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Which cues influence the perceived usefulness and credibility of an online review? A conjoint analysis

Usefulness and credibility of online review cues

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Abstract

Purpose: This article aims to assess the relative importance of the argument strength, argument sidedness, writing quality, number of arguments, rated review usefulness, summary review rating, and number of reviews in determining the perceived usefulness and credibility of an online review. Additionally, we use insights from the Elaboration Likelihood Model (ELM) to explore the effect of consumers' product category involvement on the cues' relative importance.

Methodology: A conjoint analysis (N= 287) is used to study the relative importance of the seven previously mentioned attributes. A balanced orthogonal design generated eight cards that correspond to individual reviews. Respondents scored all eight cards in random order for perceived usefulness and credibility.

Findings: Overall, argument strength is the most important cue, while summary review rating and the number of reviews are the least important for perceived review usefulness and credibility. The number of arguments is more important for people who are more highly involved with the product while writing quality and rated review usefulness are relatively more important for the low involvement group.

Originality/value: This study provides a comprehensive test of how consumers perceive online reviews, as it is the first to our knowledge to simultaneously investigate a large set of cues using conjoint analysis. This method allows for the implicit valuation (utility) of the individual cues, revealing the cues' relative importance, in a setting that comes close to a real-life context. Besides, insights of the Elaboration Likelihood Model (ELM) are used to understand how the relative importance of cues differs depending on the level of review readers' product category involvement.

Keywords: eWOM, conjoint analysis, online reviews, Elaboration Likelihood Model

Type: Research paper

Introduction

Online reviews, i.e. online product evaluations by users or experts, are significant sources of information for customers that influence as much as 20–50% of their online buying choices (Mathwick and Mosteller, 2017). Online reviews have attracted considerable attention from both marketers and academics (e.g., De Keyzer et al., 2017, Li et al., 2020, Tang et al., 2019). Online reviews can instill trust (Evans et al., 2020) and influence consumers' attitudes (Casado-Díaz et al., 2020). They impact sales (Li et al., 2020) and can also influence post-purchase evaluations (Liu et al., 2019).

Reviews may include different cues that help evaluate the product or service, such as the number of arguments, argument strength, argument sidedness (inclusion of positive and/or negative information), writing quality, rated review usefulness, summary review rating, and the number of available reviews. The Limited Capacity Model of Motivated Mediated Messages Processing (LC4MP) (Lang, 2000) and the cognitive load theory (Sweller, 1988) state that people have a limited cognitive capacity and cannot process more than a limited amount of information in a short time. Gottschalk and Mafael (2017) found that consumers selectively process online review cues. Therefore, it is important to understand which review cues have the greatest impact on review credibility and usefulness for consumers. Credibility and usefulness are commonly studied consumer responses because of the impact they exert on product and brand evaluations (Craciun and Moore, 2019). As consumers will want to avoid manipulated or biased online reviews, review credibility is an important determinant that affects whether consumers are persuaded by a reviewer's opinion (Grewal and Stephen, 2019). If a review is considered credible, the containing information is considered more valuable, is more often believed and accepted by the reader, and affects attitudes and behaviors (Thomas et al., 2019). Review usefulness refers to a measure of perceived value in the decision-making process (Siering et al., 2018) and is one of the most important determinants of information adoption (Wang et al., 2019, Wang and Li, 2019, Ventre and Kolbe, 2020).

Review usefulness helps consumers deal with information overloads and facilitates their decision-making (Li et al., 2019). Therefore, it is important to understand what makes a review useful and how to extend customer access to such reviews.

Previous studies have explored the influence of various online review characteristics or cues (such as review sentiment, star rating, readability, length, and posting date) on consumer perceptions of review helpfulness (e.g., Yang et al., 2017, Li et al., 2019) and credibility (e.g., Moran and Muzellec, 2017). Much of this research is experimental, which allows causal relationships to be tested with a high degree of internal validity. At the same time, experiments suffer from the limitation that they can only manipulate and test a limited number of review characteristics at a time. Other studies draw upon the observation of textual details from databases of reviews obtained from websites such as Amazon, which use voting mechanisms asking readers about the extent to which a review was helpful (Hong et al., 2017). However, helpful voting mechanisms can be easily manipulated. In addition, the results of previous studies on the determinants of review credibility and helpfulness seem to contradict each other at times. Therefore, the first objective of this study is to investigate, by means of conjoint analysis, the relative importance of the number, strength, and sidedness of the arguments, review writing quality, the summary review rating, the rated review usefulness, the number of reviews, on consumers' perceptions of review usefulness and credibility. By using conjoint analysis as a methodology to study a diverse range of cues in a single comprehensive study, we present a new perspective on how these cues can influence the perceived credibility and helpfulness when presented together. Previous research recommends conjoint analysis as a useful method to understand the combined effects of multiple attributes and precisely analyze the relative importance of these attributes (i.e., Rhee et al., 2016, Baek et al., 2006). As stated by Levy (1995), a conjoint analysis is relevant to predict overall consumer preferences by considering the aggregated utility scores of a product. As such, it is widely used as a marketing research tool to predict consumer choices among multiple (product) attributes (Baek et al.,

