey, as without some prior knowledge about the brands, they won’t know the related country-of-brands and thus, cannot evaluate the different options illustrated. If respondents were somewhat familiar with the brand (points 2-5), they were subsequently asked to assign all four brands to their country-of-brands out of nine listed countries (including “I don’t know” option). On the following page, the solution was shown to ensure they are now familiar with the brands’ origin. As these respondents were exposed to COO-related background information before the DCA took place, they were considered as the experimental group to prevent biases resulting from artificially increased awareness of the COO. In contrast, if respondents were very familiar (points 6-7), they didn’t receive any kind of priming (control group). By separating into experimental and control group, we control for the bias of potentially inflated COO importance, which is inherent to the majority of COO research (Samiee, 2010). Additionally, to prevent the experimental group from looking up country-of-brands information once more, we made it impossible to return to this previous page as soon as the DCA started (see also Magnusson et al., 2011a). After completing the first DCA, respondents were given thanks for having completed half of the survey to refresh concentration level and keep motivation high. We asked for frequency of buying milk powder after the milk powder DCA, and about washing machine possession after the washing machine DCA. Besides, we asked for product-origin image, basic-origin image, COI, ethnocentrism and brand attitude, whereas all constructs used were derived from literature (see Appendix B). Except for ethnocentrism (4 items) and basic-origin image (2 items), we only used one item each, as single-item measures lead to equally valid information when attributes and the object can easily, uniformly be understood and are concrete (Magnusson et al., 2011a; Maruyama & Wu, 2014), and because the constructs were only used to segment the DCA results. Implementing control variables (e.g., COI), and categorizing into experimental and control group enabled us to check for separate influences and within-sample heterogeneity, which is recommended to increase the findings validity (Cuervo-Cazurra et al., 2016).

Each DCA included eight randomized choice tasks and two fixed holdout tasks. The choice sets consisted of three stimuli and the none-option, as this increases closeness to reality (Ku et al., 2017). The order of attributes was randomized for each respondent to prevent positioning effects. As a full factorial design would result in 256 potential stimuli (4^4), we applied a fractional full-profile design with balanced

overlap in order not to overstrain respondents with too many stimuli (Green, 1974; Huber & Zwerina, 1996).

The survey itself was fielded using the same approach as for the BWS aiming for the same target group. 491 Chinese consumers were reached resulting in 402 completes. After discarding speeders (n=49), the total sample resulted in 353 respondents, whereas 63 consumers skipped the milk powder DCA, as they were completely unfamiliar with either the brand Aptamil, Mengniu or both (n_{WM}=353; n_{MP}=291). The sample contained 56% females and an average age of 32 years (for all socio-demographic information see Appendix C).

5 Results

5.1 Model estimation and aggregated results

For analysis, we applied the Hierarchical Bayes estimation, which allows precise estimations even in case of heterogeneous preferences or sparse data (Lenk et al., 1996), and calculates the model's parameter based on an iterative process (Andrews et al., 2002). Controlling for interaction effects revealed brand and price (χ^2 = 23.14, d.f. = 22, p = .006), as well as price and delivery (χ^2 = 18.36, d.f. = 22, p = .031) to improve the washing machine model compared with the washing machine base model based on a likelihood ratio Chi-Square test (Chrzan, 1994). However, the Pseudo R^2 increase would only be marginally (0.29% and 0.23%), which is why the interactions were not included to prevent overfitting. Following extant literature (Voleti et al., 2017), we performed 30,000 iterations (including 10,000 burn-in iterations) for obtaining convergence and estimating the model. The fit statistics exhibited an average RLH=0.605 for washing machine and RLH=0.588 for milk powder implying a high internal consistency (compared to the naïve model of RLH=0.25; Kalwani et al., 1994). The model's pseudo R^2 (McFadden, 1973) indicates substantial internal validity for both products (pseudo R^2_{WM}=63.7%; pseudo R^2_{MP}=61.7%; Hensher et al., 2015). Accessing predictive validity, a comparably high first choice hit-rate (FCHR) was yielded for the first (73.17%) and second holdout task (68.92%; Wlömert & Eggers, 2016). For MP, the FCHR exhibit similarly satisfying results ($FCHR_1$=61.86%; $FCHR_2$=62.89%). Additionally, we analyzed the mean absolute error (MAE; Huber et al., 1993) to evaluate results' validity. For both washing machine and MP, low MAEs were observed (WM_1=3.3%; WM_2=2.7%; MP_1=2.1; MP_2=2.7%).

More than half respondents (58%) started answering the DCA about WMs, while 12% started with the DCA about milk powder and almost one-third (30%) started in a randomized order. Regarding the washing machine part, 22% received no priming at all, accounting for the control group. The control group for the milk powder DCA consisted of 42% of all respondents. Controlling for potential priming (as a result of the brand-country assignment task), we compared the average influence of the four factors on the purchase decision between control and experimental group for both products (see Figure 2). The results showed no significant differences (based on Mann-Whitney-U tests), and we thus assume no artificially increased awareness for the potential COO effects among respondents of the experimental

group. As contextual bias is assumed to be absent, we hereinafter analyze the results from both experimental and control group. To control if evoking a favorable image for German brands among Chinese consumers worked well, we the brand attitudes are examined. Based on the 7-point Likert scale (with 7 equals "I like it a lot"), Haier (5.89) and Siemens (6.01) were rated positively, while Mengniu was evaluated with 5.73 and Aptamil 5.70.

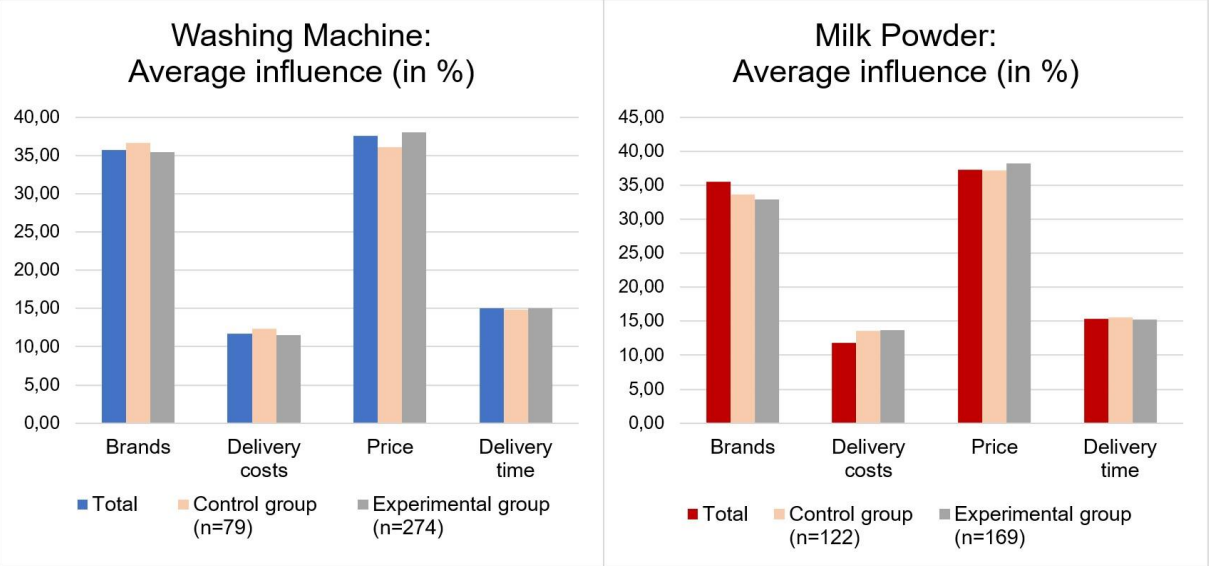


Figure 2: Factors' influence on purchase decision regarding control and experimental group

Regarding the aggregated outcomes (for detailed overview see Appendix D), price and brands affected the purchase decision for washing machine the most (37.59% and 35.67% respectively) and hence, yielded the highest predictive value. In contrast, online shopping factors were less important (delivery costs: 11.72%; delivery time: 15.01%). The same tendency can be observed for milk powder with price (37.82%) and brands (33.19%) representing the main drivers for purchasing, while delivery time (15.36%) and costs (13.64%) rather marginally affecting the purchase.

5.2 Testing Hypotheses 1a-d

The overall results show that Chinese consumers preferred the German washing machine brand (zero-centered part-worth utility: 33.60) over the Chinese one (22.62), the Japanese one (-9.93) and the South Korean one (-46.30). However, as a positive/negative brand attitude might bias the results, we segmented for those consumers with a neutral one towards the German washing machine brand (n=94). In contrast to the aggregated results, those consumers favored the Chinese brand (46.60) over the German one (16.98, $t(93) = -3.07$, $p = .003$; based on t-test), while the Japanese (-13.03) and South Korean brand (-50.55) were less preferred. As the favor towards the Chinese brand compared to the German one might be bias contingent on ethnocentrism, we split those consumers into groups holding low (points 1-2 on the Likert scale), medium (3) and high (4-5) levels of ethnocentrism. Regardless of level of ethnocentrism, all consumers preferred the Chinese over the German washing machine brand (Figure 3, left).

Regarding overall preference patterns for the MP, respondents preferred the Chinese milk powder (zero-centered part-worth utility: 7.74) over the German one (4.71), the one from New Zealand (-3.20) and the Swiss one (-9.25). Focusing on those with a neutral brand attitude towards the German brand (n=92), this sub-segment still favored the Chinese brand (22.20) over the German one (-4.79, $t(91) = -2.29$, $p = .024$; based on t-test), while again the Swiss one (-9.87) and the New Zealand one (-7.53) were least preferred. Analogously to WM, we controlled for ethnocentrism. While Chinese with low levels of ethnocentrism exhibited only a slight tendency towards their home brand (2.35) compared with the German one (-1.22), this tendency intensifies with increasing ethnocentrism (Figure 3, right).

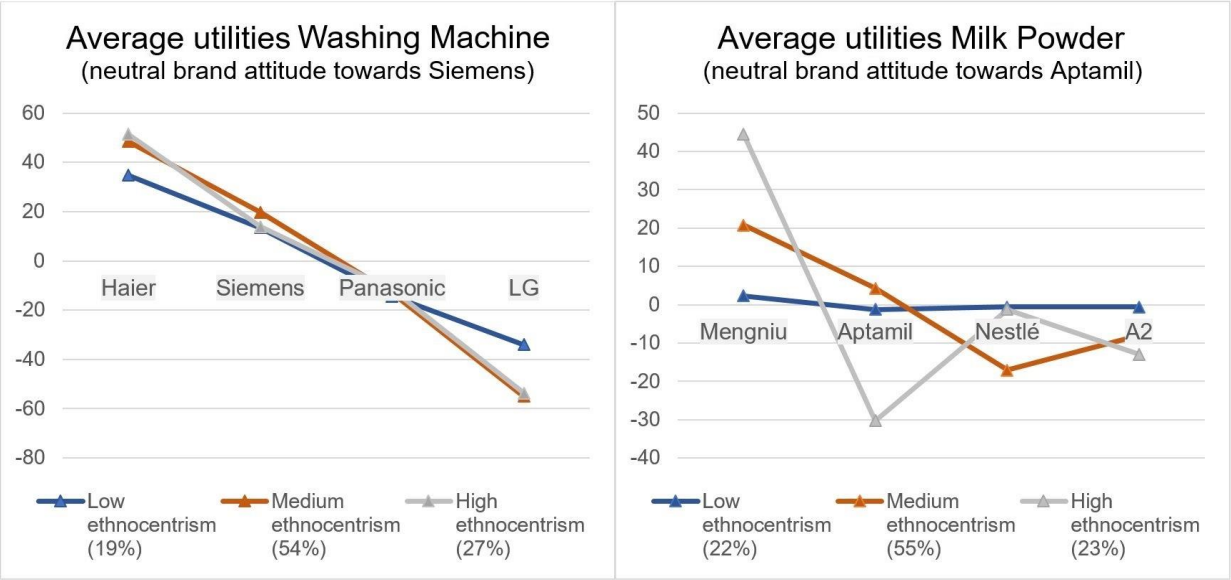


Figure 3: Utilities among consumers with neutral brand attitudes (GER) based on levels of ethnocentrism

To cross-validate these findings, we next control for the utilities provided based on the COI stated. We thus segmented into negative COI for German Washing machines (points 1-2 of Likert scale), neutral (3) and positive COI values (4-5). As an intended result of the three upstream studies, the vast majority of Chinese consumer holds a positive COI of German Washing machines (n=300), fewer with a neutral (n=47) and only some with a negative one (n=6). Solely among those consumers with a positive COI the German brand (35.77) is preferred over the second most preferred brand (Chinese one with 15.35, $t(299) = -3.66$, $p < .001$; based on t-test), and thus, indicating a COO effect (Figure 4, left). However, this finding might be biased by brand attitudes towards the corresponding brands. Hence, we examined the utilities based on COI by focusing only on those with a neutral brand attitude towards the German brand (Figure 4, right). As a result, the previously detected effect dispersed.

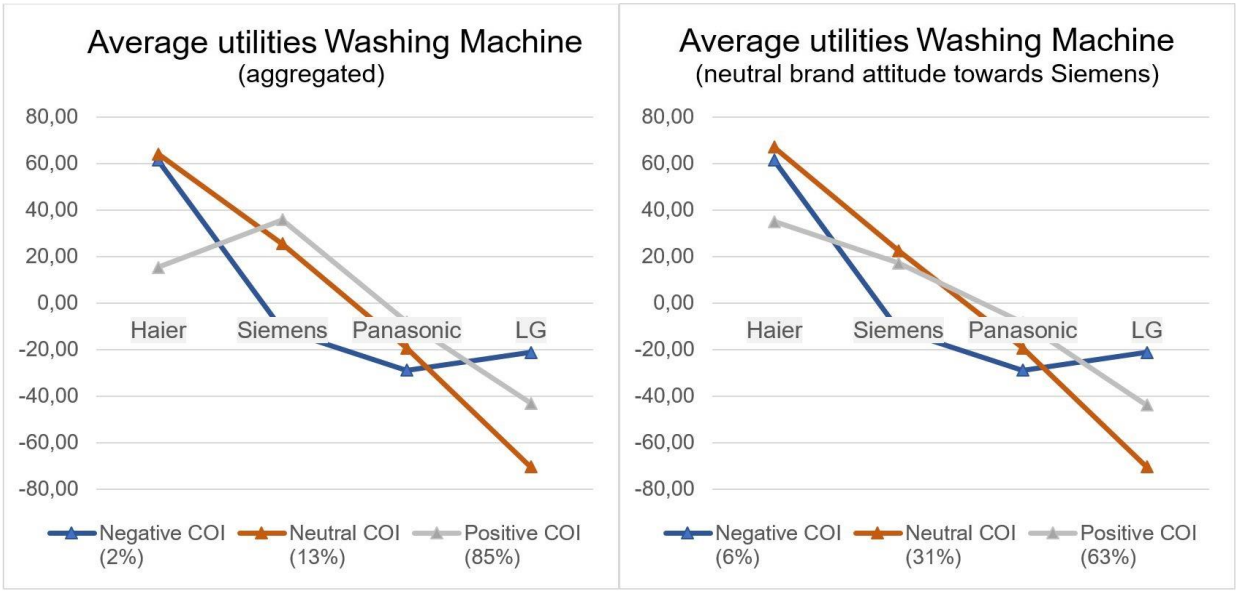


Figure 4: Utilities among all consumers and those with neutral washing machine brand attitudes (GER) based on COI

Focusing on the cross-validation for MP, we conducted the identical analysis. Similarly, triggering the COO effect by the three studies built on each other has proven to work exceptionally well, as 220 consumers (out of 291) exhibited a positive COI towards German MP, followed by 66 with a neutral and only 5 consumers with a negative COI. Again, only consumers with a very positive COI about German milk powder favored the German brand (8.78; Figure 5, left), and thus, significantly more than the second most preferred brand (from New Zealand (0.78, $t(219) = 1.98$, $p = .049$; based on t-test). To control for brand attitude biases, we focused on those yielding a neutral brand attitude once more. Analogously, the observed effect faded (Figure 5, right).

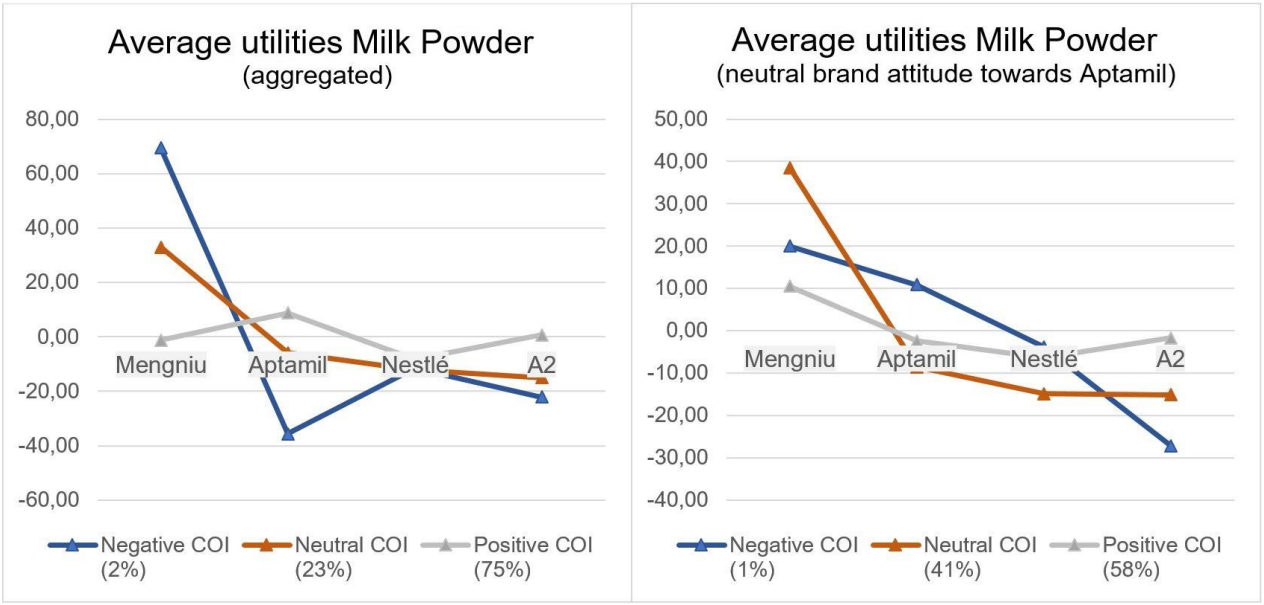


Figure 5: Utilities among all consumers and those with neutral milk powder brand attitudes (GER) based on COI

5.3 Testing hypotheses 2a-b

In a next step, we examined the importance of brands for different levels of COI (H2a, H2b) to extract the impact of COO. Starting with the high-involvement product, we focused on those holding a neutral brand attitude towards Siemens, as consumers with a more positive/negative attitude towards the German washing machine brand might bias measuring the COO effect. Since the dependent variable (influence of COO/brands) was not normally distributed among those consumers (p = .010 based on Shapiro-Wilk test), we conducted a Kruskal-Wallis-test (Kruskal & Wallis, 1952) to analyze the differences based on COI stated. We thus segmented into negative (1-2), neutral (3) and positive (4-5) COI. While differences were observed (χ^2 = 8.97, d.f. = 2, p = .011), especially between Chinese consumers with a neutral and a positive COI about German WMs, the impact of brands - and thus COO - decreases among the latter group (with z = 2.893, p = .011 based on Dunn-Bonferroni test, see Figure 6, left). Assuming the existence of the COO effect, one would expect the impact to increase instead of decrease from those consumers with negative to those with positive COI. In contrast, an up and down tendency is revealed. Only the upper quartiles of the three groups indicate an increasing inclination. While COI yields the most direct link to the product investigated, we controlled for a potential COO effect segmenting based on basic-origin image and product-origin image, however no effect occurred (χ^2 = 3.98, d.f. = 2, p = .137 and χ^2 = 4.87, d.f. = 2, p = .088 respectively), whereas the positive basic-origin image/product-origin image group exhibited lower brand and COO impact.

Regarding the low-involvement product, we applied the same steps of analysis and hence, focused on consumers with a neutral attitude towards the German milk powder brand. Again, the dependent variable was not normally distributed (p = .001 based on Shapiro-Wilk test), and we thus applied a Kruskal-Wallis-test based on consumers stating a negative (1-2), neutral (3) and positive (4-5) COI. No differences were observed, neither for the COI groups (χ^2 = 2.55, d.f. = 2, p = .279), nor for the basic-origin image (χ^2 = 1.27, d.f. = 2, p = .530) or product-origin image (χ^2 = 1.88, d.f. = 2, p = .391) groups.

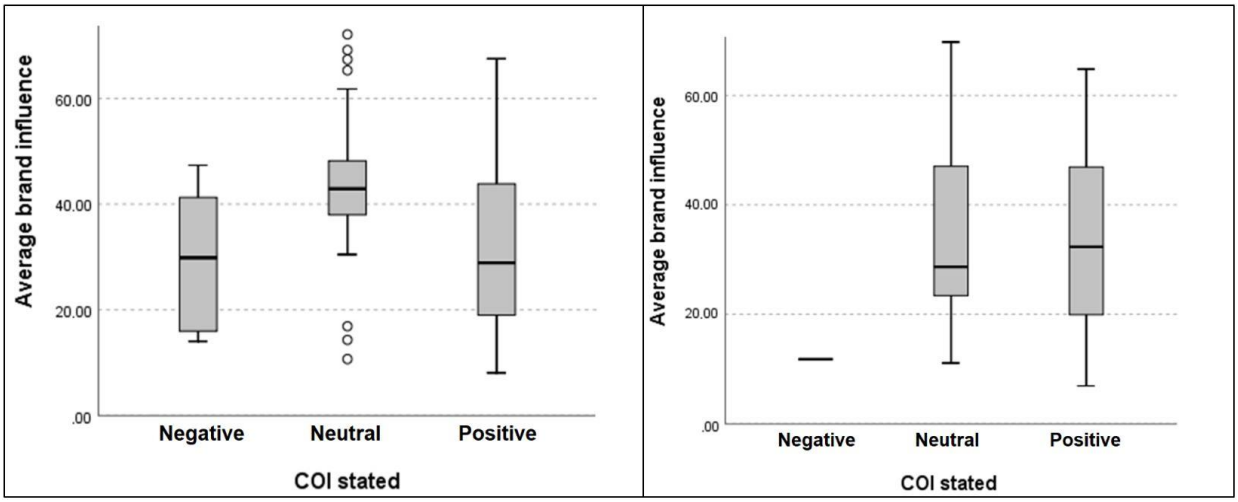


Figure 6: Brand influence dependent on COI stated for German Washing machines (left) and milk powder (right)

5.4 Testing hypothesis 3

Having examined the impact size of and preference patterns for a potential COO effect, which revealed that the effect seems not exist, we analyzed disparities between the low- and the high-involvement product. We thus segmented for those with neutral brand attitude and compared the influence of brands dependent on COI for both products. While all previous examinations indicated a potential COO effect not to appear, a tendency of increased brand importance with more positive COI is observed for MP. In contrast, no distinct direction is evinced for the influence of washing machine brands; however, the impact is generally larger for the high-involvement product (35.54%) compared with the low-involvement one (33.19, $t(290) = -2.25$, $p = .025$; based on t-test).

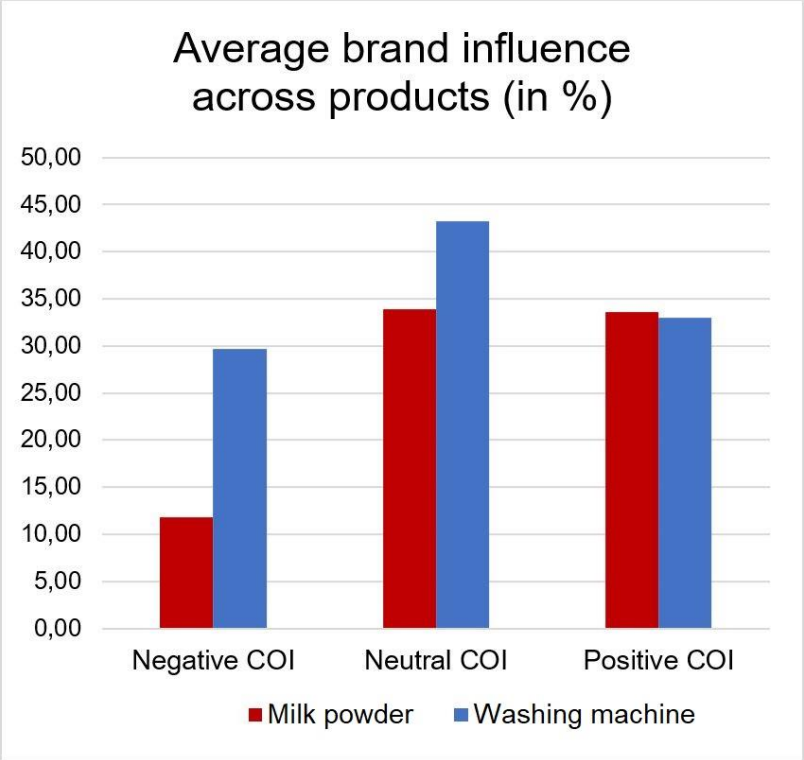


Figure 7: Comparison of brand influence for washing machine and milk powder dependent on COI

5.5 Testing hypotheses 4a-b

In a last step, we analyzed the ethnocentrism impact on the preference patterns. Hence, a confirmatory factor analysis was conducted on the four items with orthogonal rotation. After confirming the factor (Kaiser-Meyer-Olkin criterion = .79; Bartlett's test of sphericity χ^2 (6)= 555.03, $p < .001$; four factors explaining 65.78% of variance), we used the arithmetic mean and segmented into low, medium and high levels of ethnocentrism. For Washing machines the Kruskal-Wallis-test revealed different preferences dependent on ethnocentrism ($\chi^2 = 10.77$, d.f. = 2, $p = .005$), whereas consumers with low ethnocentrism significantly differ in the preference for the Chinese washing machine brand compared to those with medium ($z = -2.46$, $p = .042$ based on Dunn-Bonferroni tests) and high ethnocentrism ($z = -3.27$, $p = .003$), while those with medium and high ethnocentrism did not ($z = -1.00$, $p = .950$, see Figure 8, left).

For MP, similar effects were observed (χ^2 = 8.72, d.f. = 2, p = .013), however less strong compared with the high-involvement product with the only disparities found between consumers with high and low ethnocentrism (z = -2.77, p = .017, see Figure 8, right).

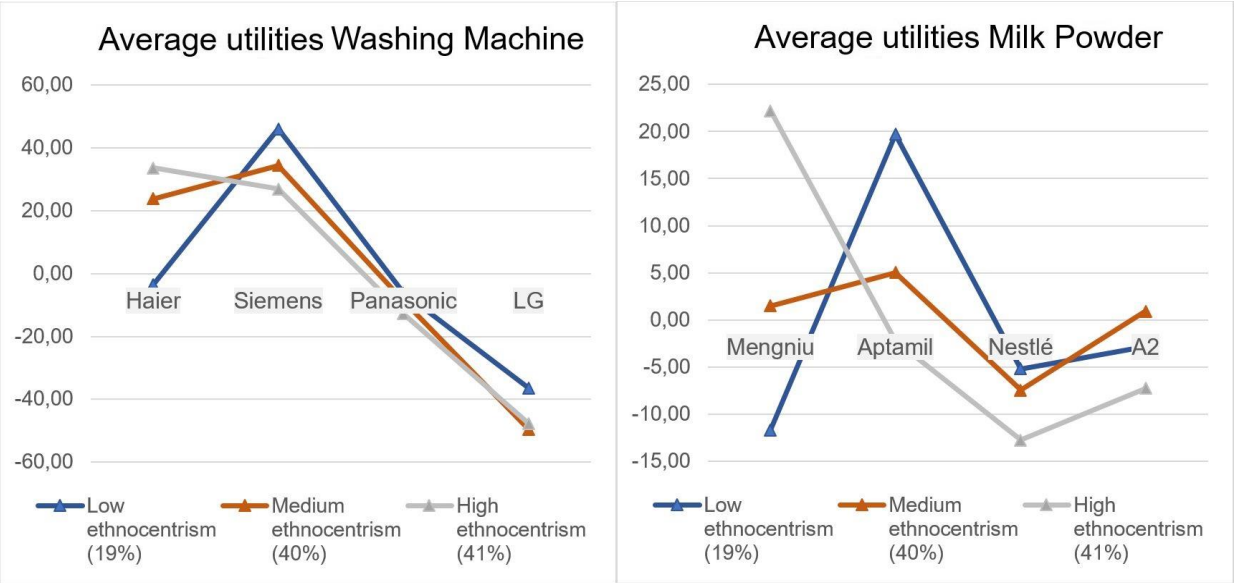


Figure 8: Utilities dependent on level of ethnocentrism

6 Discussion

To investigate if the COO effect actually exists in an e-commerce context when measured appropriately in a multi-cue setting, we built the DCA main study upon three pre-connected studies, which avoided priming respondents and aimed at effectively triggered the occurrence of this effect. Based on cue utilization theory, we emphasized the need to apply multi-cue studies taking into account several impact factors simultaneously in order to imitate purchase decision more realistically. Focusing on the predictive information value of COO on product evaluation and purchase decisions in an e-commerce setting, it has been demonstrated that brands, but not COO matter to online shoppers. By taking into account the consumer-based brand equity approach, we extracted the importance of the COO association inherent to brands while controlling for brand attitude and COI stated. As a result, the extrinsic cues of brands and price had the strongest (and almost equally strong) impact on the purchase decision for both the high- and the low-involvement product, whereas the e-commerce related aspects were of lower importance. For both products, delivery time was found to be more influential than delivery costs, which contradicts findings for sustainable clothing (Stöckigt et al., 2018). This might be explained by the different focus of this study, as delivery time and cost were out in relation to other contextual factors (e.g., environmental impact, working conditions), but price and brands (representing main purchase drivers) were disregarded. It also disagrees with research on delivery options in general (Nguyen et al., 2019); however, in this study the delivery costs were much higher and therefore potentially more important than delivery time. In comparison to other studies focusing on the most important purchase aspects (as

intended for conjoint analysis), we confirmed the major impact of price (Veale & Quester, 2009) and brands (Ong et al., 2010; Speece & Nguyen, 2005).

The three upstream studies have proven to effectively trigger a potential COO effect with a high predictive value (positive COI for German WM: 300/353; for German MP: 220/291). These results are mirrored by the fact that the German washing machine brand was preferred over the Chinese one from an aggregated perspective, and tendency of favoring the German washing machine brand with increasing COI (Figure 4, left), which indicates the existence of a COO effect. However, this finding faded when controlling for brand attitude (Figure 4, right), which corroborates the alternative hypotheses H1a (p = .003) and H1c. Hence, the results indicated that the 'COO effect' is related to the strong washing machine brand (also confirmed by brand attitude ratings) rather than due to an overall more positive COI evaluation. This conclusion is in line with the assumption by Pharr (2005) stating that "a product's country-of-origin evaluations may be subsumed or neutralized by its brand identity". In the same vein, the more general constructs of basic-origin image and product-origin image showed not to increase the importance of COO, and thus, the 'COO effect' regarding products related to Germany might be a result of 'better' brands/brand marketing.

The Chinese milk powder brand was generally slightly favored compared to the German one, whereas only consumers with low/medium ethnocentrism (Figure 8, right), and those with positive COI towards German milk powder (Figure 5, left) preferred the German brand. Again, controlling for brand attitude (Figure 5, right) is neutralizing this tendency and thus, confirming the alternative hypotheses H1b (p = .024) and H1d. Measuring the effect size of brands and a potential COO effect based on COI stated, no differences were observed for the German milk powder (corroborating H2b, p = .279), while the opposite effect occurred for WM, as a more positive COI for German washing machine resulted in an decreasing importance of brands (confirming alternative hypothesis H2a; z = 2.893, p = .011).

Comparing the high- and low-involvement product, the washing machine brand influence is significantly higher (35.54%, $t(290)$ = 2.25, p = .025; based on t-test) than the milk powder one (33.19%), which confirms H3. Although the increase of the extracted COO importance from negative to positive COI is higher for the low-involvement product compared with the high-involvement product (Figure 7), this finding needs to be treated with much caution, as only one consumer was holding both a negative COI and a neutral brand attitude towards German MP. While no COO effect was confirmed, ethnocentrism was found to moderate the preference towards respondents' home brand, both for the high- and low-involvement product (Figure 8). Hence, support is provided for hypothesis H4a (p = .005) and H4b (p = .013). These findings resonate with recent research (Balabanis & Siamagka, 2017) claiming that ethnocentrism is stronger for high-involvement products, and comparably high ethnocentrism among Chinese in general (Sun et al., 2020).

While this study's findings contradict the vast majority of COO research, which assumes the COO effect to be existing and in most cases to significantly affect the product evaluation and purchase decision, support is yielded from other investigations taking into account several impact factors simultaneously.

For instance, our results confirm studies using multi-attribute models, which found the COO effect to be of minor importance (Johansson et al., 1985). Accordingly, "Country-of-origin effects may be less significant than has generally been believed, and they may occur predominantly in relation to evaluation of specific attributes rather than overall evaluations" (Johansson et al., 1985, p. 395). Since the DCA requires respondents to make selections based on products as a whole, and thus, imitates online purchases more realistically, yielding a negligible COO effect size matches earlier findings. Similarly, our results corroborate a non-existing to marginal impact of COO compared with the conjoint study by Ettenson et al. (1988). They found that purchasing apparel products is primarily driven by fiber content (25-35%), price (13-16%), apparels' cut (11%) and style (4%), followed by only 3-4% (6% in second test) of variance explained by COO. This matches earlier findings of multi-cue research, whereby COO only marginally (2-4%) explained the variance of product quality (Thorelli et al., 1989). Another study applying a multi-cue investigation design confirms the impact of COO to be of minor importance (8%) for food products (Stöckigt et al., 2018). Accordingly, other purchase drivers are significantly more important (such as producers' working conditions (28%), price (26%), environmental impact (25%) or availability (13%)). Investigating multiple factors simultaneously, Erickson et al. (1984) also found price, attitude and products' durability to significantly impact product quality evaluation, whereas the COO did not. These studies and the analyses presented thus confirm findings from the meta-analysis by Verlegh and Steenkamp (1999), who found the COO effect to be much smaller in multi-cue investigations. Since purchase decision in real life are not made by focusing on the COO cue only to evaluate products, "[t]he use of multiple cues renders a more accurate assessment of the relative importance of the […] country-of-origin cue on consumer decision making" (Thorelli et al., 1989, p. 43).

7 Implications

7.1 Theoretical implications

In contrast to the 1970s when the COO effect was first empirically examined (Schooler, 1965), products nowadays have fabrication value chains across multiple countries, and online shopping facilitates purchasing from other countries in a globalized world. To provide a more contemporary and thus, more realistic context, we contribute to literature by being the first to capture the COO effect in an online shopping setting. While previous research analyzing transaction data found sellers' origin to matter in e-commerce (Zhao et al., 2019) or even explicitly using the COO cue to ease the decision process in a globalized world with a large range of products (Kock et al., 2019), no COO effect evinced regarding products purchased. Similar to previous conjoint studies analyzing COO, we examined its effect in a multi-cue environment to further increase the closeness to reality and hence, the findings revealed. However, in opposition to the vast majority of those investigations (see table 1), we overcome the detected limitations and measured COO as part of brands and enabled a direct comparison of the COO for low- and high-involvement products. Since the methodological approach seems to be more appropriate in capturing COO's actual effect size, we contribute to literature by empirically proofing that the effect is

irrelevant in the more contemporary context of online shopping. Hence, extant literature about the COO effect should to be treat with much caution and dependent on the investigations' contexts.

In line with findings from Andéhn and L'Espoir Decosta (2016), who found varying impact sizes of basic-origin image, product-origin image and COI on brand equity with COI revealing the most substantial influence, our results emphasized the importance of treating COO as multi-facetted construct instead of the unidirectional concept of "the" COO effect (implying one facet only). Additionally, by cross-validating the results of the DCA, we confirmed COI to most precisely explain differences in the preferences for products from various countries.

Moreover, we fill the literature gap postulated by Diamantopoulos et al. (2017) and (re-)introduced a measurement technique to capture the implicit facets of COO, as well as suggestions raised by Kock et al. (2019) for indirect measures for examining COO. By developing our main investigation on the solid foundation of four built on one another studies, we successfully triggered a potential COO effect (majority of respondents yielding very positive attitudes and COI regarding the selected brands and Germany). This approach further dissolved the priming issue inherent to many COO studies (Andéhn & L'Espoir Decosta, 2016). Not referring to the COO explicitly in the main study might explain why the majority of previous literature found evidence for the effect, as priming, treating COO as salient variable, and neglecting relevant contextual factors (e.g., price) result in an inflated COO effect, whereas it rather seems to be an artefact.

Our findings add to the concern about the existence of an actual COO effect. We thus confirm the assumption raised by Pharr (2005) stating that "it would appear that either past research has inflated the influence that country of origin has on consumers' product judgments and behavior (by using experimentally manipulated COO cues in laboratory settings) or that the construct is subject to decreased salience in today's era of global brands" (p. 41). Similarly, Showers and Showers (1993) found diverging results dependent on how COO is measured. In the same vein, Ettenson et al. (1988) found 37-42% of respondents to indicate that the COO was somewhat or very important to them when directly asked about it, whereas the COO information accounted for approximately 4% of the purchase decision when simultaneously considering several impact factors. The authors explained the discrepancies by assuming previous studies to foster socially desirable answers "particularly when the purpose of the research was made obvious by the presentation of only country-of-origin information" (Ettenson et al., 1988, p. 95). To overcome this limitation, we contribute to literature by proposing a research framework (three pre-connected studies) which prevents priming respondents and evoking an artificially increased awareness for the COO effect. Since the vast majority of COO research urges respondents to evaluate product by an artificially increased focus on the COO cue, we follow the recommendations by Magnusson et al. (2011b) and exposed respondents to product selections where they had to assess the purchase decision (including brands, price, delivery costs and time) as a whole instead. We further emphasize the need for multi-cue investigations in the COO field, since extant literature, where "country-of-origin was treated as an isolated variable in a survey task. […] the importance of country of origin in the decision process

may have been overestimated simply because it was the only variable manipulated" (Ettenson et al., 1988, p. 96).

As global players nowadays are manufacturing in one country, assembling in another and designing their products in a third one, the initial indicator of 'made in …' and thus, the related effect seems to be outdated, whereas "brand origin perception appears to be more important" (Magnusson et al., 2011b). This development might have been catalyzed by increasingly diluted legal requirements for using 'made in' claims (Clarke et al., 2000). We thus focus on brands instead of 'made in' claims, which matches recent COO literature and depicts actual purchase decisions more realistically. Moreover, we contribute to literature by examining consequences of the (geographical) disaggregation of global value chains (Buckley et al., 2017) and thus, focus on brand by controlling for three COO constructs. Apart from that, other indicators (e.g., online customer reviews) coming along with prevalence of e-commerce might be more influential than the image of the country-of-brands. Hence, one could also investigate the impact of COO in contrast to online customer reviews for products from different countries on the purchase decision.

The cue utilization theory enabled us to investigate the COO impact in relation to other main purchase drivers and thereby, to overcome methodological issues in measuring the effect size more appropriately (Thorelli et al., 1989). As a result, examining the relative importance of the COO cue through the lenses of this theoretical framework "provides a more accurate measurement of the characteristics of the country of origin cue" (Eroglu & Machleit, 1989, p. 29). In particular in the e-commerce context, where the COO effect has not yet been examined, using this theoretical framework recommends incorporating additional purchase drivers than for instance price and brands only. Moreover, by building upon the three pre-connected studies, respondents yielded high confidence values about the correct COO attribution, which was confirmed by the assigning task for the experimental group. Combining the assumptions of the consumer-based brand equity with the rationale of the predictive value, we were able to extract the influence of COO separately from the brand impact. In contrast to the very limited amount this theoretical framework received in COO research recently (Lu et al., 2016), we outlined that its assumptions constitute fruitful ground for measuring the COO effect accurately.

7.2 Managerial implications

Even though the Chinese e-commerce market provides huge potential for companies selling their products online, companies and their brands need to establish a reputation for quality early on (Clemons et al., 2016). Therefore, it is inevitable to know which product categories Chinese consumers preferably are bought from overseas. This study contributes to practical implication by highlighting the nine preferred product categories from German companies demanded by Chinese consumer and which of those are most preferably bought. The top 5 product categories for instance are automobiles, household appliances, dairy products, health-related products and apparel.

As we found the COO effect not to exist in the online shopping context, companies might focus on other information cues instead to increase the quality perception of their products. Here, the before-mentioned

online customer reviews represent one of many potential starting points; however, fake reviews are increasingly often impede finding high quality products (Zhuang et al., 2018). Additionally, online shop operators should focus more on offering a great variety of different brands and product discounts instead of trying to provide the fastest delivery with the lowest possible delivery costs, since the latter two were found to be of minor importance.

The main study further showed that brands (but not the COO) represent the most substantial reason for Chinese to purchase products preferably bought from German companies and that for high-involvement products the German ones are preferred (Appendix D) even though almost half of the respondents were identified as highly ethnocentric. Therefore, foreign companies selling their (high-involvement) products online should try to build a strong brand reputation to establish themselves in the largest e-commerce market, which appears to yield many ethnocentric consumers.

8 Limitations and future research

To trigger a potential COO effect, we focused on products yielding a German country-of-brands and Chinese consumers (more precisely: those of Generation Y) only. On the one hand, this limits generalizability, but on the other hand we intended to evoke COO's maximum effect size. Hence, focusing on the Chinese e-commerce market (representing the world's largest one) seemed to be appropriate, as experts confirmed that Chinese consumers preferably buy many products associated with the (rather outdated) 'made in Germany' claim. While we provided arguments speaking against the existence of a COO effect in this context, future research might replicate the investigation with brands of different origins and other consumers. However, the goal was not to provide a universally valid impact size of COO, but rather to reveal whether the COO actually exists by evoking it in online shopping for both low- and high-involvement products. As COO depends on (inter alia) the need to justify the decision, the presence/absence of emotionally-laden trade-offs, the product (categories) and the context (e.g., price, other available information), its impact will be modified accordingly (similar to the 'value-in-context' (Chandler & Vargo, 2011)). Additionally, the decision heuristics applied by consumers comparing different product may alter the COO impact. While this study is focusing on decisions related to finding the most preferred option out of the choice set and thus, assumes compensatory heuristics, forming the consideration set follows non-compensatory heuristics (Brand & Rausch, 2021). However, since the brands used in the main study have been found to yield high brand familiarity and positive evaluations among Chinese consumers (study 3), it can be presumed that the brands to be compared in the DCA main study are already part of the choice set and hence, compensatory heuristics will be applied.

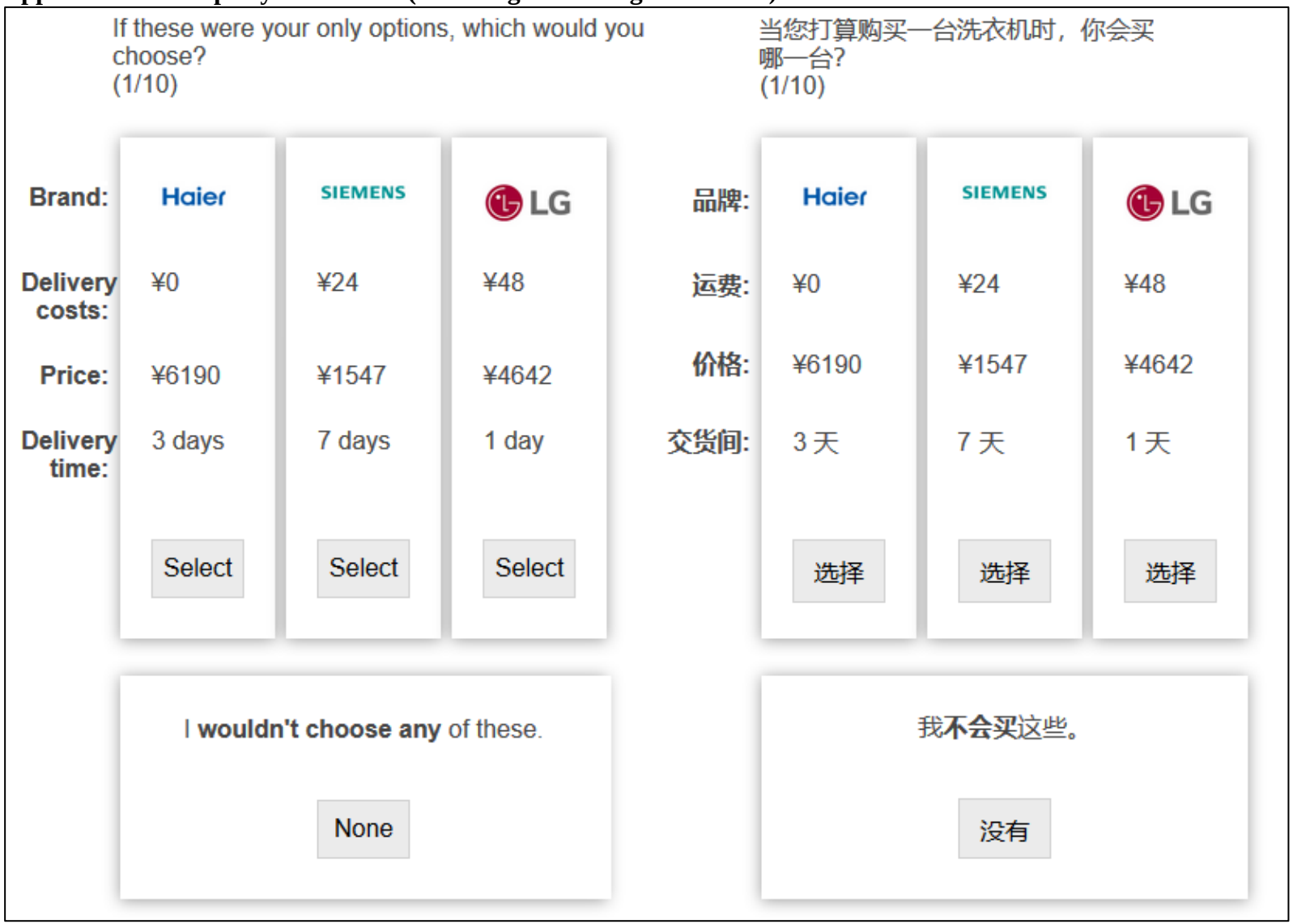
While we controlled for brand attitude, one might use the general impact of brands as another control variable in future investigations. Based on the construct of 'brand relevance in category' (Fischer et al., 2009), one could focus on consumers with neutral brand attitude, which additional yield low (vs. high) brand relevance scores, to extract a potential COO effect from the pure impact of brands. Additionally, we focused on brands yielding high brand familiarity among Chinese and thus, allowed us to prevent

priming respondents by clarifying each brands' origin. However, research showed that the COO effect might be stronger when consumers are less familiar with a brand (Bluemelhuber et al., 2007).

Apart from that, it would be of interest how intrinsic cues or further extrinsic cues (such as online product reviews or different online shop retailers) are influencing consumers' decision making regarding a potential COO impact. However, when investigating the purchase decision with many impact factors, other decompositional methods, such as the Adaptive CBC, will be more appropriate (Brand & Baier, 2020). Besides, one might examine COO effects in the food context (e.g., for supplements), as the COO with its initial 'made in' claims is of greater relevance for these products (Andéhn & L'Espoir Decosta, 2016; Meyerding et al., 2019).