2006). This study exposes consumers to multi-attribute stimuli as they would see them in real life, based on which consumers establish credibility and usefulness assessments, enhancing the external validity of our results (Janssens et al., 2008). Yang et al. (2017) conducted a conjoint analysis of six heuristic review attributes related to the reviewer (e.g., reviewer location) or review itself (e.g., review length) to test how these affect review helpfulness. Their study, however, does not look into the effects of the review text (such as the number of arguments or argument strength), where text has previously been proven to be very important for review readers (De Pelsmacker et al., 2018).

Besides looking at the relative importance of the selected review cues in general, we use the insights of the Elaboration Likelihood Model (ELM) to understand how these cues' relative importance differs depending on the level of review readers' product category involvement. As stated in the ELM (Petty and Cacioppo, 1986), consumers' involvement with the product influences how they process information. Highly involved individuals are more likely to process via the central route, paying attention to the arguments in a message (Petty and Cacioppo, 1986). In contrast, lower involvement triggers the peripheral route where persuasion is based on peripheral cues, such as the number of reviews (Park et al., 2007). The second objective of this study is to find out how the selected review cues differentially affect consumers' perceptions of usefulness and credibility depending on readers' level of involvement with the product. Argument strength and argument sidedness are commonly qualified as 'central' review elements (Filiberti et al., 2018a), while the writing quality, rated review usefulness, summary review rating and number of reviews are usually considered as more peripheral cues (Filiberti et al., 2018a, Park et al., 2007), and number of arguments can be considered either a central or a peripheral cue.

This study contributes to the literature on how online reviews are perceived and used by review readers to assess review usefulness and credibility by providing an integrative study of review cues through conjoint analysis, a method that takes real-life context into account, focusing on their relative importance. Very few studies have focused on the relative influence of multiple cues on the perceived

credibility and helpfulness of the reviews. Brand managers can use the insights of our study to guide reviewers and to optimize the usefulness and credibility of online reviews on their e-commerce sites.

Literature review

How do review cues influence review credibility and usefulness?

We discuss seven review cues frequently encountered in practice and studied in academic research (e.g., Cheung et al., 2012, De Pelsmacker et al., 2018, Zhang et al., 2014): argument strength, sidedness of the message, writing quality, number of arguments, number of reviews, rated review usefulness, and summary review rating.

Argument strength

The argument strength is the extent to which the message receiver perceives the argument as convincing or valid in supporting its position (Cheung et al., 2009). Schindler and Bickart (2005) explored the importance of the strength of review arguments in a qualitative study. They found that consumers will not readily believe the information in an online review if it does not contain sufficiently strong arguments about the product or service that they consider buying. Thomas et al. (2019) found that argument quality, related to argument strength, is the primary factor affecting review credibility. Other research has proven that strong arguments serve as a significant predictor of the perceived usefulness of the review (Clare et al., 2018, Filieri et al., 2018a). For instance, Wang and Li (2019) found that information quality, also related to argument strength, is positively associated with the perceived usefulness of review websites. In summary, the strength or quality of arguments in a review seems to be a crucial element in influencing consumers' perceived review usefulness and credibility.

Review sidedness

The sidedness of a review refers to the presence or absence of (both) positive and negative information in a review. One-sided reviews are strictly positive or strictly negative, where two-sided reviews contain both positive and negative messages (Park et al., 2019). In line with what is typically documented in advertising research, two-sided messages are often deemed more credible because they provide a comprehensive overview on debated issues (Mayweg-Paus and Jucks, 2018). Park et al. (2019) found that two-sided reviews are only more credible than one-sided (positive) reviews for firm-sponsored reviews, and not for consumer-voluntary reviews. In contrast, one-sided messages can sometimes be perceived as more credible due to the confirmation bias in information processing (Metzger et al., 2020). Pentina et al. (2018) showed that (one-sided) positive reviews are perceived as more credible than two-sided reviews, while the difference between (one-sided) negative and two-sided reviews is not significant.