Appendix

Appendix A: Exemplary choice task (including initial English version)



Appendix B: Constructs applied

Construct	Items	Source(s)
Brand Attitude	I detest the brand a lot – I like the brand a lot	Balabanis et al. (2019); Spears and Singh (2004)
Brand Familiarity	I am familiar with this brand.	Andéhn and L'Espoir Decosta (2016)
COI	[WASHING MACHINES/MILK POWDER] from that country are of high quality.	Josiassen et al. (2013)
Basic-Origin Image	1. People from [GERMANY/CHINA/JAPAN/SOUTH KOREA/SWITZERLAND/NEW ZEALAND] are very competent. 2. People from [GERMANY/CHINA/JAPAN/SOUTH KOREA/SWITZERLAND/NEW ZEALAND] are very dependable.	Josiassen et al. (2013)
Product-Origin Image	[HOUSEHOLD APPLIANCES/DAIRY PRODUCTS] from that country are of very high quality.	Josiassen et al. (2013)
Ethnocentrism	1. It is not right to purchase foreign made products. 2. Chinese people should always buy Chinese made products instead of imports. 3. Foreign made product should be taxed heavily to reduce their entry to China. 4. It is always best to purchase products made in China.	Kabadayi and Lerman (2011); Shimp and Sharma (1987)
Product Involvement	[PRODUCT] is very important to me.	Zolfagharian et al. (2017)
Purchase Intention	I have a purchase intention toward this [PRODUCT].	Garrett et al. (2017)

Appendix C: Socio-demographic information

Demographic	Specification	Counts	Proportion (in %)
Sex	Female	199	56.4
	Male	154	43.6
	No information provided	0	0
Age	18-22 years	6	1.7
	23-27 years	46	13.0
	28-32 years	139	39.4
	33-37 years	116	32.9
	38-40 years	46	13.0
Education	High/Senior school	10	2.8
	Bachelor degree	287	81.3
	Master degree	48	13.6
	PhD	5	1.4
	Other	3	0.8
Income	<4,000 ¥	12	3.4
	4,000-5,999 ¥	31	8.8
	6,000-7,999 ¥	46	13.0
	8,000-9,999 ¥	48	13.6
	10,000-11,999 ¥	37	10.5
	12,000-13,999 ¥	38	10.8
	14,000-15,999 ¥	36	10.2
	16,000-17,999 ¥	18	5.1
	18,000-19,999 ¥	28	7.9
	20,000-21,999 ¥	25	7.1
	22,000-23,999 ¥	8	2.3
	>24,000 ¥	26	7.4

Appendix D: Aggregated results for washing machine (first table) and milk powder (second table)

Attributes and Attribute Levels

(WM)		Average Importance and Part-Worth Utilities	(SD)
Brand		**35.67 %**	**(16.59)**
	Haier (China)	22.62	(72.77)
	Siemens (Germany)	33.60	(45.88)
	Panasonic (Japan)	-9.93	(37.28)
	LG (South Korea)	-46.30	(46.57)
Delivery Costs		**11.72 %**	**(6.49)**
	¥0	9.42	(21.58)
	¥24	4.23	(12.52)
	¥48	-2.36	(23.65)
	¥72	-11.29	(17.24)
Delivery Time		**15.01 %**	**(8.22)**
	1 day	17.29	(80.07)
	3 days	27.12	(32.15)
	5 days	-0.51	(36.06)
	7 days	-43.89	(66.04)
Price		**37.59 %**	**(17.63)**
	1,547 ¥ (200 Euro)	12.63	(32.00)
	3,095 ¥ (400 Euro)	8.43	(18.64)
	4,642 ¥ (600 Euro)	-6.46	(17.48)
	6,190 ¥(800 Euro)	-14.60	(24.49)
	NONE	-139.50	(178.17)

Appendix D (continued)

Attributes and Attribute Levels (MP)		Average Importance and Part-Worth Utilities	(SD)
Brand		**33.19 %**	**(15.59)**
	Mengniu (China)	7.74	(76.17)
	Nestlé (Switzerland)	-9.25	(50.03)
	Aptamil (Germany)	4.71	(51.79)
	A2 (New Zealand)	-3.20	(47.89)
Delivery Costs		**13.64 %**	**(7.48)**
	¥0	6.74	(30.40)
	¥12	7.24	(17.47)
	¥24	-0.76	(21.01)
	¥36	-13.21	(19.50)
Delivery Time		**15.36 %**	**(8.38)**
	1 day	13.93	(29.16)
	3 days	-0.28	(21.99)
	5 days	-1.17	(24.70)
	7 days	-12.48	(26.11)
Price (per kilo-gramm)		**37.82 %**	**(17.58)**
	77 ¥ (10 Euro)	16.86	(82.88)
	155 ¥ (20 Euro)	18.15	(33.11)
	232 ¥ (30 Euro)	1.02	(38.09)
	309 ¥(40 Euro)	-36.03	(70.15)
	NONE	-235.73	(231.01)

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3.2 Adaptive CBC: are the benefits justifying its additional efforts compared to traditional CBC?

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Abstract

Currently, there is a big discussion ongoing among both practitioners and scientists whether the benefits of the Adaptive Choice-Based Conjoint (ACBC) analysis in comparison to (standard) Choice-Based Conjoint (CBC) analysis are justifying the additional costs and efforts of ACBC. To answer this question, recent studies in literature are reviewed and a conducted ACBC (n=205) about e-commerce in an international context is analyzed with regards to several aspects, e.g. excluded attribute levels and stimuli used for the Choice Tasks section. The results indicate that CBC is generally able to provide the main information about the most preferred attribute levels with less effort compared to ACBC. However, ACBC is very suitable for more complex products or services and for gaining deeper insights, such as information about the second-best options or completely unacceptable features. Furthermore, CBC requires a bigger sample size and is often less precise. Still, the related context will remain the main factor for or against the usage of one or the other method.

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1 Introduction

Choice-Based Conjoint analysis (CBC) has been the most frequently used form of conjoint analysis amongst all existing ones in the last decades (Ku et al., 2017; Voleti et al., 2017). Originally developed by Louviere and Woodworth (1983) and made easily applicable by Sawtooth Software‘s CBC system in 1993, CBC nowadays is the standard method to analyze discrete choices among multi-attributed stimuli. (Standard) CBC not only outperforms traditional conjoint analysis (TCA) – even if hierarchical Bayes estimation is used in the latter one (Baier et al., 2016) – but CBC is also able to illustrate the decision making process more realistically, especially if extended by incentive alignment (Ding, 2007) or dual-response procedures (Wlömert & Eggers, 2016). However, the latest report of conjoint analysis usage (Sawtooth Software, 2019) states that the percentage of Adaptive Choice-Based Conjoint analysis[4] (ACBC) projects increased in recent years, while the percentage of CBC projects slightly declined. The ACBC invented in 2007 (Johnson & Orme) comes at certain costs, but it also provides many benefits for researchers and practitioners likewise. Accordingly, there is an ongoing major debate about whether the benefits of ACBC are justifying its additional efforts compared to CBC. To cover all relevant aspects, the paper at hand is structured as follows: First, the theoretical disadvantages of CBC investigations are presented (Section 1). Founded on these shortcomings, the ACBC and its theoretical advantages are illuminated in Section 3. Afterwards, a review of recent studies dealing with the comparison of CBC to ACBC is given (Section 4), before an own empirical study (Section 5) is used for examining the diverse trade-off aspects (Section 6). In Section 7, a conclusion is drawn based on this concrete investigation.

2 Theoretical disadvantages of CBC

The development of ACBC was propelled by shortcomings performing a CBC investigation. Major issues with CBC investigations are illustrated in table 1.

Table 1: Theoretical disadvantages with CBC investigations

Theoretical Disadvantage	Source(s)
Answering the same question multiple times across varying choice tasks is often experienced as very monotonous and boring	Bauer et al. (2015); Lines and Denstadli (2004)
Respondents are often facing stimuli that are irrelevant to them	Garver et al. (2012)
⇨ If respondents focus on certain key features not contained within the stimuli, they may only choose the none-option	Steiner and Meißner (2018)
(When applying more than just a limited amount of most important attributes) respondents tend to not carefully weigh up the trade-off of different choices (anymore)	Scholz et al. (2010)
⇨ Instead, they use fast-feasible simplification strategies	
⇨ Respondents’ choices could better be captured by non-compensatory models where only a few attribute levels are considered	Gilbride and Allenby (2004); Ryan et al. (2009); Yee et al. (2007)
Still, CBC assumes a compensatory model with respondents carefully weighing up different choice options using compensatory decision heuristics	Garver et al. (2012); Scholz et al. (2010)

[4] referring to the composition of Sawtooth Software.

Even though research proposed optimized types of CBC, where choice tasks are adapted depending on previous decisions (Gensler et al., 2012; Toubia et al., 2004), the overall layout of the survey remains identical. The findings (table 1) go in line with recently conducted research showing that the validity of commercially fielded CBC investigations slightly went down (Selka & Baier, 2014).
Apparently, the assumption of a compensatory model with compensatory decision heuristics does neither go in line with the observed quick answering behavior, nor with detected simplified respondents heuristics, which led to the development of ACBC in 2007 by Johnson and Orme.

3 ACBC and its theoretical advantages

The process of ACBC contains three to four sections: In the first section (“Build-Your-Own”, abbr.: BYO) respondents are asked to create their ideal product selecting the best attribute levels. Similar to the incentive-aligned upgrading method from Park et al. (2008), it is possible to extend the BYO by a "summed price"-setup allowing to determine a base price and/or component prices for all attribute levels. The researcher may further specify which attributes should be included in the BYO-section and whether conditional attributes exist or whether a conditional display should be part of the BYO. The latter one illustrates the current BYO-selection based on what respondents are indicating. Based on this ideal product, a screening section is pursued. Here, respondents are exposed to similar stimuli (as full-profile stimuli), asking whether presented stimuli are taken into consideration or not (binary choice: “a possibility” vs. “not a possibility”). Depending on which attribute levels of a stimulus are chosen very frequently, respondents are asked whether the related attribute level is representing a “must-have”-level to them. In parallel to this, respondents will be asked whether an attribute level is considered as an unacceptable attribute level, when the same attribute levels of a stimulus are always rejected. When respondents are thereby asked to select the most unacceptable (or most important) level out of the detected attribute levels proposed, respondents still could select that
none of these presents an unacceptable (or must-have) level. Here, researchers may specify how many unacceptable and must-have levels could potentially be detected. It is recommended to use the #Unacceptables = #ScreeningTasks – 3 and #MustHaves = #ScreeningTasks - 4 (Sawtooth Software, 2014).

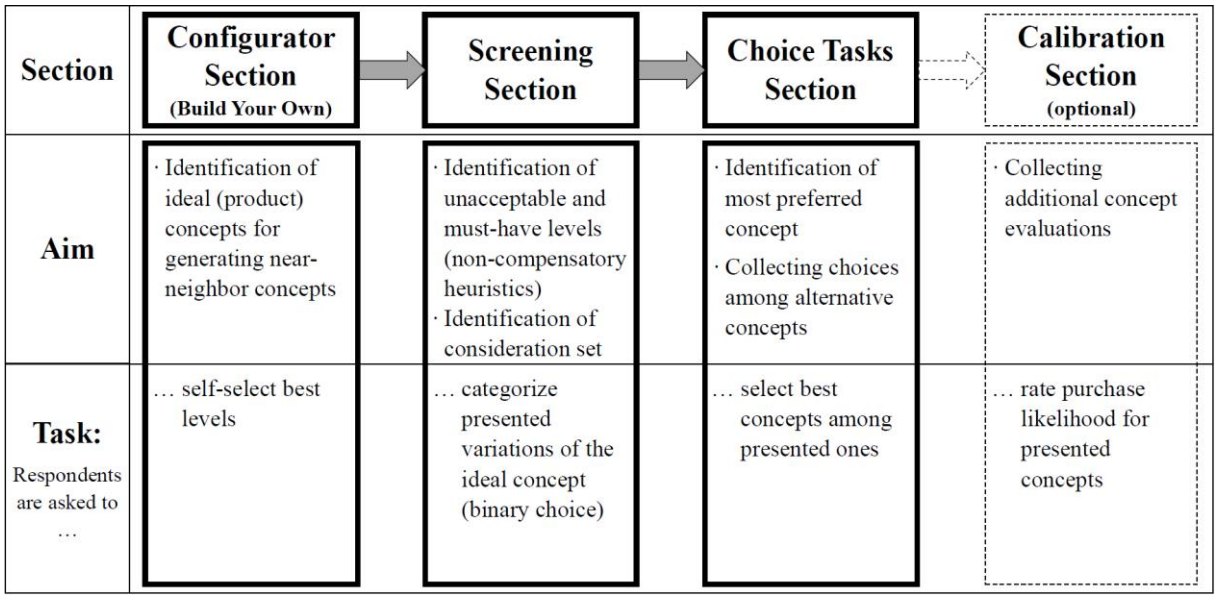

Figure 1: Procedure of an Adaptive Choice-Based Conjoint analysis (based on Sawtooth Software, 2014)

Based on the results of the selected must-have and unacceptable levels, a regular CBC is performed. Here, unacceptable attribute levels will not appear at all, while must-have levels kept constant for all stimuli in each choice set (highlighted in gray) to ensure that the proposed stimuli are really part of respondents' evoked set and to allow respondents to focus on their relevant trade-off attribute levels. Again, the researcher may specify how many stimuli (out of the stimuli selected as a possibility in the screening section) should be part of this choice tournament section. The chosen "winning" stimulus of each choice set will be compared with other winning stimuli in subsequent choice tasks, until the most preferred stimulus is identified. With k stimuli marked as a possibility in the screening section, the final winning stimulus will be yielded after k/2 choice tasks when using three stimuli per choice task (Sawtooth Software, 2014). Additionally, a fourth section can be included asking for buying probabilities ("calibration section") for the BYO-option, winning concept of the CBC tournament and further stimuli. These buying probabilities are enquired by a scale ranging from a minimum of two to a maximum of nine scale points (by default, a 5-point Likert scale is used).

Critically reflecting this procedure, one might argue that the eligibility of ACBC for simplifying the trade-off decisions compared to CBC is not sufficiently given when also using full-profile stimuli. However, in contrast to CBC design, the screening section is not asking about the best choice, but whether the presented stimuli are generally taken into consideration allowing to simplify the decision. This approach aims to mimic a more realistic choice behavior by deploying a two-step decision making process: first, consumers will form an evoked set (screening section), before choosing the best option within that evoked set (CBC section) subsequently (Shocker et al., 1991; Turley & LeBlanc, 1995). This kind of procedure is similar to dual-response types of CBC that have proven to outperform CBC in several regards (Schlereth & Skiera, 2016; Wlömert & Eggers, 2016). Apart from that, the implementation of both types of choice tasks (taking stimuli into consideration or not, as well as choosing the best stimulus)

allows to combine the benefits of applying rejectable choice sets (with more evaluative judgments) and forced choice sets (with more comparative judgments) and thereby highlight how respondents process and recall information from choice tasks (Parker & Schrift, 2011).

Furthermore, it should be noticed that the choice tournament section resembles the CBC procedure resulting in the same monotonous patterns. However, the previous two sections enable respondents to focus on far less stimuli in this section and the ones presented are even closer to the individual, ideal configuration. Additionally, specifying an ideal BYO-stimulus and include/exclude concepts into one's consideration set is loosening the rigid procedure of sole CBC procedures and could be considered to require less cognitive effort than choosing the best option. Moreover, this adaptive approach could handle extreme response behavior (frequently occurring with CBC investigations Gensler et al., 2012) better by applying the previous two sections.

The designs created for the screening-section are based on the selection in the BYO-section. In line with the traditional orthogonal array, each attribute should vary in order to accomplish maximum statistical efficiency. If only a certain amount of attributes varies, this will result in lower statistical efficiency. Therefore, the design creation using ACBC tries to antagonize these issues by focusing on "near-neighbor"-stimuli that are more relevant to respondents (Sawtooth Software, 2014). Apart from that, usual design efficiency criteria employed for CBC investigations (such as high D-efficiency and orthogonality) are based on the assumption of respondents using compensatory decision heuristics. Hence, the design of ACBC experiments should take into account the before-mentioned non-compensatory screening rules most respondents are applying. Additionally, varying only a subset of all attributes within each stimulus will lead to less noise in the data. Consequently, the designs could not be considered as perfectly orthogonal, though they have proven to function very well and a feature was implemented into the software to check the design created regarding orthogonality (Sawtooth Software, 2014).

These near-orthogonal designs follow a five-step algorithm (Sawtooth Software, 2014): Depending on the BYO-selection by respondents, a vector S_0 with as many elements as attributes contained in the BYO-section explains which attribute levels have been chosen for the ideal BYO-option. On the researchers' side, one could determine the total number of stimuli that should be created (T), as well as the minimum amount of attributes varying from the BYO-selection (A_{min}) and the maximum amount of attributes varying from the BYO-selection (A_{max}). For the latter one, half of all attributes in the BYO could be varied at maximum.

Step 1: In order to generate a new near-neighbor stimulus S_i, the algorithm randomly chooses an integer (A_i) ranging from A_{min} to A_{max} specifying how many attributes within S_0 will be modified.

Step 2: A_i elements within S_0 are randomly selected to be modified.

Step 3: New levels for the attributes selected from the previous step are randomly chosen varying from BYO-selection. All other attribute levels from the BYO-selection are kept constant.

Step 4: It is checked whether the concept selected is not a duplicate to another stimulus previously chosen for this respondent and is not at odds with any prohibited pairs. In case the chosen stimulus is prohibited or a duplicate, the stimulus will be rejected and the first step starts again.

Step 5: It is tested whether relabeling non-BYO selected attribute levels to a different non-BYO selected attribute level within the same attribute improves the relative D-efficiency of the design for this respondent. In parallel to this, it is checked whether swapping non-BYO selected attribute levels between two stimuli improves the relative D-efficiency. In case swapping or relabeling increases efficiency while the target level count balance is not deteriorating adaptions are accepted.

4 Results from empirical comparisons of CBC and ACBC

Before evaluating ACBC's benefits and additional efforts compared with CBC based on an empirical study in the context of international e-commerce, recent studies comparing the two methods in other environments are presented in chronological order:

Table 2: Review of Recent Studies Comparing (HIT-)CBC to ACBC

Source	Sample	Application Example	Results
Johnson and Orme (2007)	n_{CBC}=277, n_{ACBC}=282	Laptops	Median time to complete ACBC (11.6 minutes) more than twice the time for a CBC (5.4 minutes) ACBC is experienced as more interesting & more realistic Both methods produced similar results in terms of Mean Absolute Errors (abbr.: MAE) for predicting holdout shares Hit rate for the last holdout used was significantly higher for the ACBC
	n_{CBC}≈500, n_{ACBC}≈400	Recreational Equipment	ACBC's hit rate was higher than CBC's, albeit not significantly
Orme and Johnson (2008)	$n_{ACBC\ I}$=299, $n_{ACBC\ II}$=303, $n_{ACBC\ III}$=295, n_{CBC}=314	Home Purchases	ACBC outperformed CBC in terms of MAE, market share predictions & hit rates, albeit not significantly regarding hit rates
Chapman et al. (2009)	n_{CBC}=201, n_{ACBC}=199	Computer Accessory	ACBC's estimates were closer to actual market data, generating smaller standard deviations of respondents' utilities & yielding 15-25% lower error proportion than CBC ACBC showed to estimate greater price sensitivity
Cunningham et al. (2010)	Review of Various Articles	-	ACBC simulates the decision-making process more realistically & respondents evaluated this method as more engaging than traditional conjoint approaches ACBC shows improved prediction of holdout tasks, more precise estimations of product decisions & lower standard errors ACBC requires more time for completion
Jervis et al. (2012)	n_{CBC}=777, n_{ACBC}=250	Sour Cream	ACBC performs better in estimating the perception of brands & price compared to CBC, with smaller standard deviations at the estimated individual utilities Confirmed earlier proposition that ACBC leads to similar results even if smaller samples are used
Bauer et al. (2015)	n=423 for both methods, $n_{holdout}$=66	Cars	ACBC significantly outperforms even HIT-CBC regarding hit rates & qualitative criteria, such as overall pleasure, task simplicity, closeness to reality & enjoyment Internal (using holdout tasks) & external (using a separate holdout sample) MAEs have been smaller using ACBC

Similarily to Chapman et al. (2009), more precise estimations about the willingness-to-pay were also confirmed by Gensler et al. (2012), who adapted price levels based on previous choice decisions and

implemented conjunctive and disjunctive decision heuristics for price. Moreover, findings on higher external validity when using adaptive designs based on previous choices (Bauer et al., 2015) could also be confirmed by Gensler et al. (2012).

Summarizing all studies, it one can observe that ACBC prevails itself in most cases compared to CBC. Only the longer interview time appears to represent a major drawback. However, respondents prefer ACBC over CBC due to its more encouraging and less monotonous procedure. Moreover, it is recommended to use ACBC in rather complex decision environments with about more than six attributes, whereas CBC should be used for choice designs with just a few attributes (Eggers & Sattler, 2011). Besides the fact that the number of attributes intended always depends on the number of levels applied, literature emphasizes that respondents are cognitively overstrained when facing a wide range of attributes (Green & Srinivasan, 1990; Lines & Denstadli, 2004; Netzer & Srinivasan, 2011; Scholz et al., 2010) in full-profile designs. Apart from that, it becomes clear that ACBC is still a rather nascent phenomenon in literature with only a few applications existing (e.g. Garver et al., 2012; Hinnen et al., 2017; Wuebker et al., 2015), while most experiments are conducted by researchers affiliated with the software provider Sawtooth Software.

5 Research methodology and data collection

To examine whether ACBC's benefits are justifying its additional effort concerning time and cost compared to the predominantly used CBC, an own empirical study has been conducted. This empirical study applying an ACBC serves exemplarily for deriving advantages and disadvantages with ACBC and will be compared to hypothetical CBC investigations. Here, ACBC was applied in the context of e-commerce configurations for Chinese and German consumers. As ACBC is more appropriate for complex decision environments with more than five (Garver et al., 2012) or six attributes (Eggers & Sattler, 2011), the eight most important attributes for e-commerce were used illustrating a more holistic perspective on the ideal configuration. Furthermore, all eight attributes contained four attribute levels preventing the number-of-levels effect (Steenkamp & Wittink, 1994; Verlegh et al., 2002). In addition, the order of the attributes shown to each respondent was randomized in order to prevent the position effect. The investigation was exemplified by sport compression shorts in the considered online shop to provide a more descriptive scenario for respondents.

Table 3: Attributes and attribute levels used

Attribute	Attribute Level 1	Attribute Level 2	Attribute Level 3	Attribute Level 4
Method of payment	PayPal	Credit card	AliPay	WeChat Pay
Country of production	Germany	Europe (except Germany)	China	USA
Time for delivery	3 days	5 days	7 days	9 days
Product references	3/5 stars	4/5 stars	5/5 stars	References unknown
Website design				
Warranty options	No redemption	Return shipment at additional costs	Free return shipment	Free return shipment & extended conversion period
Contact possibilities	Via e-mail	Via phone	Via live-chat	No contact possibilities
Price	70€	80€	90€	100€

The ACBC itself included all four before-mentioned sections. Furthermore, seven screening tasks were implemented and four times it was asked for any unacceptable attribute levels, three times for any must-have attribute levels – as recommended by the software provider for the number of attributes utilized. Still, some adjustments were made to shorten the already longer survey procedure. The ACBC consisted of only three concepts per screening task (plus additional none-option). Besides, the number of calibration stimuli shown was reduced to four instead of six, the minimum number of attributes to vary from BYO-selection was scaled down to one and the maximum number of attributes to vary from BYO-selection was cut down to two. Generally speaking, the total number of potential stimuli would be 84 resulting in 4,096 stimuli. Using the ACBC approach with the BYO-selection as starting point, this number can be broken down to the number of screening tasks (7) times the number of stimuli per screening task (3) leading to 21 stimuli each respondent will be evaluating. Out of these 21 stimuli from the respondents' evoked set, 16 will be used in the third section (choice tournament) at maximum.

Holdout tasks, which are commonly used in CBC investigations for measuring hit rates and MAE, are not planned to be implemented in ACBC surveys due to the adaptive design of ACBC investigations (Sawtooth Software, 2014). As ACBC's choice design is created "on-the-fly", it is basically not possible to generate an experimental design prior to the launch. Furthermore, holdout tasks determined a priori might display respondents stimuli including attribute levels that they have already assigned as unacceptable attribute levels, potentially leading to confusion and higher dropout rates. However, implementing holdout tasks is not mandatory, because prognostic validity can be tested through diverse testing

methods: Actual market data or information about consumers' real buying probabilities should be preferred (Steiner & Meißner, 2018), as recommended by developers of the ACBC (Sawtooth Software, 2014). Ultimately, both approaches, hit rates and real-world buying probabilities, should serve as reference for judging whether estimated utilities provide predictive validity, which can be checked using the separately determined buying probabilities accessed in the calibration section.

In order to make sure that the design created will show each attribute level at least two times (generating enough near-neighbor stimuli), the design was tested with five dummy respondents answering randomly. Results strongly suggested the implementation of the BYO-section to increase the D-efficiency of the chosen design (see Table 4). Apart from that, it was ensured that each attribute level occurred at least two times (85% of the time even more than two times).

Table 4: D-efficiency with and without BYO-section

Respondent Number	D-Efficiency w/ BYO	D-Efficiency w/o BYO
1	0.8176	0.0019
2	0.8919	0.0022
3	0.8346	0.0000
4	0.8305	0.0018
5	0.8769	0.0022

Focusing on German and Chinese consumers with sport affinity and online shopping experience, a very large target group could be considered. Therefore, a two-step clustered sample approach has been conducted allowing to survey a widespread sample. Considering the subject of this investigation, respondents should be both experienced in online shopping and also demonstrate some affinity to sports. As more than two-thirds of the German population shopped online at least once, data collection has been focusing on the second segmentation criterion of exercising on a regular basis. Therefore, all German sport associations of the 16 federal states in Germany were contacted and asked to randomly select a certain number of sport clubs out of their lists to answer the survey. The number of randomly selected sport clubs varies by the number of members of the corresponding federal sport association, taking into account the varying number of sport clubs per federal sport association. Consequently, 51 randomly selected sport clubs distributed all over Germany should ask 260 members (average number of members per sport club), leading to 1,326 potential respondents assuming a response rate of 10%.

For generating a comparable sample in China, same criteria should be applied. However, internet penetration in China varies enormously by region, where the majority of internet non-users is much higher in rural areas (Tan & Ludwig, 2016). This is the reason why contacting all 22 Chinese provinces with their sport associations would lead to a sample of regularly exercising participants, but it would neglect the prerequisite of having access to internet equally distributed among their members. Therefore, focus

shifted to inhabitants of the largest cities in China, ensuring that all respondents have access to internet. As students are representing the most sportive group in China, sports universities of the five biggest cities have been contacted requesting them to forward the survey to students. Those are the sports universities of Shanghai (approx. 6,000 students), of Beijing (approx. 14,000 students), of Guangzhou (approx. 5,000 students), of Tianjin (approx. 6,000 students) and the sports faculty of Shenzhen University (approx. 5,000 students). Paying attention to the different amount of inhabitants in the selected cities, the number of students asked needed to be adapted accordingly: Beijing and Shanghai are accounting for approximately twice the number of inhabitants as in the other three cities, which is why in these cases it has been asked for 4,000 students each. In the other three universities, it was asked for only 2,000 students each, as the related cities account for a similar number of inhabitants. As a result, there were 14,000 potential respondents. Assuming the same response rate as in Germany (10%), it was expected to reach 1,400 Chinese online shoppers exercising regularly compared to 1,326 potential respondents in Germany.

6 Empirical study: results

The ACBC study resulted in N=346 respondents, where 141 out of these skipped the survey prematurely (61 Chinese and 80 Germans). Here, most respondents stopped answering the survey, when ACBC part started (6%). The remaining n=205 complete surveys were answered by 54 Chinese and 151 German respondents. The standard Hierarchical Bayes (abbr.: HB) estimation exhibited a root likelihood (abbr.: RLH) of .710 and a pseudo R2 of .593. However, using the conventional HB calculation might result in misleading estimations, because the level of errors varies by section: Distinguishing between stimuli considered as a possibility and not a possibility (binary) will result in smaller error levels than choosing the best option out of a choice task (Allenby et al., 2005). Therefore, the “Task-Specific Scale Factors Hierarchical Bayes” estimation was used taking this bias into account (Sawtooth Software, 2014). Apart from that, the highly significant interaction effect between country of production and method of payment was implemented (2-log likelihood $p<.001$). Additionally, irrational behavioral structures were detected for the attribute levels of time of delivery, which is why a constraint was used for this attribute. These structures could be a by-product of the lowest average important of time of delivery out of all eight attributes. With the three adjustments described, the new model resulted in an improved RLH=.738 with a pseudo R2=.639. The before-mentioned validity check with separately investigated buying probabilities (derived from calibration section) indicates that highest estimated part-worth utilities match the stimuli with the highest buying probabilities attesting a high prognostic validity. Furthermore, the most frequently configured BYO-selection from the first section coincides with the winning concept of the choice tournament (at the third section) verifying a high internal consistency. Regarding the effect on the decision of all eight attributes used (Figure 2), the three factors of method of payment, warranty options, and contact possibilities are the most important ones by far.

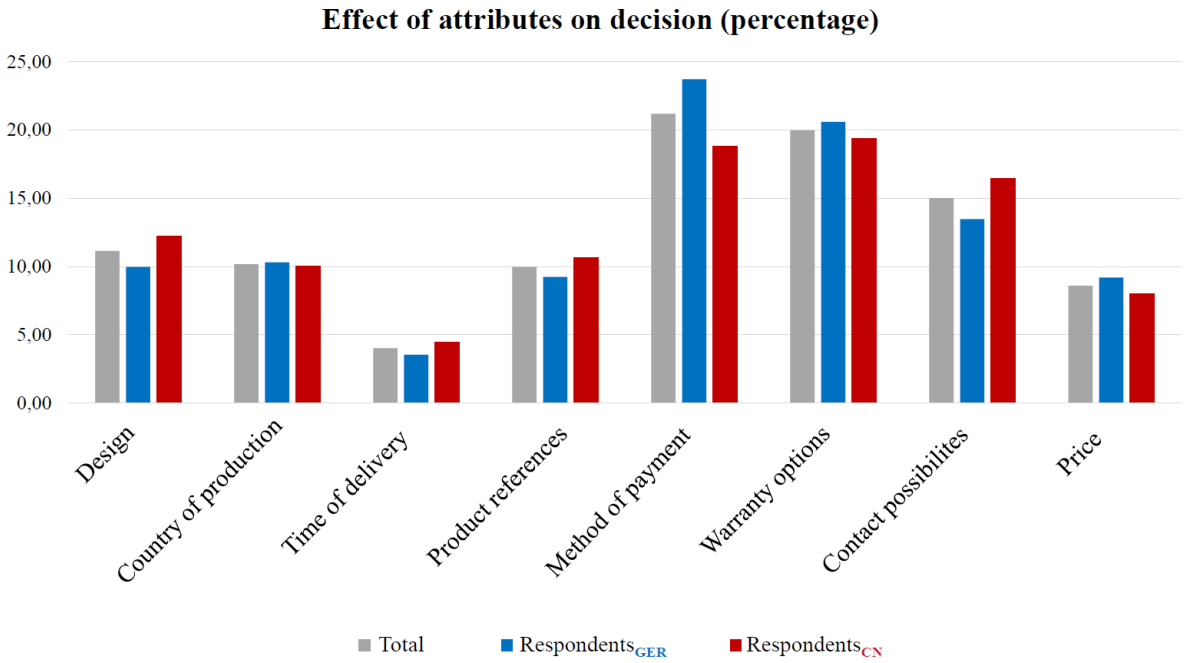

Figure 2: Effect of attributes on decision

In order to find out how valuable the additional information of the performed ACBC are and how precise ACBC is in estimating the most relevant configuration in comparison to CBC, a closer look is taken to the stimuli in the screening section. Here, the sample is analyzed separated by nationality in case any cultural influence might bias the overall consideration. In the German sample, only five out of the total 21 stimuli were assigned as “not a possibility”. However, the five most frequently considered stimuli out of the remaining 16 ones account for 64.24% of all stimuli used. In the Chinese sample, six out of the 21 stimuli were considered as “not a possibility”. Here, the seven most frequently considered ones out of the remaining 16 stimuli account for 64.91% of all stimuli used.

Another important benefit of ACBC that needs to be highlighted comparing the results to CBC investigations is the frequency of attribute levels marked as unacceptable or must-have features. Among German respondents, potentially 453 times attribute levels could be assigned as must-haves, as must-have questions have been asked three times for all 151 Germans. Out of these, respondents determined 128 times (28.26%) attribute levels as must-haves. To be precise, the most frequently chosen must-have attribute levels (> 10%) revealed minimum requirements such as at least return options at additional costs (34.44%) and at least a three star customer reference (10.60%) should be provided. On the other hand, potentially 604 times unacceptable attribute levels could be detected. Out of these, unacceptable features were chosen 449 times (73.40%). Here, many attribute levels were assigned as unacceptable more than 10% of the time: AliPay (59.60%) and WeChat Pay (50.33%) are most frequently assigned unacceptable, but also having no return options at all (45.03%), no contact possibilities (31.13%), no customer references available (13.25%), the yellow navigation bar on the right-hand side (11.26%), return option at additional costs (10.60%), and contact via live-chat (10.60%).

Similar results were identified in the Chinese sample: 42 times out of 162 related questions (25.90%), must-have attribute levels were examined. Especially, at least return options at additional costs (24.07%), a three-star customer reference (14.81%) or at least free return (12.96%) were required as must-haves. Analogous to the German sample, more unacceptable features than must-have attribute levels were identified (65.70%). Among these, the most frequently chosen unacceptable attribute levels were no return of the product possible (37.04%), payment via PayPal (25.93%), no contact possibilities available (24.07%), yellow navigation bar on the right-hand side (22.22%), contact option via phone (20.37%), payment via Mastercard (20.37%), no available customer references (16.67%), return at additional costs (12.96%), and contact via email (12.96%).

As one of the major disadvantages mentioned by literature, the time of the interview needs to be analyzed as well. In this investigation, the total survey time was eleven minutes on average among Chinese and twelve minutes among German respondents. Here, up to six question (depending on answers of the previous three questions) were asked before the actual ACBC took place and afterwards, another three questions about demographical information were included. Summarizing the results of this investigation in consideration of CBC's problems and ACBC approaches to solve these issues, the Table 5 captures the main aspects on the next page.

7 Conclusion and outlook

Starting with the disadvantages of ACBC, the longer interview time amounts to eleven to twelve minutes. This duration of the interview confirming earlier findings about ACBC investigations (Johnson & Orme, 2007) still seems to be positioned in a reasonable range of time. One could argue that respondents refuse to spend that much time answering a survey, but as demonstrated earlier (see chapter 3), survey participants report higher overall pleasure and enjoyment performing ACBC studies compared to monotonous CBC investigations. However, especially if panels are used for acquiring respondents, this downside will result in additional costs. Even though it is possible to shorten the interview time by removing the BYO-section from the ACBC survey (Orme & Johnson, 2008), one of its biggest advantages will be removed as well. Apart from that, holdout tasks are not planned to be implemented in ACBC. Focusing on this aspect, this is not a disadvantage per se, as holdout tasks are just used as a surrogate and it is questioned to what extent they are able to actually predict choices (Steiner & Meißner, 2018), rather than just testing the reliability (Leigh et al., 1984; Louviere, 1988). Another downside of ACBC compared to CBC investigations can be found in the higher price for the software to perform one or the other. For instance, the market leader for conjoint analysis software "Sawtooth Software" is charging an additional annual fee of 2,000$ for accessing the ACBC package. Besides, the dropout rate for the study conducted had its peak (6%) at the start of ACBC in the survey. On the other hand, it was proven that ACBC works well even with smaller samples (Garver et al., 2012). Confirming the literature presented, a high consistency was found even within the small German sample of 151 respondents. Apart from that,

additional respondents canceling the survey prematurely at the beginning of the ACBC part would account for 21 potential participants only.

Table 5: Problems with CBC and its solution using ACBC exemplified by study

(Identified) problems of CBC	ACBC's problem solving	Presented investigation
Answering CBC is experienced as monotonous and boring leading to higher termination rates and Respondents rushing through the survey	Non-compensatory procedure implemented making surveys more realistic and engaging (including BYO-section; selection of unacceptable and must-have attribute levels)	Only 21 respondents (6 %) stopped answering the survey when ACBC started (comparable number of Chinese and Germans) Interview length between 11 (Chinese) and 12 (Germans) minutes
Respondents are exposed to irrelevant stimuli (may only choose none-option)	ACBC starts with their personal ideal stimulus configuration (BYO), followed by near-neighbor stimuli that are adjusted with unacceptable and must-have features	High rate of stimuli considered as a possibility (CN: 71%; GER: 76%), whereas already a few represent the majority of all stimuli used
Respondents are focusing on certain key features often neglected at CBC analysis	Respondents are asked about unacceptable and must-have attribute levels. Selections influence composition of upcoming stimuli (excluding unacceptable ones, keeping must-have ones constant)	Most respondents focused on excluding unacceptable features (CN: 66%; GER: 73%), rather than determining must-have features (CN: 26%; GER: 29%)
Restricted to very few attributes (not able to illustrate complex decision environments)	ACBC usage recommended for more than six up to twelve attributes (unacceptable and must-have attribute levels help focusing on relevant trade-off aspects)	Three attributes identified (out of eight) representing the most important factors by far

In this rather complex decision environment of an e-commerce configuration in a cross-cultural comparison, ACBC proofs to be a very beneficial tool allowing to include more attributes than in CBC investigations. Furthermore, the procedure of ACBC surveys allows focusing straight on the evoked set or the most relevant stimuli – even if preferences are completely unknown in the first place. Additionally, by using non-compensatory heuristics in the screening section (with unacceptable and must-have features), it facilitates to concentrate on the most relevant trade-offs in the CBC-like part (choice tournament) of the questionnaire. These decision heuristics (especially the disjunctive ones) seem to be closer to approaches used by consumers in real life (Liu & Arora, 2011; Steiner et al., 2016) and, therefore, speak in favor for the procedure of ACBC. In particular, information generated about unacceptable attribute levels (chosen two-thirds of the time) provide valuable insights about which features need to be rejected by companies. Apart from that, ACBC allows to focus on the evoked set of each respondent with very precise estimations based on the BYO-section. Even simulations using synthetic data with respondents answering randomly resulted in better RLH values for ACBC. Using the same number of respondents as in the investigation presented (n=205) and the same eight attributes with its four attribute levels each, the CBC simulation with 50,000 iterations (including 25,000 burn-in iterations) leads to a RLH=.407 while the ACBC simulation shows a RLH=.574 (compared to the actual investigation RLH=.738). Moreover, ACBC studies reveal information about the ideal configuration of a product or

concept (BYO-section) and - if a calibration section is included - also buying probabilities for the individual stimuli could be presented. While CBC mainly focuses on finding the most preferred option, ACBC provides more detailed information, e.g. using the second most frequently chosen BYO-selection of attribute levels besides the results of the HB estimation.

Especially in the complex context of e-commerce configuration in a cross-cultural comparison, ACBC has shown its benefits. Summing up this comparison, the selection of one method over the other will always depend on the budget available, the planned maximum of time for the survey, the amount of information needed, and the complexity of the decision environment.

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3.3 Examining sustainability surcharges for outdoor apparel using Adaptive Choice-Based Conjoint analysis

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Abstract

In order to explore the compensatory effects between sustainability aspects and willingness to pay (WTP), the vast majority of studies applies Choice-Based Conjoint analysis (CBC). However, this method suffers from multiple restrictions (e.g., limited number of factors includable) resulting in biased WTP estimations. In contrast, the advanced and more realistic Adaptive Choice-Based Conjoint analysis (ACBC) allows e inter alia e incorporating all facets of sustainability and capturing the nowadays increasingly complex purchase decision process holistically. No other study has measured WTP with ACBC in the context of sustainable clothing yet. Based on expert interviews, we conduct an ACBC utilizing the 'summed price' approach and incorporating the insights gained from the Calibration section. While the latter one allows to refine the purchase likelihood and thus, enables more accurate WTP estimations, it has yet been largely neglected by previous sustainability literature. Our findings indicate significant differences in WTP and surcharges for each feature contingent on gender and the ecological orientation of consumers. While very green consumers rather emphasize the impact of sustainability-related features (e.g., materials (18.43%), labels (12.90%), country-of-origin (13.14%)), price represents by far the most influential driver for less green consumers (42.37%), followed by design (12.54%).

Keywords: Willingness to pay; Surcharges; Sustainable apparel; Adaptive Choice-Based Conjoint analysis; Sustainability; e-commerce

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1 Introduction

Most recently, research postulated the need for further investigations in analyzing consumers' sustainable consumption behavior, especially which factors can foster these behavioral patterns (Chen et al., 2019; White et al., 2019). This behavior should be examined holistically together with production issues by incorporating consumers' needs (Blok et al., 2015; Vergragt et al., 2014), and in the context of increasingly complex consumer-product interactions and decision-making processes (Young et al., 2010). Across various application fields, green literature found these consumers' decision-making processes to exhibit a bivariate inconsistency between the consumers' attitude and the subsequent behavior, frequently referred to as the attitude-behavior gap. Thereby, research found higher prices for sustainable products compared to conventional ones to be one of the main barriers (Gleim et al., 2013; Johnstone & Tan, 2015). As a result, multiple studies tried to explore consumers' preferences by focusing on the compensatory effects of the relationship between sustainability aspects and willingness to pay (WTP; Hinnen et al., 2017; Janßen & Langen, 2017).

To estimate consumers' WTP for sustainable products and decompositionally derive the importance of certain sustainability indicators (e.g., labels), the vast majority of studies applies a Choice-Based Conjoint analysis (CBC; Klein et al., 2020; Meyerding & Merz, 2018). This approach sheds light on to what extent price is influencing the purchase decision compared to other factors.

However, CBC experiments suffer from multiple limitations, as they are only able to investigate a limited number of factors (or otherwise overstrain respondents) (Meyerding & Merz, 2018; Scherer et al., 2018), they fail to handle extreme response behavior resulting in miscalculated WTPs (Gensler et al., 2012), and they assume respondents to apply compensatory decision heuristics during answering, even though research revealed respondents to utilize non-compensatory ones (Ryan et al., 2009; Yee et al., 2007). Hence, we intend to overcome these limitations by making use of the methodological benefits of the Adaptive Choice-Based Conjoint analysis (ACBC), as it enables more precise results (Cunningham et al., 2010; Wackershauser et al., 2017), resulting in more accurate WTP estimates.

Here, we focused on the setting of e-commerce, as online shopping provides various opportunities for companies to change matters into more sustainable solutions (Carrillo et al., 2014; Pålsson et al., 2017) and causes massive negative impacts on the environment (Jaller & Pahwa, 2020). As the textile industry provoked 2.1 billion tons of greenhouse gas emissions in 2018, which is comparable to the amount of annual emissions of France, United Kingdom, and Germany (McKinsey & Company & Global Fashion Agenda, 2020), the study's object is an apparel product to enable the highest potential benefits for the environment. Further, in Germany for instance, the clothing sector constitutes the most relevant e-commerce sector regarding revenues (bevh, 2020) indicating its extensive potential to reduce the amount of emissions by applying more eco-friendly interventions. To be precise, we focus on outdoor apparel, as outdoor equipement evinced to represent an appropriate field of application for sustainable materials (Scherer et al., 2018). Moreover, online shopping is most frequently carried out by younger generations (Ladhari et al., 2019), who also bear major concerns regarding climate change (Yadav & Pathak, 2016)

and represent driving forces behind the ‘Fridays for Future’-movement. More specifically, consumers of Generation Y are characterized by their substantial purchasing power in e-commerce and their advanced technological skills (Ladhari et al., 2019), which also facilitates the access to and communication about ecological knowledge (Kanchanapibul et al., 2014).

On these grounds, we first analyze which sustainability aspects influence the apparel purchase decision the most in the context of online shopping and second, how much consumer segments (inter alia based on ecological orientation) from Generation Y are willing to pay extra for more sustainable solutions. We thereby contribute to literature by examining sustainability surcharges with the more advanced and realistic methodology of ACBC as well as the summed price approach for delineating various price points for sustainable features. As applying an ACBC investigation enables including multiple purchase decision factors (Bauer et al., 2015; Brand & Baier, 2020), and yields more accurate WTP estimates due to increased validity compared to CBC studies (Cunningham et al., 2010; Wackershauser et al., 2017), we illuminate to what extend previous findings on sustainability surcharges using CBC hold true. We further reveal to what extent responses from choice tasks match with explicitly inquired WTP and which sustainability aspects are the most important when shopping online. Moreover, we thereby fill the recently stated literature gap (Oláh et al., 2019) by considering all three aspects of sustainability (social, ecological, and economic dimension) in e-commerce.

Accordingly, this paper is structured as follows: we first outline the substantial facets of sustainability, introduce the ACBC approach by demarcating it with the CBC approach, and highlight the state of the art of WTP investigations in the light of sustainable products. Afterward, we empirically examine sustainability surcharges among younger consumers and discuss the results.

2 Theoretical background

2.1 Multifold dimensions of sustainability in the context of apparel

While according to the triple bottom line sustainability comprises environmental, social, and economic aspects (Elkington, 1997), it needs to be understood as a superordinate perspective affecting materials, processes, and supply-chains to address issues related to both internal and external stakeholders (Dao et al., 2011). Accordingly, it is essential to cover all facets of sustainability of products in order to trigger sustainable consumption behaviors (Blok et al., 2015; Ritter et al., 2015) and dissolve information asymmetries between both parties (Friedrich, 2018; Lin & Chang, 2012). These information include extrinsic (e.g., country-of-origin, eco labels, and the related price), intrinsic (e.g., materials), and contextual cues (e.g., delivery conditions; Steenkamp, 1990), whereas their importance strongly varies (de Medeiros & Ribeiro, 2017). Thereby, neglecting main drivers which affect the purchase decision (e.g., design or functionality) would lead to overestimated, biased results when examining the importance of sustainable product features (de Medeiros & Ribeiro, 2017).

In the context of apparel, sustainability is determined by the material used for the corresponding products and the country-of-origin (Klein et al., 2020; Scherer et al., 2018), as well as working conditions of

employees (Goworek et al., 2012; Lundblad & Davies, 2016). Additionally, the composition of supply chains, environmentally friendly transportation procedures, and labels ensuring sustainable production are of importance (Meise et al., 2014). Regarding the latter, research recommends the distinction between different labels signaling ecological, social and/or economic aspects, as their importance varies across different consumer groups (Janßen & Langen, 2017). When examining sustainability of apparel in an e-commerce context, even more aspects can be modified in order to contribute to a more sustainable purchase, such as packaging (Nguyen et al., 2020; Pålsson et al., 2017) and delivery (Stöckigt et al., 2018).

Since we aim for analyzing all sustainability-related facets in the context of online shopping, we focus on the apparel industry, as it yields the highest revenues within e-commerce besides electronics (Mangiaracina et al., 2015). As the apparel industry provokes substantial environmental harm along the whole lifecycle of clothing from pre-purchase, purchase, to post-purchase, sustainability literature identified different factors determining sustainable clothing consumption behavior in terms of acquisition, usage, care, maintenance, and discard (Jacoby et al., 1977; Morgan & Birtwistle, 2009). Apart from sustainability-related characteristics of clothing, design seems to be a crucial product attribute, as sustainable clothes are frequently perceived as unaesthetic (Hiller Connell, 2010; Joergens, 2006), potentially inhibiting consumers from purchasing sustainable garments (Rausch & Kopplin, 2021). Besides, when comparing the product category of apparel with others, a relatively higher WTP for more sustainable products can be assumed (Tully & Winer, 2014).

Considering the multiple facets of sustainability in the context of apparel, one would need to consider a wide range of attributes, when trying to capture a consumer's complex decision process (Stöckigt et al., 2018). Thereby, multiple authors stress CBC's restriction that only a limited number of attributes can be assessed. In order to overcome this major limitation, we conduct an ACBC, which represents an adequate instrument for investigating more than six attributes (Eggers & Sattler, 2011).

Generally, the concept of CBC and ACBC could be related to the Buyer Decision Process Theory assuming that individuals pass through several stages of a problem-solving process when making a decision (Blackwell et al., 2006; Engel et al., 1968). More specifically, in terms of buying behavior, the decision-making mechanism comprises procedures before, during, and after the purchase decision itself. Within literature, the decision process comprises five different stages (Blackwell et al., 2006; Engel et al., 1968): first, the consumer identifies a need occurring when the consumer's current state does not meet his or her desired state, which is triggered by certain stimuli (Bruner & Pomazal, 1988). After this recognition stage, the consumer conducts an internal and external search, which generates an evoked set of appropriate product alternatives (Bunn, 1993; Howard & Sheth, 1969). During the third stage, the consumer assesses the product alternatives and forms different purchase criteria or attribute cut-offs for the alternatives (Huber & Klein, 1991; Klein, 1983). Here, consumers distill products from the evoked set into potential alternatives taken into consideration for a purchase (evaluation stage). Consumers then proceed towards the purchase stage by considering only those products from the consideration set with

goal-satisfying and feasible alternatives (Hauser & Wernerfelt, 1990; Nedungadi, 1990). With increasing information about the product alternatives within the consideration set, consumers make their final purchase decision based on the reduced choice set (similar to choice sets in CBC investigations). Hence, after the preceding stages, the consumer ranks the items in the choice set according to his or her preferences. It thus seems adequate to draw on conjoint analysis to imitate the purchase decision process of sustainable outdoor apparel in a realistic manner.

2.2 Introducing ACBC based on CBC's shortcomings

In order to gather a profound understanding of ACBC's advantages compared to its antecedent CBC, we briefly describe the approach of ACBC. It was developed to address the shortcomings associated with CBC (Johnson & Orme, 2007): To start with, a CBC is designed to investigate only a limited number of factors, as otherwise respondents might be overstrained resulting in decreased validity (Scherer et al., 2018; Scholz et al., 2010). This issue is particularly critical when trying to holistically illustrate the nowadays more complex products (Netzer & Srinivasan, 2011; Park et al., 2008) and all facets of sustainability (triple bottom line). Furthermore, CBC assumes that respondents apply compensatory decision heuristics (considering all factors, whereas subjectively 'negative' perceived ones can be compensated by 'positive' ones) and carefully evaluate the trade-off between options within CBC surveys. In contrast, multiple studies prove that most consumers utilize non-compensatory decision heuristics (only considering some specific factors that are used for 'cut-off rules', e.g. by identifying minimum requirements or exclusion criterions) and thus, their choices could be better captured by non-compensatory models (Gilbride & Allenby, 2004; Ryan et al., 2009). Additionally, respondents are not only frequently exposed to stimuli irrelevant to them, and thus, need to choose the 'none'-option when focusing on specific key features, but also perceive answering the same question several times across multiple choice tasks as monotonous (Brand & Baier, 2020).

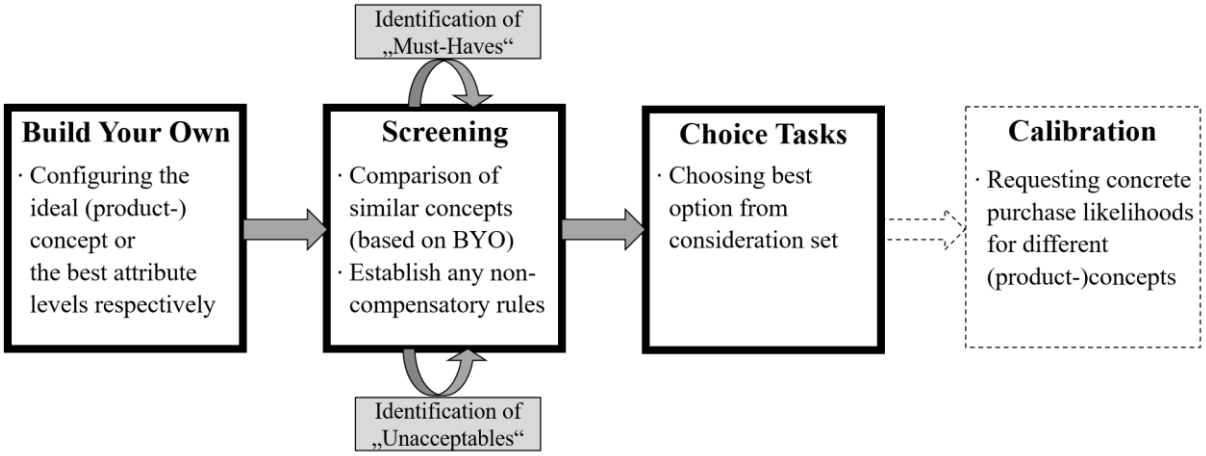

Figure 1: ACBC survey flow (based on Brand & Baier, 2020)

The process of ACBC consists of three to four sections (see Figure 1). In the first section ('Build Your Own' (BYO)), respondents are asked to configure their ideal product by determining the best attribute level for each attribute (attributes with a priori known preference order can be omitted). Here, one could

either use the ACBC-specific summed price approach or in subsequent sections the standard CBC practice of determining concrete, fixed price points. The summed price approach allows to define a base price, whereas contingent on attribute level selection surcharges will be taken into account. The second section ('Screening' section) aims at identifying respondents' consideration sets, as well as applied non-compensatory heuristics, and exhibits similar stimuli based on the BYO configuration (by following a five-step algorithm generating near-orthogonal designs (Brand & Baier, 2020)). Thereby, respondents will state if exposed stimuli are taken into consideration or not (binary choice). Based on the choices selected or not selected, respondents will be asked whether attribute levels (frequently not considered) represent an unacceptable feature (or not), and whether attribute levels (very frequently considered) represent a must-have feature. According to the detected and by respondents confirmed conjunctive and disjunctive decision heuristics, unacceptables will be eliminated and must-haves will be kept constant for all stimuli displayed within each choice set. Along with these adaptions, those stimuli selected as a possibility will be part of a choice tournament in section 3 (Choice Tasks section).

This pre-selection from the Screening section is in line with literature examining the buyer decision process: according to Shocker et al. (1991), the choice set (equivalent to section 3) is formed as a subset of the consideration set containing only those options perceived as a possibility. Accordingly, "certain product characteristics or levels are necessary for that item to be considered at all (non-compensatory) and that trade-offs are made only within this range of acceptable attribute levels and/or with and between less critical attributes" (Shocker et al., 1991, p. 185). Following this more realistic two-step decision process, Turley and LeBlanc (1995) distinguish between the evaluation stage (where the consideration stage is formed) and the subsequent choice stage (where the choice process of considered alternatives from the evaluation stage takes place). Only those alternatives accepted will be part of the choice process. Again, it is highlighted that heuristics applied when forming the evoked set (binary choice) are different from those utilized in the choice process (determining the best option), which also validates findings on varying judgment behavior for rejectable (Screening section) and forced (Choice Task section) choice sets (Parker & Schrift, 2011). These patterns (two-step decision process) were also empirically validated in the context of online shopping by using unbiased clickstream data (Moe, 2006). As the detected heuristics vary by person, this further speaks in favor of the composition of ACBC.

The third section can be compared to the standard CBC procedure, where respondents need to weigh up the trade-off between options and select the most preferred one. However, in contrast to CBC, all stimuli brought into the Choice Task section have already been confirmed as an accepted option out of respondents' consideration set and are adapted by individually detected unacceptables and must-haves. Besides, the number of choice tasks exposed individually depends on how many options were selected as taken into consideration and how many choice tasks it takes (also contingent on how many options are displayed in each choice task) to determine the most preferred option as the 'winning' stimulus as part of a choice tournament.

The fourth section ('Calibration' section) is optional and inquires respondents' willingness to purchase the BYO-stimulus, the winning stimulus of the Choice Task section, and further stimuli based on a (by default 5-point) Likert-type scale[5].

After introducing ACBC, we now condense findings comparing CBC with ACBC. Several studies reveal that ACBC requires more time for completion (Cunningham et al., 2010; Johnson & Orme, 2007), while it tends to yield more precise results not only regarding validity criteria (Bauer et al., 2015; Orme & Johnson, 2008), but also when estimating purchase prices (Chapman et al., 2009). Moreover, first insights indicate that ACBC performs significantly better than CBC, exhibiting more accurate predictive validity when comparing incentive-aligned (IA) CBC, ACBC, and IA-ACBC (Wackershauser et al., 2017). Besides, ACBC is experienced as more attractive by respondents (Bauer et al., 2015; Johnson & Orme, 2007), and seems to capture the decision-making process more realistically (Cunningham et al., 2010). Further, ACBC requires fewer respondents in order to obtain similar results (Jervis et al., 2012) and has been designed to deal with a higher number of attributes (Eggers & Sattler, 2011). The latter aspect seems to be particularly important when trying to holistically imitate the steadily increasing complexity of products and decision-making processes (Huang & Luo, 2016; Park et al., 2008), as it is especially the case for sustainable products.

While these findings might have fostered researchers' application of ACBC in the context of logistics (Garver et al., 2012), harassments at universities (Cunningham et al., 2015), groceries (Boesch & Weber, 2012; McLean et al., 2017), the health care system (de Groot et al., 2012), and venture capital decision making (Wuebker et al., 2015), its use in the context of sustainability is still sparse, especially when examining consumers' WTP.

2.3 Willingness to pay in the context of sustainability

Determining consumers' WTP for sustainable products gathered much attention within literature throughout the past years. Thereby, the vast majority employed CBC for examining sustainability surcharges (see Table 1). However, aside from the enumerated weaknesses, the CBC approach further suffers from several limitations in terms of WTP measurement that could be overcome by using ACBC. First, CBC cannot handle extreme response behavior when intending to measure WTP (Gensler et al., 2012), and thus, WTP should rather be explored by applying price intervals (Schlereth & Skiera, 2009) similar to the summed price approach provided by ACBC. Accordingly, if price levels applied in CBC are too low, respondents might never choose the none-option resulting in biased estimation of WTP and vice-versa (tendency to always select none-option). Second, CBC seems to overestimate consumers' actual WTP (Sichtmann et al., 2011). Confirming these results, Miller et al. (2011) find CBC to overestimate consumers' actual WTP even more than other methods, such as the Becker, DeGroot and Marschak's (BDM) mechanism. Apart from that, research recently revealed that results for measuring

[5] This procedure of ACBC refers to the composition of Sawtooth Software (2014).

preferences differ depending on whether consumers' WTP is derived from choice tasks or WTP-focused questions (O'Donnell & Evers, 2019).

In contrast, ACBC allows the implementation of both types of questions and combines their findings by adapting the results from the first sections (choice-based) by answers from Calibration section (WTP-focused). Consequently, this approach might attenuate the bias inherent to choice task settings. Besides the type of questions inquired, ACBC enables estimating a greater price sensitivity (Chapman et al., 2009), particularly when incorporating the none parameter derived from the Calibration section (Wackershauser et al., 2017). Hence, more realistic results derived using ACBC will also be reflected in more accurate WTP estimates. Moreover, as ACBC allows to incorporate more attributes, it enables illustrating the purchase decision of sustainable products with regard to multiple facets of sustainability. Reflections on extant research examining consumers' WTP for sustainable products and services (see Table 1) reveal that solely Hinnen et al. (2017) and Heinzle et al. (2013) investigate consumers' WTP applying an ACBC. However, both studies do not provide appropriate validation criteria for their models, such as hit rates or mean absolute error (MAE; Huber et al., 1993). Accordingly, the validity of both studies needs to be questioned. Furthermore, both investigations did not implement the Calibration section, even though WTP predictions will be significantly more precise when incorporating the none parameter from this section (Wackershauser et al., 2017). Focusing on supplementary air travel service packages, Hinnen et al. (2017) excluded the BYO-section, even though this decreases the d-efficiency of the choice design significantly (Brand & Baier, 2020). Moreover, only five attributes were included in the experiment, and thus, they omit to take advantage of ACBC's ability to deal with more complex settings. Examining the WTP for real estate, the sample size in the study of Heinzle et al. (2013) seems to be insufficient to draw reliable conclusions (n=62), as fractional choice designs with many levels (in this case n=12) require larger sample sizes in order to obtain robust outcomes (Steiner & Meißner, 2018). Apart from those methodological limitations, insights gained from the real estate and the air travel industry cannot serve as indicators to elucidate consumers' WTP for sustainable products in the online shopping context. As online shopping is primarily carried out by younger generations (Ladhari et al., 2019), it should be examined to what extent they are willing to pay a surcharge for more sustainable products. Thereby, the e-commerce context provides multiple options for transforming processes, such as ordering logistics (Dutta et al., 2020; Pålsson et al., 2017) and packaging as well as manufacturing processes (Oláh et al., 2019), into more sustainable ones, apart from the composition of sustainable products themselves. In doing so, the negative impact of online shopping on the environment (Carrillo et al., 2014; Jaller & Pahwa, 2020) can be reduced or even fully compensated. When considering environmental, social, as well as economic aspects holistically in an e-commerce strategy, the positive effects (such as new employment, declined CO_2 emissions, increased customer loyalty) are likely to countervail the negative ones (Oláh et al., 2019).

Table 1: Selection of recent choice experiment studies investigating WTP for sustainable products/services

Author, Year	Method applied (#attributes, #attribute levels)	Products applied/ Branch of industry	Results
Sammer & Wüstenhagen, 2006	CBC (6, 3-4)	Household appliances	- 30% increased WTP for washing machines with energy efficiency label A - 50% increased WTP for specific brands
Auger et al., 2008	Choice Experiment and EDS	Sport shoes; Hygienics	- Price surcharge for ethical attributes, as long as functionality is provided - Price surcharge for ethical attributes contingent on ethical attitude of consumers
Banfi et al., 2008	Choice Experiment	Real estate	- 3% - 13% increased WTP for more energy-efficient attributes of rented apartments
Heinzle et al., 2013	*ACBC (12, 2-4)*	*Real estate*	*- Price surcharge for green certified buildings existing, which though is below current transaction prices and market data*
Kaenzig et al., 2013	CBC (7, 4-5)	Electricity suppliers	- 12€ per month as the WTP for green produced energy - Electricity suppliers providing a mix of renewable and not renewable energy were preferred
Meise et al., 2014	IA-CBC (6, 4-6)	Groceries	- Increased WTP when information about sustainable are displayed at the product - When information about sustainability of groceries are available, the importance of price decreases
van Loo et al., 2015	Choice Experiment and Eye-Tracking	Groceries	- 1.16 $ for organic label USDA represents the highest WTP - Organic labels more important than fair trade labels
Delmas & Lessem, 2017	CBC (4, 2-4)	Groceries	- 14.6% of respondents prefer eco-labeled wine, in case price is therefore reduced - Eco-labels is perceived to provide lower quality - Environment-conscious consumer rather purchase wine with eco-labels
Hinnen et al., 2017	*ACBC (5, 3)*	*Air travel*	*- 14.5% of respondents yield increased WTP for green air travel products/services* *- Green consumers reveal increased WTP for green products than other consumers*
Janßen & Langen, 2017	CBC (6, 2-5))	Groceries	- 0.15€ surcharge per sustainable labels realizable for green consumers - Majority of consumers does not distinguish between different sustainability labels - WTP depends on consumers' preferences towards environmental/social friendly products
Paetz & Guhl, 2017	CBC (5, 2-4)	Groceries	- 24% increased WTP for orange juice with fair trade label
Scherer et al., 2018	CBC (7, 2-4)	Outdoor sport equipment	- Origin of raw material reveals to be the most important attribute - Cheapest option was preferred, only a limited price surcharge for bio-based products

Note: EDS=Ethical Disposition Survey; IA-CBC=Incentive Aligned CBC; USDA=United States Department of Agriculture. Studies in Italics used ACBC.

Aside from choice experiment studies, research found consumers to be willing to pay a 25% premium for an organic cotton t-shirt (Ellis et al., 2012) and a $1.86 premium for organic socks (Hustvedt & Bernard, 2008) in experimental auctions. Similarly, consumers were found to pay a $5.00 premium for organic, sustainable, and domestic grown cotton shirts (with a $30.00 retail value) (Ha-Brookshire & Norum, 2011). Additionally, consumers were willing to pay more for a rather social-facetted sustainability dimension, i.e., labor-related attribute information of apparel products (Hustvedt & Bernard, 2010).

2.4 Hypothetical framework

As we intend to elucidate the WTP for sustainable clothing in the context of e-commerce, we draw on prior findings obtained from CBC investigations. Thereby, we reveal to what degree these results can be validated when applying ACBC.

While prior research does not provide consistent results regarding the importance of price and country-of-origin for outdoor equipment (Klein et al., 2020; Scherer et al., 2018) as well as for groceries (Janßen & Langen, 2017; Meise et al., 2014), the impact of price seems to vary based on consumers' attitudes towards sustainability (Kaenzig et al., 2013; Paetz & Guhl, 2017). As more sustainability-oriented consumers consider sustainability-related attributes for business models elements as more important than price (Viciunaite & Alfnes, 2020), and for consumers with higher green consumption values the importance of price declines for outdoor jackets (Klein et al., 2020), we assume:

H1: The importance of price is higher for less green[6] consumers compared to very green consumers.

Similarly, it is assumed that price and other exclusively product-related attributes (e.g., functionality) are valued higher in contrast to sustainability-related aspects by men than by women. Several studies indicate (Baier et al., 2020; Paetz & Guhl, 2017) that women tend to be more environmentally conscious and hence, are more likely to attach importance to sustainability-related product features, such as sustainability labels, eco-friendly materials, or manufacturing products locally. Accordingly, profiling consumer based on their purchase preferences revealed that segments with larger proportion of female consumers are willing to pay more (increased relevance of price) for fair trade products (Paetz & Guhl, 2017), which has also been verified for women in general regarding groceries with sustainability labels (Vecchio & Annunziata, 2015).

H2a: The importance of price is higher for men than for women.

H2b: The importance of sustainability-related attributes is higher for women than for men.

Drawing on a more methodological perspective, we contribute to literature by examining whether WTP results calculated using ACBC by incorporating the none-threshold from the Calibration section enables

[6] We refer to green consumers as being those who possess an increased awareness of their environmental impact, and consume and behave environmentally friendly.

more accurate estimations. Based on CBC's tendency to overestimate consumers' actual WTP (Miller et al., 2011; Sichtmann et al., 2011) indicated by relatively smaller none-option values compared to a product's total utility and findings on WTP based on question type (O'Donnell & Evers, 2019), it is assumed that ACBC allows attenuating this bias by counteracting the overestimation when incorporating the insights from the Calibration section (Wackershauser et al., 2017).

H3: The resulting non-purchase probability based on choice task questions increases when incorporating the none-option derived from ACBC's Calibration section.

3 Methods

3.1 Qualitative pre-study

When performing a conjoint analysis, it is essential to determine the most relevant factors influencing the purchase decision (Scherer et al., 2018; Steiner & Meißner, 2018). Therefore, we complement the findings of an extensive literature research on (more) sustainable solutions within the e-commerce context by insights of a qualitative pre-study allowing a triangulation of findings. Semi-structured expert interviews with five professionals within the field of sustainable apparel were conducted. The purpose of this pre-study is three-fold: identifying (1) the most essential factors affecting the online purchase of sustainable products, (2) potential starting points for more sustainable solutions in the e-commerce context, and (3) realistic sur-charges for more sustainable compositions. To gather a holistic perspective on the topic, we generated a heterogeneous sample of experts. We interviewed two experts working in the retail business, while the others exhibited a manufacturer background. All interviewees had several years of professional experience and worked in management-level positions.

Table 2: Aspects revealed by expert interviews based on frequency

Aspect mentioned	**Experts mentioning this aspect**
Price (price for product or surcharge)	1, 2, 3, 4, 5
Functionality of product	1, 2, 3, 4, 5
Material (degree of recycling possible)	1, 2, 3, 4, 5
*Packaging (used for the sent products)**	1, 2, 3, 4, 5
Labels (sustainability labels)	1, 2, 3, 4, 5
Design (of the product)	1, 2, 3, 4
*Transportation (regarding sustainable options)**	1, 2, 4, 5
*CO_2 compensated delivery**	1, 2, 4
Country-of-Origin (country-of-manufacture)	3, 4
Brand	2, 3
Working conditions (rights of employees, fair trade)	4, 5
Product life cycle (long-lasting, reparable products)	1, 4
(Eco-)Electricity within the company	2, 3

Note: Aspects in italics were utilized in the main study. Asterisk indicates aspects related to the e-commerce context.

Based on the transcribed interviews, we analyzed factors influencing the online purchase of sustainable products according to the frequency of mentions (see Table 2). Even though brand may play an important role when purchasing products, it might bias WTP results. In order to yield generalizable findings, we thus decided not to include brands in the main study. Besides, for younger generations, sustainable product characteristics seem to be more relevant for their purchase decision than the affiliated brand (Lu et al., 2013). The three least frequently mentioned factors are somewhat out of scope when evaluating sustainable products' purchase decision. As it is crucial to only implement the most relevant attributes, we excluded them from further considerations. Besides, as online shopping nowadays offers click-and-collect services (Gallino & Moreno, 2014) and/or the possibility to pay a CO_2 compensation fee, we combined both the transportation aspect and potential compensation fees for delivery.

Furthermore, the experts revealed surcharges for sustainable material to be around 20% on average. Additionally, one expert provided us a booklet with actual surcharges for different sustainable materials. Based on this information, we determined surcharges for the summed price approach.

3.2 ACBC main study

3.2.1 Survey conceptualization

To measure consumers' WTP for products with a varying degree of sustainability, we conducted an ACBC (using Sawtooth Software's Lighthouse Studio 9.8.1). Thereby, we took advantage of ACBC's benefits by including all four sections and applying the summed price approach (varying price by ± 10%). All attributes were included in the BYO-section with a specified sequence and preference order where appropriate. For the BYO-product modification strategy, we applied the mixed approach. We further randomized the order of the attributes for each respondent in order to prevent the position effect. The ACBC consisted of seven Screening tasks containing three stimuli with a maximum of 16 stimuli being transferred to the choice tournament. Here, three unacceptable and one must-have level can potentially be evinced, as disjunctive decision heuristics seem to occur more frequently (Brand & Baier, 2020). The Choice Task section itself also displayed three stimuli per task, and the Calibration section showed six stimuli. Even though holdout tasks are not intended to be implemented into ACBC by default (Brand & Baier, 2020), we manually integrated one into the ACBC to evaluate its validity. As the number of potential stimuli (8^4=4,096) would result in an overcharging amount of choice tasks needed, we applied a fractional factorial design (Green, 1974). The choice design created was checked by generating synthetical data of five dummy respondents answering randomly. Here, each attribute level appeared at least two times, ensuring a well-balanced design. The d-efficiency varied from 0.79 to 0.82 (Kuhfeld et al., 1994). The attributes and attribute levels used were substantiated based on an extensive literature review and the results derived from the qualitative pre-study (see Table 3).

The empirical study was conducted using an outdoor jacket due to several reasons. First, the clothing sector represents the most crucial branch within e-commerce, generating the highest revenues (bevh, 2020). Consequently, potential benefits for the environment will be most influential when reducing or fully compensating the negative impact of shopping less sustainable apparel online. Second, research emphasizes that one can assume a comparably high WTP for sustainable apparel products (Tully & Winer, 2014). However, empirical findings on WTP for sustainable clothing is still sparse, and ACBC-based estimations are lacking (see Table 1). Third, literature postulates to further explore consumers' demands for sustainable clothing (Matthews & Rothenberg, 2017; Oh & Abraham, 2016). Fourth, outdoor equipment was found to represent an adequate application for recyclable, sustainable materials (Scherer et al., 2018). Further, focusing on an outdoor jacket allows elucidating the extent to which previous findings dealing with the same product, and using CBC (Klein et al., 2020) can be held true when using ACBC. Finally, outdoor jackets can be assumed to be a unisex product resulting in an equal involvement of both male and female participants.

Aside from the main part, we queried the construct 'green consumption values' measured by six items on a 7-point Likert-type scale (Shiel et al., 2020), online shopping frequency of outdoor apparel, outdoor activity level (7-point Likert-type scale), as well as demographics.

Table 3: Attributes and attributes levels

Attribute	Attribute levels	Surcharge	Reference(s)
Functionality	L., I., F-D., B. [a]	0.00€	Expert interviews; de Medeiros & Ribeiro, 2017; Matthews & Rothenberg, 2017
	L., I., F-D., B., W-R., WP. [b]	0.00€	
	L., I., F-D., B., W-R., WP., E., ED. [c]	0.00€	
Design	Black, straight-cut	0.00€	Expert interviews; Arora, 2006; de Medeiros & Ribeiro, 2017
	Black, slim-fit	0.00€	
	Dark blue, straight-cut	0.00€	
	Dark blue, slim-fit	0.00€	
Label	No label	0.00€	Expert interviews; Castka & Corbett, 2016; Janßen & Langen, 2017; Paetz & Guhl, 2017; Plank & Teichmann, 2018
	Eco label	9.00€	
	Social label	9.00€	
	Eco and social label	18.00€	
Country-of-Origin	Made in Asia	0.00€	Expert interviews; Meyerding & Merz, 2018; Rashid & Byun, 2018; Scherer et al., 2018; Stöckigt et al., 2018
	Made in Europe	18.00€	
	Made in Germany	27.00€	
Materials	100% synthetically	0.00€	Expert interviews; Klein et al., 2020; Reinders et al., 2017; Sandin & Peters, 2018; Scherer et al., 2018
	≥ 50% recyclable	18.00€	
	100% recyclable	36.00€	
	100% biodegradable	36.00€	
Delivery	Home delivery without CO_2 compensation	2.99€	Expert interviews; Edwards et al., 2010; Stöckigt et al., 2018; Zhang & Zhang, 2013
	Pick up at store	0.00€	
	Home delivery with CO_2 compensation	4.79€*	
Packaging	Plastic	0.00€	Expert interviews; Friedrich, 2020; Herbes et al., 2020; Nguyen et al., 2020; Paetz & Guhl, 2017
	Recyclable	1.00€	
	Biodegradable	1.00€	

Attribute	Attribute levels	Surcharge	Reference(s)
Price	Base price:	180€	Expert interviews; Hinnen et al., 2017; Klein et al., 2020; Meyerding & Merz, 2018

[a] Light, insulating, fast-dry, breathable.
[b] Light, insulating, fast-dry, breathable, water-repellent, windproof.
[c] Light, insulating, fast-dry, breathable, water-repellent, windproof, elastic, eudermic.
* Additional 1.00€ if manufactured in Europe; additional 2.00€ if manufacture in Asia.

We incorporated extrinsic and intrinsic attributes, as merging all information about one product when evaluating its quality may reduce the importance of price compared to other information (Rao & Monroe, 1988; Zeithaml, 1988). Thereby, examining the purchase holistically also results in more accurate WTP estimations (Koschate-Fischer et al., 2012). We calculated surcharges solely for sustainability-related attributes in order to reveal which sustainability aspect affects WTP the most. Hence, the jacket's design and functionality will not affect the price. Accordingly, the product's base price is 180.00€: the jacket then consists of synthetical material and is manufactured in Asia, is shipped packed in an additional plastic bag, and does not exhibit sustainability labels.

We decided not to implement specific labels, as these may bias the results based on their reputation analogously to the product's brand. Additionally, evaluating concrete labels requires a certain degree of familiarity, which cannot be taken for granted for all respondents. Thus, we incorporated the multi-dimensional sustainability conceptualization from the triple bottom line (Elkington, 1997) with the labels, emphasizing the ecological and social impact (Plank & Teichmann, 2018). According to recent findings (Splendid Research, 2020), consumers' WTP increases by 5% if quality labels are available. Therefore, we calculated a 9.00€ surcharge for each label.

As it has become common practice for many companies located in industrialized countries to shift manufacturing sites to countries overseas in order to increase margins by lowering production costs (Funk et al., 2010), we included 'made in Asia' (e.g., China) as one of the country-of-origin attribute levels. Although this is common nowadays (which is why we do not calculate surcharges for this case), manufacturing apparel products overseas results in increased CO_2 emissions (Scherer et al., 2018) caused by long-distance transportation (Koschate-Fischer et al., 2012) and often implies poor working conditions (Stöckigt et al., 2018). We thus estimated additional 18.00€ for manufacturing within Europe and additional 27.00€ for production in Germany (see, e.g., 20% WTP increase for made in Germany (Pastuch, 2016)), as wage levels are, on average, higher than in Asia.

According to literature and the interviews, materials cause the highest monetary impact and thus, yield the highest surcharge. We determined the surcharges according to actual surcharges derived from a catalog of one of the experts containing realistic values. Following previous literature, we utilized different attribute levels for varying proportions of specific (sustainable) materials in the product to yield more granular insights (Klein et al., 2020; Scherer et al., 2018).

Delivery costs were calculated based on common market standards, with a surcharge for CO_2 compensation of 1% of the base price (see, e.g., at online shop Zalando). As delivery costs increase if the product is shipped from manufacturing sites in Asia or Europe to the target population in Germany, we implemented a conditional pricing function for a realistic survey design. When produced in Asia, the surcharge for home delivery with CO_2 compensation increases by 2.00€ and 1.00€ when produced in Europe. The surcharges and options for the packaging were derived from the expert interviews. An exemplary choice task (from the Screening section) can be seen in the appendix (see Appendix A).

3.2.2 Sampling

Our target population was German consumers of Generation Y (born 1981-2000), not only because they are an essential segment within e-commerce (Ladhari et al., 2019), but further due to their concerns regarding climate change (Yadav & Pathak, 2016). Extant exploratory research found consumers to perceive sustainable products as less affordable compared to conventional products, and thus, these perceived higher prices represent a barrier towards sustainable consumption (Leeuw et al., 2015). This seems particularly applicable for Generation Y, as they were found to exhibit an attitude-behavior gap concerning green consumption behavior (Hume, 2010). Summarizing prior research, literature found a higher WTP for sustainable products among millennials (Lu et al., 2013), and we thus complement these findings by determining sustainability surcharges for Generation Y respondents. Similarly to prior research, first insights from a pre-test within the target group revealed that the majority refused to pay 180.00€ or more for outdoor jackets (potentially due to the lower wage level of the younger generations), resulting in an increased part-worth utility for the none-option and leaving questions about their preferences unanswered. Therefore, we decided to expose respondents to a scenario in which they have received a voucher worth 100.00€ as a Christmas gift that they would like to use for an outdoor jacket. As the investigation was conducted in January and February 2020, this scenario seemed appropriate due to Germany's cold winters and the temporal proximity to Christmas.
Due to the increased online shopping affinity of inhabitants of Bavaria and Baden-Wuerttemberg (HDE, 2018), the online survey was distributed in local social media channels, which provide some degree of sustainability affiliation. Additionally, green start-ups in both regions were asked to share the survey.
The investigation resulted in 247 completed questionnaires; however, we excluded speeders (n=13) to gather a high-quality data set. Another 19 respondents did not comply with the age range of Generation Y, leading to 215 responses taken into further consideration. The sample is 26 years old on average (SD=4.32) and comprises 60% females. Besides, the sample appears to exhibit a rather substantial green consumption value (mean=2.54), it comprises many outdoor sportsmen (mean=2.84), and purchases outdoor apparel online approximately two times per year (for further descriptive statistics see Appendix B).

4 Results

For analysis, we applied a Hierarchical Bayes (HB) estimation, deriving the model parameters through an iterative process. We ran 40,000 iterations (including 20,000 burn-in iterations) and included the task-specific scale factor analysis in the estimation (Allenby et al., 2005), which allows taking into account the different error levels inherent to binary choices (Screening section) and choices in the choice tournament. To assess the validity of our results, we evaluated quality criteria: The model's root likelihood (RLH) can reach values between 1 (implying a perfect model) and 1 divided by the number of stimuli per choice task for a naïve model (in our case 0.333; Kalwani et al., 1994). For our estimated model, RLH is 0.625, indicating a high internal consistency. The model's pseudo R^2 (McFadden, 1973) yields moderate internal validity (pseudo R^2=45.9%). Considering predictive validity (Huber et al., 1993; Wlömert & Eggers, 2016), the first choice hit-rate (FCHR) exhibits high values (72.6%), and the MAE is relatively low (MAE=1.2%). As the vast majority of previous studies demonstrate significant differences for green and less green consumers (Delmas & Lessem, 2017; Hinnen et al., 2017), we analyze the results segmentally based on the construct of green consumption value (for aggregated results see Appendix C). Factor analysis revealed that green consumption value indeed represents a factor explaining 65.70% of the variance. As the sample is generally rather green in their consumption behavior, and, hence, the distribution is rather left-censored (see Appendix D), it seems reasonable to summarize the first group as 'very green consumers' (VGC; 32%), the second one as 'green consumers' (GC; 53%), and the third one as 'less green consumers' (LGC; 15%). Figure 2 illustrates the attributes' average importances based on this segmentation.

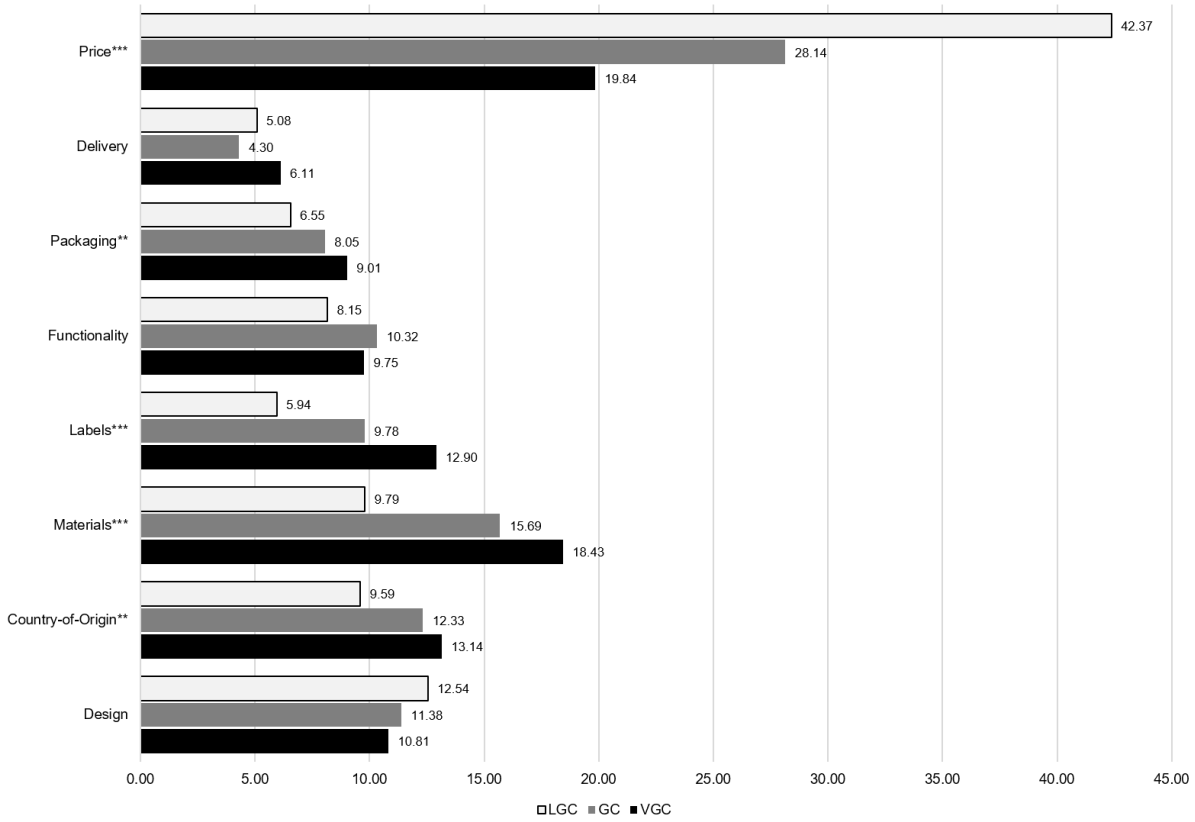

Figure 2: Relative average importances (in %) of attributes

Note: Differences between VGC and LGC with ***= p<0.001; **= p<0.01, *= p<0.05.

Significant differences were observed for the importance of price (p<0.001), labels (p<0.001), and materials (p<0.001), but there are also significant differences concerning country-of-origin (p=0.009) and packaging (p=0.005) between VGC and LGC. While for LGC, price represents the most important aspect (42.37%) when purchasing more or less sustainable outdoor jackets online, the material used (18.43%) is almost as important as price (19.84%) for VGC. Other sustainability-related attributes such as country-of-origin (13.14%) and labels (12.90%) evince a higher impact for VGC than product-related ones such as design (10.81%) and functionality (9.75%). In contrast, purely product-related features, such as design (representing the second most important factor 12.54%), are emphasized among LGC, whereas the most representative feature of sustainability (i.e., labels) plays a minor role (5.94%). Factors related to sustainable online shopping, such as delivery with/without CO_2 compensation and more/less eco-friendly packaging, seem to be of minor importance for both VGC (delivery: 6.11%; packaging: 9.01%) and LGC (delivery: 5.08%; packaging: 6.55%). However, VGC rather prefer the most eco-friendly solutions by picking up the product in a physical store or – in case of delivery – are willing to pay at least a CO_2 compensation fee (see Table 4). In contrast, LGC prefer delivery without CO_2 compensation over the other two options.

Table 4: Averaged part-worth utilities (zero-centered diffs) of the attribute levels

Attributes and Attribute Levels	VGC	LGC	Total	SD
Functionality				
Light, insulating, fast-dry, breathable	-42.79	-35.18	-42.78	(23.73)
Light, insulating, fast-dry, breathable, water-repellent, windproof	15.97	12.59	16.19	(20.73)
Light, insulating, fast-dry, breathable, water-repellent, windproof, elastic, eudermic	26.82	22.59	26.59	(16.23)
Design				
Black, straight-cut	-1.35	6.41	-2.29	(36.90)
Black, slim-fit	9.44	10.78	14.22	(41.10)
Dark blue, straight-cut	-6.17	-12.75	-11.36	(39.76)
Dark blue, slim-fit	-1.93	-4.45	-0.56	(37.97)
Label				
No label	-53.05	-16.61	-40.48	(34.22)
Eco label	14.51	-2.21	9.97	(16.95)
Social label	-4.24	4.60	-1.53	(13.16)
Eco and social label	42.78	14.21	32.04	(25.11)
Country-of-Origin				
Made in Asia	-63.42	-38.38	-56.31	(37.88)
Made in Europe	30.31	17.16	27.69	(21.85)
Made in Germany	33.12	21.22	28.61	(22.66)
Materials				
100% synthetically	-92.56	-43.09	-77.11	(49.85)
≥ 50% recyclable	16.60	17.16	19.41	(19.96)
100% recyclable	35.97	15.24	28.93	(23.89)
100% biodegradable	39.99	10.69	28.77	(29.97)

Attributes and Attribute Levels	VGC	LGC	Total	SD
Delivery				
Home delivery without CO_2 compensation	-14.61	5.55	-6.50	(18.62)
Pick up at store	14.55	-0.55	7.81	(18.97)
Home delivery with CO_2 compensation	0.06	-5.00	-1.31	(18.14)
Packaging				
Plastic	-37.72	-24.91	-33.84	(20.54)
Recyclable	7.31	10.29	9.68	(14.83)
Biodegradable	30.41	14.63	24.16	(18.81)
Price				
162*	76.66	169.46	109.29	(68.48)
296.77*	-76.66	-169.46	-109.29	(68.48)
None-Option				
Derived through Screening section	103.17	88.13	96.99	(38.38)
Derived through Calibration section	101.84	113.49	104.06	(126.93)

Note: *=potential maximum and minimum price points vary between 162.00€ for the basic configuration minus 10% variation and the expensive configuration plus 10% variation (296.77€).

Considering the sustainability-related factors, both segments prefer to buy a jacket made in Germany over made in Europe, and made in Europe over made in Asia. Moreover, VGC and LGC rather purchase biodegradable packaging than solely recyclable ones or those made of plastic. Regarding delivery options, LGC prefer to order products shipped to their homes without CO_2 compensation fee over shipping it with compensation fee and over picking it up at the store. In contrast, VGC favor the more comfortable way of home delivery, though with CO_2 compensation fee, followed by picking up the product in store with home delivery without compensation fee representing the least preferred option. While both VGC and LGC prefer the jacket not to be made of 100% synthetical material, VGC would rather choose a jacket made of 100% biodegradable material than made of 100% or 50% recyclable material. In contrast to these preference patterns, LGC would favor the jacket to be made of at least 50% recyclable materials, followed by 100% recyclable and 100% biodegradable materials. The most frequently chosen unacceptable levels constitute 100% synthetical material (27.91%), jackets manufactured in Asia (19.07%), and no label (14.42%). Besides, respondents most often chose made in Europe (19.07%), jackets with the second-best functionalities

(12.09%), and the black slim-fit design (2.79%) as must-haves features representing their minimum requirements. While the average none-option utility calculated using the HB estimation for all respondents increases when incorporating the answers from the Calibration section, differences can be observed among the two segments: For LGC, the none-option utility becomes larger (value derived from not buying the jacket increases), when inquiring concrete purchase probabilities. In contrast, the opposite effect occurs for VGC, signaling even increased purchase probabilities.

Besides differences based on ecological orientation, we reviewed the results categorized by all demographic and psychographic variables enquired, however, no notable disparities were detected except for gender. Comparing both the female and male segments (see Figure 3), females tend to emphasize sustainability-related factors. While price is significantly more important for males ($p<0.001$) when making the purchase, materials ($p<0.001$), country-of-origin ($p<0.001$), and labels ($p=0.017$) play a significantly greater role for female consumers.

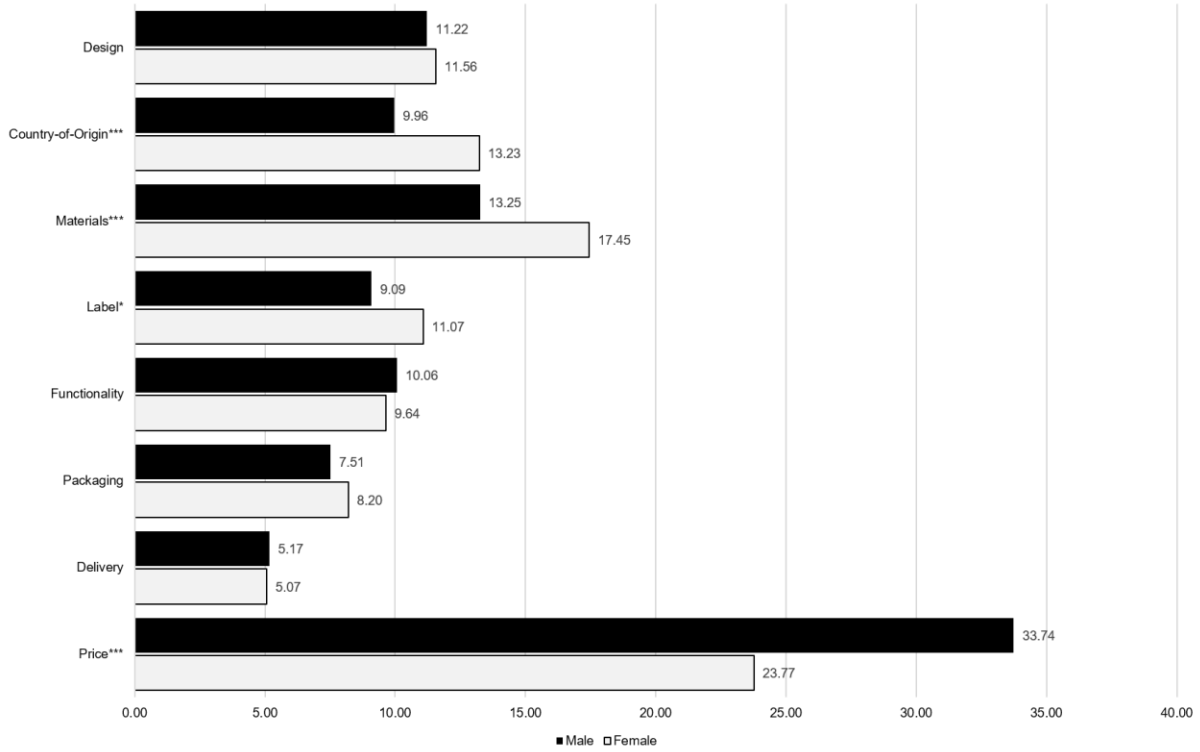

Figure 3: Relative average importances (in %) of attributes

Note: ***= p<0.001; **= p<0.01, *= p<0.05.

Apart from the average importances and part-worth utilities, we calculated the absolute WTP and the surcharge per attribute level consumers are willing to pay. Here, we followed the procedure suggested by Miller et al. (2011, p. 176) and assumed:

(1) $u_{it|\sim p} + v_i(p) \geq u_i^* + \in$,

where $u_{it|\sim p}$ displays the aggregated utility of the product without the utility of price for respondent $_i$ and $v_i(p)$ representing the utility of a specific price level p, and u_i^* is the aggregated utility of the none-option, and $\in$ representing a positive number. Assuming a linear price function, the WTP can be described as (Miller et al., 2011, p. 177):

(2) $WTP = v_i^{-1} (u_i^* - u_{it|\sim p})$

As a result, VGC are on average willing to pay 299.10€ for their favorite jacket configuration (highest utility), while LGC's WTP is 219.60€ (total sample's average WTP=261.28€). In line with the gender differences detected, women's WTP (280.20€) reveals to be much higher on average than men's WTP (238.00€) for their corresponding ideal product configuration.

Besides, we quantified the surcharge possible following guidelines related to the survey software (Bryan K. Orme, 2001):

(3) $\frac{(p_{m,i} - p_{n,i})}{v(p_{m,i}) - v(p_{n,i})}$,

where $p_{m,i}$ represents the lowest price point in a linear price function and $p_{n,i}$ displays the highest price point for each respondent, $v(p_{m,i})$ represents the utility of $p_{m,i}$ and $v(p_{n,i})$ displays the utility of $p_{n,i}$.

Hence, the surcharge per utility aggregated for VGC is approximately 0.88€/utility and 0.40€/utility for LGC.

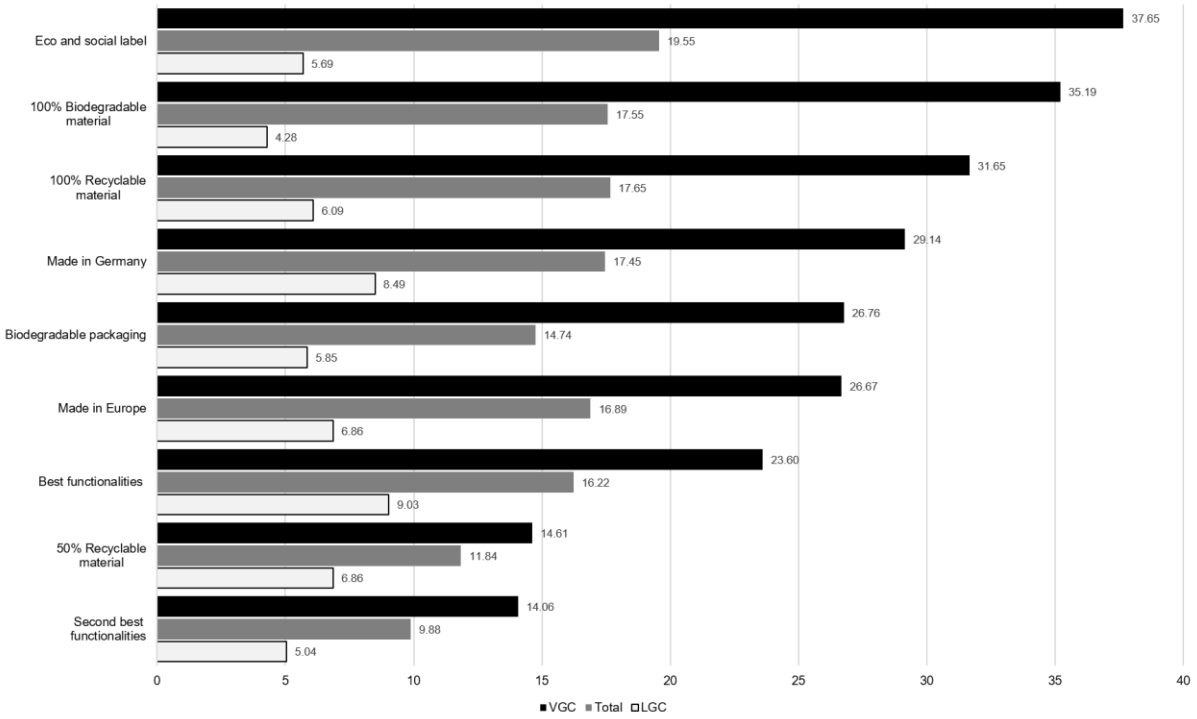

Figure 4: Highest calculated surcharges per attribute levels (in Euro)

Controlling for income among LGC and VGC, no significant differences were found. While the six attribute levels resulting in the highest calculated surcharges for VGC are all sustainability related (ranging from 37.65€ for eco and social label to 26.67€ for made in Europe), the highest possible surcharge among LGC is expected for the jacket providing the most functionalities (9.03€; more specifically: light, insulating, fast-dry, breathable, water-repellent, windproof, elastic, eudermic). Our findings suggest that particularly the usage of sustainable material, manufacturing in Germany or Europe, and jackets with many functionalities lead to high surcharges. The only other attribute level yielding one of the highest surcharges (at least 14.00€) is biodegradable packaging, whereby this is mainly held true for VGC (26.76€) rather than for LGC (5.85€). In line with the results derived from the aggregated WTP and the none-option, VGC are generally more likely to spend higher surcharges for the jacket (see Figure 4).

5 Discussion

Compared to extant studies analyzing the importance of sustainability when purchasing apparel products, we align with prior research finding that price (Klein et al., 2020), but not the product's country-of-origin (Scherer et al., 2018) is the most important factor. However, the importance of price for bio-based running shoes (Scherer et al., 2018) is similarly high compared with the outdoor jacket among VGC (21.20% vs. 19.84%). In contrast, the impact of price detected for rain jackets made of bio-based plastics (Klein et al., 2020) can be compared to the one found among LGC (45.30% vs. 42.37%).