With respect to review helpfulness, prior research is also inconsistent. On the one hand, one-sided reviews offer readers a clear indication of what to do. Cao et al. (2011) found that reviews with extreme opinions (one-sided) receive more helpfulness votes than those with mixed or neutral opinions (two-sided). Pentina et al. (2018), too, showed that (one-sided) positive reviews are perceived as more helpful than two-sided reviews (although the difference between one-sided negative reviews and two-sided reviews was not significant). At the same time, Filieri et al. (2018b) argued and found that two-sided reviews are more likely perceived as helpful because they better help readers to understand the strengths and weaknesses of a service and better evaluate whether it suits their needs. Considering the inconsistent findings, this study does not only assess the relative importance of review sidedness, but can also contribute to the debate on the direction of the effect of one-sided versus two-sided reviews.

Writing quality

The writing quality of an online review is related to factors such as spelling, structure, and grammar. Stylistic elements that may impair the clarity of a review, such as poor spelling and grammatical errors, cause the review to be perceived as less helpful (Schindler and Bickart, 2012, Wang et al., 2019). Poor grammar also makes readers question the competence of the author and dismiss the review's credibility as a result (Moran and Muzellec, 2017, Clare et al., 2018). A meta-analysis by Wang et al. (2019) showed that review readability (related to writing quality) is the most important factor in evaluating review helpfulness as it is directly related to the extent to which a review text is understood.

Number of arguments

The number of arguments refers to how many arguments are used in an online review. The more arguments a review has, the more comprehensive it is, making the message more complete and clear (Zhang et al., 2014). Previous studies have found a positive effect of the number of arguments in an online review on the perceived usefulness of the review (Chua and Banerjee, 2015). Reviews with many arguments are more helpful because they contain more details, which can help consumers with their purchase decision (Schindler and Bickart, 2012). According to Chua and Banerjee (2015), the number of arguments is important since reviews with substantial depth command a sense of adequacy and competence of the reviewer. In other words, a comprehensive number of arguments improves perceived source credibility, consequently enhancing the review's credibility.

Number of reviews

The number of reviews refers to how many online reviews are available for a particular product or service (Park and Kim, 2008). Zhang et al. (2014) state that the number of reviews is a helpful cue to

assess the popularity of the product. Consumers are more likely to purchase products with many online reviews rather than with a few (Zhang et al., 2014). This is consistent with the consensus heuristic (Purnawirawan et al., 2014) which posits that people tend to consider that the majority's opinion is true. By seeing that a product is popular amongst others (because it has a high number of reviews), consumers may feel confident in trusting the choice of a big group of people, increasing the credibility and the perceived usefulness of the reviews (Purnawirawan et al., 2014). Thomas et al. (2019) point at the opposite direction, showing that review quantity has a negative impact on review credibility. Consumers might perceive a higher number of online reviews for a certain product or service as less credible if they suspect that companies have deceptively contributed to this multitude. In the present study, we will not only assess the relative importance of the number of reviews, but also the direction of its effect on perceived usefulness and credibility.

Rated review usefulness

The rated usefulness of an online review informs readers about how many (previous) users found the review useful (Kolomiets et al., 2016). If many previous readers have indicated that they found a review useful, this will have a positive effect on the perceived usefulness of this review (Cheung et al., 2008). This influence may be explained by the bandwagon effect, which states that cues about others' behaviors guide our own decisions (Sundar et al., 2008). On the other hand, De Pelsmacker et al. (2018) found that the rated review usefulness did not affect readers' review impression (the extent to which the reader has a negative or positive impression from the review about the target object) and may be ignored when consumers have access to the review text. The rated review usefulness can also be relevant for readers to determine the perceived credibility of a review: the credibility of a review depends on how helpful it is perceived to be and vice-versa (Clare et al., 2018).

Summary review rating

In a review, consumers can sometimes summarize their overall appreciation of a product or a service in a summary score (e.g., from 1 to 5) or visual rating (e.g., from 1 star to 5 stars). Previous research has shown that summary review ratings have a strong influence on perceived review helpfulness and trustworthiness since this information is easy to process and allows an easy overall evaluation (Filieri, 2015). Also, the summary review star rating has proven to strongly influence e-tailer trustworthiness (Sebastianelli and Tamimi, 2018). The results of both Chevalier and Mayzlin (2006) and De Pelsmacker et al. (2018) suggest that, in the presence of both review text and (star) ratings, review readers rely on the review text rather than on summary statistics such as ratings. That would imply that the effect of the summary review star rating on review helpfulness and credibility might be minimal. Considering these results, it is not clear what should be expected in terms of the relative importance of summary review star rating in the presence of other review cues such as argument strength.

In summary, previous research consistently suggests that cues such as the strength of the arguments, the number of arguments, and writing quality influence review credibility and usefulness positively. For cues such as summary review star rating and rated review usefulness, the results of previous studies are unclear regarding their effectiveness in the presence of other review elements, such as the review text. For still other cues, such as message sidedness and the number of reviews, the direction of their effect on perceived usefulness and credibility is unclear as prior studies document opposing effects. Besides, very few studies focused on the relative importance of several cues that are simultaneously present in a review, to determine perceived review credibility and helpfulness, and the methods used do not allow to study the relative importance of the cues in a format close to the real-life exposure to online reviews.

No study so far has included the variety of the seven review cues that we included in the present study. Since the literature does not present a clear direction for the influence of all the cues on our outcome variables, we formulate the following research question:

RQ1: What is the relative importance of argument strength, sidedness of the message, writing quality, number of arguments, number of reviews, rated review usefulness, and summary review rating, on perceived review credibility and usefulness?

The moderating role of involvement

Dual processing theories such as the Elaboration Likelihood Model (ELM) (Petty and Cacioppo, 1984, Petty and Cacioppo, 1986) explain how consumers process information in persuasive communication. According to the ELM, persuasion can occur through a central or a peripheral route (Petty and Cacioppo, 1984). When an individual processes a message via the central route, the information, and arguments present in the message are elaborated in-depth. Under these circumstances, the reader of the message will cognitively endeavor to process the available information and put more effort into evaluating the message, for instance, elaboration on the strength of the arguments. The peripheral route, on the other hand, implies less cognitive effort from the reader, or low elaboration. Individuals use simple signals or indicators, referred to as peripheral cues, to assess the message. For instance, in the case of online reviews, the average star rating of a product or service might serve as a peripheral cue (Baek et al., 2012).

The ELM has been applied to the study of online reviews to explain consumer cognitive processing of product reviews and evaluation of review messages, especially to understand the role of central and peripheral cues on consumers' decision-making processes (Baek et al., 2012, Filieri et al., 2018a, Thomas et al., 2019). Central cues are related to the content of the message (Baek et al., 2012); in the present

study, argument strength and sidedness of the message can be considered as central cues. Peripheral cues in an online review are non-content factors that do not require a lot of processing effort (Filiari et al., 2018a). Writing quality, the number of reviews, rated review usefulness, and summary review rating can be considered as peripheral cues. The role of the number of arguments is unclear. On the one hand, reviews with more arguments are more comprehensive, presenting the reader with meaningful extra content (Zhang et al., 2014) and longer reviews (i.e. with more arguments) provide more opportunities for consumers to elaborate on the message and its arguments and enhance counter-arguing (Kim et al., 2018). As a result they may be considered as central cues (Petty and Cacioppo, 1986). On the other hand, readers may use multiple arguments as a mere indication of the amount of available information, and consider them as a shortcut (i.e., a peripheral cue) (Petty and Cacioppo, 1986).

The use of the central or peripheral cues is determined by the consumer's motivation, ability, and opportunity to process the information. One of the determinants of elaboration motivation (and thus, the relative importance of central versus peripheral cues) is the review readers' degree of product category involvement. Readers who are less involved with the product category will more likely use the peripheral route. By using mental shortcuts (Petty and Cacioppo, 1986), the lowly involved individual will focus on easy to process non-content cues, such as star rating or the rated review usefulness. Indeed, Lee et al. (2008) found that low involvement readers tend to conform to the opinion expressed in the reviews regardless of the quality of the reviews, supporting the idea that they rely more on peripheral than on central cues. Similarly, Park et al. (2007) show that low-involvement readers are affected by the quantity (the "more-is-better" heuristic) rather than the quality of reviews.

In contrast, high involvement with a product will encourage readers to use the central route, in which a significant cognitive effort of the recipient is expected. Individuals with a high degree of product involvement are more likely to elaborately process and scrutinize the content of a review to evaluate the provided product information (Park and Lee, 2008). For example, De Pelsmacker et al. (2018) found

that the influence of (the valence of) the review text on evaluative responses is stronger for more highly involved people.

Considering the unclear role of some of these review characteristics in the presence of each other, we formulate the following research question:

RQ2: What is the relative importance of the writing quality, number of reviews, rated review usefulness and summary review rating, number of arguments, argument strength and sidedness for highly involved individuals and lowly involved ones when evaluating review usefulness and credibility?