This might further indicate three findings. First, the importance of price may depend on the product's price level (running shoes: 89-109€; bio-based jacket: 69-349€; our study: 169-296€), whereby its importance grows with higher prices. Second, the importance of price in conjoint analysis will technically always depend on the number of attributes used in the study. Hence, its importance declines when imitating the purchase decision more realistically by utilizing more factors (running shoes: 7; jacket: 5; our study: 8). This finding stresses the need to examine the influence of sustainability in purchase decisions holistically speaking in favor of ACBC. Similarly, research focusing purely on extrinsic information of the purchase decision of apparel goods (Stöckigt et al., 2018) found delivery costs to be the most essential driver (32%) and the environmental impact to be less important (17%) compared to our study. In contrast, when incorporating intrinsic product information (e.g., material, design), as well as extrinsic information (e.g., price based on sustainability-related costs), and factors related to online shopping (e.g., delivery costs), the importance of the latter diminishes. Third, as prior research on the importance of price reveals to be similar compared to either the importance for VGC (Scherer et al., 2018) or the importance for LGC (Klein et al., 2020), results need to be analyzed based on segments. In the same vein, literature exploring WTP for groceries demonstrated large differences in the importance of price among different segments (Janßen & Langen, 2017; Paetz & Guhl, 2017). Additionally, heterogeneous preference patterns were also found in the context of evaluating companies' business models, whereby the importance of sustainability-related features showed to be even higher than price for some consumers (Viciunaite & Alfnes, 2020). In line with this, our results prove significant differences in the importance of price between VGC and LGC, and hence, we can confirm H1. Moreover, comparable to the consumer segment detected by Paetz and Guhl (2017), we also found groups of consumers, which appear to be very price-sensitive, not caring much about sustainability labels and for whom the type of packaging seems to be irrelevant.

This finding becomes even more distinct when analyzing the most green and the least green consumers. While we determined the minimum size for each segment to be at least 10% of the total sample, other research postulates 5% (Sarstedt et al., 2011). When performing a sensitivity analysis on the results allowing such small segment sizes, the least environmental concerned respondents (n=14) emphasize price (53.22%), design (10.68%), country-of-origin (8.64%), and functionality (7.62%) as the four main drivers. Hence, no

directly evident sustainability factor is of considerable importance. Especially, the social dimension of sustainability (displayed with labels) indicates to be irrelevant to this segment, as for this group labels exhibited the lowest influence (4.49%) of all factors. Needless to say that such small segments harbor the danger of inconclusive implications. Apart from segmenting the sample based on their green consumption value, analyzing consumers based on gender provides interesting differences. These results validate prior findings (Baier et al., 2020; Paetz & Guhl, 2017) and confirm H2a and H2b.

Considering the second research question, the amount of money consumers of Generation Y are willing to pay extra also depends on their greenness and gender. The highest possible WTP for VGC is 66.17% (or 119.10€) higher compared to the non-sustainable base price of 180.00€. In contrast, LGC are only willing to pay an additional 22.00% (or 39.60€) more for more sustainable configurations. Female consumers' represent a potential surcharge of 55.67% (or 100.20€) in total. The maximum WTP among male consumers yields a surcharge of 32.22% (or 58.00€). In contrast to results derived from CBC investigations in other sustainability-related fields, the calculated surcharges are comparably high. While research found potential sustainability-related surcharges to be 24% for orange juice (Paetz & Guhl, 2017), a maximum of 22.9-29.2% surcharge for sustainable coffee (van Loo et al., 2015), and a 30% price increase for energy-efficient household appliances (Sammer & Wüstenhagen, 2006), these benchmarks are rather comparable with the WTP surcharges observed for LGC (22.00%) or male consumers (32.22%), rather than for the average of the total sample (45.16%). This might either be caused by the eventually more important field of apparel, which consumers are wearing regularly, by the methodology of ACBC, or due to the combination of both. Hence, future research could validate these findings in the field of apparel or by applying ACBC in other fields.

Contrasting our findings with insights gained from the two before-mentioned ACBC studies, the surcharge for green products in air travelling among greener consumers from Switzerland (32.19%; Hinnen et al., 2017) is comparable to the one of our total sample (45.16%). Potential explanations for a higher surcharge in our investigations might be the different setting (fashion sector in e-commerce), the refined value for the purchase likelihood through the Calibration section, the application of more attributes with more possibilities to select a eco-friendly attribute level, or a combination of those aspects. In opposition to these similar surcharge ranges, the other ACBC study with n=62 respondents (comprising 95.2% Singaporeans) revealed that the surcharge for a green building certificate is 6.05% for the biggest condominium (Heinzle et al., 2013). This rather low sustainability surcharge might be caused by consumers from a different cultural background (Ritter et al., 2015), the neglect of insights from the Calibration section, the disparate context, or the limited number of respondents. Hence, future studies might shed light on the influence of sustainability aspects in purchase decisions by including a cross-cultural comparison to explore where the deviations stem from.

Besides, we intended to examine whether combining the results from ACBC's Calibration section with the answers derived from choice task allows attenuating CBC's tendency of overestimating purchase likelihoods. The results imply a more reliable and more precise estimation of the none-threshold: in line with the other findings, the utility of the none-option slightly decreases for VGC (from 103.17 to 101.84) and tremendously increases for LGC (from 88.13 to 113.49) when including the answers from Calibration section. While hypothesis H3 is held true for the total sample, reasonable differences emerge for VGC and LGC.

5.1 Theoretical contribution

We contribute to literature by being the first to analyze consumers' WTP for a sustainable apparel product using the optimized CBC version, namely ACBC. The vast majority of prior research applied CBCs for investigating WTP and hence, suffers from several issues inherent to CBC (Delmas & Lessem, 2017; Janßen & Langen, 2017; Scherer et al., 2018). Only two other studies use ACBC (Heinzle et al., 2013; Hinnen et al., 2017) for measuring WTP in other sustainability contexts (real estate and air travel settings). However, they lack verifying their investigations' validity and did not include the Calibration section, which is particularly important when estimating WTP. Additionally, our results represent more accurate WTP calculations due to incorporating actual surcharges for the varying materials derived from one of the experts.

Second, we add to literature by considering all three aspects of sustainability in the e-commerce context and thereby fill the recently stated literature gap (Oláh et al., 2019). The economic dimension (represented by price) plays the most important factor when purchasing sustainable clothing in e-commerce. However, its importance massively varies based on consumers' greenness. E-commerce related sustainability factors evince to be of minor importance, even though differences can be observed depending on the greenness of consumers. We further enabled a holistic view on the purchase decision by analyzing the impact of purely product-related features (design, functionality) compared to sustainability-related ones, as well as e-commerce specific factors, and their influence on price. As a result of this holistic perspective, the alternatives in consumers' evaluation stage of making a decision comprise more factors and thus, represent more realistic options. Moreover, we contribute to the theoretical framework of the buyer decision process by highlighting the alternative evaluation and purchase stage through the use of ACBC, which seems to imitate consumer behavior in these stages more realistically, as consumers apply different heuristics when developing their consideration set (non-compensatory heuristics) compared to when deciding about the purchase between products of the consideration set (rather compensatory heuristics; see choice tournament section). In contrast, CBC investigations only allow deciding about the purchase between alternatives that would eventually be discarded from further consideration based on previous screening rules.

Third, apart from the topic-related insights, we also provide a methodological contribution: ACBC implies more accurate and thereby, more realistic estimates about respondents' WTP, when incorporating the none-option derived from the Calibration section. While CBC investigations rely on the results solely deduced

from choice task scenarios and thereby overestimating respondents' WTP, the related bias inherent to these types of questions (O'Donnell & Evers, 2019) can be attenuated using ACBC.

Summarizing these findings and thereby answering the first research question, it needs to be stated that the sustainability aspects, which exhibit the strongest influence on the purchase decision in an e-commerce context, strongly depend on consumers' greenness and gender. Reflecting the results from an aggregated perspective, the most influential sustainability factors are materials (15.81%; SD=8.26), country-of-origin (11.95%; SD=6.48), and labels (10.30%; SD=5.94).

5.2 Practical implications

Our study yields fertile practical implications not only on how potential surcharges should be quantified, but also on which consumer segments should be targeted when selling sustainable clothing. Hence, green companies should try to specifically target eco-conscious consumers (which seem to be overrepresented among outdoor sportspeople) and potentially put more weight on marketing efforts towards women, who indicate to yield increased sustainability-orientation.

While multiple manufacturers still hesitate to offer more sustainable products, as some studies indicate incompatibility of profit-oriented goals and sustainability aspects (Chkanikova & Lehner, 2015; Gleim et al., 2013), our results evince high potential surcharges for more sustainable solutions. Companies need to increase their efforts to inform consumers about all facets of their sustainability alignment in order to foster more sustainable consumption. The insights gained in this study evince that when providing several sustainability-related characteristics, consumers of Generation Y are indeed willing to pay more for sustainable products. However, one needs to be aware of massive differences between more and less green consumers, as well as of gender differences.

5.3 Limitations

Similar to other investigations in this field, our study is subject to limitations. Even though it has been attempted to yield a representative picture of Generation Y of Bavaria and Baden-Wuerttemberg, the sample acquisition suffers from self-select bias, which might have caused an overrepresentation of (very) green consumers. Although the survey was distributed in local social media channels of Bavaria and Baden-Wuerttemberg related to sustainability, the sample cannot be considered to be a random sample. Future research might replicate this study with a larger sample consisting of a more balanced distribution of green consumers.

6 Conclusion and future research

This paper aimed at examining the potential sustainability surcharge among younger consumers regarding apparel bought online, and at analyzing which factors impact the purchase decision the most. We therefore illustrated the multifold dimensions of sustainability in the context of apparel and thus, the need to consider applying a methodology capable of taking more than just a handful of factors into account. As a result, we introduced the ACBC and its advantages compared to the predominantly used CBC and provided an overview over previous literature examining WTP in the context of sustainability. Based on expert interviews, we revealed comparably higher surcharges for sustainability modifications than previous literature, however, significant differences exist between gender and ecological orientations.

As these disparities might stem from the different field of application, the advanced methodology, or a combination of both, future studies might replicate our investigation. Apart from the different methodology and setting, it needs to be examined whether the insights can be held true for other generations (e.g., Generation X) and interculturally. As the other two ACBC studies (focusing on different settings) demonstrate large WTP discrepancies for sustainable products by enquiring consumers from Central European or Southeast Asia respectively, cross-cultural investigations on sustainability surcharges might represent a fertile field for future research. Additionally, analyzing in-sample differences based on unobserved heterogeneity within ACBC results (e.g., using latent class analysis) would be of interest. While the social dimension in our investigation has been represented as part of the label factor, future research might examine ecological, social and economic factors as attributes for themselves in order to derive their importance on the purchase decision separately.

If manufacturers make use of the potential surcharges for more sustainable modifications highlighted (especially, including eco and social label, using 100% biodegradable or recyclable material, producing in Germany), a eco-friendlier and cleaner production can be established as the WTP will be met but not exceeded. As in e-commerce the fashion industry is the biggest one regarding revenues (besides consumer electronics), the impact of our findings on the environment is heavily benefiting from scale effects.

Appendix

Appendix A. Exemplary choice task from the Screening section

Now different product alternatives are listed.
Please indicate for each outdoor jacket, whether you take it into consideration for purchasing or not.

(1 of 7)

Home delivery *with* CO_2-Compensation	**Home** delivery *with* CO_2-Compensation	Delivery into the **store**
Recyclable packaging	Plastic packaging	Recyclable packaging
100% recyclable materials	100% *Synthetical* materials	*100% recyclable* materials
Black, slim-fit	Dark blue, slim-fit	Dark blue, slim-fit
		
235.00€	224.00€	258.00€
Eco label	Eco and social label	Eco and social label
Made in **Europe**	Made in **Germany**	Made in **Europe**
• light • insulating • fast-dry • breathable • water-repellent • windproof • *elastic* • *eudermic*	• light • insulating • fast-dry • breathable • water-repellent • windproof • *elastic* • *eudermic*	• light • insulating • fast-dry • breathable • *water-repellent* • *windproof*
◯ Take into consideration ◯ Take **not** into consideration	◯ Take into consideration ◯ Take **not** into consideration	◯ Take into consideration ◯ Take **not** into consideration

Figure 5: Exemplary choice task from the Screening section

Note: The jackets from Stimuli 2 and 3 initially were illustrated in dark blue.

Appendix B: Descriptive statistics

Demographics/ Characteristics	Specifications	Counts	Relative Proporation (in %)
Sex	Female	131	60.4 %
	Male	84	39.6 %
	Divers	0	0.0 %
	No information provided	0	0.0 %
Age	19-25 years old	109	50.7 %
	26-32 years old	81	37.7 %
	33-39 years old	25	11.6 %
Education	Without school-leaving qualification	0	0.0 %
	Primary Education	0	0.0 %
	Secondary School level I	7	3.2 %
	High School degree	41	19.1 %
	Technical education	14	6.5 %
	Bachelor's degree	92	42.8 %
	Master's degree	58	27.0 %
	PhD degree	2	0.9 %
	No information provided	1	0.5 %
Net income per month	≤ 499 €	44	20.5 %
	500 – 999 €	41	19.1 %
	1,000 – 1,499 €	28	13.0 %
	1,500 – 1,999 €	24	11.2 %
	2,000 – 2,499 €	25	11.6 %
	2,500 – 2,999 €	11	5.1 %
	≥ 3,000 €	29	13.5 %
	No information provided	13	6.0 %
Residence size	Village (≤ 5,000 inhabitants)	32	14.9 %
	Small town (> 5.000 inhabitants)	16	7.4 %
	Town (> 20.000 inhabitants)	96	44.7 %
	Major city (> 100.000 inhabitants)	71	33.0 %
Level of sport activities	≥ 8 times per month	136	63.3%
	4-8 times per month	59	27.4%
	2-3 times per month	15	7.0%
	≤ 1 time per month	1	0.5%
	Rarer	4	1.9%
	Never	0	0.0 %
Online shopping frequency	> 9 times per year	9	4.2%
	6-9 times per year	19	8.8%
	2-5 times per year	90	41.9%
	≤ 1 time per year	57	26.5%
	Rarer	23	10.7%
	Never	17	7.9%

Appendix C: Average importances for the total sample

Attributes and Attribute Levels	Average Importances in Percent (SD)
Functionality	9.80 (4.27)
Design	11.43 (5.44)
Label	10.30 (5.94)
Country-of-Origin	11.95 (6.48)
Materials	15.81 (8.26)
Delivery	5.11 (2.80)
Packaging	7.93 (3.79)
Price	27.67 (16.60)

Appendix D: Relative occurrence of green consumption value scores derived by confirmatory factor analysis

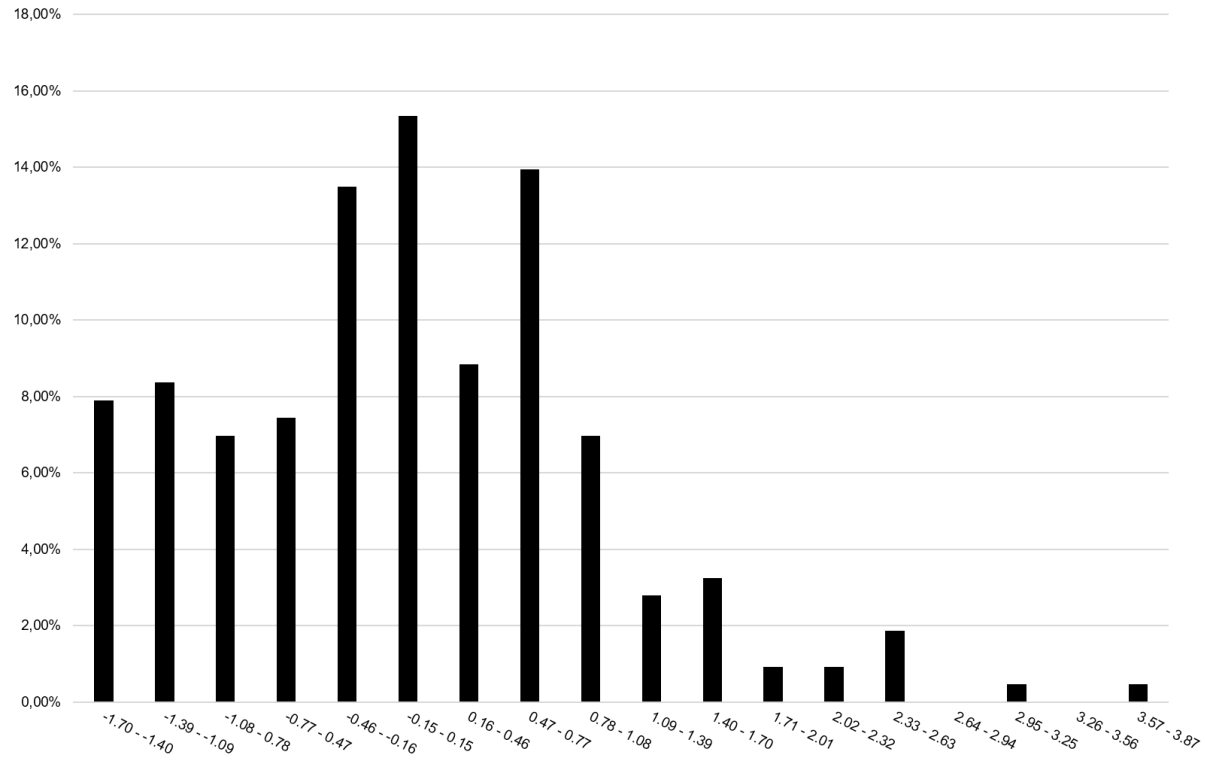

Figure 6: Relative occurrence of green consumption value scores

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3.4 The importance of sustainability aspects when purchasing fashion online: comparing Generation X and Generation Z

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Abstract

As research on the sustainability orientation across generations is still sparse, we contribute to literature by enriching this research field focusing on Generation Z ('Zers') and X ('Xers'). Moreover, no other study has analyzed cross-generational differences in the sustainability context by making use of choice experiments, which overcome issues related to (Likert) scale item investigations, and allow respondents to evaluate the trade-off between different purchase factors simultaneously. We thus applied one of the most recent advancements in choice experiments named Adaptive Choice-Based Conjoint (ACBC) analysis, which appears to be more realistic than previous alternatives. The results indicate Zers to consume more sustainably (inter alia higher importance of social labels; higher purchase likelihood) when shopping online, however, differences within each generation were observed, especially among Xers (e.g., gender differences regarding importance of price).

Keywords: sustainability; online shopping; generational comparison; Adaptive Choice-Based Conjoint analysis; segmentation; labels

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1 Introduction

Even though intergenerational duties are central to many discussions on business ethics (e.g., measures against climate change), investigating upcoming generations has largely been neglected by business ethics literature (Arenas and Rodrigo, 2016). Investigating how consumers fulfill some of these duties by consuming in a socially, environmentally and economically sustainable manner and thus, preserving the current world with all of its possibilities for next generations, constitutes a meaningful field of scientific interest. In contrast, recent research still noticed very few scientific support for assuming that one or the other generation behaves more sustainable (Yamane & Kaneko, 2021). Since shopping online causes massive environmental harm, provides multiple opportunities to consuming in such a more sustainable way and is predominantly used by the younger generations (Brand & Rausch, 2021), this context should be of particular importance. While recent research exhibited consumers' perception of retailers' ethics (consisting of non-deception, green products, fair-trade, product and price fairness) in offline settings (Cheung & To, 2020), questions about ethical consumption patterns in an online context remain unanswered. In contrast, business ethic literature recognized early on that "the internet […] should perhaps be treated as distinct to the physical world in terms of understanding ethical issues" (Freestone & Mitchell, 2004, p. 126). Moreover, research later on confirmed offline and online settings to differ, inter alia with regard to antecedents of perceived deception (Riquelme & Román, 2014).

Apart from that, previous research showed age to moderate the effect of perceived deception on consumer satisfaction in online shopping contexts (Román, 2010); however, literature comparing different generational cohorts with regards to their more or less sustainable consumption patterns is still lacking. Resultantly, current research proposes examining similarities and discrepancies between different generational cohorts (Weeks & Schaffert, 2019) and with regard to sustainable consumption (Dabija et al., 2020). As research postulates the need to focus on Generation Z and older ones (Dabija & Băbuț, 2019), we intend to analyze to what extent consumers from Generation Z (also referred to as 'Zers') and Generation X (also referred to as 'Xers') differ in online shopping behavior of sustainable (outdoor) products.

We thus contribute to literature by answering this question and further, by filling the literature gaps, according to which the three aspects of sustainability have not been examined holistically in e-commerce (Oláh et al., 2019). Additionally, we follow research's postulation to examine sustainability labels separated into social and ecological ones (Reimers & Hoffmann, 2019), as well as the need for investigations in the field of sustainable fashion for consumers with varying demographic characteristics (Şener et al., 2019).

To explore these issues, the paper first provides a literature review about previous articles dealing with sustainability in the light of cross-generational analysis, before describing the qualitative pre-study (conducting a focus group investigation) and the quantitative main study. The fourth section presents the results

within and between generations. Then, the results are critically reflected and theoretical contributions as well as managerial implications are derived.

2 Theoretical background

2.1 Sustainability across generations

A generation comprises individuals of similar age, who are exposed to the same political, social, and economic events and have a collective consciousness based on values, common beliefs, and attitudes (Pilcher, 1994). These, in turn, essentially influence purchasing and consumption behavior of a generation (Schewe & Meredith, 2004). According to Mannheim's theory of generations (1927; Mannheim, 1952), generational cohorts are affected by their socio-historical environment, such as happenings actively involving them in their youth. Since younger generations are – for instance – actively involved in the 'Fridays for Future' movement, while consumers born in the 1960's experienced massive economic growth and faced increasing entertainment possibilities (television, cinemas, etc.). As values and attitudes have also been identified as important determinants of sustainable consumption practices (Jacobs et al., 2018; Leeuw et al., 2015), it can be assumed that those belonging to a generation also share a common sustainable behavior. However, focusing on different generations can facilitate market segmentation and support the development of more effective strategies and product positioning (Schewe & Meredith, 2004).

Currently, the six contemporary generations are the Silent Generation (born before 1945; Kim et al., 2015), Baby Boomers (1946-1964; Dabija & Bejan, 2018), members of Generation X (Xers; from approximately 1961-1976; Fernández-Cruz & Fernández-Díaz, 2016; Lissitsa & Kol, 2016), Millennials - often synonymously referred to as 'Generation Y' (Ladhari et al., 2019) - (born 1980-2000; Lu et al., 2013), Generation Z members (Zers; born 1994/95-2010; Bassiouni & Hackley, 2014) and those from Generation alpha (or 'α'; born after 2010; Fernández-Cruz & Fernández-Díaz, 2016).

Within this paper, we focus on Gen X and Gen Z as previous sustainability literature particularly concentrated on Gen Y (or Millennials respectively) (e.g., (Gurtner & Soyez, 2016; Weber, 2019; Yadav & Pathak, 2016)), as well as on the comparison of Gen X and Gen Y (e.g., (Casini et al., 2015; Severo et al., 2017; Severo et al., 2018)). Nevertheless, Gen Zers are of increasing interest within research as they exhibit a similar consciousness towards sustainability issues like Gen Y (Chaney et al., 2017; Dabija et al., 2020) and despite their limited financial resources, they are willing to pay a premium for sustainable product attributes (Tait et al., 2020; Yamane & Kaneko, 2021). In contrast, Gen Xers can be considered the generation with the highest disposable income (Lissitsa & Kol, 2016). Currently, literature lacks a cross-generational comparison of both the financially strongest generation and the generation with the highest consciousness towards sustainability.

While few studies focus solely on Generation Z (inter alia Leeuw et al., 2015; Su et al., 2019), cross-generational analysis in light of sustainability is still very limited (see Table 1) and found contrary results (Dabija et al., 2020; Yamane & Kaneko, 2021). Research regarding the sustainability orientation (including the environmental, social and economic dimensions in accordance with the triple bottom line) of consumers from Generation Z revealed that on the one hand they favor retailers which help to preserve the environment and take care of employees' welfare (Dabija et al., 2020). On the other hand then again their sustainable food consumption is limited to eating seasonal and regional food (Kamenidou et al., 2019). Additionally, perceived control over pro-environmental behavior was observed to be the strongest predictor for the intention to exhibit such behavior (Leeuw et al., 2015). Having said this, one still needs to be aware of within generational differences among Zers, as factors affecting the purchase of sustainable consumption regarding food products vary based on Zers degree of environmental consciousness (Su et al., 2019). However, throughout recent years, the members of Generation Z have also been developing into responsible, independent consumers and thus, are shifting into the focus of customer research (Chaney et al., 2017). As they have been born at a time of profound global and ideological crisis (Pencarelli et al., 2020), they seem to be worried about the future as indicated by the current 'Fridays for Future' movement. Even though they are relatively young, they are very well informed about retailers and their offers due to the spread of communication technologies as well as social media and prefer those retailers with the most sustainable principles (Dabija et al., 2020). Recent research further attested such younger consumer segments to be willing to pay more for sustainable products with eco-labels and care much about smartphones' durability (Bigerna et al., 2021).

In contrast to younger ones, literature concerning Generation X stated that customer service is more important than sustainability to Xers when making a purchase (Dabija & Băbuț, 2019). Further, literature recommended marketers to target Xers as they have a higher purchasing power due to a higher disposable income compared with other generations (Lissitsa & Kol, 2016). Xers have the desire to gather detailed information about products while shopping, they are more heedful regarding product characteristics, especially of online information, making them more cautious when conducting new purchases, as they just got in touch with online media as adults (Dabija et al., 2018). Using a conjoint analysis to mitigate social desirability bias when exploring the consumption of sustainable products, de Pelsmacker et al. (2005) found consumers of Gen X to focus predominantly on fair-trade labels, especially the higher educated ones. Comparing Xers with Generation Y regarding ethical attitude, the first ones were found to keep established concepts of an organizational life (Boyd, 2010). While several papers about the attitudes of Xers towards sustainability exist, there is a lack of quantitative approaches within this research area (Gazzola et al., 2020).

Comparing both generations, especially younger consumers are targeted by green marketing plans and analyzed by marketing research (Chaney et al., 2017; Kanchanapibul et al., 2014), as they are future buyers and employees of tomorrow with their own income (Hume, 2010). Moreover, compared with older generations (Gen X and Baby Boomers), Gen Y and Zers are more concerned about global warming and environmental degradation, and perceive a strong responsibility towards the environment (Kanchanapibul et al., 2014; Yadav & Pathak, 2016). Their motivation to buy green products seems to be stronger and they are willing to pay a premium for sustainability attributes (Tait et al., 2020). Nevertheless, in a conventional clothing context, younger consumers were found to be rather price-sensitive purchasing low-quality clothes, whereas older generations were found to prefer high-quality apparel (Jung & Jin, 2014). One explanation for a less green orientation of Gen X could be the fact that, throughout the most time of their lives, issues such as climate change and environmental pollution did not receive much media attention and public interest as they do today. Other studies, however, came to contrary results. Severo et al. (2018), for example, reveals that Gen Yers are less affected by the socio-environmental practices of companies than Gen X. The study of Kamenidou et al. (2019) reveals that Gen Zers' purchase of organic food is rather limited. Further, older consumers were found to be more aware of sustainability issues (Johnstone & Lindh, 2018), and Gen Xers were found to be the most concerned about the environment (Lakatos et al., 2018).

Table 1: Green literature on cross-generational comparisons

Author(s) (Year)	Method	Generational focus	Findings
Bulut et al. (2017)	Mann-Whitney U Tests	Baby Boomers, Gen X, Y, and Z	Unneeded consumption differs across groups: Baby Boomers have the highest level of unneeded consumption, Gen Zers the fewest
Dabija (2018)	SEM	Baby Boomers, Gen X, Z, Millennials	Gen Zers and Millennials were found to have the strongest loyalty towards green-oriented apparel retail stores
Dabija & Băbuț (2019)	SEM	Gen X, Millennials	Retailer's sustainable behavior has an influence on Millennials' apparel store patronage and no influence on Xers
Dabija & Bejan (2018)	SEM	Baby Boomers, Gen X, Z, Millennials	Baby Boomer choose those green DIY stores whose market strategy is in line with their personal sacrifice to protect the environment. Xers choose green DIY stores to protect the environment for future generations. Millennials choose DIY stores whose strategies are in line with their own aspirations for environmental protection. Zers choose green DIY stores depending on the financial sacrifice they have to make.

Author(s) (Year)	Method	Generational focus	Findings
Johnstone & Lindh (2018)	Focus groups, interviews, SEM	Mainly millennials	The older consumers are, the more they are aware of sustainability issues. As sustainability is perceived as more complex for millennials, influencers are important to them to create sustainability awareness
Kapferer & Michaut-Denizeau (2020)	Correlations; Descriptive statistics; regression	Gen X, Millennials	Luxury and sustainability are perceived as contradictory across millennials from multiple countries. Millennials should be splitted into sub-segments.
Lakatos et al. (2018)	ANOVA	Gen X, Y, Z	Gen Xers are the most concerned about the environment but Gen Yers are more open towards reducing resource consumption
Littrell et al. (2005)	ANOVA, Multiple Regression	Baby Boomers, Gen X, Swing	All generation cohorts put emphasis on fair trade philosophy (wages, working conditions, and environment)
Pencarelli et al. (2020)	SEM	Gen Y, Z	Gen Yers were found to exhibit more sustainable habits than Gen Zers
Severo et al. (2017)	Multiple linear regression, ANOVA	Baby Boomers, Gen X, Y	Baby Boomers presented greater environmental sustainability awareness in relation to sustainable consumption behavior
Severo et al. (2018)	SEM	Baby Boomers, Gen X, Y	Gen Yers perceive organizations' cleaner production, social responsibility, and eco-innovations as less intense
Sogari et al. (2017)	Logistic regression	Millennials, Non-Millennials	Young generation is more sensitive towards energy issues and less towards possession of environmental certification

Note: ANOVA = Analysis of Variance, SEM = Structural Equation Modelling.

Reflecting upon previous literature examining sustainability issues in light of cross-generational analysis (see Table 1), it becomes evident that the vast majority applies questionnaires with statements requested to answer on (Likert) scale items or assess descriptive statistics. However, the application of fixed-point scale items harbors the danger of several biases (Woodside, 2013). Accordingly, ratings on a quasi-interval scaled range, where respondents indicate to what extent they agree/disagree with statements that are extracted from their context or omitting a direct interplay with other impact factors, should be questioned or at least treated with much care. In the same vein, Weber summarized that the business ethics literature "is limited as it typically assesses individual, isolated elements of the complex, multifaceted decision-making process" (Weber, 2019, pp. 1672–1673).

2.2 Measuring the purchase of sustainable products implicitly

To prevent inflation of demands when prioritizing factors affecting the purchase and allow respondents to evaluate different (sustainable) products holistically, multiple studies investigate the compensatory effects of sustainability aspects and price by applying Choice-Based Conjoint analysis (CBC) experiments (inter alia Beak et al., 2020; Meyerding & Merz, 2018; Scherer et al., 2018). While CBC experiments allow consumers to express their preferences by selecting their favorite product out of a set, which is more realistic to what consumers actually do being in a marketplace (Delmas & Lessem, 2017; Ku et al., 2017) - especially in the context of sustainability to prevent/attenuate the attitude-behavior gap - it is also tied to some disadvantages. Thus, CBC investigations assume respondents to use compensatory heuristics while deciding between choices, and the number of factors displaying products is very limited, as otherwise respondents might be overstrained (Meyerding & Merz, 2018; Scholz et al., 2010). In contrast, literature found respondents to utilize non-compensatory decision heuristics (Gilbride & Allenby, 2004; Ryan et al., 2009; Yee et al., 2007), in particular when consumers form their individual consideration set (Shocker et al., 1991; Turley & LeBlanc, 1995). Additionally, answering the same question multiple times is experienced as monotonous (which might lead to thoughtless click-throughs), and oftentimes respondents are exposed to stimuli irrelevant to them (Brand & Baier, 2020). To overcome these issues related to CBC, the Adaptive Choice-Based Conjoint (ACBC) analysis has been introduced (Johnson & Orme, 2007). Making use of this still a rather nascent methodology to explore the importance of sustainability among consumers from Generation X and Z, we briefly describe the ACBC and its benefits compared to CBC investigations.

In contrast to CBC investigations, the ACBC comprises three to four sections (see Figure 1).

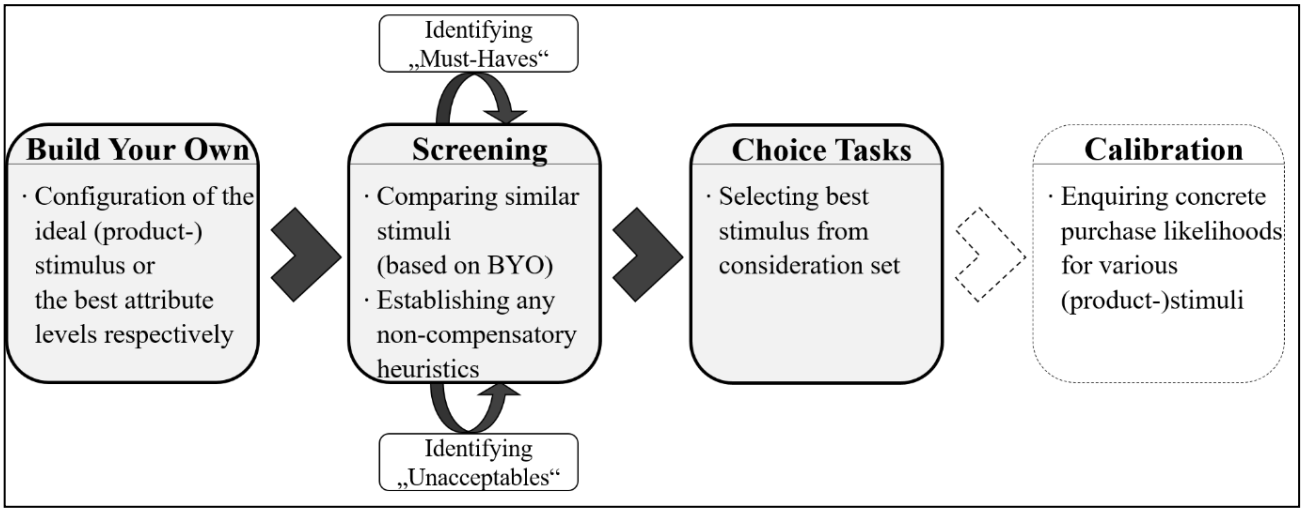


Figure 1: Procedure of an ACBC (based on Brand & Rausch, 2021)

The first two sections aim at specifying the individual stimuli exposed to respondents to prevent presenting irrelevant ones to them (identifying their consideration set) and revealing individual non-compensatory heuristics applied. The third section can be compared to a regular CBC where stimuli taken into consideration are traded off against each other before an optional fourth section asks about purchase probabilities[7].

This comparably novel methodological approach has recently gained increasing attention (Ronda et al., 2020), also in the field of sustainable behavior (see e.g., Cocquyt et al., 2020; Hinnen et al., 2017).

2.3 Comparing CBC with ACBC experiments

We now summarize the results of studies comparing ACBC with its antecedent CBC. ACBC's procedure with the screening and the choice tournament section depicts the third and fourth stage of the buyer decision process (Blackwell et al., 2006; Engel et al., 1968) more accurately than the predominantly used CBC, as the choice set (Section 3) is emerging as a subset of the consideration set constituting only of alternatives perceived as a possibility (Shocker et al., 1991). Moreover, during this two-step decision process different decision heuristics are applied by consumers: While forming the consideration set (binary choice) non-compensatory considerations are employed, compensatory trade-offs are applied when determining the final choice (Shocker et al., 1991; Turley & LeBlanc, 1995). These conceptual reflections of the two-step decision procedure were also empirically verified in the field of online shopping utilizing unbiased clickstream data (Moe, 2006). Accordingly, the preferences and applied decision rules varied by person, which further speaks in favor of the individual design inherent to ACBC.

One of ACBC's major advantages represents its ability to deal with a larger amount of attributes (Eggers & Sattler, 2011), which enables a more accurate depiction of the nowadays more complex products. According to the literature review by Cunningham et al. (2010), ACBC allows imitating the decision-making process more realistically. However, the additional sections result in an increased time for completion compared with CBC experiments (Cunningham et al., 2010; Johnson & Orme, 2007). Still, ACBC is experienced as more engaging and attractive by respondents (Bauer et al., 2015; Johnson & Orme, 2007). Based on the manageable size of empirical investigations comparing both methods, it is assumed that ACBC tends to estimate purchase prices more precise (Chapman et al., 2009) and needs fewer participants to yield similar results (Jervis et al., 2012), as it collects more information for each respondent (Salm et al., 2016). Besides studies attesting ACBC more accurate results concerning validity criteria (Bauer et al., 2015; Orme & Johnson, 2008), first indications suggest that ACBC is significantly outperforming CBC regarding predictive validity (Wackershauser et al., 2017).

[7] The composition of this procedure refers to the one illustrated in Sawtooth Software (2014)

2.4 Hypothetical framework

As extant literature revealed substantial differences contingent on values a generation holds (Weber, 2019), ethical beliefs (Strutton et al., 1997) and how ecology-oriented consumers are (Hinnen et al., 2017; Klein et al., 2020), we first examine within generation preferences before analyzing cross-generational ones. Analyzing a sample aged 47 years on average, Hinnen et al. (2017) evinced that green consumers pay less attention to price compared to others, but rather emphasize sustainability-related aspects. Following Tait et al. (2020) revealing a higher willingness to pay among younger generations, we assume this observation to be confirmed for younger consumers likewise.

H1a: For Xers, the importance of price is higher for consumers less concerned about ecological sustainability compared to very concerned consumers.

H1b: For Zers, the importance of price is higher for consumers less concerned about ecological sustainability compared to very concerned consumers.

Besides differences regarding consumers' greenness, literature found disparities based on their other sustainability aspects (Balderjahn et al., 2018; Viciunaite & Alfnes, 2020), such as social sustainability. According to the consumer groups identified in the study by Balderjahn et al. (2018), we expect this assumption to hold true for consumers with varying levels of social consciousness for sustainable consumption as well.

H2a: For Xers, the importance of price is higher for consumers less concerned about social sustainability compared to very concerned consumers.

H2b: For Zers, the importance of price is higher for consumers less concerned about social sustainability compared to very concerned consumers.

While some research found Generation Z to pay significantly more attention to retailers' green strategy and socially responsible guidelines compared to Xers (Dabija, 2018), others also reported higher environmental sustainability behavior among Zers, however with no significant differences compared with other generations (Bulut et al., 2017). Following this tendency, Huang et al. (2021) evinced that younger generations (living in smaller cities) show strong preferences for the more environmentally friendly electronic cars. Summarizing these findings, we assume Zers to pay more attention to the two types of sustainability labels implemented.

H3a: The importance of eco-labels is higher among Zers compared to Xers.

H3b: The importance of social labels is higher among Zers compared to Xers.

Focusing on millennials (in their study equivalently used to Generation Y) and consumers of Generation Z, Gazzola et al. (2020) report that the younger ones are willing to pay an increased price for sustainable

products. While Brand and Rausch (2021) found price to account for 28% of the purchase decision on sustainable clothing among consumers from Generation Y, Klein et al. (2020) reported a much higher importance (45%) for a sample primarily consisting of consumers aged older than 60 years. Hence, we assume:

H4: The importance of price is higher for consumers of Generation X compared to consumers of Generation Z.

Additional to the generational focus, we intend to examine gender differences regarding the purchase of sustainable products, as various literature indicates large disparities (Baier et al., 2020; Paetz & Guhl, 2017). Also applying an ACBC, Cocquyt et al. (2020) found women to prefer sharing platforms for fashion articles emphasizing social goals, while their male counterpart favors commercial goals. Moreover, female consumers exhibit increased importance of sustainability aspects concerning sustainable apparel (Gazzola et al., 2020), such as labels, eco-friendly materials and the country-of-origin, at the expense of decreased importance of price compared to men (Brand & Rausch, 2021).

H5a: The importance of price is higher for men than for women among Generation X.

H5b: The importance of price is higher for men than for women among Generation Z.

3 Method

3.1 Pre-study

As one of the essential steps in creating a conjoint analysis experiment lies in the identification of the most relevant factors for the purchase decision (Steiner et al., 2016), we complemented an extensive literature review with findings revealed from a focus group interview (Morgan & Spanish, 1984). We decided to conduct an online focus group interview, as a moderated discussion enables gathering a comprehensive view on the topic and benefits from observing the dynamics related to developing preferences patterns (Morgan & Spanish, 1984; Steiner et al., 2016). To obtain a heterogeneous sample, we invited outdoor sportsmen, consumers with a lot of experience in shopping outdoor articles online, and employees from the outdoor industry. The seven participants were four females as well as three males and were aged between 19 and 59 years. To uncover the most important drivers for purchasing sustainable outdoor apparel online, we asked the participants to imagine being in an online shopping situation with the intention to buy an outdoor jacket.

We decided to focus on an outdoor jacket, since first, the clothing sector generates the highest revenues in e-commerce (bevh, 2020) and thus, reducing the related negative impact on the environment (Jaller & Pahwa, 2020) for clothing can be attenuated the most or maybe even compensated due to scale factors. Since sustainable clothing (Tully & Winer, 2014) and slow fashion (Şener et al., 2019) both are associated with higher willingness to pay, research postulates to take advantage of the related potential inherent to the apparel

industry (Goworek et al., 2012; Hill & Lee, 2012; Jacobs et al., 2018). Various authors investigate this field of industry, as the fashion industry yields a huge negative impact on the environment (Colucci & Vecchi, 2021; Rahman et al., 2020) and society (Lee et al., 2018). Second, research emphasizes the need for additional investigations examining consumers' demand for sustainable apparel (Matthews & Rothenberg, 2017; Oh & Abraham, 2016), and further, when pursuing green strategies, apparel retailers may benefit from increased consumer loyalty (Dabija, 2018). Third, outdoor equipment proved to serve as an appropriate example for sustainable materials (Scherer et al., 2018), and companies selling outdoor textiles seem to be particularly important in the light of sustainability (Börjeson & Boström, 2018).

After explaining the product, its characteristics mentioned by the participants were collected, condensed, and potential attribute levels discussed. In the next step, participants prioritized the attribute levels with a scale ranging from minus three to plus three, with plus three representing the most important score. Table 2 summarizes the product features and the characteristics' rating (with the highest potential score being $8 * 3 = 24$).

Table 2: Results from the focus group discussion

Product features	**Feature characteristics (Max. Score 24)**
Features and quality issues	Waterproof (21) Windproof (20) Water-repellent (20) High water column (17) Durable (16) Functional (15) Low weight (11) Small pack size (9)
Materials and manufacturing process	Workmanship (20) Recycled materials (17) Fair production (17) Applied materials (17) Regenerative resources (15) Free of PFC (12) Transparent manufacturing processes (12)
Price	Price performance ratio (16) Discounts (9)
Design	Look/Visual appearance (19) Fitting (17) Colored (-5)
Labels	Fair Wear Foundation label (15) Bluesign label (10) ‚Grüner Knopf' ('Green Button') label (9) Green Shape label (5)
Country-of-origin	Transparent information about product (18) Produced in Europe (11) Place of manufacture (8) Sent from Germany (7)

Product features	Feature characteristics (Max. Score 24)
Brand proposition	Warranty (14) Sustainable brand philosophy (13) Service (e.g., repair in case of deterioration) (12) Campaigns for environmental protection (8)
Online service	Good online customer ratings (16) Repair services (14) Free returns (13) Plastic-free packaging for delivery (12) Product test judgments (9) Climate-neutral delivery (9) Resale of returned products (9) Replacement services (8) Place of shipment (4)

Illuminating those product attribute levels with the highest scores (15 or higher), the ideal outdoor jacket should exhibit multiple functionalities, such as being waterproof (summarizing the aspects of high water column and water-repellent), windproof, functional for doing sports outside, and durable. Additionally, the materials used should preferably consist of regenerative, recycled resources that are manufactured under fair conditions (which can be ensured via labels) and high workmanship (should be considered as an additional basic product feature). The price and visual appearance (including fitting) are also considered to be of major importance. Besides, labels indicating social sustainability (Fair Wear Foundation; FWF) were rated as very important. Applying labels might further allow multiple positive effects which compensate negative ones compared to more radical measures, such as boycotts against companies tolerating child labor (Ballet et al., 2014). However, as we intend to examine sustainability in online purchase behavior holistically, we also use labels indicating ecological sustainability into further consideration (Bluesign). Moreover, transparent information about the product's country-of-origin and positive online customer ratings are essential, whereas the latter cannot be directly influenced by manufacturers but is rather a result of meeting the before-mentioned requirements, which is why online customer ratings will be excluded from further considerations.

3.2 Main study

Survey

Merging the results derived from literature with the insights gained from the focus group interview, we draw on the attributes and attribute levels in Table 3, as they turned out to be the most important drivers when purchasing sustainable outdoor jackets online. Besides the FWF label indicating social sustainability and the Bluesign signaling ecological sustainability, we extended the corresponding attributes by one additional label for each attribute. This slight modification's purpose is due to (1) preventing the number-of-levels effect (Currim et al., 1981), and (2) gathering more granular insights about which sustainability goal results in the highest utility for consumers, as the two additional labels put more emphasis on other aspects of

environmental and social sustainability respectively. Hence, we explained that each label follows several goals, whereas each focuses on a specific one. To make sure each respondent becomes familiar with the labels, we implemented a timer preventing from skipping the explanation page. Moreover, after introducing the labels, a small symbol beneath each label indicated its main goal. Accordingly, Bluesign emphasizes reducing the environmental impact and the use of chemicals in the textile industry, whereas OEKO-TEX (second eco label) aims for providing less sanitary worryingly textile products. Similarly, FWF advocates optimizing the working conditions in the textile industry, whereas Fair Trade (second social label) fosters a sustainable livelihood and payment of financial bonuses. This approach further allows to make a (purchase) decision with a better understanding of the benefits related to each label (Godwin, 2015). Additionally, it takes the assumption into account that most consumers are not aware of the social and/or social effects related with sustainability labels (Prado, 2013). To control for heterogeneous levels of background information about the labels, we added a question at the end of the survey, as consumer preferences might be affected by prior knowledge about sustainability certifications (Rekker et al., 2021). Additionally, using three attribute levels for each label also mitigates extreme instances of a jacket with a label or with no label at all. To avoid preferences between the labels based on the graphics' size, we adjusted all labels to be equal in size.

Table 3: Attributes and attributes levels used for the ACBC

Attribute	Attribute Levels	References
Design	Regular fit in black; Slim fit in black; Regular fit colored; Slim fit colored	Matthews & Rothenberg, 2017; Rausch & Kopplin, 2021; Focus group
Functionality	- Waterproof, windproof, breathable - Waterproof, windproof, breathable, minimized package size - Waterproof, windproof, breathable, minimized package size, low weight	Jacobs et al., 2018; Laitala et al., 2018; Focus group
Materials (major proportion)	Synthetical materials; Recycled materials; Bio-based materials	Klein et al., 2020; Scherer et al., 2018; Focus group
Eco-labels	No eco-labels; bluesign® PRODUCT ; OEKO-TEX® CONFIDENCE IN TEXTILES STANDARD 100 00000000 Institute Geprüft auf Schadstoffe. www.oeko-tex.com/standard100	Ho et al., 2018; Janßen & Langen, 2017; Partwise focus group
Social Labels	No social labels;	Nikolaou & Tsalis, 2018; Plank & Teichmann, 2018; Stöckigt et al., 2018; Focus group

Attribute	Attribute Levels	References
	 ; 	
Country-of-origin	Made in Asia; Made in Europe; Made in Germany	Meyerding & Merz, 2018; Rashid & Byun, 2018; Focus group
Price	79.00 EUR; 119.00 EUR; 159.00 EUR; 199.00 EUR	Hinnen et al., 2017; Niedermeier et al., 2021; Focus group

The level of background information on synthetical, recycled, and bio-based materials was assumed to be heterogeneous, which is why an introduction page was shown before the ACBC explaining each material and providing examples, as well as for presenting the upcoming online shopping scenario. As it is common standard for (fashion) enterprises of industrialized countries to manufacture in countries that enable lowered production costs (Funk et al., 2010), we included made in Asia (as many textile products are fabricated in China/Bangladesh), made in Germany, as we surveyed German consumers, and made in Europe representing some sort of compromise between the first to options. The price points were derived based on actual prices for outdoor jackets and are comparable with similar investigations (Klein et al., 2020). While the lowest price might be considered comparably cheap for a (more/less sustainable) outdoor jacket, we intended to take into account the lower purchasing power among consumers from Generation Z.

The ACBC was created using Sawtooth Software's Lighthouse Studio (version 9.8.1) and consisted of the first three sections. Except for price (where preference patterns are a priori known), we included all attributes in the BYO-section and adjusted preference and sequence order, where applicable. We used the mixed approach for the BYO-product modification strategy and randomized the order of attributes in the survey preventing the position effect. Seven screening tasks were conducted with three stimuli per choice task and a maximum of 16 stimuli potentially included in the choice tournament. Following previous literature, we reduced the number of must-haves to one and determined that potentially three unacceptable features are identified, as the consumers tend to apply disjunctive decision heuristics more often (Brand & Baier, 2020). The third section showed three stimuli per choice task and was extended by three additional holdout tasks.

We employed a fractional factorial design, as the number of stimuli that need to be evaluated would otherwise be overstraining (Green, 1974). Reviewing the choice design based on synthetical data of five dummy respondents answering randomly, each attribute level occurred at least three times assuring a balanced design. Additionally, the d-efficiency was between 0.97 and 0.99 (Kuhfeld et al., 1994).

Before the ACBC started, we asked respondents about their environmental (EnSC), social (SoSC) and economic consciousness for sustainable (EcSC) consumption (Balderjahn et al., 2018) when purchasing apparel. Additionally, respondents' age, online shopping experience, gender, education and income were inquired at the end of the questionnaire. A pre-test with twelve experienced participants yielded only minor modifications.

Sampling

While some studies lump Gen Y and Z together (Johnstone & Lindh, 2018; Pomarici & Vecchio, 2014; Sogari et al., 2017) and thus, do not allow for distinct implications for both segments, we focus on Gen Z and X to allow an explicit differentiation between older and younger consumers. Additionally, this approach prevents the representativeness bias inherent to student or convenience samples (Jacobs et al., 2018). To gather comparable samples for consumers of Generation X and Z with both groups being representatively spread across Germany, we recruited respondents using an established panel (Kantar Group, with more than 100 million respondents in 90 markets). To yield similar shares of consumers from both generations of interest, we incorporated a quota function based on age. Additionally, respondents with no online shopping experiences were dropped out from the survey. The data acquisition took place in November 2020. In total, we gathered data from 692 respondents, however, excluded those respondents answering the survey twice as fast as the (median) average (n=47), and those with straight lining response patterns within the first block of questions (n=35) to increase the quality of the data set. The remaining 610 respondents comprise 56% females and 305 consumers from Generation X (for further descriptive statistics, see Appendix A).

4 Results

4.1 Within-generation analysis

Generation X

To analyze how Generation X and Z differ in their online shopping behavior of sustainable outdoor products, we first outline the corresponding within-generation results, before contrasting them. Concerning Generation X, we first applied a Hierarchical Bayes (HB) estimation, where the model's parameters are yielded through an iterative process. Following literature (Wuebker et al., 2015), we ran 50,000 iterations (including 40,000 burn-in iterations) and incorporated the task-specific scale factor into the analysis (Allenby et al., 2005) for taking into account the varying error levels inherent to choices in the Choice Tournament (identifying the best stimulus) and the Screening section (binary choice). Assessing the validity of the results, the

model's pseudo R^2 (McFadden, 1973) yields a substantial internal validity (pseudo R^2=0.536) measured by McFaddens R^2 references (Hensher et al., 2010). The model's root likelihood (RLH) indicates a high internal consistency (RLH=0.680), whereas the value can vary between 1 (implicating a perfect model) and the value for a naïve model (1 divided by the number of stimuli per choice task; Kalwani et al., 1994). Regarding the model's predictive validity (Huber et al., 1993), the mean absolute error (MAE) is very low (MAE=2.04%) and the first choice hit-rate (FCHR) across three holdout tasks amounts to 71% exhibiting a high validity comparable to advanced CBC approaches (Wlömert & Eggers, 2016).

Hierarchical Bayes estimation

For Generation X, the highest impact on purchase had price (28.48%), design (19.28%), and country-of-origin (16.89%), followed by materials (10.76%), eco-labels (10.24%), social labels (8.83%), and functionality (5.52%). Respondents preferred bio-based (zero-centered utility: 14.08) and recycled materials (11.77) over synthetical ones (-25.85). Besides, they would rather buy products made in Germany (41.85) compared to those made in Europe (24.56) or in Asia (-66.41). Regarding social labels, respondents preferred products with the Fair Trade (19.92) over the FWF label (1.00), compared to no social label at all (-20.92). Among eco-labels, consumers preferred OEKO-TEX (29.65) over Bluesign labels (-6.90) and no eco-labels (-22.76; for detailed overview see Appendix B). As the preference patterns for social and eco-labels (and its corresponding main aim) might be biased by varying familiarity with the labels used across the sample, we controlled for levels of label knowledge in advance. Results exhibited no differences in the prioritizing of labels and thus, paying financial rewards and fostering a sustainable livelihood (Fair Trade) seems to receive more support than optimizing working conditions (FWF). Similarly, offering less sanitary worryingly clothing (OEKO-TEX) is preferred over reducing the environmental impact and application of chemicals in the textile branch (Bluesign).

In line with the importance of design and country-of-origin, the features most often selected as unacceptable are the colored slim fit jacket (24.92%), manufacturing in Asia (24.92%), and the black slim fit jacket (24.92%). Similarly, the black regular fit jacket most often represented a must-have (5.90%), followed by at least the additional functionality of the minimized package size (4.26%) and made in Germany (3.93%).

As the vast majority of sustainability literature observed heterogeneous consumer preferences (Delmas & Lessem, 2017; Hinnen et al., 2017; Klein et al., 2020), we further conducted an ANOVA regarding the impact of three facets of sustainability and a clustering analysis and to yield more granular insights. In a first step, we conducted a confirmatory factor analysis to verify that three before-mentioned sustainability consciousness constructs (EnSC; SoSC; EcSC) form one factor each. Except for EcSC, all constructs were confirmed for Generation X. We then coded a binary dummy variable, where consumers are divided into groups based on the arithmetic mean of all EnSC (1 with n=163; 2 with n=142) and SoSC (1 with n=155; 2 with n=150) items.

(Welch-)ANOVA

Table 4: Results within Generation X from the (Welch-) ANOVA

Variables	None-Option *F* value	Importance of eco-labels *F* value	Importance of social labels *F* value	Importance of price *F* value
EnSC (mean=3.64[2])	5.897[1,*]	27.155[1,***]	17.325[1,***]	28.178***
SoSC (mean=3.21[2])	3.209[1]	24.331[1,***]	31.707[1,***]	43.698***
Gender	0.182	9.612[1,**]	5.834*	14.930***

Note: * p < .05; ** p < .01; *** p < .001; [1] based on Welch-ANOVA; [2] mean based on 7-point Likert scale with 1 = completely agree and 7 = completely disagree.

As conducting a conventional ANOVA assumes equal variances between segments, but homoscedasticity is not asserted for all conditions (assessed using Levene tests), we applied the Welch-ANOVA for certain comparisons. The ANOVA (Table 4) revealed that consumers with high degrees of environmental consciousness for sustainable consumption were less likely not to buy the jacket (p = .016), which is even clearer mirrored in a highly significantly decreased influence of price on the purchase decision ($EnSC_{High}$ = 24.45 vs. $EnSC_{Low}$ = 33.10; p < .001). Additionally, the level of EnSC significantly influences the importance of eco-labels ($EnSC_{High}$ = 11.50 vs. $EnSC_{Low}$ = 8.80; p < .001) and less strong the one of social labels ($EnSC_{High}$ = 9.84 vs. $EnSC_{Low}$ = 7.67; p < .001). For consumers with varying levels of SoSC, the opposite effect was observed with a more substantial impact regard the influence of social labels ($SoSC_{High}$ = 10.26 vs. $SoSC_{Low}$ = 7.36; p < .001) compared to the one of eco-labels ($SoSC_{High}$ = 11.51 vs. $SoSC_{Low}$ = 8.93; p < .001). The degree of social consciousness of sustainable consumption did not affect the utility related to the None-Option (and inherent the likelihood of purchasing), but exhibited price to diminish in importance for consumers with higher SoSC (p < .001).

Controlling for H5, we examined the influence comparing women with men. While no significant impact was found between male (n=151) and female (n=154) consumers regarding the utility related to the None-Option, gender evinced significant influence on the importance of social labels (female = 9.47 vs. male = 8.17; F = 5.834; p = .016) and eco-labels (female = 11.07 vs. male = 9.40; F = 9.612; p = .002) on the purchase. Additionally, price seems to play a minor role for female consumers compared to males (F = 14.930; p < .001).

Clustering analysis

As literature revealed large heterogeneity among consumers of Generation Y (Brand & Rausch, 2021; Niedermeier et al., 2021), we conducted a clustering analysis as a side note of the investigation to deeper scrutinize which aspects are most important within the distilled groups. Applying the *k*-means algorithm (MacQueen, 1967) with varying amounts of segments, we identified a two-segment solution (see Appendix C). The two different segments could be referred to as ‘price-sensitive less sustainable consumers’ and the ‘sustainable design-oriented consumers’. The latter ones pay even more attention to the design than the price

of the product. Additionally, sustainability aspects, such as country-of-origin, materials, eco- and social labels represent important drivers.

Table 5: Most influential factors for sub-segments (in %) among Xers

Factor	Segment 1	Segment 2
Design	21.49	16.75
Functionality	5.56	5.47
Materials	13.57	7.53
Eco-Labels	12.04	8.17
Social labels	10.15	7.31
Country-of-Origin	20.38	12.89
Price	16.81	41.87

In contrast, for the second segment price is the predominant driver when considering a purchase. Besides, sustainability aspects play a minor role in the decision compared with the first segment (see Table 5). Examining which enquired variables might explain the segment membership revealed gender to represent a good predictor ($\chi^2 = 8.50$, $p = .004$).

Generation Z

Analogously to examining the results among consumers of Generation X, we follow the same analysis approach. The HB estimation resulted in a pseudo R^2 of 0.456 representing a substantial internal validity (Hensher et al., 2010). The model's RLH of 0.635 exhibited a high internal consistency (compared to the naïve model of 0.333). The model's predictive validity yielded an average MAE of 4.08% and a rather moderate average FCHR (FCHR=65.38%; Wlömert & Eggers, 2016).

For Generation Z, the most important drivers are the product's price (25.95%), its design (20.79%), and where it was manufactured (15.96%), followed by eco-labels (10.66), social labels (10.20%), materials used (9.54%), and the jacket's functionality (6.90%). The Zers prefer recycled materials (zero-centered utility: 15.97) over bio-based (-0.74) and synthetical ones (-15.23). Manufacturing in Europe (30.10) and in Germany (28.44) is favored rather than made in Asia (-58.55). Regarding the eco-labels, OEKO-TEX (19.52) and Bluesign (12.02) yielded precedence before products with no eco-labels (-31.55). Consumers from Generation Z rather choose jackets with Fair Trade label (22.96) than the FWF one (8.10) or none at all (-31.07; for detailed overview see Appendix D). Again, we controlled for potentially biasing levels of familiarity with the labels and found no changes in the preference patterns. Hence, providing workers monetary bonuses and fostering a sustainable livelihood (Fair Trade) seems to be more supportable than optimizing their working conditions (FWF). Regarding ecological aims, results indicate a higher preference for supplying less sanitary worryingly textile products (OEKO-TEX) compared to reducing the environmental impact and usage of chemicals in the clothing industry (Bluesign).

Confirming the impact of design and country-of-origin, the three most frequently chosen unacceptable features are the colored slim fit jacket (20.90%), the colored one with regular fit (20.66%), and manufactured in Asia (18.03%). Must-have features were selected less often yielding that the jacket should at least be waterproof, windproof, breathable, is minimized in package size (3.93%), should at least be manufactured in Europe (2.62%), and must be black as well as slim fit (2.62%).

To enable within-generation insights comparable to those of Generation X, we conducted the same analysis. Again, EnSC and SoSC were confirmed as one construct, while EcSC was not. In the next step, we thus compared the 156 most social sustainability consciousness consumers with its counterpart (n=149), and the ones with the highest EnSC (n=160) and its corresponding complement (n=145), as well as 187 females with 117 males.

(Welch-)ANOVA

Table 6: Results within Generation Z from the (Welch-) ANOVA

Variables	None-Option *F* value	Importance of eco-labels *F* value	Importance of social labels *F* value	Importance of price *F* value
EnSC (mean=3.22[2])	2.027	13.107[1,***]	8.770**	15.844***
SoSC (mean=2.76[2])	0.019	7.134**	4.935*	9.468**
Gender[3]	0.013	5.565*	3.486[1]	0.003

Note: * p < .05; ** p < .01; *** p < .001; [1] based on Welch-ANOVA; [2] mean based on 7-point Likert scale with 1 = completely agree and 7 = completely disagree; [3] to enable direct comparisons to Generation X, we focused on males and females only.

The ANOVA (Table 6) revealed that the degree of environmental consciousness for sustainable consumption significantly impacts the influence of eco-labels ($EnSC_{High}$ = 11.71 vs. $EnSC_{Low}$ = 9.49; p < .001), social labels ($EnSC_{High}$ = 11.03 vs. $EnSC_{Low}$ = 9.28; p = .003) and price ($EnSC_{High}$ = 22.84 vs. $EnSC_{Low}$ = 20.38; p < .001). Similarly, SoSC affected the importance of social labels ($SoSC_{High}$ = 10.85 vs. $SoSC_{Low}$ = 9.52; p = .027) and price ($SoSC_{High}$ = 23.46 vs. $SoSC_{Low}$ = 28.56; p = .002), however, in a less substantial manner. Additionally, higher degrees of SoSC evinced to increase the impact of eco-labels (p = .008). Besides, females were found to pay more attention to eco-labels when buying a sustainable outdoor jacket online (female = 11.23 vs. male = 9.71; F = 5.565; p = .019). In contrast, gender does not seem to affect the influence of price or social labels. All three variables do not affect the None-Option and thus, the likelihood of purchasing.

Clustering analysis

To check for within generational differences, we again conducted a clustering class analysis. Based on the *k*-means algorithm, a two-segment solution should be preferred (see Appendix C). The first segment could

be characterized as ‘design-oriented sustainable consumers’, who emphasize design of the jacket even more than price.

Table 7: Most influential factors for sub-segments (in %) among Zers

Factor	Segment 1	Segment 2
Design	23.68	17.14
Functionality	7.50	6.15
Materials	11.14	7.53
Eco-Labels	12.51	8.32
Social labels	11.88	8.08
Country-of-Origin	18.68	12.54
Price	14.60	40.24

Compared with the second segment, these consumers pay more attention to sustainability-related aspects, such as country-of-origin, eco- and social labels. In contrast, the second segment predominantly focuses on price when facing the product. The other drivers yield almost equal importance, which is why this segment could be referred to as ‘price-sensitive consumers’ (see Table 7). No enquired variable could significantly explain the membership among Zers.

4.2 Between-generation analysis

To yield a first impression of the sustainability consciousness when purchasing clothes, we compared the EnSC and SoSC means of Gen X with Gen Z. Here, Zers stated significantly higher degrees of EnSC ($p < .001$ based on Mann-Whitney-U test) and SoSC ($p < .001$). Additionally, Zers were more familiar with the labels Bluesign ($p < .001$), FWF ($p < .001$) and Fair Trade ($p < .001$), but exhibited lower income levels ($p < .001$). Furthermore, female consumers of Generation X emphasized eco- ($p = .002$) and social labels ($p = .016$), as well as country-of-origin ($p < .001$), whereas price was more influential among men ($p < .001$; see Appendix E for details). In contrast, the only gender difference found among Zers was observed for the eco-label impact ($p = .019$; see Appendix E).

Comparing the most important drivers for purchasing, materials (4th most important one) revealed to be more important than eco-labels and social labels among Xers, whereas the opposite effect evinced among Zers (6th most important one). Besides, the order of priority regarding influencing factors exhibited to be identical. However, the impact size (see Figure 2) varied across generations concerning price ($p = .042$; $z = -2.034$; $r = 0.08$) and materials ($p = .013$; $z = -2.474$; $r = 0.10$), and even more substantially concerning functionality ($p < .001$; $z = -5.233$; $r = 0.21$) and social labels ($p = .001$; $z = -3.401$; $r = 0.14$). For Xers the impact of eco-labels is higher than the one of social labels ($p < .001$), while Zers seem not to differentiate ($p = .125$).

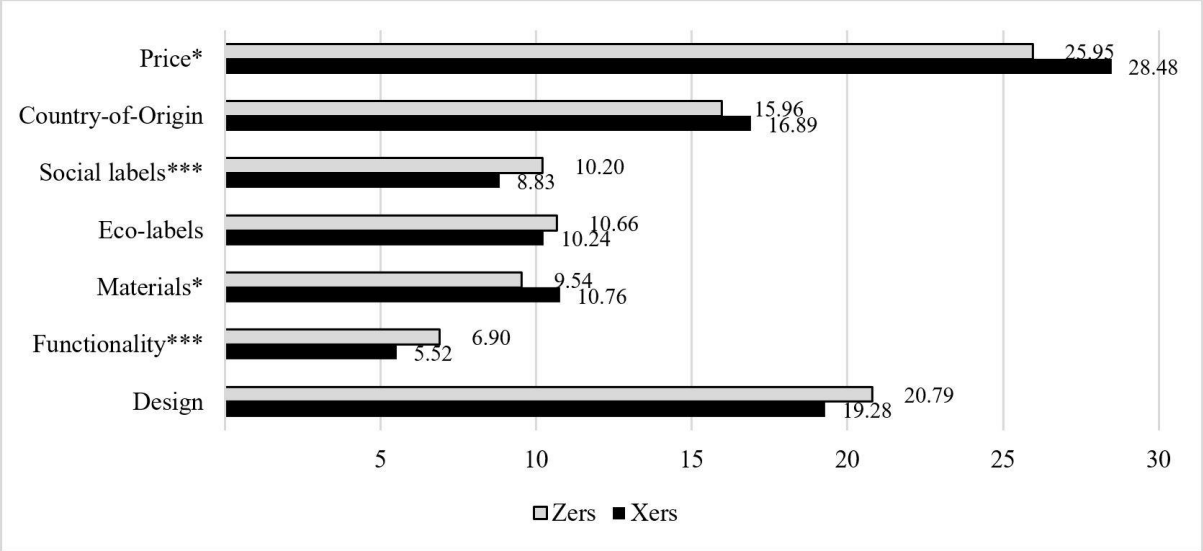


Figure 2: Average influence across generations (in %)
Note: * p < .05; ** p < .01; *** p < .001 based on Mann-Whitney U test.

Besides differences on the aggregated factor level, notable disparities were observed within the preferences patterns for the materials used. Zers rather chose outdoor jackets preponderantly made of recycled materials (15.97) than those of bio-based ones (-0.74 with p < .001), while Xers tend to prefer bio-based materials (14.08) and recycled ones (11.77) almost equally. Apart from that, Zers exhibited to be more likely to buy the jacket (None-Option: 99.46) compared to Xers (None-Option: 131.52).

5 Discussion

Multiple findings indicate that Zers tend to care more about sustainable aspects when purchasing clothing online. First, the None-Option is much lower for Zers (99.46) compared to Xers (131.52), which infers a higher likelihood to purchase sustainable clothing among the younger consumers. Second, the impact of price is significantly lower among Zers when exposed to sustainable clothing, which confirms H4 and Gazzola et al. (2020), and thus contradicts the results from Kamenidou et al. (2019). Disparities from these prior findings might stem from the different research context (food consumption), the different respondents' nationalities (Greeks), or a combination of both. Third, while materials were found to be the fourth most important driver when deciding about the purchase among Xers, Zers were rather impacted by eco-labels and social labels with materials representing the pre-last influential aspect. This finding is mirrored by the fact that social labels are significantly more important to Zers compared with Xers (p = .001), which approves H3b. Additionally, it verifies research focusing on the loyalty towards green-oriented retail stores (Dabija, 2018) and the higher impact of corporate social responsibility measures on the preference for slow fashion among Zers (Pencarelli et al., 2020). Fourth, Zers reported higher levels of EnSC and SoSC, which approves earlier research (Yamane & Kaneko, 2021), and further, more Zers were familiar with the four

labels applied. This overall tendency confirms extant research and might be explained by the higher level of information among Zers about sustainability issues spending more time online informing themselves (Dabija, 2018), and by the fact that they will have to deal with the negative impacts on the environment.

Apart from these indicators implying that Zers emphasize sustainability more than Xers when buying online, considerable similarities were observed between generations. In contrast to social labels, no differences were found regarding eco-labels, which is why H3a cannot be supported. This verifies prior literature (Gazzola et al., 2020), which revealed no notable differences between Generation Z and older consumers. For future research, this interesting finding implies an important aspect. While several studies exclusively emphasize the ecological dimension regarding sustainable consumption (Hinnen et al., 2017; Matthews & Rothenberg, 2017; Scherer et al., 2018), significant differences in the impact of social labels across generations should foster future studies to include both or all three dimensions, especially when focusing on Zers or Xers. While Xers distinguish between ecological and sustainability labels (rather focusing on eco-labels), Zers emphasize both aspects in an almost equal manner. Furthermore, no differences were found concerning country-of-origin, which we could verify to be the main driver when considering purchasing sustainable clothing online (Brand & Rausch, 2021).

Besides differences and similarities concerning sustainability aspects, Gen X and Z vary massively in the impact of functionality of outdoor clothing on the purchase. The younger consumers pay much more attention to the functionality, which is in line with literature revealing that other quality aspects, such as longevity (Niinimäki, 2010) and 'technologies' (e.g., shrink-free, stain-resistant), represent the most important drivers for sustainable clothing among students, as well as a substantial effect of durability on the attitude towards sustainable clothing (Jacobs et al., 2018). Additionally, we confirm price to be the most important factor in the context of sustainable clothing (Klein et al., 2020), however, its importance varies for the sub-segments within each generation, and thus, affirms findings from Brand and Rausch (2021). Especially among Xers, the impact of price is diminished for the more sustainable and design-oriented ones (16.81%) compared to the price-sensitive consumers (41.87%).

As the influence of the product's design represents the second-largest driver within both generations, studies solely focusing on sustainability aspects and price might be biased as one essential purchase criterion is omitted. Hence, we encourage future research to implement design in their experiments. Arising from ACBC's benefit to identify unacceptable and must-have features, we also confirmed findings from Brand and Baier (2020) demonstrating that respondents are much more likely to apply disjunctive decision heuristics compared to conjunctive ones

Apart from cross-generational results, the within-generation analysis indicated Zers to be more homogeneous regarding sustainability orientation. While massive differences were found among Generation X contingent on higher/lower levels of EnSC and SoSC, as well as among males and females with strong effects

(confirming H5a), fewer disparities with smaller effects were observed among Zers. Especially gender differences barely occurred among Zers evincing females only to slightly differ in the importance of eco-labels (rejecting H5b), which are more important for women. This finding corroborates literature exhibiting women to emphasize sustainability aspects more than men (Brand & Rausch, 2021; Paetz & Guhl, 2017), as men seem to perceive sustainable behavior as associated with femininity (Brough et al., 2016). However, within both generations, the importance of price is significantly less important for consumers with high levels of EnSC, which supports H1a and H1b, and thus, verifies prior research (Brand & Rausch, 2021). This effect was stronger among the more heterogeneous Xers. Analogously, consumers with lower levels of SoSC of both generations paid much more attention to price, which confirms H2a and H2b. While Zers tend to consume more sustainable than Xers from an aggregated perspective, within-generational differences were observed for each generation. Hence, we corroborate previous literature emphasizing the need to distinguish between more sustainable consumers and those who are rather price-oriented (Brand & Rausch, 2021; Paetz & Guhl, 2017; see clustering analysis). Table 8 summarizes the findings regarding the proposed hypotheses.

Table 8: Summary of hypothesis-related findings

	Hypotheses	Confirmed/ Rejected	p-value
H1a	For Xers, the importance of price is higher for consumers less concerned about ecological sustainability compared to very concerned consumers.	Confirmed	<.001
H1b	For Zers, the importance of price is higher for consumers less concerned about ecological sustainability compared to very concerned consumers.	Confirmed	<.001
H2a	For Xers, the importance of price is higher for consumers less concerned about social sustainability compared to very concerned consumers.	Confirmed	<.001
H2b	For Zers, the importance of price is higher for consumers less concerned about social sustainability compared to very concerned consumers.	Confirmed	.002
H3a	The importance of eco-labels is higher among Zers compared to Xers.	Rejected	.546
H3b	The importance of social labels is higher among Zers compared to Xers.	Confirmed	.001
H4	The importance of price is higher for consumers of Generation X compared to consumers of Generation Z.	Confirmed	.042
H5a	The importance of price is higher for men than for women among Generation X.	Confirmed	<.001
H5b	The importance of price is higher for men than for women among Generation Z.	Rejected	.995

5.1 Theoretical contribution

While the vast majority of studies examining sustainability in the light of cross-generational comparisons apply (Likert) scale items to survey consumers (see Table 1), we enrich extant literature by contrasting those findings with a choice experiment. While CBC experiments are considered to provide a more realistic setting that is closer to the actual purchase decision (Ku et al., 2017), we made use of the methodology developed to solve issues inherent to the CBC. Since ACBC allows to take multiple purchase decision factors into account (without yielding less valid results) and seems to exhibit more precise validity (Orme & Johnson, 2008; Wackershauser et al., 2017), the insights gained in this study are in turn reinforced. As its composition is closer to the stages of the Buyer Decision Process Theory incorporating the evaluation and purchase stages, whereas different heuristics are applied in each stage (Brand & Rausch, 2021), ACBC yields more realistic results.

Several out of the few studies dealing with cross-generational comparisons about sustainable behavior suffer from representativeness biases due to student/convenience samples (inter alia Gazzola et al., 2020; Kamenidou et al., 2019; Lakatos et al., 2018), whereas this study depicts preferences patterns from consumers representatively spread over Germany. Hence, the two samples do not exhibit an artificially increased skew towards more informed consumers (e.g., students), which would potentially consist of more sustainability-oriented ones (Panzone et al., 2016), and thus, reinforces the findings revealed. We thereby also respond to the postulation to investigate sustainable clothing behavior with larger samples and preferably equal shares of males and females (Jacobs et al., 2018), as well as to enlighten latent sub-segments' particularities regarding sustainability labels (Sarti et al., 2018).

Additionally, we empirically demonstrated that paying financial rewards to and fostering a sustainable livelihood for manufacturing employees is clearly preferred among both generations compared to an optimization of working conditions. Less distinct differences were observed regarding environmental goals, however, Xers and Zers both rather support the production of less sanitary worryingly textile articles than the reduction of chemicals in the clothing industry and the impact on the environment. The results further indicate that theory of generations seems not to be sufficiently explaining generational differences concerning superordinate issues such as sustainability. Although differences were detected, sustainability is an important topic for both generations, and thus, confirms research indicating the younger generations do not behave more sustainable than older ones (Yamane & Kaneko, 2021).

In line with postulation for a clear demarcation between different sustainability labels (Janßen & Langen, 2017), we contribute to extant research by examining the impact of eco- and social labels separately and revealed large cross-generational differences for the latter one. While several studies using choice experiments solely rely on ecological factors for measuring the impact of sustainability (inter alia Matthews & Rothenberg, 2017; Scherer et al., 2018) or subsume the social facet under eco-labels (Delmas & Lessem, 2017), our results claim to put more emphasis on social labels when marketing to Zers (compared with Xers).

Moreover, this study follows the postulation to analyze the impact of certified products compared with non-certified ones to reveal potential benefits of labels (Delmas & Grant, 2014). By examining all facets of sustainability in an online shopping context, we thus fill the literature gap, according to which research has not yet analyzed these holistically in e-commerce (Oláh et al., 2019).

Even though the apparel sector represents the most important one in e-commerce concerning revenues in Germany (bevh, 2020) and witnessed the largest sales growth together with consumer electronics globally (Mangiaracina et al., 2015), no other study has explored the consumption preferences for sustainable clothing comparing Xers and Zers. We thus contribute to literature by complying with the postulation to further examine consumers' demands for sustainable apparel (Matthews & Rothenberg, 2017; Oh & Abraham, 2016) and by focusing on Generation Z and older consumers (Dabija & Băbuț, 2019). Moreover, we fill the recently postulated literature gap by exploring to which extent findings on the sustainability consumption preferences of Generation Y hold true for generation X and Z (Brand & Rausch, 2021). Apart from that, we follow research's postulation for analyzing sustainability labels' sub-dimensions separately (Reimers & Hoffmann, 2019). Additionally, we fill the gap stated by Şener et al. (2019) and provide insights on sustainable fashion perception for consumers with various demographic characteristics, such as age.

5.2 Limitations and future research

We focused on the most important online shopping sector of apparel, as transforming this industry into a more sustainable one will result in large positive effects for ecological, social and economic sustainability. However, recent studies indicate that buying sustainable clothing might be particularly driven by consumers with high levels of online shopping affinity (Jacobs et al., 2018), and further, environmental concerns represent the main driver for online shopping (Panzone et al., 2016). Therefore, future studies might replicate this study in an offline context and/or in other industries. Apart from that, online shoppers are exposed to information asymmetries that can not only be attenuated by labels and the country-of-origin of a product as in this study, but by online customer reviews (Manes & Tchetchik, 2018). This seems to be particularly important, as consumers nowadays tend to mistrust companies proclaiming to be "green", and thus, exhibit greenwashing concerns (Chen & Chang, 2013), also regarding sustainable clothing (Rausch & Kopplin, 2021). Hence, future research might holistically examine the impact of sustainability labels, country-of-origin and online customer reviews.

5.3 Practical implications

We focused on the largest e-commerce sector of apparel, which comes along with a massive negative impact on the environment (Jaller & Pahwa, 2020), and thus, provides multiple opportunities to change matters into more sustainable realizations (Carrillo et al., 2014; Pålsson et al., 2017). Accordingly, transforming the online apparel sector enables multiple benefits and effects profiting from economies of scale. Hence, matching the varying demand of Zers by implementing social labels and emphasizing functionality will result in

higher revenues, which might compensate for non-sustainable procedures in the supply chain. In contrast, retailers should highlight the materials used and be aware of greater heterogeneity among Xers. Especially female Xers are willing to purchase sustainable clothing and pay more attention to sustainability aspects. As country-of-origin represents the third most important driver for both generations, companies might consider shifting their production sites dependent on whether this investment pays off in the long run.

Appendix A

Table 8: Descriptive Statistics

		Generation Z (n=305)		**Generation X (n=305)**	
		Frequency	**Proportion (in %)**	**Frequency**	**Proportion (in %)**
Gender	Female	187	61,3	154	50,5
	Male	117	38,4	151	49,5
	Diverse	1	0,3	0	0
Age	16-20 years	133	43,6	0	0
	20-25 years	172	56,4	0	0
	44-48 years	0	0	56	18,4
	49-53 years	0	0	104	34,1
	54-59 years	0	0	145	47,5
Education	Without qualification	7	2,3	0	0
	Primary education	10	3,3	12	3,9
	Secondary School level I	81	26,6	48	15,7
	High School degree	143	46,9	38	12,5
	Technical education	35	11,5	139	45,6
	Bachelor	26	8,5	22	7,2
	Master	1	0,3	41	13,4
	PhD	1	0,3	5	1,6
	other	1	0,3	0	0
Net Income (€)	≤ 499	61	20,0	14	4,6
	500 - 999	45	14,8	29	9,5
	1.000 - 1.499	59	19,3	43	14,1
	1.500 - 1.999	30	9,8	42	13,8
	2.000 - 2.499	35	11,5	49	16,1
	2.500 - 2.999	10	3,3	40	13,1
	≥ 3.000	13	4,3	68	22,3
	no specification	52	17,0	20	6,6
Online shopping experience	Yes, very frequently	256	83,9	246	80,7
	Yes, occasionally	49	16,1	59	19,3
	None	0	0	0	0

Appendix B

Table 9: Results from the HB estimation for Generation X

Attribute Levels	Average Zero-Centered Utilities	Standard Deviation
Regular fit, black	30.03	56.58
Slim fit, black	-19.98	52.14
Regular fit, colored	20.32	59.38
Slim fit, colored	-30.37	43.31
Waterproof, windproof, breathable (wwb)	4.02	20.39
wwb, minimized package size	-10.33	14.21
wwb, minimized package size, low weight	6.30	17.25
Synthetical materials	-25.85	42.39
Recycled materials	11.77	26.29
Bio-based materials	14.08	26.91
No eco-labels	-22.76	30.76
Bluesign	-6.90	20.91
OEKO-TEX	29.65	24.52
No social label	-20.92	32.05
FWF	1.00	19.82
Fair Trade	19.92	21.24
Made in Asia	-66.41	35.67
Made in Europe	24.56	20.82
Made in Germany	41.85	32.12
79.00 EUR	92.10	64.75
119.00 EUR	31.45	26.48
159.00 EUR	-27.27	28.65
199.00 EUR	-96.28	58.36
None-Option	131.52	105.79

Levels	Average Importances (in %)	Standard Deviation
Design	19.28	9.45
Functionality	5.52	3.06
Materials (major proportion)	10.76	6.27
Eco-labels	10.24	4.77
Social labels	8.83	4.73
Country-of-origin	16.89	8.21
Price	28.48	14.83

Appendix C

Table 10: Cluster analysis for Generation X with *k*=2.

AIC	BIC	2loglikelihood	Average Silhouette Width total	Average Silhouette Width Cluster 1 (n=163)	Average Silhouette Width Cluster 2 (n=142)	Separa-tion	Dunn Index	En-tropy
84910,54	84962,63	-84882,54	0,33	0,44	0,24	2,39	0,04	0,69

Table 11: Cluster analysis for Generation Z with *k*=2

AIC	BIC	2loglikelihood	Average Silhouette Width total	Average Silhouette Width Cluster 1 (n=135)	Average Silhouette Width Cluster 2 (n=170)	Sepa-ration	Dunn Index	En-tropy
88546,32	88598,4	-88518,32	0,34	0,44	0,26	6,18	0,1	0,69

Appendix D

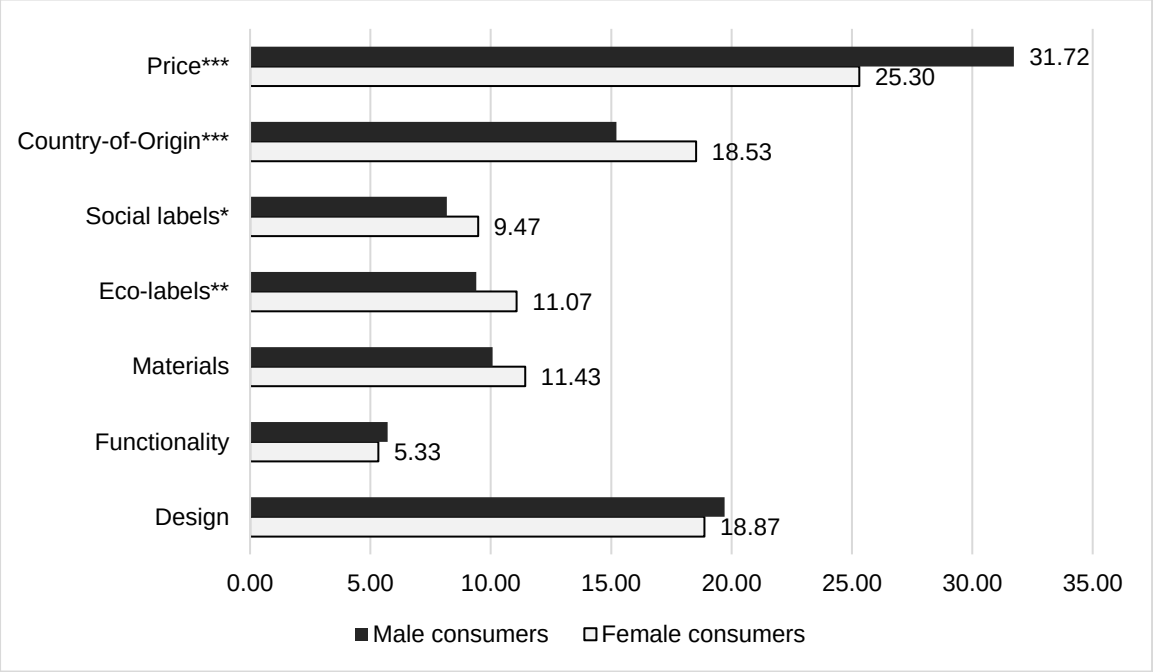
Table 12: Results from the HB estimation for Generation Z

Attribute Levels	Average Zero-Centered Utilities	Standard Deviation
Regular fit, black	46.69	58.96
Slim fit, black	32.47	48.63
Regular fit, colored	-31.40	41.03
Slim fit, colored	-47.76	49.93
Waterproof, windproof, breathable (wwb)	1.80	25.02
wwb, minimized package size	-8.34	17.21
wwb, minimized package size, low weight	6.55	23.68
Synthetical materials	-15.23	36.33
Recycled materials	15.97	28.30
Bio-based materials	-0.74	25.27
No eco-labels	-31.55	31.97
Bluesign	12.02	25.56
OEKO-TEX	19.52	24.94
No social label	-31.07	31.54
FWF	8.10	23.68
Fair Trade	22.96	21.64
Made in Asia	-58.55	38.92
Made in Europe	30.10	26.64
Made in Germany	28.44	34.79
79.00 EUR	79.64	66.11
119.00 EUR	28.84	29.85
159.00 EUR	-24.24	27.67
199.00 EUR	-84.24	62.15
None-Option	99.46	68.54

Average Importances	Average Importances (in %)	Standard Deviation
Design	20.79	10.49
Functionality	6.90	3.47
Materials (major proportion)	9.54	5.53
Eco-labels	10.66	5.49
Social labels	10.20	5.23
Country-of-origin	15.96	7.72
Price	25.95	14.69

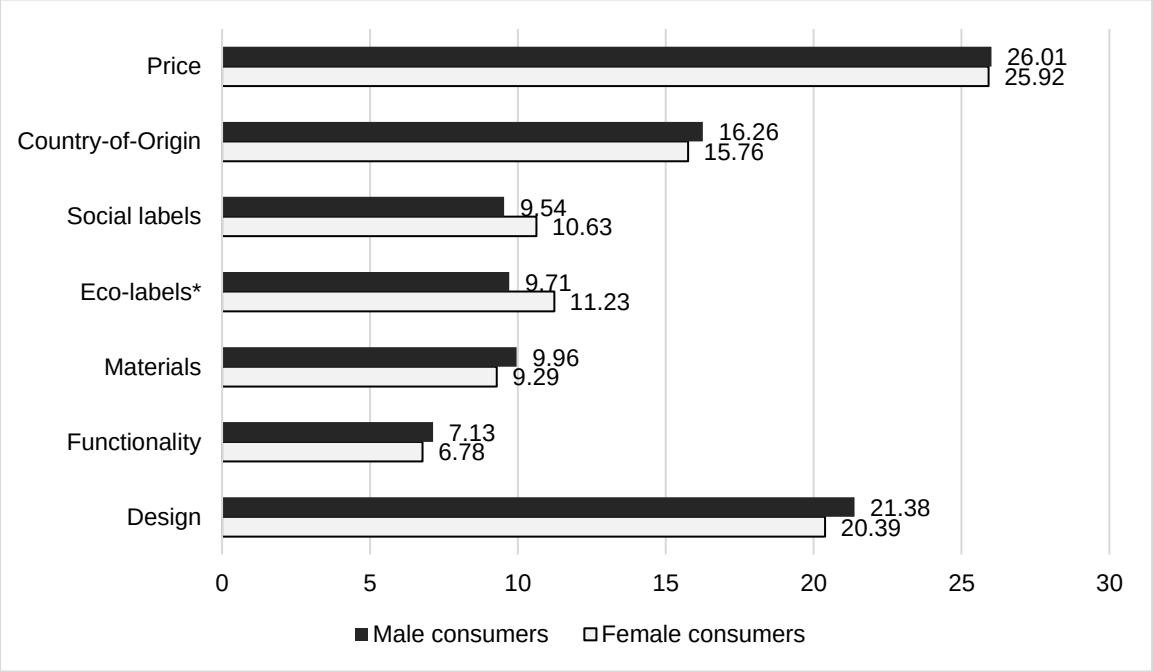
Appendix E

Figure 3: Gender differences among Generation X



Note: ***= p<0.001; **= p<0.01; *= p<0.05.

Figure 4: Gender differences among Generation Z



Note: ***= p<0.001; **= p<0.01; *= p<0.05.

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3.5 Cultural differences in the perception of credible online reviews – The influence of presentation format

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Abstract

As recently several authors postulated the need to examine the credibility of online reviews (ORs) in an intercultural context, we investigate this issue by building upon different theoretical frameworks and upon insights gained from an eye-tracking pre-study. Herein, the study is the first to explore ORs' credibility in an intercultural comparison. Moreover, no other study has shed light on the effect of OR's presentation format by incorporating cross-national perspectives yet. Applying a (2 x 2) between subjects experiment design, the results indicate that video reviews are able to only slightly increase arguments' quality effect on review credibility compared to textual reviews. However, differences occurred based on nationality, gender, and online shopping frequency. Furthermore, intercultural differences were detected between the effects of review consistency on review credibility, of review rating on review credibility, and of review credibility on purchase intention.

Keywords: online reviews; intercultural comparison; presentation format; review credibility

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1 Introduction

Throwing a glance at the e-commerce landscape from a global perspective, enormous differences evince: Amazon representing the most prevailing online marketplace in the west (Fang et al., 2013; Mudambi & Schuff, 2010) – only accounts for 0.7 percent of the gross merchandise volume in the B2C segment in China (iResearch, 2017). On the other hand, Tmall and Taobao (Alibaba Group) are dominating the online shopping landscape in China (Xia et al., 2020) and is struggling to have a foothold in the American or European markets. Additionally, the Chinese e-commerce market is of particular interest because of two reasons: it constitutes the biggest e-commerce market worldwide (Akram et al., 2018) and cross-border e-commerce to and from China is gaining growing relevance (Giuffrida et al., 2017). Apart from that, Amazon meanwhile started to list online reviews (ORs) based on reviewers' nationality, which further emphasizes the importance of cultural backgrounds in practice. In contrast to real-world business, literature is drawing rather small attention on this aspect. While the number of articles dealing with ORs increased in recent years (for literature reviews, see Hong et al., 2017; Ismagilova et al., 2020a), only some authors included cultural differences (e.g., Fang et al., 2013; Hong et al., 2016; Park & Lee, 2009). However, even fewer have based their models on exploratory pre-studies with real consumer behavior (Kim et al., 2018a; Zablocki et al., 2019; Zhu et al., 2017) to enhance closeness to reality.

Credible ORs play a crucial role for the success of e-commerce business, as user-generated first-hand experiences represent a major source for an informed decision making (Lin et al., 2019; Thomas et al., 2019), whereas increasing numbers of fake reviews could negatively affect the trust in such reviews and thus, decrease purchase intentions (Wu et al., 2020). Since research indicates that antecedences of credibility (such as perceived expertise of reviewers (Obal & Kunz, 2016)) and subsequently credibility itself is subject to varying cultural perception and importance (Tang, 2017), this study sheds light on the impact of culture on review credibility, which seems to display "the most important factor in eWOM adoption" (Baek et al., 2012, p. 99). Therefore, we intend to cover most recently postulated literature gaps urging the need for intercultural studies in the field of ORs (Filieri et al., 2018; Lee & Hong, 2019; Lin et al., 2019; Thomas et al., 2019) and being the first study to answer the question: how do which factors increase the credibility of ORs in a cross-cultural investigation?

Based on a literature review of previous studies analyzing ORs in cross-cultural contexts, it is exhibited that review credibility has not yet been examined interculturally, whereas research emphasizes its importance and its assumed culturally different perception. To counteract the scientific paucity on different cultural frameworks applied to thoroughly explain intercultural differences in IS research (Chu et al., 2019; Guo et al., 2020), we draw on various theoretical underpinnings to developed a research model. Using an eye-

tracking pre-study revealed that the ORs' presentation format plays an important role affecting what is perceived as credible. Therefore, we advanced our research model by presentation format, which has not yet been explored between consumers from different cultural backgrounds, and conducted a 2 x 2 between subjects (n=585 Chinese and n=552 German/European) experiment design using structural equation modelling.

Results indicated presentation format to increase the effect of the arguments raised in ORs on the perceived review credibility for specific sub-segments (varying by nationality, gender and online shopping frequency), whereby videos reviews were perceived as significantly more credible only among Chinese when observing review credibility separately. Further, intercultural differences were uncovered across antecedents of review credibility. We thus contribute to literature by presenting the first study to investigate review credibility between different cultures and thus, follow the postulated intercultural comparison on credibility of ORs by literature, as well as by extending the OR literature by relevant factors identified through an exploratory eye-tracking pre-study, which is also among the first to use a mobile device (instead of desktop PC and monitors) increasing the findings' realism.

2 Theoretical framework and hypotheses

2.1 Intercultural comparisons about online reviews

While previous cross-cultural investigations in the field of ORs (table 1) focused on product sales (Fang et al., 2013), market share (Tang, 2017), product attitude (Zablocki et al., 2019), reactions to reviewers (Obal & Kunz, 2016), review posting behavior (Kim et al., 2018a), or some sort of text mining (Wang et al., 2019; Zhu et al., 2017), only very few studies examine review usefulness (Park & Lee, 2009) – similar to helpfulness (Hong et al., 2016; Nakayama & Wan, 2019) – or review credibility (Luo et al., 2014). In contrast, reflecting upon research dealing with helpfulness and credibility of ORs, Baek et al. (2012) recapitulate that "the most important factor in eWOM adoption is information credibility" (p. 99). Nowadays, the aspect of credibility in the OR context has become particularly important, as reviews in general might not be able to serve as a proper information cue in the future due to an increasing number of fake reviews (Wu et al., 2020). Even though the concept of credibility within ORs has already received some attention in literature exploring its antecedents (Cheung et al., 2009; Cheung & Thadani, 2012; Luo et al., 2013; Thomas et al., 2019), in relation to other mediums (Flanagin et al., 2014), contingent on product types (Bae & Lee, 2011), on the emotions applied in reviews (Guo et al., 2020), in interplay with expectations of lexical complexity of reviews (Jensen et al., 2013), under varying levels of similarity and source reputation (Shan, 2016), conflicting aggregated ratings as antecedent (Qiu et al., 2012), or on argument quality and its facets (Hong & Pittman,

2020), it becomes obvious that its impact in cross-cultural comparisons has yet not been examined sufficiently.

Table 1: Recent studies on ORs including cultural context

Author (source#)	Dependent Variable	(Relevant) Findings (for this investigation)
Park & Lee (2009)	Review Usefulness	Culture (between U.S. and Korean consumers) moderates the relationship between online reviews and its antecedents (consumer susceptibility and internet shopping experience)
Fang et al. (2013)	Product Sales	Culture (between USA and China) impacts the way reviews are written and affects the perceived reviewer's reputation, positivity/negativity of reviews, and the importance of the number of reviews differently.
Luo et al. (2014)	*Review Credibility*	Individual individualism-collectivism orientation moderates factors influencing review credibility (based on ELM model and *for two Chinese eWOM forums*).
Obal & Kunz (2016)	Reaction to Reviewer	Culture moderates the reliance and skepticism towards expert vs. non-expert reviewers (comparing North Americans (Americans and Canadians) and Asians (Chinese and Indians)).
Hong et al. (2016)	Review Helpfulness	Culture (collectivism vs. individualism) influences the extent to which consumers confirm prior reviews and express emotions writing reviews (based on reviews from 52 countries).
Tang (2017)	Market Share	Culture (individualism, uncertainty avoidance and power distance) moderates the effect of eWOM on market share of (high involvement) products.
Zhu et al. (2017)	Textual Dimensions	Culture moderates textual dimensions (based on Chinese and American B2C websites). Chinese are more likely to comment on product aesthetics, product quality, price, product functionality and seller trustworthiness, while Americans are more likely to reference recommendation expressions and emotional attitudes.
Kim et al. (2018a)	Review Posting & Recommendation Behavior	Culture (UK and USA vs. China) impacts the positivity writing reviews, the dispersion of ratings and the usefulness of reviews from reviewers with the same cultural background.
Nakayama & Wan (2019)	Review Helpfulness and Sentiments	Cultural impacts social commerce revealing resulting in different sentiment distribution patterns.
Zablocki et al. (2019)	Product Attitude	Culture moderates the influence of emotional content of reviews towards hedonic and utilitarian product attitudes (based on different self-construal levels within diverse countries, such as Austria, USA, and Thailand).
Wang et al. (2019)	Different Foci of Review Descriptions	Culture serves as moderator regarding the focus of product features in reviews. Americans express themselves more negatively and rather rely on usability features, while Chinese are more likely to mention product aesthetics.

Note: Credibility of reviews is only examined by Luo et al. (2014) (highlighted in italic). However, the study focused on intra-country cultural differences.

Since credibility depends on "human perception or evaluation of an object's credibility" (Tseng & Fogg, 1999, p. 40) and perception, in turn, is influenced by culture (Kim et al., 2018a; Nisbett et al., 2001; Wang et al., 2019), credibility of ORs needs to be explored in cross-cultural contexts thoroughly. In contrast to Luo et al. (2014), who analyzed two Chinese eWOM forums only (and thereby not permitting intercultural comparisons), and applied the standard framework of Hofstede's cultural dimensions, we draw on SCST

(Nisbett et al., 2001), Hall's categorization (1976) and the value theory by Schwartz (1992) taking into account cultural differences in perception and communication style within OR.

2.2 Conceptual framework and hypotheses

In line with previous research analyzing ORs (inter alia (Baek et al., 2012; Cheung et al., 2012; Filieri et al., 2018; Luo et al., 2015)), we build our research model upon the Elaboration Likelihood Model (ELM) from Petty and Cacioppo (1981) as a starting point. The ELM elucidates how persuasive information are processed by the receiver and how it affects the receiver's attitudes. Therefore, ELM distinguishes between a central route and a peripheral route of information processing. If messages are processed through the central route, recipients will carefully elaborate the message's content. Contrarily, recipients focusing on non-message-related information are processing information through the peripheral route resulting in less stable attitude changes. However, research shows that people tend to elaborate messages involving both routes to a certain degree (Cheung et al., 2012). As ORs provide not only the content of the review itself but also surrounding factors (such as star ratings, reviewer expertise, etc.), ELM has proven to represent an adequate theoretical framework (Baek et al., 2012; Luo et al., 2015).

While the majority of studies examining ORs in cross-cultural comparison derives their hypothetical framework by exclusively building upon on Hofstede's cultural dimensions (inter alia (Luo et al., 2014; Park & Lee, 2009; Tang, 2017; Zhu et al., 2017)), the (meanwhile) six dimensions categorization (Hofstede, 1980; Hofstede & Minkov, 2017) has faced increasing criticism (Chu et al., 2019; Guo et al., 2020). Oftentimes, it is criticized that Hofstede's empirical study for developing its originally four dimension exclusively incorporated employees from IBM (Hofstede, 1980) (code-named "HERMES") and is therefore not generalizable (Hong et al., 2016). Additionally, Hofstede himself pointed out that new technologies might enable nations to leapfrog in their development and thereby shift cultural values, particularly highlighting the case of China. These changes could in turn weaken the validness of his cultural classifications developed around 1970 (Hofstede, 2011). As many alleged "developing countries" (such as China) have recently experienced rapid economic growth (Che et al., 2021) and rising westward orientation, focusing on Hofstede's cultural dimension only to explain intercultural differences might not be sufficient anymore (Tang, 2017). In particular when examining drivers in the perception of credible ORs, other theoretical framework seem to be more appropriate to explain intercultural differences. Therefore, we take up the call for using other cultural frameworks than the one by Hofstede (Chu et al., 2019), align with recent OR research (Barbro et al., 2020; Kim et al., 2018a), and combine different cultural frameworks (including more contemporary ones) to thoroughly understand how intercultural differences might be explained. In contrast to Hofstede's rather generalized value dimensions, the SCST allows exploring the different thinking styles applied between Westerners and East Asians when facing different OR elements (e.g., review text per se versus contextual factors). Addi-

tionally, Hall's low- and high-context communication styles (1976) offer fruitful ground to explain intercultural differences concerning the disparate communication styles applied to the OR context. The value theory by Schwartz (1992) further outlines how conformity affects consumers from different cultures in the light of ORs.

Argument Quality (AQ)

While some researchers reported up to eight factors influencing credibility (Thomas et al., 2019), we aimed at developing a more parsimonious model which still contains all relevant ones. Consequently, the central route only comprises the *AQ* (Cheung et al., 2012) (also referred to as information quality (Filieri, 2015) or argument strength (Cheung et al., 2009; Fang, 2014)) of an online customer review. Although *AQ* could be split into word count (Baek et al., 2012; Cheng & Ho, 2015; Fang, 2014), review length (Filieri et al., 2018; Kuan et al., 2015), or information quantity (Filieri, 2015), the helpfulness of an OR is not necessarily increasing with its length, but reaching a plateau of helpfulness after a certain amount of words (Baek et al., 2012). Additionally, some research separates word count from image count constituting to *AQ* (Cheng & Ho, 2015), whereas not text-based messages such as pictures and videos could support an argument with these complementary information through the peripheral route (Xu et al., 2015) and strengthen the *AQ* in the central route (Maslowska et al., 2017). Following the initial idea of the ELM, the central route concentrates on "[i]f the person perceives the message to contain strong, compelling arguments" (Petty & Cacioppo, 1981, p. 265). Therefore, we define *AQ* by its text-based content without comprising images. In line with literature (Cheung et al., 2012; Fang, 2014; Thomas et al., 2019), we assume *AQ* has a positive effect on *review credibility*.

To explain how the effect of *AQ* on *review credibility* might vary by culture, the SCST by Nisbett and colleagues (2001) and the low- versus high-context categorization by Hall (1976) are taken into account. Based on the SCST, it is assumed that different historical roots of Westerners and East Asians affect the way members of culturally different societies apply disparate thinking styles. Westerners tend to cognitively process information in a rather *analytical* manner by focusing on an object regardless of its context, analyzing the object's composition and assign its parts into categories, explain its behavior by applying formal logic and rules about the categories, and actively try to avoid contradiction by open debates (Nisbett et al., 2001). In opposition, East Asians' thinking style could be described as rather *holistic*, since they pay more attention to the context and the interplay between an object and its context as a whole, and explaining phenomena based on these relationships. Additionally, holistic approaches focus less on categorization and formal logic but are "dialectical" (highlighting the awareness of contradictions and changes) (Nisbett et al., 2001). Chinese people growing up in structures of social organizations that focus on harmony would for instance be less likely to develop behaviors of debates and confrontation (Nisbett et al., 2001). Within the context of ORs this means that the review text with inherent arguments itself (representing the focal object)

is emphasized among Westerners (e.g., Germans), whereas contextual cues like star ratings, date of review, etc. receive more attention among East Asians (e.g., Chinese). Hence, based on the SCST it is presumed that *AQ* comprising the main message itself might have a stronger effect on *review credibility* among Westerners compared to East Asians. Further support for this assumption is provided by a study comparing Canadians (Westerners) and Thais (East Asians) which revealed that argument strength (similar to *AQ*) affects the purchase of products significantly more among Westerners compared to East Asians (Pornpitakpan & Francis, 2000).

Moreover, founded on Hall's categorization of communication styles into low- and high-context based on consumers' cultural background, it is assumed that low-context cultures (such as Germany) place more emphasis on messages' main information itself (Hall, 1976). In contrast, consumers from high-context cultures (such as China) focus more on contextual cues and non-verbal communication notes (Würtz, 2005), and apply less direct ways of expressing themselves (Kim et al., 1998). Since *AQ* represents the only factor of the central route, its effect on *review credibility* is generally presumed to be comparably high for both consumers with high- and low-context focus (compared with those from the peripheral route). However, based on the theoretical foundations by Hall (1976) and Nisbett et al. (2001), it should be assumed that consumers with a low-context cultural background (or Westerners) might emphasize *AQ*'s effect even more than those exhibiting a high-context background (or East Asians).

H1: *Argument quality* has a more substantial effect on *review credibility* for Western consumers compared to East Asian consumers.

Review Sidedness (RS)

Furthermore, credibility of ORs is increased if a review contains positive as well as negative aspects about a product (inter alia (Risselada et al., 2018)), referred to as *RS* (inter alia (Cheung et al., 2012; Kuan et al., 2015)). Previous research shows that providing pros and cons about a product increases reviews' credibility (inter alia (Cheung et al., 2009; Cheung & Thadani, 2012; Luo et al., 2015)) and helpfulness (Baek et al., 2012; Kuan et al., 2015) by anticipating potential counterarguments. Especially including negative aspects could increase reviews' credibility and helpfulness (Baek et al., 2012; Schlosser, 2011), as such aspects are weighted stronger compared to positive ones ('negativity bias') (Jensen et al., 2013; Kim et al., 2018a; Qiu et al., 2012). While *RS* is generally assumed to be important for both East Asians and Westerners, the effect on credibility might be higher among the latter ones, since according to the SCST Western history is affected by a culture of open debates, whereby outlining pros and cons is welcomed. Comparing American and Chinese ORs, Fang et al. (2013) found the latter ones to avoid writing negative ORs, whereas they tend to outline positive aspects even when they are actually not satisfied with the product, which further supports the assumption:

H2: *Review sidedness* has a more substantial effect on *review credibility* for Western consumers compared to East Asian consumers.

Review Consistency (RC)

Apart from that, various studies emphasize the importance of *RC* (inter alia (Cheung et al., 2012; Schlosser, 2011; Thomas et al., 2019)) in order to increase credibility of ORs, as well as their helpfulness (Choi & Leon, 2020). Here, literature uniformly defines *RC* as the extent to which information contained in one review is consistent with other reviews regarding the same product. If the same review information is occurring multiple times by several reviewers, the review will be perceived as more credible (Luo et al., 2015). However, as we focus on a single review, *RC* can only be accessed by other reviews read in the past. According to the SCST, Westerners do not avoid open debates in order to yield reliable, consistent insights, which is why they might emphasize review consistency more compared to East Asians. Further support could be found in the study by Kim et al. (2018a), which revealed that ORs' rating dispersions (indicating lower *RC*) and associated inconsistencies are higher and more likely to be tolerated among Chinese. This also corroborates the before-mentioned findings by Fang et al. (2013), who found Chinese to write rather positive reviews even if actually dissatisfied with the product indicating inconsistent reviewing behavior. We thus assume:

H3: *Review consistency* has a more substantial effect on *review credibility* for Western consumers compared to East Asian consumers.

Product and Review Rating (RR)

Two other important factors influencing the credibility of a review represent product and review rating (Gu et al., 2012; Kaushik et al., 2018; Li et al., 2019; Mudambi & Schuff, 2010). Here, it is essential to differentiate between the rating of one single review and the overall rating of all reviews from one product. While reviews on an aggregated level are mostly illustrated by review quantity (number of reviews; (Baek et al., 2012; Fang, 2014; Filieri, 2015)), valence (dispersion of differently rated reviews; (Kuan et al., 2015)) and the overall rating scores (Filieri et al., 2018; Kaushik et al., 2018) as the driving factors, we intend to examine the different perception of Chinese and German consumers regarding one single review. In cases where those aggregated indicators favor towards or against a purchase, one will not require additional information anyway. However, when providers and their (new) product have not yet established themselves, or the aggregated indicators cannot evince a clear direction, consumers are in need of additional information. Consumers thus will be likely to read single reviews in order to gain sufficient information before potentially purchasing a product. As eWOM's purpose is to support consumers in judging about products while shopping online and thereby bridging the information asymmetry inherent to e-commerce to some extent, we focus on those more frequently occurring cases with single review factors. Even though the number of

reviews (oftentimes referred to as "volume") represents an important factor at an aggregated level for increasing sales (Cheung & Thadani, 2012), the *RR* (created by other consumers, e.g., previous readers (Luo et al., 2015)) is of high importance for single reviews and more precisely, such previous reviews have shown to affect review credibility (Jha & Shah, 2021). Moreover, investigating *RR* displays a high or low rating (sometimes represented by likes and dislikes, see e.g. at YouTube or eBay) for a single review (Cheung et al., 2009) and thereby serves as a similar indicator as the volume for the aggregated level by counting the number of high and low ratings.

Previous investigations among Chinese indicate that *RR* increases *review credibility* significantly (Cheung et al., 2009) and that the relationship between *RR* and *review credibility* could be increased by the moderating role of sense of membership (Luo et al., 2015). As single *RR*s count as external/contextual cue, it is hypothesized that *RRs* have greater influence for the more holistic East Asians, whereas Westerners will more likely be focusing on the review text itself. To explain intercultural differences concerning *RR*, we take into consideration the value theory by Schwartz (1992), which initially comprised eleven values (Benevolence, Self-Direction, Tradition, Conformity, Security, Stimulation, Hedonism, Achievement, Power, Universalism) that can implicitly found in each culture. This theory underpinned by a recent empirical proof among young adults (Lee et al., 2011), further support for this assumption can be found. Accordingly, to Chinese (representing East Asians) the value of conformity is significantly more important compared to Americans (representing Westerners) (Lee et al., 2011). Hence, Chinese tend to restrain themselves in their action in order not to upset others and to prevent the violation of conventions and social expectations (Schwartz, 1992). Assuming Chinese (East Asians) align with how others have evaluated a review and emphasize their judgment more than Westerners, we suppose:

H4: *Review rating* has a more substantial effect on *review credibility* for East Asian consumers compared to Western consumers.

Review Credibility (CR)

Another clarification that should be made is the distinction between ORs' credibility and their helpfulness. When ORs' source (the reviewer) is perceived as credible, the review's helpfulness is increased (Baek et al., 2012; Kuan et al., 2015). In contrast, ORs marked as helpful does not necessarily mean that the review is credible (Schlosser, 2011). One possibly could argue that helpfulness should be included for holistically explaining *CR*, however review helpfulness already consists of some factors enquired (e.g., *RR*) (Huang et al., 2015). Consequently, we excluded review helpfulness for preventing multicollinearity. As companies focus on sales rather than the credibility of their products' reviews, we incorporated *purchase intention* (*PI*) to elucidate the potential economic benefits derived from exhibiting more credible ORs (Ismagilova et al., 2020b). Generally, *CR* can be expected to result in *PI* among both East Asians and Westerners.

Similar to the explanation for H4, Chinese are assumed to yield higher values of conformity (Lee et al., 2011). Since Chinese emphasize conformity, a highly credible OR might more like result in *PI* of products. Additional support for this assumption can be found in the study by Park and Lee, who investigated the impact of ORs' usefulness on *PI* among Westerners (Americans) and East Asians (Koreans) (Park & Lee, 2009). In their study, this effect on *PI* was significantly higher among Koreans compared to Americans. Therefore, we assume:

H5: *Review credibility* has a more substantial effect on *purchase intention* for East Asian consumers compared to Western consumers.

While up to this point, such a model deduced by extant literature represents a rather established one and has already been applied on a national level in similar forms (Cheung et al., 2009; Cheung et al., 2012; Luo et al., 2014), we extend it by with an intercultural perspective. Additionally, since the majority of previous studies are founded on extant constructs from earlier investigations (oftentimes derived from self-report questionnaires including their biases), they are limited to already existing ones and thus, might overlook additional essential factors. Based on the SCST, Westerners are assumed to focus on an object (in our case: review text) itself regardless of its context, whereas East Asians pay more attention to external, complementary OR components (such as reviews' date or complementary product pictures) besides an OR's text itself. Hence, there might be other important factors such as the way reviews are presented (purely textual vs. enhanced with pictures/videos), which potentially affect Westerners and East Asians differently.

Neglecting intercultural comparisons, research revealed that presentation format (text/picture/video) influences usefulness (Cheng & Ho, 2015) and credibility of ORs (Xu et al., 2015). The recently conducted study by Xu et al. (2015) attested increased credibility for video-based reviews, however this effect was analyzed in the absence of other main drivers for evaluating reviews (such as *RS*, *RR*, etc.). Additionally, only US-consumers participated in the experiment, leaving the question about cross-cultural differences unanswered. Besides, Bigne et al. (2020) recently examined positive and negative reviews with and without additional photos. They revealed that review photos attenuate the negativity bias within ORs. Also Xia et al. (2020) found that alongside the number of ORs and product price, photos (with street scene motives) positively affect the sales volume for Chinese male. As video-enhanced ORs are able to increase review credibility stronger than image-enhanced ones (Xu et al., 2015), we hereinafter focus on the video-based ORs. Following the initial definition of *AQ* by Petty and Cacioppo (1981), it refers to "the audience's subjective perception of the arguments in the persuasive message as strong and cogent on the one hand versus weak and specious on the other" (p. 264-265). Consequently, the potential factor of presentation format might be able to support the arguments made (Maslowska et al., 2017) and thereby moderate the effect of the *AQ* on *CR*, depending on whether purely text-based messages or whether video-enhanced illustrations are used (Cheng & Ho, 2015; Xu et al., 2015). According to the SCST, East Asians are assumed to pay more attention to

external OR components, such as pictures/videos, and videos were generally found to increase ORs' credibility (Xu et al., 2015), one might assume:

H6: Video-enhanced illustrations within a review increase the effect of *argument quality* towards *review credibility* more substantially for East Asian consumers compared to Western consumers.

Summarizing these assumptions, the model illustrated in Figure 1 evinces.

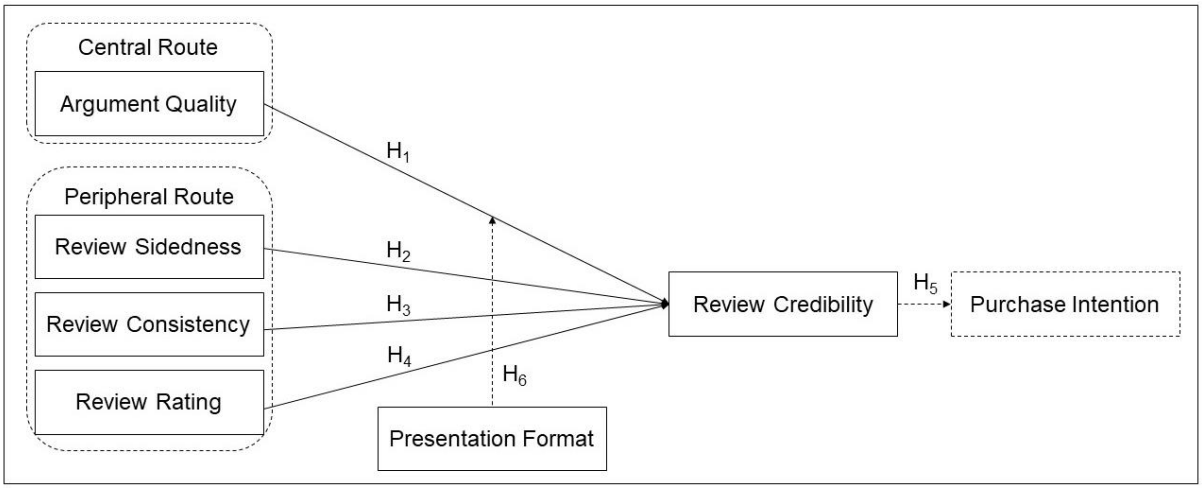


Figure 1: Research model including all hypotheses

Since the newly introduced potentially varying effect of presentation format (H6) has not yet been examined interculturally, we next outline an exploratory eye-tracking pre-study to gain certainty about this assumption and to confirm the SCST empirically.

3 Method

3.1 Explorative pre-study

The majority of literature on credibility of ORs applies influencing factors that are derived by other articles. As a result, these studies might be confined by previous findings revealed by literature. Besides, survey-based self-report investigations (often used to create new constructs) are always affected by several limitations (Woodside, 2013). In contrast, we intend to explore *actual* consumer behavior for identifying factors influencing the credibility of ORs. Therefore, the eye-tracking pre-study aimed at observing actual user behavior and potentially identifying factors not yet considered in OR literature, as well as empirically validating the SCST (Nisbett et al., 2001). More precisely, we shed light on if East Asian consumers indeed rather focus on external/contextual factors instead of concentrating on the object (here: OR text) itself compared to Westerners. Based on the SCST, we expect East Asians to pay more attention to contextual factors (Kim et al., 2018a) (e.g., date of creation of ORs, product illustrations, etc. (Wang et al., 2019), whereas Westerners focus more on the OR text itself.

Sample

For the investigation, we focused on consumers from the biggest e-commerce market worldwide, which is the one of China (Akram et al., 2018). As representatives for the Western consumers, we examined German consumers and thereby extending the cultural and geographical scope of OR literature that is primarily focusing on Americans (Filieri, 2015). The target group of respondents is aged between 20 and 39 years ("Generation Y") because this consumer segment defines itself through enormous purchasing power and advanced technological skills growing up with the beginnings of the internet (Ladhari et al., 2019). After a pretest (n=4), we conducted the experiment with 17 German (GER) and 17 Chinese (CN) participants based on quota sampling. However, due to insufficient gaze plot recordings data from two German and five Chinese consumers could not be used for analysis. The final sample included 14 males and 13 females and an average age of 24.9 years (SD=1.55).

Apparatus, Stimuli and Procedure

Since the majority of consumers nowadays use their smartphones for reading ORs and shopping online (Gupta & Arora, 2017), it would result in unrealistic outcomes if subjects are facing ORs presented on monitors. As current literature has proven that the creation and consumption of ORs are different when using mobile phones (Min Kim et al., 2020), we intended to create a realistic experimental setting by applying mobile phones as apparatus for the eye-tracking investigation. As this approach is technically more difficult to perform, recent literature with eye-tracking investigations still employs monitors with large screens (such as monitors with 23 inches (Bigne et al., 2020)). The experiment was conducted using Tobii Pro Glasses 2, which apply an optimized version of traditional pupil center corneal reflection (PCCR) technology. The glasses use near-infrared illumination for creating reflection patterns on the cornea and pupil of the eye and for capturing images of the eyes and the reflection patterns image sensors are used (Tobii Technology, 2021). Then a physiological 3D model of participants' eyes and advanced image-processing algorithms are applied for estimating the position of the eye and the point of gaze with increased accuracy (Tobii Technology, 2021).

Respondents obtained a Huawei P20 (5.8 inch screen), where the online marketplace of Amazon was shown (web browser version). We decided to use Amazon as frame setting, because it is the only marketplace available in both countries and it provides the same OR configuration except the language (Wang et al., 2019), and has been used in several other studies (e.g., (Kaushik et al., 2018; Mudambi & Schuff, 2010)). The marketplace was shown in the Adobe Acrobat Reader App in the reader mode and illustrated by vertically scrollable screenshots, analog to the real Amazon product feed. As we were interested in the perception of ORs, the original website content was slightly modified by removing elements between product description at the top of the page and the reviews at the end of the page (e.g., "frequently bought together", etc.). Besides the usual product description, the final webpage included the overview of ORs for the product

(number of reviews, rating, valence), as well as eight original reviews with varying star ratings. The original German version of the Amazon webpage was then translated into Mandarin and checked on comprehensibility by native Chinese (n=5). Both groups were exposed to ORs in their respective native language.

The experiment follows the established procedure of eye-tracking investigations by Wang et al. (2017): After a brief explanation about the procedure, the eye-tracking glasses used were calibrated for each participant. The recording was started and participants received a scenario: "You have saved some money during the last couple of months. Now, you would like to buy a new smartphone. Please inform yourself about the new iPhone X, so that you could argue in favor for or against a purchase based on the product page shown.". The scenario was created in a manner that should not artificially increase the perception of the product page, but also prevent from just skipping through the page without collecting enough information. We decided to use a smartphone representing a high-involvement product because these more expensive products come along with more extensive information search in the decision-finding process (Baek et al., 2012; Gu et al., 2012). By choosing Apple's iPhone, we aimed at preventing country of origin effects. Afterward, participants received a survey in order to give meaning to the correlations obtained by the eye-tracking experiment and derive causalities. The survey comprised questions about consumer behavior regarding online shopping, interest in iPhones, experience with Amazon, socio-demographic information and free format questions.

Results

The free format question revealed that most frequently the information of "details" (27%) increased ORs' credibility among German participants, whereas 33% of Chinese participants mentioned "pictures" instead. The same tendency could be observed with the free format question on particular interesting aspects of the reviews. Here, 25% of Chinese stated "photo/video", while the most frequently occurred answer among Germans has been "evaluation of the service". The results from the eye-tracking recordings could be found in table 2 and figure 2.

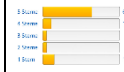
Discussion

The results give evidence that Chinese consumers pay significantly more attention to contextual, external factors besides the review and its content itself. To be precise, Chinese focused significantly more on the date of the review ($p = .032$) and the star ratings related to each single review ($p = .014$), whereas Germans spent almost twice the time eyeing the review texts ($p = .032$, table 2). The only other significant difference that occurred is the time spent watching the Amazon logo ($p = .028$). In addition, ORs' details about the product itself were most likely to increase credibility among Germans (according to free format questions), whereas Chinese emphasized photos/videos (representing complementary components). While for review data and star rating, one would rationally expect similar linear relations (the more recent, the better; the more stars, the better), we hereinafter intend to analyze the impact of the differing conditions of purely text-based reviews compared to video-enhanced reviews in the cross-cultural comparison (H6).

Apart from that, major differences were observed regarding the time spend watching the product pictures ($mean_{GER}$=1.424s; $mean_{CN}$=3.017s). Although this difference showed not to be significant (which might be due to the rather small groups), the contrast becomes clear when taking a look at the heat maps (see figure 2). Summarizing the results, the pre-study revealed several findings indicating a validation of SCST.

Those insights gained suggest that the perception and potentially the importance of peripheral cues and varying components of ORs, such as the review text itself and the product picture, differ by culture, and thus, affirm our assumptions for hypothesis H6. Therefore, we intend to extend previous literature about credibility of ORs by examining how deviant presentation formats affect review credibility in an intercultural comparison. Here, we refer to presentation format as the way the review is displayed. ORs can be illustrated either purely text-based, enhanced by pictures, or completely consist of a video (Xu et al., 2015).

Table 2: Absolute duration per AOI (in seconds)

#	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12
Area of Interest (AOI)	**review text**							305 Kundenrezensionen	211 Personen fanden diese Informationen hilfreich	4. Dezember 2018		Verifizierter Kauf
Chinese	24.947	3.017	0.250	1.244	2.439	0.194	1.808	0.867	1.281	0.444	1.206	0.683
Germans	42.199	1.424	0.062	1.033	2.262	0.493	1.973	0.773	1.051	0.137	0.602	0.409
Exact Sig.	**0.032***	0.256 (n.s.)	**0.028***	0.277 (n.s.)	0.981 (n.s.)	0.152 (n.s.)	0.486 (n.s.)	0.755 (n.s.)	0.217 (n.s.)	**0.032***	**0.014***	0.217 (n.s.)
r=(Z/√27)	0.413		0.588							0.410	0.413	

Note: the pictures in this table exemplary display the German version; "review text" includes the reviews exposed to participants during the eye-tracking; #3 shows the marketplace logo at the top of the website; #4 shows the aggregated rating of the product; #6 shows the exact rating of all reviews (aggregated); #7 shows the rating for three functionalities of the product; #8 shows the total number of reviews for the product; #9 shows how many persons found the review to be helpful at each review (in the table exemplary by the first review presented); #10 show the date when the review was uploaded at each review (in the table exemplary by the third review presented); #11 shows the rating related to each of the presented reviews (in the table exemplary by the first review presented); #12 shows the AOI for verified purchase.

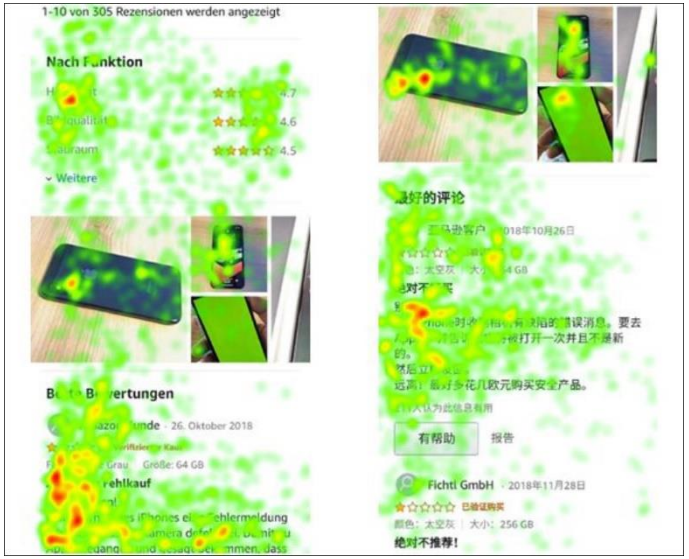


Figure 2: Exemplary heat map for German (left) and Chinese (right) participants

3.2 Main study

Measures

For the main study, we aim to explore potential intercultural differences based on the newly identified and in the pre-study most prevailing factor of the varying presentation format (text vs. video) in relation to other main factors of accessing ORs' credibility. As exposing the same review two times with different presentation formats to respondents would suffer from positioning bias and learning effects, we apply a 2 (text vs. video) x 2 (two different high-involvement products) between subjects (Chinese vs. Germans) experimental design. In line with our eye-tracking pre-study, we focused on high-involvement products for the main study, because consumers spend more time informing themselves about these kinds of products due to the higher monetary risk of bad investments. We have chosen a digital camera (already used in similar investigations (Mudambi & Schuff, 2010; Obal & Kunz, 2016; Wang et al., 2019) and a tablet (inter alia used in (Risselada et al., 2018)). Consequently, respondents would face one of the four survey versions: digital camera with a textual review (DCT), digital camera with a video review (DCV), or one of the versions with the tablet based on a random assignment (TT or TV; see figure 3). In contrast to previous literature separating the importances of peripheral and central cues based on product categories (e.g. high- vs. low-involvement products (Baek et al., 2012)), we assume Chinese consumers to pay generally more attention to peripheral, contextual factors, whereas German consumers might highlight the review text itself (see H6). Additionally, enquiring two high-involvement products allows examining the generalizability of potential findings that might be exclusively related to one specific product.

The questionnaire comprised questions on shopping frequency (as experience increases skills to classify reviews correctly, (Park & Lee, 2009)), product categories for which reviews are most likely read, consumer socio-demographic information, and the main part with the two different products. Following previous literature (Xu et al., 2015), respondents first faced a brief description from the vendor including major product details and a product picture (either digital camera or tablet). Secondly, respondents were exposed to the related customer review in their respective native language, whereby the textual review contains the identical content as in the video. Afterward, respondents were asked to answer several questions about their perceptions on the related customer review (constructs from the research model, see figure 1), as well as control questions to guarantee that they have read the review. To prevent common method bias, we randomized the order in which products will be presented, as well as the order of the constructs asked to prevent any positioning bias. For constructs applied, we concentrate on established ones derived from literature (see Appendix A).

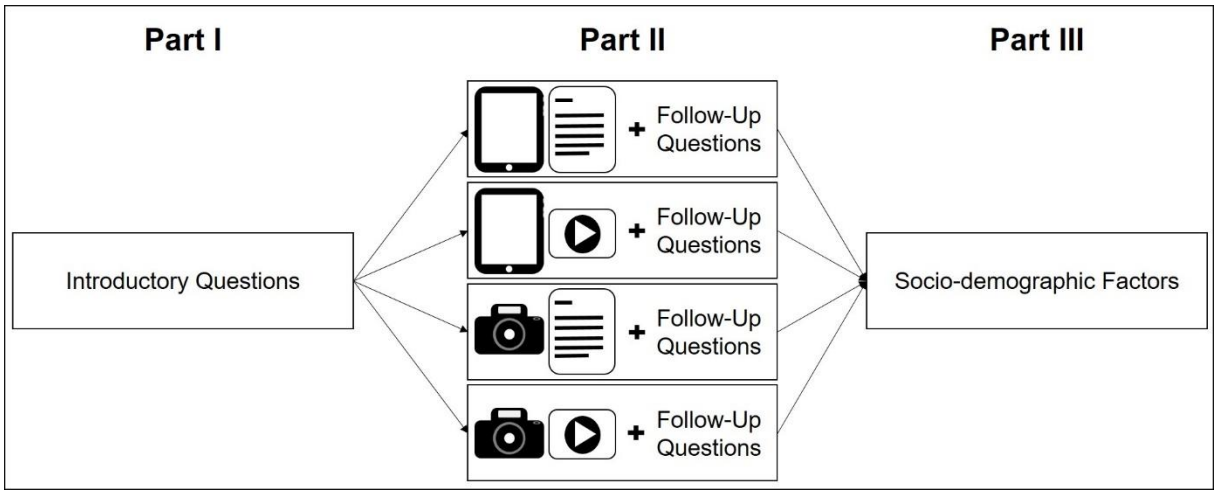


Figure 3: Survey procedure of the main study

For both products and review texts applied, we relied on field data from a real online shop with existing products in order to enhance this study's realism (Luo et al., 2015). As including brands facilitates biases in evaluating the credibility of reviews (Kostyra et al., 2016), especially among consumers from different cultural backgrounds (Monga & Roedder John, 2007; Tang, 2017), we excluded brand names from the product description. In the same vein, we suppressed price in order to keep all independent variables of our experimental setting constant while only manipulating the presentation format (Kostyra et al., 2016; Xu et al., 2015). We selected review videos from Amazon.com for the same reasons why we chose this online shop for the pre-study, and transcripted them into textual form. For preventing cultural biases, we focused on English review videos, as product features displayed in the video would neither be German nor Mandarin and therefore not irritating for Chinese or German respondents. Additionally, video sequences where the person explaining his review was shown, were cut for the same reasons. We then muted the original video and recorded the content spoken in German and Mandarin, both with a male voice (like in the original video) from native speakers, and implemented it into the video. In line with previous research (Xu et al., 2015), we controlled information content and kept the number of words to approximately 400 or 2.5 minutes in the video. We implemented a timer on questionnaire pages presenting the review video or text in the amount of the video length preventing respondents from clicking to the next page before the video review has been watched completely or the textual version read. Both reviews included pros and cons about the product described. The reviewer's name was culturally adapted to a German one for the German version and a Chinese one for the Mandarin version. The *RR* serving as a similar indicator for single reviews as volume for ratings at the aggregated level was set to 200 positive ratings (comparable to previous research (Kostyra et al., 2016)) and kept constant for all four cases in order to reveal the effect of varying presentation formats ceteris paribus. We applied the same procedure for both products to yield comparable results. Based on a first pilot test with a student sample (n=19), the information and length of the videos were slightly modified and comprehension issues were solved (review used is shown in Appendix B for the tablet).

Sampling

For obtaining comparable samples for Chinese and German consumers, we employed a panel from an established provider (Kantar group, also used in (Tang, 2017)). In line with our pre-study, we focused on consumers aged between 20 and 39 ("Generation Y"), as this accounts for one of the most important online shopper segments (Ladhari et al., 2019) known for using ORs most frequently (Lee & Hong, 2019). The sample acquired is representatively spread across the corresponding countries, targeting consumers with online shopping affinity (ensured by screen out question), and is almost evenly split between males and females (see Appendix C). After data cleansing (speeders, straightliners, incorrect answer for control question), we obtained n=552 German and n=585 Chinese respondents.

4 Results

4.1 Measurement model

As our study focuses on analyzing the predictors of review credibility and purchase intention, we employed partial least squares (PLS) for structural equation modeling (SEM), which is more prediction-oriented compared to covariance-based approaches (Rigdon, 2012). We applied the statistical software SmartPLS 3 to estimate the parameters of our research model. Following common recommendations (Hair et al., 2021), we used path weighting, a maximum of 300 iterations, and a stop criterion of 10^{-7} in the PLS-SEM algorithm settings.

To evaluate the structural models and identify the moderating effect of culture, a multi-group analysis approach was utilized. Before comparing effects between constructs between Chinese and German consumers, we assessed metric and configural invariance (Steenkamp & Baumgartner, 1998). This necessitates that (1) factor loadings are fundamentally and significantly divergent from zero, (2) unity is significantly different from the correlations between the constructs, and (3) discriminant validity is evident in both samples (Steenkamp & Baumgartner, 1998). To avoid introducing errors, we followed the recommendation of Becker et al. (Becker et al., 2013) and ensured that the subgroups were similar in size. Table 3 demonstrates the factor loadings and the average variance extracted (AVE) as a measure for the correlations between the factors. Additionally, we included measures for composite reliability and Cronbach's alpha. All factors exceeded the recommended thresholds for composite reliability of being over .8 (Nunnally & Bernstein, 1994), for Cronbach's alpha of being over .70 (Nunnally & Bernstein, 1994), and the AVE of exceeding .5 (Barclay et al., 1995). Discriminant validity demonstrates the degree to which measures of disparate variables are demarcated. It is evinced by demonstrating that the AVE through one factor is greater than its shared variance with the other constructs, which can be determined by their squared correlations (Fornell & Larcker, 1981). Besides, discriminant validity can also be demonstrated by proofing that the off-diagonal inter-construct correlations are smaller than the corresponding square roots of the AVEs ((Henseler et al., 2015); see table 4). Additionally, we examined heterotrait-monotrait ratio (HTMT; see Appendix D) according to Henseler et al. (2015). We applied bootstrapping drawing 5,000 samples on a level of 0.01 to calculate the HTMT inference (Henseler et

al., 2015). While for Germans both criteria exhibit discriminant validity, issues arise among the Chinese sample between *AQ* and *CR*. However, the corresponding confidence intervals do not contain the null value of "1", and thus, according to the common standards no lack of discriminant validity is indicated (Henseler et al., 2015).

Table 3: Internal reliability and convergent validity of the measurements

	Chinese (n=585)			Germans (n =552)		
Constructs	Composite reliability	Cronbach's alpha	AVE	Composite reliability	Cronbach's alpha	AVE
Argument Quality (AQ)	.854	.747	.663	.912	.856	.776
Review Sidedness (RS)	.906	.792	.828	.890	.755	.802
Review Consistency (RC)	.922	.874	.797	.898	.832	.746
Review Rating (RR)	.914	.858	.779	.925	.878	.803
Review Credibility (CR)	.942	.918	.803	.928	.895	.763
Purchase Intention (PI)	.953	.934	.835	.949	.928	.822

Regarding *AQ*, Chinese found the reviews to contain generally stronger arguments (mean = 2.78, with '1' representing 'completely agree'), whereas Germans were more skeptical (mean = 3.08). Consequently, *CR* was also perceived to be higher among Chinese (mean = 2.66), compared to Germans (mean = 3.01).

Table 4: Inter-construct correlations and square roots of AVE

	Chinese (n=585)						Germans (n =552)					
	AQ	*RS*	*RC*	*RR*	*CR*	*PI*	*AQ*	*RS*	*RC*	*RR*	*CR*	*PI*
AQ	**.814**						**.881**					
RS	.595	**.910**					.411	**.896**				
RC	.408	.268	**.893**				.484	.262	**.864**			
RR	.741	.565	.375	**.883**			.612	.383	.510	**.896**		
CR	.820	.631	.370	.742	**.896**		.731	.441	.540	.569	**.873**	
PI	.739	.518	.408	.683	.693	**.914**	.586	.202	.517	.458	.557	**.907**

Note: Diagonal elements in bold are the square roots of the average variance extracted.

As the data are accessed from perceptual measures from a single source at one point in time, common method bias might occur (Podsakoff et al., 2003). Hence, we control for common method bias by conducting Harman's single factor test (Thomas et al., 2019). Harman's single factor test revealed that no single factor emerged from the analysis, as the first factor accounts for 47.26 percent of the variance. Thus, it is assumed that common method bias is not a severe concern in our study. Supporting this presumption, a Guttman-split-half test reliability analysis revealed that the coefficient is .943 and hence, above the threshold value of .6 (Thomas et al., 2019).

4.2 Structural model and hypotheses test

For assessing the structural model, we follow the guidelines of Hair et al. (2011) and examine the inner model regarding potential collinearity issues indicated by the variance inflation factor (VIF). As all VIF values are ranged below the threshold, we assume collinearity issues to be absent. For distilling cross-

cultural differences, testing our hypotheses, and examining the generalizability of our findings by comparing both products (with both conditions for each product), we first tested the significance of the main effects across all four conditions (DCV; DCT; TV; TT) on an aggregated level comparing Chinese and Germans. We ran the analysis with 5,000 bootstraps. The outcomes demonstrate that *AQ* had a significant effect on *CR* for Chinese (β = .526, p < .001), as well as for Germans (β = .516, p < .001). For the effect of *RS* on *CR*, we identified significant correlations for both Chinese (β = .174, p < .001) and Germans (β = .139, p < .001). While the effect of *RC* on *CR* cannot be confirmed for Chinese (β = .016, n.s.), it was validated for Germans (β = .205, p < .001). An opposite result could be identified for the effect of *RR* on *CR*. For Chinese *RR* significantly influenced *CR* (β = .248, p < .001), but not for Germans (β = .095, n.s.). For both groups, *CR* had a strong and significant effect on *PI*, which was even stronger for Chinese (β = .693, p < .001) than for Germans (β = .557, p < .001; for all effects see figure 4).

The in-sample model fit is evaluated by the determination coefficient R^2 (Nagelkerke, 1991). *CR* yields an R^2 value of 0.731 (adjusted R^2 = .730) for the Chinese and 0.603 (adjusted R^2 = .600) for the German sample, representing a 'moderate' value for Germans and approaching the 'substantial' benchmark of 0.750 for Chinese (Hair et al., 2019). Regarding *PI*'s variance explanation, *CR* provided a higher moderate explanatory power among the Chinese (R^2 = .481) compared with the German sample (R^2 = .310). To test for moderation, the path coefficients of both models need to be compared. Hence, we ran a multigroup analysis (MGA), where the p-value indicates whether this difference is significant. As illustrated in table 5, the moderating effect of culture on the relationships between *RC* and *CR* (H3), *RR* and *CR* (H4), as well as on the correlation between *CR* and *PI* (H5) was confirmed. Contrary to our assumptions, there was no significant difference between the effect of *AQ* on *CR* (H1) as well as on the effect of *RS* on *CR* (H2).

Table 5: Culturally-specific results on an aggregated level

Hypotheses	Chinese (β)	Germans (β)	Difference (Chinese vs. Germans)	p-value of difference (non-parametric)	p-value of difference (parametric)
H1: *AQ* → *CR*	.526***	.516***	.010	.871 n.s.	.866 n.s.
H2: *RS* → *CR*	.174***	.139***	.035	.462 n.s.	.462 n.s.
H3: *RC* → *CR*	.016 n.s.	.205***	-.189	.000***	.000***
H4: *RR* → *CR*	.248***	.095 n.s.	.153	.028*	.026*
H5: *CR* → *PI*	.693***	.557***	.137	.004**	.005**

Note: *significant at p < .05, **significant at p < .01, ***significant at p < .001, n.s. = not significant.

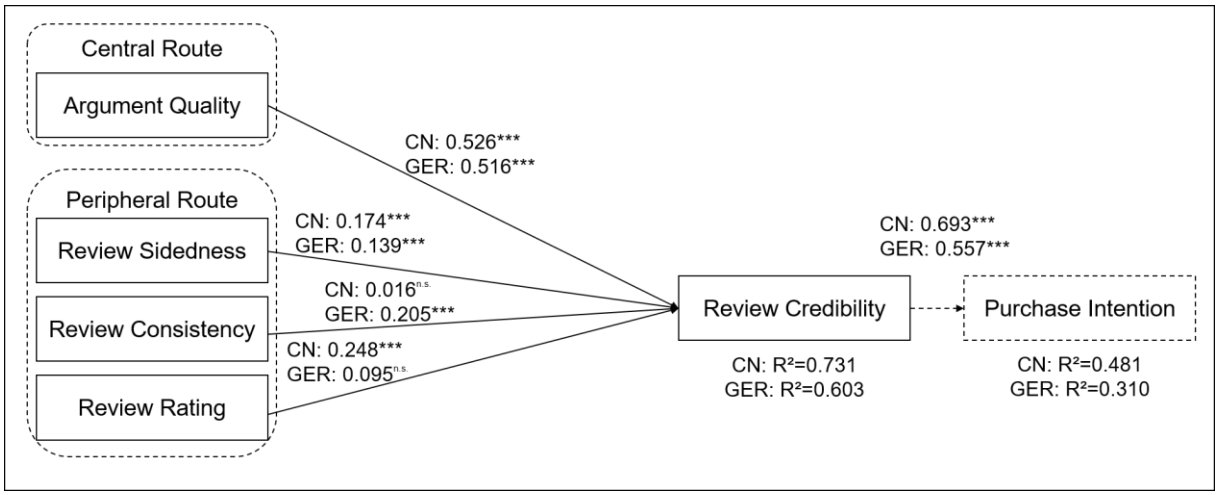


Figure 4: Structural model evaluation for Chinese (CN) and German (GER) consumers

Note: *significant at p < .05, **significant at p < .01, ***significant at p < .001, n.s. = not significant.

We controlled our results for heterogeneity regarding age, gender, education, and online shopping frequency, but did not detect significant effects. In the next step, we examined the assumed moderating role of presentation format (H6) intra-culturally across both products. The MGA comparing the results for DCV and TV with DCT and TT respectively showed to strengthen the effect of *AQ* on *CR* among Chinese (difference = .088) and Germans (difference = .118), however, both moderations were not found to be significant (CN: p = .244; GER: p = .192). Even though the presentation format of videos enables to increase the effect of *AQ* on *CR* among Chinese (path coefficient increases from .489*** to .578***) and Germans (path coefficient increases from .458*** to .566***), H6 could not be supported at a statistically significant level. To control for product-specific differences, we then analyzed the varying presentation format by product intra-culturally. For Germans, the MGA comparing TV with TT revealed to increase *AQ* on *CR*, although the effect was not significant. Analogously, the effect of *AQ* on *CR* was increased through the video in condition DCV compared to DCT, but not significantly. For the Chinese sample, positive moderating effects in both MGAs (comparing TV with TT, as well as DCV with DCT) were detected, however not at a significant level.

To control for intercultural differences based on the product exposed to respondents, we ran MGAs comparing the results for tablets among Germans (across presentation formats) with those for tablets among Chinese (across presentation formats). Here, significant differences exist between cultures for the effect of *RC* on *CR* (p = .001), whereas this effect appears to be stronger among Germans (corroborating H3). Comparing the results for digital cameras among Germans with digital cameras among Chinese (both across presentation formats), even more cultural differences evince. The effects of *RR* on *CR* and *CR* on *PI* are significantly higher for Chinese (p = .015 and p = .003), whereas the effect of *RC* on *CR* exhibits to be stronger among Germans (p = .018).

Comparing the video-related conditions, similar cultural differences occurred as in the MGAs comparing tablets across presentation formats and comparing digital cameras across presentation formats respectively. To be precise, the effect of *RC* on *CR* is significantly stronger among Germans for the TV condition compared to Chinese (p = .001), which is in line with H3. For the DCV condition, the effects

of *RR* on *CR*, and *CR* on *PI* are significantly higher among Chinese compared to Germans (p = .013 and p = .016 respectively).

Finally, we conducted manipulation checks on the effects of video compared with textual reviews based on varying levels of online shopping frequency and gender. For Germans with high online shopping frequency (five times a month or more often), H6 can be confirmed for digital cameras indicating *AQ* to influence *CR* more for video than for textual reviews (path coefficient difference = .498; p = .013). Concerning less frequent online shoppers from China, H6 is also corroborated (difference = .296; p = .028). Besides online shopping frequency, male Chinese were found to exhibit a significantly increased effect of the arguments raised (*AQ*) on *CR* (difference = .250; p = .040; confirming H6 for this sub-segment).

5 Discussion

To answer the research question how which factors increase ORs' credibility between consumers from different cultures, we first outline the effect for the factors heretofore established on a national level. While the results confirm hypotheses H3, H4, and H5, *AQ* seems to affect *CR* (H1) almost equally strong among Chinese and Germans, *AQ* was further confirmed as the most important driver for credible ORs (Cheung et al., 2012; Luo et al., 2015). Even though differences between samples evince not to be statistically significant, the tendency of Chinese to put more emphasis on the effect of *RS* on *CR* (H2) is indicated. *RR* reveals a more substantial effect on *CR* among Chinese (H4), since they are more likely to align with others (conformity) and hence, value the opinion of previous reviewers. In contrast, Germans evaluate reviews' credibility regardless of its context and prior *RR* stemming from others. Additionally, a significantly stronger effect of *CR* on *PI* is exhibited among Chinese (H5), which again emphasizes the high value of conformity and corroborates previous findings.

Apart from the main effects on *CR* (H1-4) and *PI* (H5), interesting findings were uncovered testing role of presentation formats (H6). While no significant differences were detected regarding video vs. text reviews for the aggregated models, the effect of *AQ* on *CR* was always increased (both for cameras and tablets) for both Chinese and Germans, when exposed to videos (H6). However, video reviews resulted in an increased impact of *AR* on *CR* for (1) Chinese males. On the one side, this might be explained by the more holistic mindset in contrast to Westerners, which is why *AQ*'s impact on *CR* is increased due to additional visual information about the product besides the reviews spoken/textual content itself. On the other side, Chinese males are found to be more confident in using innovative online technologies (e.g., online payment methods (Ho & Awan, 2019)) than their female counterparts. Additionally, for (2) Chinese shopping online less frequently the arguments raised showed to result in a higher impact increase on the credibility of reviews when exposed to videos (confirming H6 for this sub-segment). As those consumers are less familiar with online shopping and less used to informing themselves properly before purchasing a high-involvement product online, they might be in greater need for information and

thus, benefit from a video visualization to obtain a better impression of the product. Analogously, the digital camera video review also raised *AQ*'s effect on *CR* for (3) frequently shopping Germans (corroborating H6 for this sub-segment). As they yield greater experience and familiarity with online shopping, they might have already stumbled across video reviews before and thus, were more likely to adopt arguments raised in a video. Additionally, they might hold a higher awareness of (textual) fake reviews and assume that it is more difficult to fake a video demonstrating a product's functionality. In contrast to tablets, where many components are standardized and performance is easily quantifiable (Li et al., 2019), digital cameras oftentimes comprise more and more complex functionalities, which might be why this effect was only found for the latter one among this sub-segment, as videos reviews enable a more detailed product visualization and thus, a more accurate impression about the product.

In contrast to Xu et al. (2015) who investigated different OR presentation formats for American participants only and solely enquired dependent variables (ORs' helpfulness, credibility, persuasiveness), we enhanced closeness to reality by holistically measuring presentation formats impact on the arguments raised in ORs and extend it by incorporating an intercultural comparison. This approach is more in line with the ELM (Petty & Cacioppo, 1981) and current OR findings (Cheng & Ho, 2015; Maslowska et al., 2017). However, when focusing on *CR*'s mean stated dependent on condition (text vs. video) as in the study of Xu et al. (2015), videos reviews were perceived as significantly more credible than textual ones among Chinese ($U(N_{textual} = 290; N_{video} = 295) = 38671.00$, $z = -2.014$, $p = .044$). Those differences arise comparing DCT_{CN} and DCV_{CN} with $U(N_{textual} = 142; N_{video} = 148) = 8972.50$ ($z = -2.158$, $p = .031$), whereas no differences appeared for TT_{CN} and TV_{CN} ($p = .477$). Among Germans, no differences for increased *CR* when exposed to video reviews compared to textual ones evinced.

Limitations

As a result of the cleansing criteria applied (control questions, speeders, straightliners), the group size for each experimental condition varies to some extent. Hence, the condition TV has been replied by n=147, TT by n=148, DCV by n=148, and DCT by n=142 Chinese consumers. Due to fewer correctly answered control questions, the TV version has been filled out by n=135, TT by n=140, DCV by n=137, and DCT by n=140 German consumers. However, according to the rule of thumb (Hair et al., 2021) (ten times six constructs), 60 respondents are needed, whereas we acquired more than twice as much. Even though our results are limited to consumer electronic products, articles from this category are most likely to be read among Germans (most important category) and Chinese (second most important category, see Appendix C), enhancing the relevance of our findings.

Practical implications

As *AQ*'s impact on *CR* was increased in all cases when exposed to video reviews instead of textual ones, online shop provides should start offering video reviews or incentivize customers to provide video reviews. While multiple OR videos can be found on YouTube or 小红书, dissemination of such videos is rather rare in online shops. To prevent consumers from switching channels for watching these videos

and thus, from potentially buying products elsewhere, online shop operators should take advantage of providing video reviews on their websites. Aligning with previous research (Fang et al., 2013), we summarize the practical implications in table 6.

Table 6: Summary of practical implications

Implications: Online shop operators should …
… offer and/or incentivize customers to provide video reviews *in both countries* (since OR arguments' effect on review credibility increased when exposed to video instead of textual reviews – especially *in China*, where ORs were perceived significantly more credible in this case)
… emphasize the possibility to upload video reviews especially to - Chinese males - Chinese shopping rather seldom - Germans interested in complex products (e.g., digital cameras) shopping frequently
… implement the possibility to rate ORs (e.g., via thumbs up/thumbs down buttons) and/or incentivize customers to use this functionality (reward) *in China only*
… incorporate the possibility to write ORs, when attempting to start a business in China, since ORs were generally perceived as more credible resulting in higher purchase intentions

Theoretical contributions

We contribute to literature by providing the first to examine review credibility with an intercultural comparison and thus, fill the recently postulated literature gaps. Additionally, we extend previous literature by building upon an eye-tracking pre-study (applying a more realistic online shopping situation through a smartphone rather than a desktop computer with a monitor), which revealed a new contextual factor (presentation format) to differ between cultures. While the effect of varying presentation formats has yet only been investigated within one country, we are the first to explore different presentation formats of ORs within an intercultural comparison and uncovered interesting differences.

We empirically demonstrated that even though *CR* was increased through video across all conditions, differences were not found to be statistically significant for the overall models, but for specific subsegments and when focusing on *CR* only. We further extend previous literature solely focusing on ORs' presentation format and review credibility on a national level (Xu et al., 2015) by enabling an intercultural comparison, as well as by holistically examining presentation formats' impact on *AQ* compared to other antecedents of *CR*. Here, we advance extant research by confirming the findings of Xu et al. (2015) (based on US students) for Chinese consumers, whereas Germans did not show an increased credibility perception when exposed to video instead of textual reviews. This might be explained by literature emphasizing Chinese to focus more on product visualizations (Cheng & Ho, 2015) than Westerners (Wang et al., 2019). Additionally, we identified interesting differences contingent on product type (significant increase for digital cameras, but not for tablets). This stresses the need to take into account multiple products for deriving generalizable insights. We also validated the assumptions of the SCST by findings from the eye-tracking study and demonstrated that taking into account other theoretical frameworks than Hofstede's cultural dimensions is necessary to entirely understand intercultural differences.

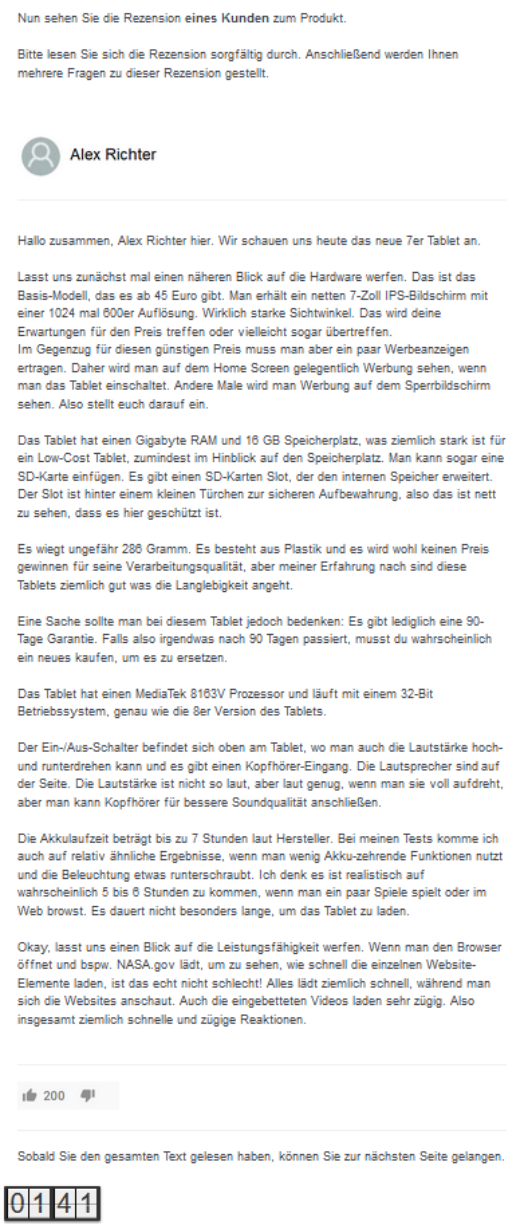
Apart from that, we exhibit that *RS* reveals almost equally strong effect sizes towards *CR* among consumers from both cultures (H2) with relatively small effect sizes compared to other drivers. This finding confirms earlier investigations conducted in Western (Cheung et al., 2012) and East Asian countries (Cheung et al., 2009; Luo et al., 2014; Luo et al., 2015). Analogously, we approved *AQ* as the factor impacting *CR* the most, which is also consistent with results derived from Western (Cheung et al., 2012) and East Asian studies (Fang, 2014; Luo et al., 2014; Luo et al., 2015).

Appendix

Appendix A: Constructs used

Construct	Items	Source
Argument Quality (*AQ*)	1: Arguments of this online review were convincing. 2: Arguments of this online review were persuasive. 3: Arguments of this online review were strong.	Adapted from Fang, 2014
Review Sidedness (*RS*)	1: This review includes both pros and cons on the discussed target. 2: This review includes both positive and negative comments.	Adapted from Luo et al., 2015
Review Consistency (*RC*)	1: The comments made in this review are consistent with other reviews I have read in the past. 2: The comments made in this review are similar to other reviews I have read previously. 3: The comments made in this review match with other reviews I have read before.	Adapted from Luo et al., 2015
Review Rating (*RR*)	1: Based on the review rating, this review was found to be favorable by previous readers. 2: Based on the review rating, this review was highly rated by previous readers. 3: According to the review rating level, this review was good.	Luo et al., 2015; Cheung et al., 2009
Review Credibility (*CR*)	1: I think this review is believable. 2: I think this review is factual. 3: I think this review is accurate. 4: I think this review is credible.	Cheung et al., 2012
Purchase Intention (*PI*)	1: Based on this product description, I would recommend my friend to buy this product. 2: Based on this product description, I will purchase this product the next time I need a product like this. 3: Based on this product description, it is likely that I will buy this product. 4: Based on this product description, I will definitely try this product.	Xu et al., 2015

Appendix B: Review shown to respondents in German (left) and Chinese (right) (here: tablet)



Nun sehen Sie die Rezension **eines Kunden** zum Produkt.

Bitte lesen Sie sich die Rezension sorgfältig durch. Anschließend werden Ihnen mehrere Fragen zu dieser Rezension gestellt.

Alex Richter

Hallo zusammen, Alex Richter hier. Wir schauen uns heute das neue 7er Tablet an.

Lasst uns zunächst mal einen näheren Blick auf die Hardware werfen. Das ist das Basis-Modell, das es ab 45 Euro gibt. Man erhält ein netten 7-Zoll IPS-Bildschirm mit einer 1024 mal 600er Auflösung. Wirklich starke Sichtwinkel. Das wird deine Erwartungen für den Preis treffen oder vielleicht sogar übertreffen.
Im Gegenzug für diesen günstigen Preis muss man aber ein paar Werbeanzeigen ertragen. Daher wird man auf dem Home Screen gelegentlich Werbung sehen, wenn man das Tablet einschaltet. Andere Male wird man Werbung auf dem Sperrbildschirm sehen. Also stellt euch darauf ein.

Das Tablet hat einen Gigabyte RAM und 16 GB Speicherplatz, was ziemlich stark ist für ein Low-Cost Tablet, zumindest im Hinblick auf den Speicherplatz. Man kann sogar eine SD-Karte einfügen. Es gibt einen SD-Karten Slot, der den internen Speicher erweitert. Der Slot ist hinter einem kleinen Türchen zur sicheren Aufbewahrung, also das ist nett zu sehen, dass es hier geschützt ist.

Es wiegt ungefähr 286 Gramm. Es besteht aus Plastik und es wird wohl keinen Preis gewinnen für seine Verarbeitungsqualität, aber meiner Erfahrung nach sind diese Tablets ziemlich gut was die Langlebigkeit angeht.

Eine Sache sollte man bei diesem Tablet jedoch bedenken: Es gibt lediglich eine 90-Tage Garantie. Falls also irgendwas nach 90 Tagen passiert, musst du wahrscheinlich ein neues kaufen, um es zu ersetzen.

Das Tablet hat einen MediaTek 8163V Prozessor und läuft mit einem 32-Bit Betriebssystem, genau wie die 8er Version des Tablets.

Der Ein-/Aus-Schalter befindet sich oben am Tablet, wo man auch die Lautstärke hoch- und runterdrehen kann und es gibt einen Kopfhörer-Eingang. Die Lautsprecher sind auf der Seite. Die Lautstärke ist nicht so laut, aber laut genug, wenn man sie voll aufdreht, aber man kann Kopfhörer für bessere Soundqualität anschließen.

Die Akkulaufzeit beträgt bis zu 7 Stunden laut Hersteller. Bei meinen Tests komme ich auch auf relativ ähnliche Ergebnisse, wenn man wenig Akku-zehrende Funktionen nutzt und die Beleuchtung etwas runterschraubt. Ich denk es ist realistisch auf wahrscheinlich 5 bis 6 Stunden zu kommen, wenn man ein paar Spiele spielt oder im Web browst. Es dauert nicht besonders lange, um das Tablet zu laden.

Okay, lasst uns einen Blick auf die Leistungsfähigkeit werfen. Wenn man den Browser öffnet und bspw. NASA.gov lädt, um zu sehen, wie schnell die einzelnen Website-Elemente laden, ist das echt nicht schlecht! Alles lädt ziemlich schnell, während man sich die Websites anschaut. Auch die eingebetteten Videos laden sehr zügig. Also insgesamt ziemlich schnelle und zügige Reaktionen.

200

Sobald Sie den gesamten Text gelesen haben, können Sie zur nächsten Seite gelangen.

0141

现在您看到的是关于这款产品的用户评价。

请读看此评论。然后将询问您有关此评论的几个问题。

鑫文

大家好，是鑫文。今天我们来看看新的第七代平板电脑。

首先让我们看一下硬件。这是基本型号，起价为148元。您将会得到一个漂亮的7英寸IPS显示屏，它的分辨率是1024 x 600。真的是很棒的视角。这款平板电对物有所值甚至物超所值。但是为了享受如此优惠的价格，您不得不忍受一些广告。因此，打开平板后，您偶尔会在主屏幕上看到一些广告。有时，您会在锁定的锁定屏幕上看到广告。请您为此做好心理准备。

这款平板拥有1 GB的RAM和16 GB的内存，至少从内存角度来看，这样的配置对于低价平板还是相当强悍的。您甚至可以将SD卡放入该设备中。SD卡插槽就在这儿，帮助扩展内存。为了更好地保护卡槽和卡，卡槽被安装在一个小门后面。

这款平板重约286克。它是用塑料制成的。虽然它可能不会获得加工质量奖，但是根据我的经验来看，这种平板非常耐用。

关于这款平板有一点您不得不考虑，它只有90天的保修期。也就是说，如果90天后发生任何故障，您可能不得不买一台新的。

这款平板电脑具有MediaTek 8163V处理器，运行32位操作系统，和8英寸版本一样。

有一个电源开关，有一个音量控制和耳机插孔。有一个处是扬声器。虽然声音不是很大，但是当您将音量调到最大时足够响了，您可以连上耳机获得更好的音效。

据生产商说，这款平板电脑的电池续航时间长达7小时。根据我的测试，结果差不多，如果您不用太耗电的功能并且把屏幕调暗一点。我认为，如果您听一些游戏或者浏览网络，可以续航5至6个小时。充电不需要很长时间。

好了，现在让我们来看一下性能。我们打开浏览器，转到NASA.gov，看看上网功能有多快。还不错。您可以看到浏览网页运行很快。或许我们还可以试一下播放这个视频，看看它加载有多快。总体而言相当快且很流畅。

200

读了整个评论，您可以转到下一页。

0141

Appendix C: Descriptive Statistics of both samples

	German sample (n=552)	Chinese sample (n=585)
Averaged age (SD)	30.80 (5.67)	31.25 (4.66)
Gender	Female: 50% Male: 50%	Female: 51% Male: 49%
Education	w/o school-leaving qualification: 0.18% Primary education: 5.25% Secondary School level I: 15.22% High School degree: 24.82% Technical education: 24.28% Bachelor: 14.49% Master: 13.59% PhD: 1.27% Other: 0.91%	w/o school-leaving qualification: 0.17% Primary education: 0.51% Secondary School level I: 1.20% High School degree: 71.62% Technical education: 13.16% Bachelor: 2.05% Master: 10.09% PhD: 0.51% Other: 0.00%
Online shopping frequency	≥ 8 times per month: 11.59% 5-7 times per month: 18.12% 2-4 times per month: 43.84% ≤ 1 times per month: 26.45%	≥ 8 times per month: 37.61% 5-7 times per month: 31.45 2-4 times per month: 28.21 ≤ 1 times per month: 2.74%
Product category in which OR are most likely to be read (multiple selections possible)	Furniture & decoration: 26.45% Household appliances: 51.27% Books & audio books: 27.36% Apparel & shoes: 48.19% Consumer electronics: 74.64% Sports equipment & leisure: 27.54% Movies & music: 25.18% Others: 8.70%	Furniture & decoration: 45.47% Household appliances: 66.50% Books & audio books: 28.21% Apparel & shoes: 84.27% Consumer electronics: 78.97% Sports equipment & leisure: 63.59% Movies & music: 25.30% Others: 3.76%

Appendix D: Evaluation of the HTMT* criterion for Germans and Chinese consumers

Germans	*AQ*	*PI*	*RC*	*CR*	*RR*	*RS*
AQ						
PI	0.651					
RC	0.568	0.578				
CR	0.835	0.604	0.613			
RR	0.706	0.503	0.588	0.640		
RS	0.508	0.239	0.322	0.535	0.467	

Chinese	*AQ*	*PI*	*RC*	*CR*	*RR*	*RS*
AQ						
PI	0.874					
RC	0.515	0.449				
CR	0.961	0.747	0.408			
RR	0.902	0.762	0.428	0.836		
RS	0.757	0.602	0.320	0.740	0.686	

***** HTMT represents the state-of-the-art criterion in detecting discriminant validity issues by comparing the heterotrait-heteromethod correlations and the monotrait-heteromethod correlations (Henseler et al., 2015).

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3.6 Cultural differences in processing online customer reviews: holistic versus analytic thinkers

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Abstract

While the majority of studies exploring online customer reviews in the light of intercultural comparisons draw on the theoretical framework of Hofstede's cultural dimensions, which faced justifiable criticism, we make use of Socio-Cognitive Systems Theory to illustrate how consumers from different cultures are cognitively processing information. Building upon a research model established at a national level, we interviewed Western (German; n=552) and East Asian (Chinese; n=585) consumers to analyze intercultural disparities. The results empirically validate the assumptions of the Socio-Cognitive Systems Theory, and thus, finds East Asians to perceive review credibility holistically, whereas Westerners tend to categorize its antecedents for evaluating them separately. By employing this alternative framework, we un-cover incidents questioning the generalizability of previous studies on review credibility conducted among East Asians, as well as the appropriateness of the (heretofore established) Elaboration Likelihood Model for examining online customer reviews in intercultural contexts.

Keywords: online customer reviews; Socio-Cognitive Systems Theory; intercultural comparison; Elaboration Likelihood Model

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1 Introduction

Although research on online customer reviews (OCRs) mushroomed throughout recent years (Ismagilova et al., 2020b; King et al., 2014), the number of articles dealing with cross-cultural comparisons is still sparse (Lin & Kalwani, 2018). The vast majority of these studies draws on an understanding of cultures that has been developed a decade before the mainstream spread of the Internet and OCRs: Geert Hofstede's cultural dimensions (1980). Based on investigations with IBM employees in the 1970's, Hofstede initially derived four, and iteratively added two more dimensions over time (Hofstede et al., 2017). As Hofstede himself emphasized that new technologies could allow less developed countries to leapfrog interim stages of their development and, hence, shift their cultural values (2011), it needs to be examined to what extent these initial assumptions still hold true in the current age of mobile shopping and omni-channel retailing.

The psychologist Richard Nisbett and colleagues have more recently introduced a different theoretical framework, which might be more appropriate to examine OCRs. They highlight the disparate cognitive information processing of consumers from different cultures, concretely Westerners and East Asians (Nisbett et al., 2001). Their framework about different thinking styles has been used to not only elucidate the perception of online websites (Cyr, 2008; Dong & Lee, 2008; Faiola & Matei, 2005), offline reviews (Aggarwal et al., 2013), and to evaluate brand extensions (Monga & John, 2006), but also yielded mentions in the context of OCRs (Kim et al., 2018).

As the literature indicates that aspects determining the credibility of OCRs (e.g., perceived expertise of reviewers (Obal & Kunz, 2016)) are influenced and, in turn, the perception of credibility itself is affected culturally differently (Tang, 2017), it needs to be explored which factors are able to increase OCRs' credibility in the light of an intercultural comparison. While most literature examining OCRs' credibility are built on the Elaboration Likelihood Model (ELM) from Petty and Cacioppo (1981) (e.g., Cheung et al., 2012; Luo et al., 2014; Thomas et al., 2019), we further intend to challenge its appropriateness in the light of an intercultural comparison, as intercultural generalizability was out of interest by that point. Therefore, we intend to contribute to the literature by (1) addressing recently stated research gaps demanding intercultural investigations about OCRs (Filieri et al., 2018; Lee & Hong, 2019; Lin et al., 2019; Thomas et al., 2019), (2) empirically examining the Socio-Cognitive Systems Theory (SCST) from Nisbett et al. (2001) as an alternative framework to Hofstede's cultural dimension in the context of OCRs, and (3) reviewing ELM's suitability when comparing information processing interculturally. Hence, we aim to answer how Westerners and East Asians differ in their perception of credible online reviews. To answer this question, we first present recent studies concerning cultural comparison in the context of OCRs and the corresponding cultural framework used before introducing SCST by Nisbett et al. (2001). We then derive our research model and hypothesis, present the empirical investigation, and discuss the results, as well as managerial implications and contributions to literature.

2 Theoretical background

2.1 Cultural comparisons within online customer reviews

Reflections of the extant literature on OCRs and cross-cultural differences reveal that most studies draw on Hofstede's cultural dimensions as theoretical framework to elucidate potential differences in OCR credibility perception (see Table 1). This theory evaluates a society's culture based on its individualism, power distance, uncertainty avoidance, masculinity, long-term orientation, and indulgence (Hofstede et al., 2017). In general, consumers from a collectivist culture (e.g., Asian consumers) were found to be more likely to rely on the opinion of other peers (e.g., in terms of online reviews) than consumers from an individualistic culture (e.g., North American consumers) (Fong & Burton, 2008; Obal & Kunz, 2016; Sia et al., 2009). More specifically, Hong et al. (2016) found consumers from a collectivist culture to be less likely to deviate from the previous average rating of other consumers' reviews and to express their emotions in a review. Similarly, Luo et al. (2014) found a society's collectivist orientation to weaken the impact of review rating and consistency on review credibility and strengthen the relationship between review sidedness and credibility. However, their investigation was only conducted based on two different online forums within China. With respect to their high score in long-term orientation, Chinese consumers are further considered to be rather risk-averse, and thus, were found to perceive negative reviews as more helpful than American consumers (Fang et al., 2013). Differences regarding the thematic focus within online reviews have also been explained with Hofstede's cultural dimensions, finding evidence that American review authors rather focus on usability features (Wang et al., 2019), whereas Chinese review authors rather comment on the products' aesthetics (Wang et al., 2019; Zhu et al., 2017). Notwithstanding its striking popularity, Hofstede's cultural dimensions are frequently criticized, as insights from IBM employees are considered not generalizable (Hong et al., 2016). They may fall short of capturing the cultural orientation of rapidly developing countries, such as Brazil and China (Tang, 2017).

As an alternative to Hofstede's cultural dimensions, another minor stream of literature makes use of Hall's cultural dimensions classifying cultures as either low- or high-context cultures (Hall, 1976), monochronous or polychronic cultures (Hall, 1983), cultures that need less or more (private) space (Hall, 1966), and slow or fast flow of information (Hall & Hall, 1990). Aside from Hofstede's cultural dimensions, Barbro et al. (2020) used Hall's framework to elucidate the impact of culture on online reviews and found high-context cultures (e.g., China) to exhibit a lower verbosity. Further, low-context cultures are rather analytical and logical in their textual review content (Kim et al., 2018a).

Besides Hofstede's cultural and Hall's dimensions, the SCST gathered attention within recent OCR research recently. Some studies in the field of OCRs refer to the SCST, even though they do not conduct intercultural comparisons, but use the theoretical underpinnings to explain how information is perceived (Filieri, 2015; Filieri et al., 2018). Besides, SCST's underlying assumptions were confirmed by OCR

studies not explicitly referring to this theoretical framework by revealing that Americans rather emphasize usability features. In contrast, products' aesthetics are more often found in Chinese reviews (Wang et al., 2019).

Although OCR literature drawing on SCST is still sparse, initial attempts were made to explain different thinking styles (Kim et al., 2018a). Thus, differences in OCR perception are inherent to consumers' cultural identity with SCST. In contrast to the only two studies tangent to SCST in context of OCR analyzing existing reviews to observe cultural differences (see Table 1), SCST's serves as ideal framework to examine perceptions of information and thus, should be investigated using methods enquiring to reveal such perceptions (e.g., consumer surveys). To the best of the authors' knowledge, this hence is the first study to shed light OCRs' credibility perception interculturally by explaining differences using SCST and actually interviewing consumers about review perceptions, which enables new insights for this growing stream of research.

Table 1: Recent studies including cultural comparisons and underlying cultural framework

Author (Year)	Framework	Study's Focus	Findings
Biswas et al. (2021)	HCD	Perceived helpfulness & non-voted reviews	Culture moderates the effect of antecedents for helpfulness votes (e.g., social context, review title, star rating, review sentiments) on the number of helpfulness votes.
Barbro et al. (2020)	Hall, HCD, SCST	Language's & country's effect on review helpfulness	Culture impacts review length, the degree of response bias, and the number of helpfulness votes.
Hong et al. (2016)	HCD	Conformity's & emotionality's effect on review helpfulness	Culture affects the extent to which consumers express emotions when writing reviews and confirm previously read reviews.
Kim et al. (2018a)	Hall, HCD, SCST	Review recommendation & posting patterns	Culture serves as a moderator regarding consistency in review rating dispersion. Westerners are more likely to give positive reviews. Culture moderates the usefulness of reviews of consumers from the same citizenship.
Lin & Kalwani (2018)	HCD	Occurrence of reviews and relation to sales	Culture affects the relationship between product sales and eWOM, as well as the general occurrence of eWOM.
Obal & Kunz (2016)	HCD	Response to expert/non-expert reviews	Culture moderates skepticism and the reliance on non-expert versus expert reviewers.
Tang (2017)	HCD	Product market performance	Culture moderates the relationship between market share and eWOM.
Wang et al. (2019)	HCD	Various aspects of review description	Culture is a moderator regarding the emphasis of different product features in reviews. Chinese are more likely to discuss product aesthetics, while Americans articulate themselves more negatively and rely on usability features.
Zablocki et al. (2019)	HCD	Emotional OCR content	Different self-construal levels of varying countries moderate the relationship between emotional content and product attitude.
Zhu et al. (2017)	HCD	Dimensions of textual content	Based on different textual content dimensions on Chinese and American B2C websites: Chinese are more likely to comment on product aesthetics, product quality, price, product functionality, and seller trustworthiness, while Americans are more likely to reference recommendation expressions and emotional attitudes.

Note: HCD=Hofstede's cultural dimensions, Hall=Cultural concept by Hall (1976), SCST=Socio-Cognitive Systems Theory.

2.2 Socio-Cognitive Systems Theory

The theoretical framework of SCST (Nisbett et al., 2001) claims that – as a result of the past decades of socialization within societies – members from different cultures developed different cognitive processing patterns. The authors thereby differentiate Westerners from East Asians by highlighting the historical roots of ancient Greek and ancient China, respectively. As ancient China has influenced East Asian societies (e.g., Korea, Japan) and, to some extent, Southeast Asia, it is assumed that the derived cognitive patterns account for all East Asian cultures. Hence, ancient China considering individuals as part of a group (togetherness), which resulted in a culture of avoiding criticism and preventing open debates, affected all East Asian societies. Besides, ancient China's citizens tried to explore the "natural world" by applying empiricism and following their intuitions instead of creating formal models to explain it. Furthermore, Confucianism and the related beliefs stressing harmony and balance influenced ancient China's society. Unlike ancient Greek, ancient China evaluated the world with all its elements and the interdependencies of all its components from a rather holistic perspective instead of disaggregating them. In contrast, ancient Greek influenced European civilizations and post-Columbian American society, and thus, ancient Greek's values (e.g., a tradition of debating), beliefs (e.g., the influence of gods), and their approaches in epistemology (developing models to categorize and explain the nature of objects) serve as starting point for socio-cognitive systems of Westerners. Accordingly, the philosophers of ancient Greek tried to understand the world as it is rather analytically by breaking it down into objects consisting of certain attributes, and categorized those attributes accordingly. One of many examples illustrating this different approach can be observed in medicine: While it has been common to execute surgeries to heal one part of the body in Western civilization, East Asians associated health with a balanced Qi related to intertwined, natural forces of Yin and Yang concerning the body as a whole (Nisbett et al., 2001).

As societal structures and organizations are able to affect cognitive processing patterns without being mediated by metaphysical beliefs (Nisbett et al., 2001), the way ancient Greek and China cognitively processed information influenced the patterns of modern Western and East Asian societies. Consequently, SCST postulates that Westerners cognitively process information in an analytical way, while East Asians' cognition follows a more holistic approach (Choi & Nisbett, 2000; Ji et al., 2000; Masuda & Nisbett, 2001; Nisbett et al., 2001; Park et al., 1999).

Table 2: Characteristics of holistic versus analytic thinkers

	East Asians ('Holistic')	**Westerners ('Analytic')**
Approaches in Epistemology	Focusing on the interdependencies between objects and their context as a whole	Focusing on an object detached from its context
	Paying more attention to the context	Understanding objects as a composition of its parts, which are categorized
Values	Avoiding contradictions and confrontations Emphasizing harmony	Open debates are common

The values and approaches in epistemology inherent to East Asians and Westerners (see Table 2) can still be observed in how they cognitively process information and, further, in the case of OCRs (Kim et al., 2018a).

3 Research model and hypotheses

Aligning with previous literature on OCRs (Baek et al., 2012; Cheung et al., 2012; Filieri et al., 2018), we base our research model on the ELM developed by Petty and Cacioppo (1981). This model explains how receivers process persuasive information and how this information affects receivers' attitudes. It separates into a central and a peripheral route of information processing. Messages processed through the central route will make recipients carefully elaborate on the message's content. In contrast, when recipients concentrate on non-message-related information, they will be processed through the peripheral route, causing less stable attitude changes. Against this clear separation, more recent research found consumers to tend processing messages by activating both routes to a certain extent in context of OCRs (Cheung et al., 2012). Moreover, while multiple studies investigated OCRs' credibility by drawing on the ELM, none of these previous studies examined the ELM's eligibility in the light of intercultural comparisons, but applied it for research on a national level only. Similar to messages and its surrounding factors, OCRs consist of the review itself and other indicators (e.g., reviewer expertise, helpfulness votes, and the like) and therefore, the ELM established as an adequate framework for OCR research models (Baek et al., 2012). Hence, the following constructs are substantiated by extant OCR literature, and have proven to represent important factors on a national level (Cheung et al., 2009; Cheung et al., 2012; Luo et al., 2015; Thomas et al., 2019). Since we aim at analyzing intercultural differences, the hypotheses scrutinize if culture serves as a moderator (as indicated by literature; see Table 1) for explaining potential differences regarding antecedents of review credulity.

3.1 Argument quality (ArgQual)

For the central route, we only incorporate ArgQual to develop a parsimonious model. ArgQual's composition and understanding in the literature vary heavily: while some refer to ArgQual as argument strength (Cheung et al., 2009; Fang, 2014) or information quality (Filieri, 2015), others suggest to disaggregate it into review length (Filieri et al., 2018; King et al., 2014), word count (Baek et al., 2012; Cheng & Ho, 2015; Fang, 2014) or information quantity (Filieri, 2015). Although a tendency exists according to which the helpfulness of ArgQual will increase with the number of words used, a plateau will be reached after a certain amount of words (Baek et al., 2012). Additionally, the relation between the amount of information provided in OCRs and purchase intentions showed not to be linear, but U-shape (Furner & Zinko, 2017), whereas too much information could decrease purchase intention (Zinko et al., 2020). Thus, we do not follow this separation. Besides, some studies consider ArgQual to combine both word count and image count (Cheng & Ho, 2015). However, we define ArgQual in line with the notion initially used in the ELM. Accordingly, "[i]f the person perceives the message to contain strong,

compelling arguments" (Petty & Cacioppo, 1981, p. 265), then the central route is activated, emphasizing its text-based content without images. Following previous studies (Cheung et al., 2012; Fang, 2014), we assume ArgQual to have a positive effect on review credibility. In line with SCST, Westerners are assumed to focus on an object (in our case: the review) itself and neglect contextual factors and the relationship between impact factors. We thus hypothesize:

H1: Argument quality has a stronger positive effect on review credibility for Western consumers than for East Asian consumers.

3.2 Author credibility (AuthorCred)

Besides the central route, research identified various peripheral factors affecting the credibility of OCRs: AuthorCred or source credibility both describe how credible readers perceive the message's source (Cheung et al., 2012). The latter concept rather refers to the credibility of the respective review platform (Hsieh & Li, 2020; Luo et al., 2013; Mudambi & Schuff, 2010; Thomas et al., 2019), whereas the former refers to the credibility of the respective reviewer (Cheung et al., 2009; Ismagilova et al., 2020b; Lee & Hong, 2019; Li et al., 2013). As a result of cultural differences between Westerners and East Asians, difficulties arise in finding an online platform with equal awareness and usage. Hence, focusing on Amazon would be disconcerting for East Asians, as it only contributes to 0.7 percent of the gross merchandise volume in the B2C segment in China (iResearch, 2017). Therefore, we focus on AuthorCred for obtaining comparable results across cultures. Since East Asians value the relationship between members of a group and try to avoid conflicting beliefs, while Westerners evaluate AuthorCred regardless of the review itself and are more used to contrary opinions, we assume:

H2: Author credibility has a stronger positive effect on review credibility for East Asian consumers than for Western consumers.

3.3 Review sidedness (RevSided)

Besides AuthorCred, research found OCRs to be perceived as more credible if they contain both positive as well as negative aspects about an object/product (Cheung et al., 2009; Cheung & Thadani, 2012; Jensen et al., 2013; Luo et al., 2015). This OCR characteristic is often referred to as RevSided (Cheung et al., 2012; Schlosser, 2011) or review extremity (Kuan et al., 2015). By anticipating potential counterarguments, review credibility (as well as review helpfulness (Baek et al., 2012; King et al., 2014)) can be increased. Particularly, incorporating negative aspects could increase the reviews' credibility (Baek et al., 2012; Schlosser, 2011), as these aspects are of higher relevance to the readers compared to positive aspects ('negativity bias'; Cui et al., 2012; Kim et al., 2018a; Qiu et al., 2012). While some authors classify RevSided as part of the central route (Luo et al., 2014), others assort it into the peripheral route. In line with the before mentioned explanation about which factors constitute the central route according to the ELM (see Section 3.1), we follow the latter categorization and treat RevSided as part of the peripheral route. As East Asians emphasize harmony and try to avoid conflicts, RevSided may affect review credibility more for East Asians than for Westerners.

H3: Review sidedness has a stronger positive effect on review credibility for East Asian consumers than for Western consumers.

3.4 Product and review rating (RevRating)

Further aspects, which are frequently assumed to influence review credibility, are product and review rating (Cui et al., 2012; Gu et al., 2012; Kaushik et al., 2018; Ziegele & Weber, 2015). It is crucial to distinguish between the rating of one single review ('review rating'; RevRating) and the averaged aggregated rating across all reviewers ('product rating'). While for the latter valence (dispersion of review ratings; e.g., Lee & Youn, 2009; Wang & Herrando, 2019), volume (number of reviews; e.g., Kostyra et al., 2016; Park et al., 2007; Zhang et al., 2014), and overall rating scores (e.g., Qiu et al., 2012; Zhang & Lin, 2018) are of relevance, we focus on elucidating the varying perception among Western and East Asian consumers regarding one single review. The reason for choosing RevRating is three-fold. First, when the product rating provides an ambiguous picture, not revealing a tendency for or against the purchase, online shoppers require additional information. Hence, they will be likely to read single reviews to check how previous readers have rated these reviews (frequently with likes and dislikes (Cheung et al., 2009), see, e.g., at YouTube or eBay) to gather more information before conducting the purchase. Second, single RevRating becomes especially important when trying to sell a (new) product that has not been established yet in the market. As consumers generally focus on reviews with more product ratings resulting in biases towards the already established products ('early bird effect', see, e.g., Risselada et al., 2018), we intend to avoid this effect by selecting RevRating for the research model. Third, as OCRs' purpose lies in dissolving the information asymmetry inherent to e-commerce (particularly in the case of new products and ambiguous rating variance), RevRating should be incorporated. Prior literature found RevRating to increase trust (Goraya et al., 2019) and review credibility among Chinese (Cheung et al., 2009), whereby this effect is strengthened by the sense of membership (Luo et al., 2015). According to SCST, East Asians emphasize group membership and harmony, and thus, they may be more likely to rely on prior readers' judgments (as indicated by RevRating). Additionally, the more holistic East Asians are assumed to pay more attention to contextual information cues besides the review itself, which is why they RevRating plays a larger role in assessing a review's credibility. Hence, the positive effect of RevRating towards review credibility is assumed to be higher for East Asians.

H4: Review rating has a stronger positive effect on review credibility for East Asian consumers than for Western consumers.

3.5 Review consistency (RevConsist)

Another important factor affecting review credibility of OCRs represents RevConsist (Cheung et al., 2009; Cheung et al., 2012; Luo et al., 2015; Schlosser, 2011; Thomas et al., 2019). Prior research uniformly defines RevConsist as the extent to which a review's information is consistent with other reviews (for the same product). With the increasing occurrence of the same review information across multiple reviewers, the review's credibility will rise (Luo et al., 2015). As we focus on single reviews, RevConsist

can only be evaluated by other reviews read in the past. According to SCST, East Asians approach of emphasizing harmony (also related to Taoism and the Yin-Yang principle) results in a dialectic, whereas seemingly incompatibilities ("A can actually imply that not A is also the case" (Nisbett et al., 2001, p. 294)) are also accepted. In contrast, Westerners are not afraid of open debates to obtain reliable, consistent findings, and hence, they might pay more attention to RevConsist. Therefore, we assume:

H5: Review consistency has a stronger effect on review credibility for Western consumers than for East Asian consumers.

3.6 Review credibility (RevCred) and purchase intention (PI)

Besides review helpfulness, RevCred is frequently chosen as the dependent variable in the context of OCR investigations. According to the meta-analytic review by Ismagilova et al. (2020b), OCR information is evaluated helpful when it is useful for deciding about a purchase, and such useful reviews impact the intention to buy the corresponding products with lower intensity compared to RevCred. As online shop operators and manufacturers alike are primarily interested in increasing their sales, we thus rather focus on RevCred. In the same vein, Baek et al. (2012, p. 99) summarized that "the most important factor in eWOM adoption is information credibility", which is why online retailers should provide credible OCRs to ensure long-term success. In contrast to review helpfulness (frequently understood as voting judgments for each review), RevCred neither suffers from the winner circle bias nor the early bird bias within eWOM (Li et al., 2013).

Moreover, as the number of fake reviews increases, and thus, negatively affecting consumers' purchase intention (Zhang et al., 2016; Zhuang et al., 2018), exploring RevCred seems to be of particular importance. Besides, selecting RevCred as our dependent variable allows us to fill the recently claimed literature gap demanding intercultural research on RevCred (Thomas et al., 2019). As the antecedents of credibility (Obal & Kunz, 2016) and thus, credibility itself, are subject to different cultural perceptions and importance, RevCred ought to be examined within an intercultural comparison. While it has been shown that (offline) WOM affects customer evaluation dependent on cultural background (Schumann et al., 2010), and cultural to affect WOM (Lam et al., 2009), no other study has examined RevCred in the light of an intercultural comparison yet (see Table 1). From a practitioner's perspective, it can be assumed that the potential sales increase related with OCRs is of higher importance than the impact of RevCred alone. Therefore, we follow prior research (Cheung & Thadani, 2012; Thomas et al., 2019), enrich the currently sparse literature between eWOM and actual sales (Lin & Kalwani, 2018), and complement our model by integrating purchase intention (PI) to illustrate the impact of credible OCRs on PI. While more credible reviews are assumed to result in higher PI for consumers of both cultures, East Asians are considered to actively avoid contradictions and emphasize harmonic relations. Thus, not buying a product even though its reviews are perceived as highly credible is less likely to occur among East Asians. Additionally, Westerners analytic information processing might more likely lead to two separate evaluations: credibility of a review and the decision regarding a potential purchase of the corresponding product. Hence, one might expect:

H6: Review credibility has a stronger positive effect on purchase intention for East Asian consumers than for Western consumers.

Summarizing these prior findings, we derive a model that is established in literature (e.g., Cheung et al., 2012; Luo et al., 2015), but has not been examined in the light of an intercultural comparison and by viewing it through the lenses of the SCST (see Figure 1).

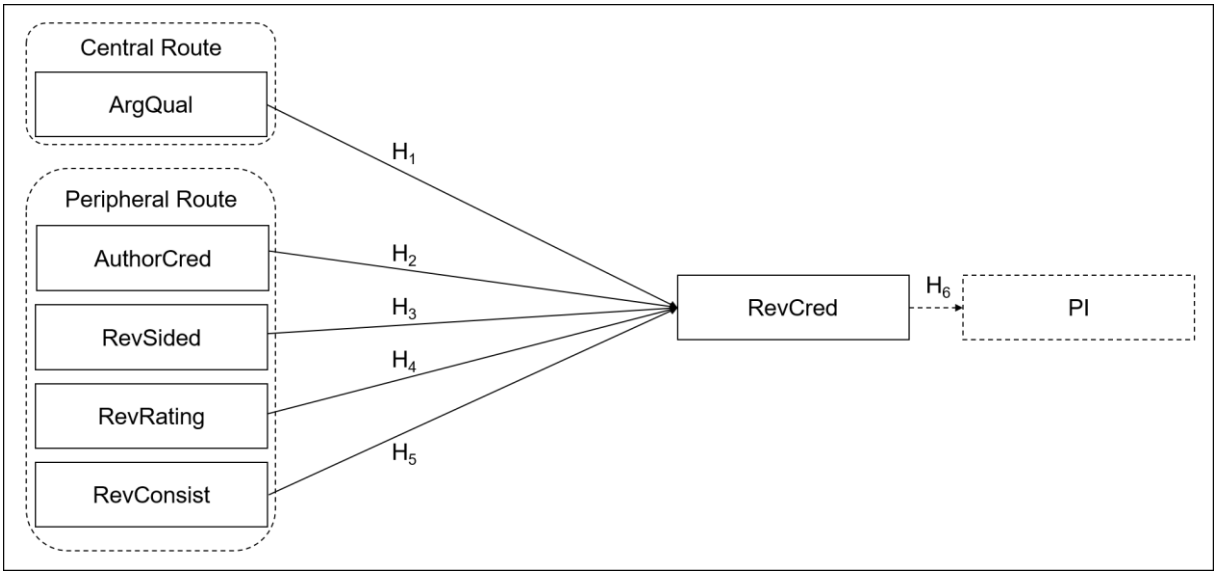

Figure 1: Established model about review credibility based on prior research without intercultural comparisons

4 Method

4.1 Questionnaire and measurement items

To measure the constructs and their relations, we developed an online questionnaire. To assess wording, clarity, appropriateness, and completeness, we pre-tested the questionnaire with five researchers and experienced participants (n=19). Only minor amendments were made. The final questionnaire consisted of three major sections. The first section comprised preliminary questions about online shopping frequency and asked about which product category respondents are most likely to read OCRs for (multiple selections possible).

Within the main part, the respondents first were exposed to one online review in their respective native language. In line with previous literature, the reviews were derived from a real online shop (Amazon.com), to create a realistic setting (Luo et al., 2015). To yield more generalizable insights and prevent product-specific as well as format-related biases, respondents faced the review based on four conditions (textual review; video-based review; digital camera; tablet) to which they were assigned randomly. As high-involvement products are related with a more extensive information search (inter alia, due to more expensive prices; Baek et al., 2012), we decided to use one review of a digital camera (Mudambi & Schuff, 2010; Obal & Kunz, 2016; Wang et al., 2019), as well as one review of a tablet (Li et al., 2019; Risselada et al., 2018), because they have already been applied in similar investigations in the OCR

research. Following extant research, the number of word comprised approximately 400 words (Xu et al., 2015), and consisted of both pros and cons about the product (Cheung et al., 2009). Any information about the product's price or brand were avoided to prevent any related biases. Secondly, respondents evaluated the constructs based on several items. The constructs' items were adopted from previous literature (see Table 3). The last part inquired about the respondents' demographics.

Table 3: Measurement items

Construct	Items	Source
Argument Quality	1: Arguments of this online review were convincing. 2: Arguments of this online review were persuasive. 3: Arguments of this online review were strong.	(Fang, 2014)
Author Credibility	1: The reviewer was credible. 2: The reviewer was experienced. 3: The reviewer was trustworthy. 4: The reviewer was reliable.	(Filieri, 2015)
Review Sidedness	1: This review includes both pros and cons of the discussed target. 2: This review includes both positive and negative comments.	(Luo et al., 2015)
Review Consistency	1: The comments made in this review are consistent with other reviews I have read in the past. 2: The comments made in this review are similar to other reviews I have read previously. 3: The comments made in this review match with other reviews I have read before.	Adapted from (Luo et al., 2015)
Review Rating	1: Based on the review rating, this review was found to be favorable by previous readers. 2: Based on the review rating, this review was highly rated by previous readers. 3: According to the review rating level, this review was good.	(Luo et al., 2015); (Cheung et al., 2009)
Review Credibility	1: I think this review is believable. 2: I think this review is factual. 3: I think this review is accurate. 4: I think this review is credible.	(Cheung et al., 2012)
Purchase Intention	1: Based on this product description, I would recommend my friend to buy this product. 2: Based on this product description, I will purchase this product next time I need a product like this. 3: Based on this product description, it is likely that I will buy this product. 4: Based on this product description, I will definitely try this product.	(Jiang & Benbasat, 2007)

4.2 Data collection and descriptive statistics

To collect data for East Asians, we focused on China's consumers, as they represent the biggest e-commerce market worldwide (Akram et al., 2018). We decided to gather consumer data from Germany for Westerners and extend the geographical scope of extant OCR literature, primarily drawing on American consumers as Westerners. The target group of consumers is 'Generation Y' (aged between 20 and

39 years), as this segment is among the most important online shopper segments (Ladhari et al., 2019) and is known for utilizing OCRs (Lee & Hong, 2019). To prevent biases in the sampling approach and yield comparable samples, we used a well-established panel provider (Kantar Group). Hence, we acquired samples spread representatively across both countries with equal shares of males and females exhibiting online shopping affinity.

In total, we collected 616 responses from Chinese consumers. However, we excluded straightliners (n=5), speeders (n=19), and those with incorrect control questions (n=7). Among Germans, we gathered 591 completes and screened the sample for the same criteria (straightliners n=15; speeders n=7; control question incorrect n=17). Accordingly, the final samples consist of 585 Chinese and 552 Germans. The German sample consists of 50% males and is on average 31 years old (SD=5.67). The Chinese sample contains 49% males and is, on average, also 31 years old (SD=4.66). Table 4 provides a detailed overview of further descriptive statistics.

Table 4: Descriptive statistics

Demographics		**German sample (n=552)**		**Chinese sample (n=585)**	
		Frequency	**Proportion (in %)**	**Frequency**	**Proportion (in %)**
Gender	Female	276	48.4	299	51.1
	Male	274	48.1	286	48.9
	Diverse	2	0.4	0	0
Age	20-24 years	99	17.9	49	8.4
	25-29 years	115	20.9	138	23.6
	30-34 years	164	29.7	236	40.3
	35-39 years	174	31.5	162	27.7
Education	Without qualification	1	0.2	1	0.2
	Primary education	29	5.3	3	0.5
	Secondary School level I	84	15.2	7	1.2
	High School degree	137	24.7	419	71.5
	Technical education	134	24.3	12	2.1
	Bachelor	80	14.5	77	13.2
	Master	75	13.6	59	10.1
	PhD	7	1.3	4	0.7
	Other	5	0.9	3	0.5
Online shopping frequency	≥ 8 times per month	64	11.2	220	37.6
	5-7 times per month	100	17.5	184	31.5
	2-4 times per month	242	42.5	165	28.2
	≤ 1 times per month	146	25.6	16	2.7
Product category in which OCRs are most likely to be read*	Apparel & shoes	266	48.2	493	84.3
	Consumer electronics	412	74.6	462	79.0
	Furniture & decoration	146	26.5	266	45.5
	Household appliances	283	51.3	389	66.5
	Books & audio books	151	27.4	165	28.2
	Sports equipment & leisure	152	27.5	372	63.6
	Movies & music	139	25.2	148	25.3
	Others	48	8.7	22	3.8

Note: * = Multiple choice.

5 Results

5.1 Results: established model

5.1.1 German sample

The model is analyzed for the German and the Chinese sample. Partial least squares structural equation modeling (PLS-SEM) with SmartPLS 3.3 (Ringle et al., 2015) is used, employing a path weighting scheme with 300 maximum iterations and a stop criterion of 10^{-7}. In both cases, the algorithm converged after five iterations. Model assessment begins with the outer, i.e., measurement, model. Starting with the German sample, outer loadings are checked. All indicators meet the threshold of 0.708. Construct reliability and validity are evaluated drawing on Cronbach's Alpha, Composite Reliability, and average variance extracted (AVE) (Hair et al., 2011; Hair et al., 2019). Table 5 summarizes the findings, indicating sufficient values for all latent variables.

Table 5: Construct assessment for the German sample

Construct	Cronbach's Alpha	Composite Reliability	AVE
ArgQual	0.856	0.912	0.776
AuthorCred	0.899	0.937	0.832
RevConsist	0.832	0.898	0.746
RevRating	0.878	0.925	0.803
PI	0.928	0.949	0.822
RevCred	0.895	0.928	0.763
RevSided	0.755	0.890	0.802

Note: ArgQual = Argument Quality, AuthorCred = Author Credibility, AVE = Average Variance Extracted, RevConsist = Review Consistency, RevCred = Review Credibility, RevRating = Review Rating, RevSided = Review Sidedness, PI = Purchase Intention.

Next, discriminant validity is assessed using a triad of the Fornell-Larcker criterion, an evaluation of cross-loadings, and the heterotrait-monotrait ratio (HTMT) (Henseler et al., 2015). Both Fornell-Larcker and cross-loadings confirm discriminant validity, as displayed in Table A.1 and Table A.2 in Appendix A. HTMT yields a slightly high value of 0.884 for the pair of ArgQual / RevCred. This potential issue is resolved by a bootstrapping procedure with 10,000 draws, calculating HTMTinference. The 95 percent confidence interval ranges from 0.767 to 0.888, far off the null value of 1. Hence, discriminant validity for ArgQual / RevCred could be established (Henseler et al., 2015). HTMT values are provided in Table 6.

Table 6: HTMT ratios for the German sample

	ArgQual	AuthorCred	RevConsist	RevRating	PI	RevCred	RevSided
ArgQual							
AuthorCred	0.846						
RevConsist	0.568	0.575					
RevRating	0.706	0.737	0.588				
PI	0.651	0.582	0.578	0.503			
RevCred	0.835	0.884	0.613	0.640	0.604		
RevSided	0.508	0.545	0.322	0.467	0.239	0.535	

Note: ArgQual = Argument Quality, AuthorCred = Author Credibility, RevConsist = Review Consistency, RevCred = Review Credibility, RevRating = Review Rating, RevSided = Review Sidedness, PI = Purchase Intention.

After the measurement model assessment, we move on to the inner, i.e., structural, model. As a first step, potential collinearity issues are checked, drawing on variance inflation factors (VIFs). VIF values range between 1.000 and 2.746, indicating an absence of issues (Hair et al., 2019). Consequently, the results from the structural model can be interpreted meaningfully. The coefficient of determination is used to assess the model's explanatory power. PI exhibits R^2 and adjusted R^2 values of 0.310 and 0.309, respectively. RevCred yields values of 0.699 and 0.697. A blindfolding procedure was employed to derive Q^2 values for an assessment of predictive ability. A Q^2 of 0.249 is calculated for PI, and a value of 0.525 for 0.525, indicating predictive relevance. Table 7 shows hypotheses testing results, carried out using bootstrapping with 10,000 draws (Streukens & Leroi-Werelds, 2016).

Table 7: Hypotheses testing for the German sample

Hypothesis				Path coefficient (effect size f^2)	95 percent CI (BCa)	T-value (p-value)
H1	ArgQual	→	RevCred	0.270 (0.100)	[0.172, 0.367]	5.470 (< 0.001)
H2	AuthorCred	→	RevCred	0.513 (0.320)	[0.408, 0.616]	9.663 (< 0.001)
H3	RevSided	→	RevCred	0.075 (0.015)	[0.019, 0.130]	2.624 (0.008)
H4	RevRating	→	RevCred	-0.034 (0.002)	[-0.106, 0.044]	0.891 (0.373)
H5	RevConsist	→	RevCred	0.145 (0.047)	[0.081, 0.215]	4.249 (< 0.001)
H6	RevCred	→	PI	0.557 (0.450)	[0.480, 0.619]	16.020 (< 0.001)

Note: ArgQual = Argument Quality, AuthorCred = Author Credibility, BCa = bias-corrected and accelerated, CI = confidence interval, RevConsist = Review Consistency, RevCred = Review Credibility, RevRating = Review Rating, RevSided = Review Sidedness, PI = Purchase Intention.

Most hypotheses can be supported. No convincing evidence for an impact of RevRating on RevCred could be established. Regarding RevCred, the construct is most substantially affected by AuthorCred (path coefficient = 0.513, f^2 = 0.320), followed by ArgQual (path coefficient = 0.270, f^2 = 0.100). RevConsist, on the other hand, only yields a small effect on RevCred (path coefficient = 0.145, f^2 = 0.047). The impact of RevSided (path coefficient = 0.075, f^2 = 0.015) falls slightly short of the recommended threshold for a small effect. RevCred, in turn, yields a strong effect on PI (path coefficient = 0.557, f^2 = 0.450) and is found to be a good predictor (PI's R^2 value is 0.310, and Q^2 value is 0.249).

5.1.2 Chinese sample

An assessment of the outer loadings reveals that most values exceed the recommended threshold of 0.708, except for ArgQual4 yielding a loading of 0.687. However, the check of construct reliability and validity shows that all criteria are sufficient, and, as such, the indicator is maintained to ensure theoretical rigor. Table 8 summarizes the results.

Table 8: Construct assessment for the Chinese sample

Construct	Cronbach's Alpha	Composite Reliability	AVE
ArgQual	0.747	0.854	0.663
AuthorCred	0.872	0.921	0.796
RevConsist	0.874	0.922	0.797
RevRating	0.858	0.914	0.779
PI	0.934	0.953	0.835
RevCred	0.918	0.942	0.803
RevSided	0.792	0.906	0.828

Note: ArgQual = Argument Quality, AuthorCred = Author Credibility, AVE = Average Variance Extracted, RevConsist = Review Consistency, RevCred = Review Credibility, RevRating = Review Rating, RevSided = Review Sidedness, PI = Purchase Intention.

To evaluate discriminant validity, we draw on Fornell-Larcker, cross-loadings (provided in Table A.3 and Table A.4 in Appendix A), and HTMT once again. In contrast to the German sample, we find severe issues. For the Fornell-Larcker criterion, RevCred exceeds ArgQual's AVE square root. Cross-loadings reveal rather high values for the pairs of ArgQual and RevCred, as well as ArgQual and AuthorCred. HTMT corroborates these findings (see Table 9): critically high values are detected for ArgQual and AuthorCred (HTMT = 0.930), ArgQual and RevRating (HTMT = 0.902), ArgQual and RevCred (HTMT = 0.961), AuthorCred and RevRating (HTMT = 0.910), and AuthorCred and RevCred (HTMT = 0.929). This result seems devastating at first; however, the German sample confirms the measurement model and proves its applicability, and previous investigations have proven the model's applicability in other Western societies (Cheung et al., 2012; Thomas et al., 2019). Consequently, the question of the Chinese sample's results arises.

Table 9: HTMT ratios for the Chinese sample

	ArgQual	AuthorCred	RevConsist	RevRating	PI	RevCred	RevSided
ArgQual							
AuthorCred	0.930						
RevConsist	0.515	0.407					
RevRating	0.902	0.910	0.428				
PI	0.874	0.760	0.449	0.762			
RevCred	0.961	0.929	0.408	0.836	0.757		
RevSided	0.757	0.740	0.320	0.686	0.602	0.740	

Note: ArgQual = Argument Quality, AuthorCred = Author Credibility, RevConsist = Review Consistency, RevCred = Review Credibility, RevRating = Review Rating, RevSided = Review Sidedness, PI = Purchase Intention.

While these findings for the established research model might seem irritating at first glance, they validate the assumptions of SCST for East Asians. Accordingly, Chinese consumers consider AuthorCred, ArgQual, RevRating, and RevCred not as stand-alone constructs, but rather evaluate the review holistically by incorporating contextual factors and the relationship between the factors (Nisbett et al., 2001). In contrast, Westerners analyze each object individually (detached from its context and relationships to other constructs), try to categorize it, and thus, discriminant validity issues do not occur.

When taking a closer look at previous studies, which examined RevCred and incorporated the factors yielding in discriminant validity issues in our study, it becomes apparent that they either were conducted

among Westerners (Cheung et al., 2012; Thomas et al., 2019) or also indicate issues concerning discriminant validity (Cheung et al., 2009; Fang, 2014; Luo et al., 2014; Luo et al., 2015). More specifically, discriminant validity issues among East Asians are likely to arise between ArgQual and RevRating (Fang, 2014; Luo et al., 2015), AuthorCred and RevRating (Cheung et al., 2009; Luo et al., 2014; Luo et al., 2015), ArgQual and RevCred (Cheung et al., 2009; Fang, 2014; Luo et al., 2014; Luo et al., 2015), AuthorCred and RevCred (Cheung et al., 2009; Luo et al., 2015), RevRating and RevCred (Fang, 2014), as well as AuthorCred and ArgQual (Cheung et al., 2009). Since these studies were conducted before the more reliable HTMT criterion was established (Henseler et al., 2015), they report the Fornell-Larcker criterion only. However, using HTMT might have uncovered the absence of discriminant validity, as it more reliably detects discriminant validity problems than applying the Fornell-Larcker criterion (Henseler et al., 2015).

Following the assumption of the SCST, ArgQual, AuthorCred, and RevRating might not be perceived as independent constructs by the holistic East Asians, but rather their interplay is of higher importance compared to Westerners (Nisbett et al., 2001). Hence, the constructs ArgQual, AuthorCred, and RevRating are combined to yield one latent variable, as, contrary to the popular assumption, they cannot be integrated into a higher-order construct, as this construct's lower-order components still need to exhibit discriminant validity (Sarstedt et al., 2019). Regarding the previous discriminant validity issues, the newly composed variable is expected to be equivalent to RevCred. To test our assumption, we use a convergent validity approach that is commonly used to assess formative higher-order constructs and show that for the holistic Chinese culture, RevCred and a composite of ArgQual, AuthorCred, and RevRating are equivalent. Figure 2 displays the model configuration necessary for the evaluation. Confirmatory tetrad analysis (CTA-PLS) was used to verify that the left-hand construct's reflective specification is correct (Gudergan et al., 2008).

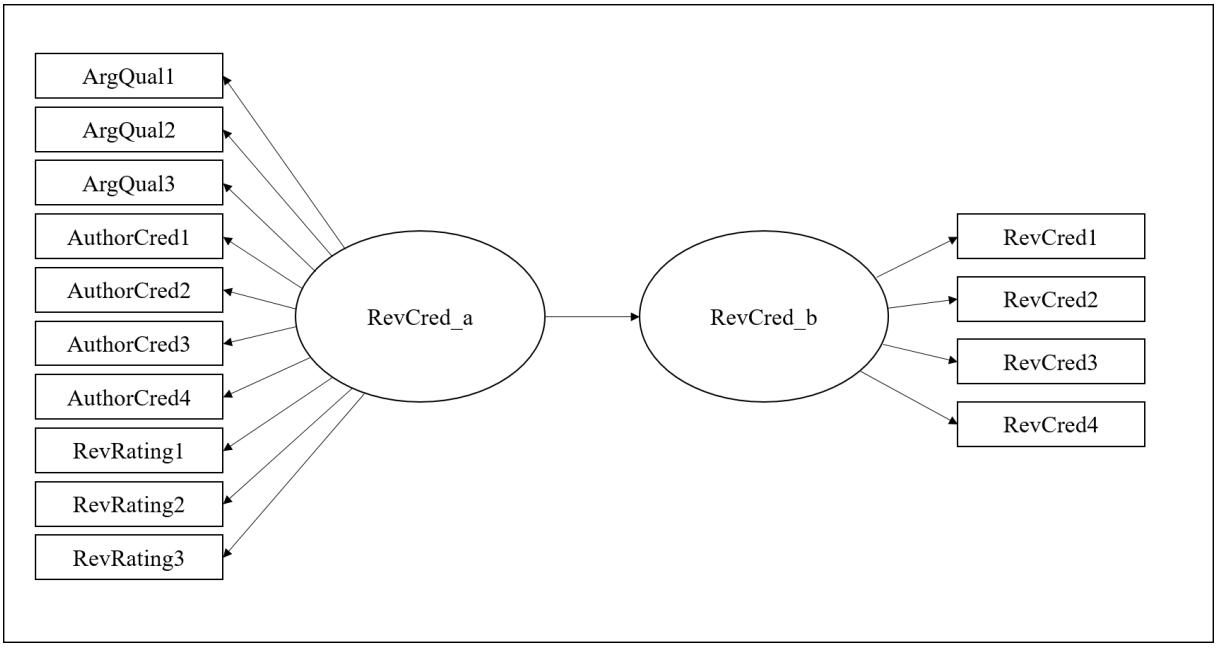

Figure 2: Equivalence assessment

Note: Latent variables are displayed as ellipses, manifest variables (indicators) are shown as rectangles. ArgQual = Argument Quality, AuthorCred = Author Credibility, RevCred = Review Credibility, RevRating = Review Rating.

The path coefficient between the integrated latent variable and RevCred is 0.849, which exceeds the recommended threshold of 0.8 for convergence by far. This value also indicates symmetric effects (Woodside, 2013), which we would demand for equivalent latent variables. The imposed effect is very strong ($f^2 = 3.318$), and the R^2 value for RevCred identified through its original indicators is 0.768. Consequently, we culturally adapt the structural model for the Chinese sample, consistent with its holistic cultural nature. The measurement model, due to parsimony, specifies RevCred using its four indicators instead of the pool of indicators stemming from ArgQual, AuthorCred, and RevRating. Figure 3 displays the adapted model.

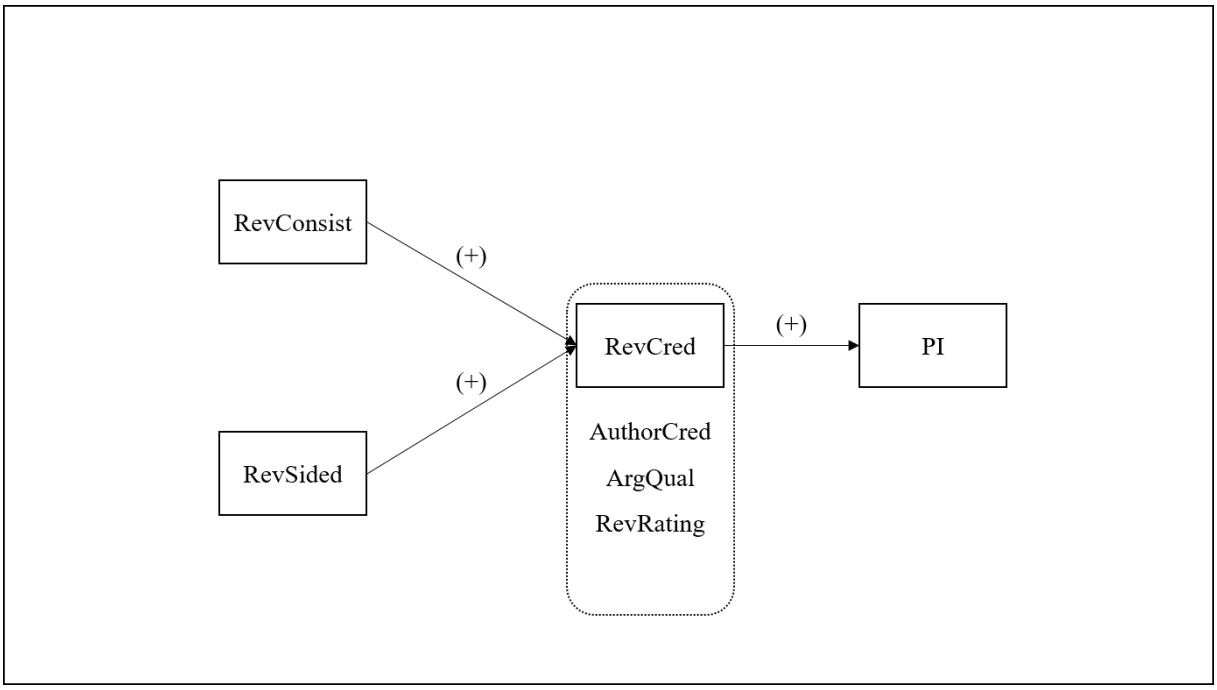

Figure 3: Culturally adapted model

Note: ArgQual = Argument Quality, AuthorCred = Author Credibility, RevConsist = Review Consistency, RevCred = Review Credibility, RevRating = Review Rating, RevSided = Review Sidedness, PI = Purchase Intention.

5.2 Results: culturally adapted models

The novel model is assessed from the ground up, starting with outer loadings, all of which exceed 0.708. Construct reliability and validity could be established, as shown in Table 10.

Table 10: Construct assessment for the adapted model

Construct	Cronbach's Alpha	Composite Reliability	AVE
RevConsist	0.874	0.922	0.797
PI	0.934	0.953	0.835
RevCred	0.918	0.942	0.803
RevSided	0.792	0.906	0.828

Note: RevConsist = Review Consistency, RevCred = Review Credibility, RevSided = Review Sidedness, PI = Purchase Intention.

The Fornell-Larcker criterion (Table B.1 in Appendix B), assessment of cross-loadings (Table B.2 in Appendix B), and HTMT (Table 11) corroborate the latent variables' discriminant validity.

Table 11: HTMT ratios for the adapted model

	RevConsist	PI	RevCred	RevSided
RevConsist				
PI	0.449			
RevCred	0.408	0.747		
RevSided	0.320	0.602	0.740	

Note: RevConsist = Review Consistency, RevCred = Review Credibility, RevSided = Review Sidedness, PI = Purchase Intention.

Moving on to the inner model, VIFs are checked, which are ranging between 1.000 and 1.077. Thus, collinearity issues can be assumed to be absent. R^2 values are 0.481 for PI and 0.442 for RevCred. Derived from a blindfolding procedure, PI yields a Q^2 value of 0.398, and RevCred a Q^2 of 0.353.

Table 12: Hypotheses testing for the Chinese sample

Hypothesis				Path coefficient (effect size f^2)	95 percent CI (BCa)	T-value (p-value)
H3	RevSided	→	RevCred	0.573 (0.548)	[0.500, 0.640]	16.006 (< 0.001)
H5	RevConsist	→	RevCred	0.217 (0.078)	[0.144, 0.292]	5.697 (< 0.001)
H6	RevCred	→	PI	0.694 (0.927)	[0.621, 0.751]	21.047 (< 0.001)

Note: BCa = bias-corrected and accelerated, CI = confidence interval, RevConsist = Review Consistency, RevCred = Review Credibility, RevSided = Review Sidedness, PI = Purchase Intention.

The adapted model yields striking effects of RevSided on RevCred, and RevCred on PI. RevConsist exhibits a comparatively smaller impact with a path coefficient of 0.217 and an f^2 value of 0.078 (see Table 12).

6 Discussion

Reflecting on extant OCR literature and the claims to explore OCRs in the context of intercultural comparisons, we intended to analyze how Westerners and East Asians differ in their perceptions of credible reviews implying identical models, which would allow a direct comparison. However, based on considerations founded on the SCST, and by contrasting prior RevCred research conducted among Westerners or East Asians, we revamped our research model for Chinese consumers. Its adapted form appears to fit the extant literature better and provides a vivid illustration of the differences between analytic and holistic thinkers.

For both samples, a strong impact of RevCred is imposed on PI, indicating that consumers indeed integrate this information into their opinion formation. The effect was strong for Germans and Chinese alike, but even more substantial for the holistic thinkers ($f^2 = 0.927$). RevRating did not yield a striking impact for the German sample, which appears rather surprising. As analytical thinkers, we would assume that German consumers include information about the general reputation of a review to gain additional data on its reliability. However, this does not seem to be the case.

6.1 Theoretical contribution

Our investigation emphasizes the need to culturally adapt model settings in case of varying cognitive processing patterns among respondents based on the SCST. Accordingly, the more holistic Chinese consumers perceived ArgQual, RevRating, and AuthorCred as one driver constituting RevCred, whereas more analytic Westerners strongly separate those three constructs and evaluate each antecedent independently, yielding diverse impact sizes. In contrast to prior literature building upon the ELM as a theoretical framework for examining online reviews (Cheung et al., 2012; Filieri et al., 2018; Luo et al., 2015), we contribute to the literature by empirically demonstrating and theoretically explaining (Nisbett et al., 2001) that such models cannot be applied uniformly across cultures, but need to be adapted contingent on respondents' cultural roots. Therefore, the clear distinction between the central and the peripheral route suggested by the ELM did not hold true among Chinese consumers facing OCRs. A potential explanation may be found in the circumstances of how, when, and by whom the ELM was developed. When ELM was introduced, the two American researchers incorporated motivation and ability to process information, as well as the nature of the message's arguments and nature of the advocacy into their model (Petty & Cacioppo, 1981); however, intercultural generalizability was not a major concern by that point of time.

While literature exploring OCRs mushroomed in the last decade, none of the studies concerning the credibility of reviews (Cheung et al., 2009; Cheung et al., 2012; Fang, 2014; Luo et al., 2014; Luo et al., 2015; Thomas et al., 2019) examined discriminant validity between constructs based on the HTMT criterion, which is more reliable in uncovering discriminant validity issues compared to the Fornell-Larcker criterion and cross-loadings (Henseler et al., 2015). Holistically scrutinizing previous research related to RevCred dependent on where (Western or East Asian countries) those studies were conducted, we identify objectionable high cross-loadings/Fornell-Larcker assessments among studies from East Asian countries. Thus, no other study has shed light on the necessity to culturally adapt research models when surveying East Asians to yield valid results and prevent discriminant validity issues.

Apart from that, we contribute to literature by empirically validating the assumptions of the SCST (Nisbett et al., 2001) based on two comparably large samples representatively spread over China and Germany in the context of OCRs. Hence, we prove that the Westerners are more likely to analytically break down online reviews into their subcomponents (e.g., the argument made, its rating, and the like), whereas East Asians holistically perceive RevCred to be composed of ArgQual, RevRating, and AuthorCred, and their relationships. Moreover, building upon an alternative framework for cultural differences enabled us to contemplate the cognitive perception of OCRs from a different angle. We thereby emphasize the need to explore cross-cultural differences with perspectives beyond the viewpoints of Hofstede's cultural dimension to analyze and understand disparities sufficiently.

Besides, we add to previous research by being the first to examine OCR's credibility in the light of an intercultural comparison. As Luo et al. (2014) analyzed information credibility comparing two Chinese online forums highlighting intra-cultural differences, recent papers claimed research on intercultural

comparisons about OCRs (Filieri et al., 2018; Lin et al., 2019), especially regarding RevCred (Thomas et al., 2019). We thus filled this research gap and revealed that reviews including pros and cons yield a substantial effect on the credibility of OCRs among East Asians, whereas this characteristic is of minor relevance among Westerners. While this confirms earlier findings among Westerners (Cheung et al., 2012), it contradicts studies among East Asians (Cheung et al., 2009; Luo et al., 2014; Luo et al., 2015) that did not consider HTMT as a criterion for assessing discriminant validity and thus, did not culturally adapt their research models accordingly. Similar to other research examining the impact of the reviewers' expertise among Westerners (Thomas et al., 2019), AuthorCred evinced a very strong impact on RevCred among Germans. Besides AuthorCred, ArgQual represents the strongest effect on RevCred among Germans, which verifies the assumptions inherent to SCST, as Westerners rather focus on the content of a review itself regardless of other contextual factors.

6.2 Practical implications

Apart from our theoretical contribution, this study's results allow practical implications for researchers and practitioners, likewise. From a researchers' perspective, proving that RevCred is equivalent to the composition of ArgQual, AuthorCred, and RevRating among holistic East Asian consumers allows future investigations to omit including items for four different constructs, and, instead, incorporate RevCred only. This shortens questionnaires examining RevCred in OCRs enormously, and thus, prevents (or at least attenuates) respondent fatigue.

Moreover, our findings suggest that online shop operators in East Asia implement various OCR features into their user interfaces to allow consumers to incorporate contextual factors besides the review text itself. Furthermore, they might restructure the input mask for reviewers by providing a pro's and a separate con's section, as Chinese consumers emphasize the importance of RevSided. Additionally, evincing at least one positive as well as one negative aspect about the review's object could be incentivized (e.g., receiving a discount voucher for the next purchase). In contrast to online shops in East Asia, Western managers should consider highlighting the role of review authors, as it affects a review's credibility the most besides the review text (arguments) itself. Therefore, they might integrate an additional star rating for authors providing helpful reviews (ranging from one to five) or some kind of categorization indicating the experience and credibility of authors, such as "proficient reviewer" (level 1), "top reviewer" (level 2), "excellent reviewer" (level 3) for providing reviews that received, for instance, ten, 50 or 100 helpfulness votes.

6.3 Limitations and future research

As our study focused on high-involvement products only due to higher search costs and financial risk (which could also be categorized as search goods), it needs to be questioned to what extent our findings may be replicated for experience goods or low-involvement products, as OCR research indicates differences based on product type (Baek et al., 2012; Xu et al., 2015). Thus, future research could focus on intercultural comparison regarding OCRs of experience goods or low-involvement products.

Apart from that, we extended the geographical scope of OCR research by focusing on German (instead of the predominantly analyzed American) citizens as Westerners and Chinese consumers representing the East Asians. While according to the SCST, all Westerners are assumed to process information (and thus OCRs) rather analytically, it still needs to be further examined whether our findings can be confirmed for Westerners from other countries, as well as whether they can be confirmed for other East Asian consumers. Similarly, intra-cultural differences were out of scope in this study, whereas research indicates disparities concerning digital consumer engagement (Thompson & Brouthers, 2021).

7 Conclusion

As the number of articles examining OCRs in the light of intercultural comparisons is still scarce, and thus, research demands further investigations to explore the field (Filieri et al., 2018; Lee & Hong, 2019; Lin et al., 2019), we intended analyzing how Westerners and Asians differ in their perception of credible online reviews. Illustrating recent OCR studies that incorporate intercultural comparison, we found that the vast majority of research refers to Hofstede's cultural dimensions, even though this framework faced a lot of criticism (Hong et al., 2016; Tang, 2017). Hence, we choose the SCST as an alternative theoretical framework capable of elucidating how consumers from different cultures are cognitively processing information. Building upon an established research model from literature, the results proved that the model is adequate within the German sample, whereas discriminant validity issues arose among Chinese consumers. Reflecting on the assumptions inherent to SCST and analyzing prior OCR literature based on the cultural background of the corresponding samples, we were able to explain theoretically and empirically validate that East Asians perceive several variables holistically when evaluating OCRs' credibility.

Appendix A: Measurement model evaluation of established model

Table A.1: Assessment of the Fornell-Larcker criterion for the German sample

	ArgQual	AuthorCred	RevConsist	RevRating	PI	RevCred	RevSided
ArgQual	0.881						
AuthorCred	0.742	0.912					
RevConsist	0.484	0.510	0.864				
RevRating	0.612	0.653	0.510	0.896			
PI	0.586	0.541	0.517	0.458	0.907		
RevCred	0.731	0.799	0.540	0.569	0.557	0.873	
RevSided	0.411	0.448	0.262	0.383	0.202	0.441	0.896

Note: ArgQual = Argument Quality, AuthorCred = Author Credibility, RevConsist = Review Consistency, RevCred = Review Credibility, RevRating = Review Rating, RevSided = Review Sidedness, PI = Purchase Intention.

Table A.2: Assessment of cross-loadings for the German sample

	ArgQual	AuthorCred	RevConsist	RevCred	RevRating	PI	RevSided
ArgQual_1	**0.898**	0.653	0.446	0.656	0.561	0.572	0.367
ArgQual_2	**0.877**	0.662	0.390	0.636	0.517	0.447	0.388
ArgQual_4	**0.867**	0.645	0.444	0.640	0.539	0.527	0.332
AuthorCred_2	0.644	**0.854**	0.381	0.625	0.591	0.394	0.432
AuthorCred_3	0.707	**0.942**	0.499	0.786	0.603	0.543	0.407
AuthorCred_4	0.679	**0.938**	**0.505**	0.762	0.598	0.529	0.397
RevConsist _1	0.457	0.508	**0.872**	0.538	0.503	0.499	0.282
RevConsist _2	0.381	0.370	**0.851**	0.399	0.403	0.397	0.200
RevConsist _3	0.407	0.425	**0.869**	0.442	0.399	0.431	0.183
RevCred_1	0.636	0.698	0.519	**0.906**	0.532	0.517	0.399
RevCred_2	0.585	0.634	0.429	**0.868**	0.435	0.457	0.352
RevCred_3	0.639	0.687	0.414	**0.790**	0.481	0.437	0.388
RevCred_4	0.689	0.764	0.515	**0.923**	0.532	0.528	0.400
RevRating _1	0.567	0.591	0.467	0.521	**0.894**	0.396	0.384
RevRating _2	0.536	0.592	0.465	0.518	**0.906**	0.407	0.322
RevRating _3	0.543	0.574	0.438	0.489	**0.889**	0.430	0.324
PI_1	0.600	0.543	0.511	0.564	0.486	**0.895**	0.215
PI_2	0.520	0.492	0.458	0.490	0.391	**0.926**	0.177
PI_3	0.522	0.481	0.472	0.517	0.419	**0.923**	0.176
PI_4	0.466	0.432	0.423	0.431	0.349	**0.883**	0.158
RevSided_1	0.417	0.442	0.253	0.419	0.387	0.191	**0.910**
RevSided_2	0.315	0.357	0.214	0.369	0.295	0.171	**0.882**

Note: Indicator loadings on their assigned constructs are highlighted in bold. ArgQual = Argument Quality, AuthorCred = Author Credibility, RevConsist = Review Consistency, RevCred = Review Credibility, RevRating = Review Rating, RevSided = Review Sidedness, PI = Purchase Intention.

Table A.3: Assessment of the Fornell-Larcker criterion for the Chinese Sample

	ArgQual	AuthorCred	RevConsist	RevRating	PI	RevCred	RevSided
ArgQual	0.814						
AuthorCred	0.775	0.892					
RevConsist	0.408	0.363	0.893				
RevRating	0.741	0.788	0.375	0.883			
PI	0.739	0.689	0.408	0.683	0.914		
RevCred	0.820	0.833	0.370	0.742	0.693	0.896	
RevSided	0.595	0.614	0.268	0.565	0.518	0.631	0.919

Note: ArgQual = Argument Quality, AuthorCred = Author Credibility, RevConsist = Review Consistency, RevCred = Review Credibility, RevRating = Review Rating, RevSided = Review Sidedness, PI = Purchase Intention.

Table A.4: Assessment of cross-loadings for the Chinese Sample

	ArgQual	AuthorCred	RevConsist	RevCred	RevRating	PI	RevSided
ArgQual_1	**0.882**	0.772	0.374	0.803	0.714	0.695	0.581
ArgQual_2	**0.860**	0.628	0.259	0.677	0.614	0.583	0.464
ArgQual_4	**0.687**	0.437	0.390	0.466	0.438	0.507	0.379
AuthorCred_2	0.646	**0.840**	0.260	0.675	0.656	0.533	0.529
AuthorCred_3	0.722	**0.919**	0.357	0.776	0.716	0.660	0.557
AuthorCred_4	0.706	**0.916**	0.347	0.774	0.735	0.645	0.558
RevConsist _1	0.395	0.363	**0.905**	0.369	0.388	0.384	0.278
RevConsist_2	0.357	0.332	**0.883**	0.328	0.324	0.353	0.204
RevConsist_3	0.335	0.264	**0.891**	0.284	0.281	0.351	0.230
RevCred_1	0.747	0.750	0.375	**0.906**	0.701	0.641	0.569
RevCred_2	0.731	0.728	0.324	**0.884**	0.661	0.595	0.539
RevCred_3	0.725	0.736	0.304	**0.885**	0.653	0.621	0.568
RevCred_4	0.736	0.771	0.323	**0.910**	0.646	0.629	0.587
RevRating _1	0.670	0.692	0.339	0.656	**0.891**	0.596	0.503
RevRating _2	0.632	0.691	0.330	0.633	**0.869**	0.606	0.496
RevRating _3	0.661	0.704	0.325	0.675	**0.887**	0.607	0.497
PI_1	0.696	0.661	0.410	0.676	0.648	**0.915**	0.487
PI_2	0.676	0.619	0.370	0.620	0.621	**0.910**	0.445
PI_3	0.673	0.631	0.351	0.628	0.626	**0.919**	0.472
PI_4	0.652	0.604	0.356	0.607	0.598	**0.909**	0.488
RevSided_1	0.568	0.553	0.234	0.586	0.520	0.488	**0.914**
RevSided_2	0.513	0.564	0.254	0.563	0.508	0.454	**0.906**

Note: Indicator loadings on their assigned constructs are highlighted in bold. ArgQual = Argument Quality, AuthorCred = Author Credibility, RevConsist = Review Consistency, RevCred = Review Credibility, RevRating = Review Rating, RevSided = Review Sidedness, PI = Purchase Intention.

Appendix B: Measurement model evaluation of culturally adapted model

Table B.1: Assessment of the Fornell-Larcker criterion

	RevConsist	PI	RevCred	RevSided
RevConsist	0.893			
PI	0.408	0.914		
RevCred	0.370	0.694	0.896	
RevSided	0.268	0.518	0.632	0.910

Note: RevConsist = Review Consistency, RevCred = Review Credibility, RevSided = Review Sidedness, PI = Purchase Intention.

Table B.2: Assessment of cross-loadings

	RevConsist	RevCred	PI	RevSided
RevConsist _1	**0.905**	0.369	0.385	0.278
RevConsist_2	**0.883**	0.328	0.354	0.204
RevConsist_3	**0.891**	0.284	0.351	0.230
RevCred_1	0.375	**0.907**	0.641	0.569
RevCred_2	0.324	**0.882**	0.595	0.539
RevCred_3	0.304	**0.885**	0.621	0.568
RevCred_4	0.323	**0.910**	0.629	0.587
PI_1	0.410	0.676	**0.915**	0.487
PI_2	0.370	0.620	**0.910**	0.445
PI_3	0.351	0.628	**0.919**	0.472
PI_4	0.356	0.607	**0.909**	0.488
RevSided_1	0.234	0.586	0.488	**0.914**
RevSided_2	0.254	0.563	0.454	**0.906**

Note: Indicator loadings on their assigned constructs are highlighted in bold. RevConsist = Review Consistency, RevCred = Review Credibility, RevSided = Review Sidedness, PI = Purchase Intention.

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4 Conclusion

Summarizing the key takeaways of the six papers outlined, this chapter aims at answering the research questions, highlighting the new insights gained, and deriving practical implications. Starting off with the oldest extrinsic information cue of interest and thus, focusing on RQ1.1, paper #1 empirically demonstrates that in an e-commerce context the country of origin effect seems to be absent for both high- and low-involvement products. While the three pre-connected studies effectively triggered a favorable country of origin image of the German products among Chinese consumers and enabled minimizing/preventing potential priming biases in the main study, the preference towards the German products fades when controlling for brand attitude and analyzing the results based on COI stated. Dependent on which literature stream in country of origin research one is focusing on, this study provides the novel contribution that the country of origin effect seems to be non-existent, especially in e-commerce and among Chinese consumers. Moreover, no other study has analyzed the implicit facets of the country of origin effect in the e-commerce context, which allows a more complete picture on impact factors for purchasing (Diamantopoulos et al., 2017) and actually might depict the country of origin effect in a more accurate manner by measuring it non-saliently. One practical implication lies in revealing those product categories Chinese consumers preferably buy from German companies as indicated by one of the three pre-connected studies. Furthermore, since the country of origin effect seems to be absent in e-commerce, whereas the importance of brands dominates, companies should rather focus on building a strong brand reputation and might consider pushing other extrinsic information cues, such as online customer reviews.

Taking up this implication, paper #2 evinced online customer reviews to be more relevant among Chinese consumers than the country-of-manufacture of products. While both online customer reviews and country-of-manufacture are of minor importance to Chinese and German consumers when shopping online, method of payments, warranty options and contact possibilities represent main drivers for an online purchase. Apart from examining the importance of online customer reviews and country-of-manufacture, paper #2 answers RQ2 by demonstrating ACBC's advantages and disadvantages compared to its antecedent CBC. It is shown that ACBC takes approximately 50% more time for completion amounting to eleven minutes, whereas summarizing extant literature indicates respondents to perceive the ACBC with higher overall enjoyment and pleasure. Moreover, ACBC is better suited when using smaller samples, and dropout rates were found to be comparably small. By implementing the BYO- and Screening-sections, ACBC allows focusing more precisely on respondents' individual choice set and takes into account non-compensatory (conjunctive and disjunctive) decision heuristics. Concerning the latter one, disjunctive heuristics were more often applied than conjunctive ones. Especially in more complex decision environments, ACBC seems to be more appropriate than CBC experiments and allows gaining additional information, such as identification of the ideal (product) concept, as well as must-have and unacceptable features. While some studies dealing with CBC vs. ACBC comparisons exist,

the vast majority is somehow related to the market leader for conjoint software Sawtooth Software, which might bias the results. First insights from independent researchers indicate ACBC to perform better than CBC regarding predictive validity (Wackershauser et al., 2017). However, more research in this field is needed to yield an accurate, non-biased picture of ACBC's potential superiority compared with CBC. From a practitioner's point of view, using one method or the other depends on the budget available, the intended length of the questionnaire (since ACBC requires more time for completion), the complexity of the purchase decision to be illustrated, and the amount of information needed (e.g., including must-have features).

Similar to paper #2, paper #3 contains a methodological contribution concerning ACBC. Making use of ACBC's 'summed price' (individual surcharges per attribute level) approach and including the Calibration section, it is indicated that especially the latter one allows a more realistic WTP estimation. Taking into account the data from the Calibration section seems to attenuate the bias (O'Donnell & Evers, 2019) related to incorporating choice task information only. Additionally, ACBC seems to capture the buyer decision process more holistically, and thus, more realistically. ACBC covers the alternative evaluation (rather non-compensatory heuristics) and the purchase stage (rather compensatory), whereby heuristics applied vary between stages. In contrast, CBC focuses on the purchase stage only and displays alternatives which might actually have been screened out in the alternative evaluation stage. Apart from that, paper #3 represents the first study to measure WTP using an ACBC in the context of sustainable clothing, whereby ACBC is assumed to result in more realistic results. Particularly in the context of purchasing sustainable clothing online, various impact factors should be considered holistically, which is done by using an ACBC. Answering RQ1.2, quality seals and country-of-manufacture represent driving forces only among consumers with a very green orientation. Depending on consumers' greenness, they are among the top 3-4 impact factors besides price and materials/design. While country of origin with its implicit facet seems not to be a driving force when purchasing household appliances or dairy products online (paper #1), the importance of its initial notation country-of-manufacture largely depends on consumers' greenness when exposed to online purchase decisions concerning sustainable clothing. For less green consumers, country-of-manufacture is of minor importance, which matches findings from paper #1. The insights gained allow various practical implications, for instance how to price the surcharges for different sustainability materials, since these were derived from a booklet with real market prices from one of the experts and then evaluated by consumers as one part of the product. Moreover, the results suggest sustainable clothing companies to address outdoor sportspeople and women, since they tend to be receptive for paying higher prices for sustainable clothing (e.g., for quality seals or country-of-manufacture in Germany).

Linking to paper #3, paper #4 is also focusing on German/Asian country-of-manufacture and quality seals, whereas the latter one is examined in more depth and between consumers from different generational cohorts. While consumers from Generation Z appeared to put more emphasis on sustainability aspects when purchasing clothing online than those from Generation X, notable difference evinces within each generation. Besides gender, the ecological and social sustainability orientation as predictors for such differences, a k-means clustering revealed two more homogeneous segments within each generational cohort. One is largely influenced by price, whereas the other one emphasizes design and sustainability aspects. Answering RQ1.3, country-of-manufacture seems to be almost equally important for Generation X and Z representing the third most important driver for purchasing fashion online (subsequent to price and design). The importance of quality seals among Generation Z and X depends on the type of QS. Generation Z is focusing significantly more on social labels compared to Generation X, while eco-labels evince to be equally important, and both quality seals are less important than the country-of-manufacture. However, one needs to be aware of the before-mentioned within-generational differences. Hereby, paper #4 represents the first study to examine cross-generational differences in the sustainability context by applying a choice experiment, which allows solving issues related to (Likert) scale item investigations by considering purchase decisions holistically including the relevant trade-off aspects. Moreover, paper #4 takes up the postulation to explore latent sub-segments' characteristics when exposed to different quality seals (Sarti et al., 2018), as well as the need for a clear differentiation between different sustainability quality seals (Janßen & Langen, 2017; Reimers & Hoffmann, 2019). Addressing the latter call enabled uncovering massive differences in the importance of social sustainability quality seals between the generations of interest, whereas eco-labels were equally relevant. From a practitioner's point of view, companies targeting Generation Z should highlight the usage of social sustainability quality seals (if applicable), whereas for Generation X the materials used could be emphasized. While Generation Z revealed to be less heterogenic than Generation X, companies selling sustainable fashion and are concentrating on the latter group might target women in particular, since they tend to put more emphasis on sustainability aspects and are willing to pay more for such products.

Paper #5 demonstrated that Chinese perceive online customer reviews consisting of videos as more credible than textual ones when focusing on the dependent variable only, whereas no differences evinced among Germans. In contrast to Xu et al. (2015), the effect of video online customer reviews was examined in relation to other contextual drivers (review consistency; review sidedness; etc.), as part of an intercultural comparison. While the results found among American students in the previous study were verified for Chinese consumers of Generation Y, they were not for Germans. Furthermore, it was shown that the argument quality of online customer reviews is increased for video reviews for some specific consumer segments, which vary by culture. Apart from these insights, intercultural differences were found (effect of review consistency on review credibility, and review credibility on purchase intention, and review rating on review credibility) and explained in the paper. The findings' novelty lies (inter alia)

in being the first study to examine online customer reviews' review credibility in an intercultural comparison as well as the first to show how different presentation formats affect review credibility and purchase intention in relation to other online customer review components. Additionally, no other study has explored how different presentation formats impact review credibility between consumers yielding different cultural backgrounds. Answering RQ1.4, video online customer reviews led to an increase in perceived review credibility primarily among Chinese, whereas only for one specific segment among Germans videos enhanced argument quality's impact on review credibility. The insights gained in paper #5 provide fruitful practical implications, such as especially Chinese online shop operators should offer the opportunity to upload video online customer reviews and potentially should even incentivize those. Besides, Chinese online shops should implement the possibility to rate online customer reviews (via thumbs up/down buttons), whereas review rating did not have an impact on review credibility among Germans.

Focusing on the cultural differences of how information is cognitively processed, paper #6 challenges extant research about the credibility of online customer reviews by making use of the SCST. Applying a research model established on a national level, it is demonstrated that from the Chinese consumer viewpoint, review credibility is holistically perceived, and consists of author credibility, argument quality, and review rating. In contrast, Germans cognitively process all factors leading to review credibility separately and evaluate each aspect independently. At odds with extant literature, which primarily uses the ELM as framework for investigating review credibility regardless of the cultural context, the need for culturally adapted models is revealed. Previous studies examining review credibility, which were conducted among East Asians, did not report the more recent heterotrait-monotrait ratio criterion (HTMT), which proves to be more reliable in detecting potential discriminant validity issues compared to the Fornell-Larcker criterion (Henseler et al., 2015). Since East Asians holistically process information (also in the context of online customer reviews), such issues seem to be likely to occur and might have been detected in previous studies conducted among Asians by making use of the HTMT. Further, paper #6 is the first study to provide an empirical proof of the SCST in the context of credible online customer reviews. Answering RQ1.5, this proof verifies the assumption that Chinese differ from German consumers in their perception of credible online customer reviews by holistically processing all information available instead of breaking down each factor to evaluate them independently, which would be the way Germans are dealing with online customer review facets. In contrast to Hofstede's cultural dimensions from the 1970s, which were deduced by enquiring employees of one company only, the more recent SCST enabled to uncover intercultural differences in the perception of more/less credible online customer reviews. Taking into account the call for cultural frameworks other than the one proposed by Hofstede (Chu et al., 2019), paper #6 also counteracts the paucity of alternative theories to entirely capture and explain intercultural differences in IS research.

Recapitulating the insights gained in this dissertation, the importance of country of origin, online customer reviews, and quality seals in an e-commerce context largely varies based on product type, consumers' age and their cultural background. While the (implicit) country of origin facet seems not to be existent for Chinese consumers when shopping online (paper #1), Chinese retailers should offer the possibility to integrate video online customer reviews to increase online customer reviews' credibility and consequently sales (especially due to the strong effect of review credibility on purchase intention; paper #5). Online customer reviews and country-of-manufacture appear to be equally important among German and Chinese consumers when exposed to an online shopping scenario with clothing articles (paper #2), whereby online customer reviews matter more for Chinese. Among Germans, the impact of country-of-manufacture on the online purchase decision is larger compared to quality seals, whereas the importance of social sustainability quality seals varies by consumers' generational cohort (paper #4). Similarly, the relevance of quality seals and country-of-manufacture heavily differs based on consumers' green orientation (paper #3). From an aggregated perspective, country-of-manufacture represents one of the main drivers for purchasing apparel products online besides price, design, and materials. Focusing on the general e-commerce configuration, payment methods, warranty options and contact possibilities are even more important than online customer reviews or country-of-manufacture. Here, Germans emphasize payment methods even more than Chinese do. Apart from the content-related results, papers #2 and #3 answered RQ2, and revealed the advantages and disadvantages of ACBC compared to its antecedent CBC.

Future research might focus on all extrinsic cues listed within this dissertation and investigate their interplay between consumers from different cultures. To uncover the implicit importance of country of origin, online customer reviews, and quality seals besides other main drivers simultaneously when considering purchasing online, the ACBC analysis seems to represent an appropriate tool, as it explicitly is recommended when handling more than a handful of impact factors[8]. Avenues for future research on ways to reduce the information asymmetry in e-commerce are manifold, e.g. by optimizing the product visualization as demonstrated by Stöcker et al. (2021; this paper and all other additional contributions of the author are listed in table 4 in the appendix).

[8] Examining all three information cues simultaneously by applying an ACBC is an ongoing research project, which is currently in the stage of data analysis.

Appendix

Table 4: Additional papers and conference contributions

Author(s) (Year)	Title	Journal/ Conference	Status
	Papers		
Stöcker, Baier, Brand (2021)	New insights in online fashion retail returns from a customers' perspective and their dynamics	Journal of Business Economics (VHB: B)	Published
Kopplin, Brand, Reichenberger (2021)	Consumer acceptance of shared e-scooters for urban and short-distance mobility	Transportation Research Part D: Transport and Environment (VHB: B)	Published
Rausch and Brand (2021)	Gotta buy 'em all? Online shopping cart abandonment among new and existing customers	International Journal of Electronic Business (VHB: C)	Published
Shaw, Eschenbrenner, Brand (2022)	Towards a Mobile App Diffusion of Innovations Model: A Multinational Study of Mobile Wallet Adoption	Journal of Retailing and Consumer Services (VHB: C)	Published
Friedrich and Brand (tbd)	The role of fiber and polymer in Wood-Plastic Composite (WPC) packaging: a consumer study under conjoint-approach	Resources Conservation and Recycling	About to be submitted
Brand and Yu (tbd)	Bridging the information asymmetry in e-commerce: a cross-cultural perspective on sustainable clothing	Tbd	Writing stage
Brand – Baier – Yu (tbd)	E-tailing Servicescape Features and E-shopping Satisfaction among Older Customers: A Multi-Country Comparison[9]	Tbd	Writing stage
Brand and Kopplin (tbd)	Effective return prevention measurements in the post-purchase stage: a Best-Worst Scaling approach among consumers of Generation Y	Tbd	Writing stage

[9] Will be part of the Mitacs Globalink Research Award for research in Canada (starting in September 2021).

Author(s) (Year)	Title	Journal/ Conference	Status
Brand and Dintner (tbd)	Brand Familiarity as a moderator for the country-of-origin effect – a German-Chinese comparison	Tbd	Writing stage
	Conference contributions		
Brand and Kopplin (2020)	Examining Best-Worst Scaling's validity and reliability: Worth a try?	2nd Meeting of AG MARKETING	Presented
Brand and Baier (2019)	Adaptive CBC: Are the Benefits Justifying its Additional Efforts Compared to Traditional CBC?	5th European Conference on Data Analysis (ECDA2019)	Presented
Brand and Baier (2019)	Comparative Analysis of E-commerce Configuration Between China and Germany	26th International Conference on Recent Advances in Retailing and Consumer Services	Presented

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