Method

Pretest

First, we conducted a pre-test to determine the product to be used in the main study. Because one of the purposes of the study is to test the moderating role of involvement, we wanted to select a product with a moderate level of and a substantial variation in involvement. We decided against the use of two products differing in involvement to avoid potential confounds due to the product itself. The product also had to be at least moderately appealing to consumers, to enhance the realism of the study (the idea being that people would never consult an online review for a product they have no intention of buying). In the pretest, respondents ($n = 16$) rated their product category involvement (3-item, De Keyzer et al., 2017 $\alpha=0.947$) and purchase decision involvement (3-item, Dens and De Pelsmacker, 2010 $\alpha=0.85$) on a 7-point semantic differential scale for 15 different products. The results indicated that a GPS is moderately involving ($M = 4.375$, $SD = 1.897$) and moderately appealing ($M = 3.958$, $SD = 1.804$) and had the largest variation in involvement. We constructed positive reviews for a fictitious GPS brand to avoid

potential confounds due to prior brand experience. The reviews were based on actual reviews about existing GPSs.

Main study

The relative importance of different cues for review credibility and usefulness was assessed through conjoint analysis. This research method is used to understand how consumers respond to stimuli varying in characteristics. The characteristics are attributes that have different 'levels' (Hair et al., 1992) (for instance the attribute 'strength of the arguments' with levels 'low' and 'high'). In the current study, individuals are exposed to eight online reviews varying in attributes and levels (see hereafter) and are invited to rate the credibility and usefulness of each individual review. 'Part-worth utilities' for each level of each attribute (the extent to which each level contributes to credibility and usefulness) are the outcomes of the analysis. This, in turn, allows us to calculate the relative importance of each attribute for perceived review credibility and usefulness.

Design

The attributes selected for the conjoint analysis are the seven review cues discussed previously. Each attribute has two levels (see Table 1 for a detailed overview). The first attribute is the strength of the arguments (strong arguments about relevant functional features such as the processing speed and the price/quality relationship vs. weak arguments about less relevant features, such as the design, the availability of fun accessories, and the color of the product). The second attribute is sidedness (one-sided messages with only arguments in favor of the product vs. two-sided messages with arguments both for and against the product). Because the reviews were all positive, the two-sided review contained more positive than negative arguments. The third attribute is the number of positive review arguments.

We used four positive arguments vs. two positive arguments to represent “more” or “fewer” arguments. In the two-sided conditions, we added two and one negative attributes, respectively. We did not want to use more than four positive arguments, because that could cause confounds due to review length. The fourth attribute is writing quality (good, a well-structured review incorrect language vs. poor, an unstructured review containing grammar and spelling errors). The fifth attribute is the number of available reviews (high = 274 other reviews available vs. low = two other reviews available). This number was displayed, but participants could not actually access the other reviews to avoid confounds. The sixth attribute is the rated review usefulness (high = 235 positive and seven negative usefulness ratings vs. low = seven positive and 235 negatives). The last attribute is the average product star rating (present, with four stars out of five vs. absent).

Table 1 - Attributes and levels

Argument strength	Sidedness	Number of arguments	Writing quality	Number of reviews	Rated usefulness	Star rating
Strong	One-sided	More	Good	High	High	Present
<i>related to functional features such as speed and price/quality relation</i>	<i>only positive product reviews</i>	<i>4 arguments</i>	<i>well-structured review in correct language</i>	<i>274 other reviews available</i>	<i>235 positive, 7 negative</i>	<i>4 stars on a 5-star scale</i>
Weak	Two-sided	Fewer	Poor	Low	Low	Absent
<i>related to design, availability of accessories, and color</i>	<i>both positive and negative product reviews</i>	<i>2 arguments</i>	<i>unstructured review containing grammar and spelling errors</i>	<i>2 other reviews available</i>	<i>7 positive, 235 negative</i>	<i>no star rating displayed</i>

We used SPSS orthoplan to produce a balanced orthogonal design of eight cards (reviews) (Appendix 1). A balanced design means that each level of an attribute occurs an equal number of times over the different stimuli (De Meulenaer et al., 2015). In this study, we used a ‘full profile’ conjoint analysis

where respondents score all eight cards, because of its perceived realism (Hair et al., 1992, Sebastianelli and Tamimi, 2018). Before seeing and scoring the reviews, all participants saw the same product description and specifications (such as the price or the memory capacity, see Appendix 1 for more detail) to enhance the tangibility of the product and to provide a standard context to all participants.

Participants and measures

The study was conducted utilizing an online survey in a convenience sample of Belgians recruited via social media. 287 people (47.7% female) completed the questionnaire. The average age of the respondents was 37 years (SD = 17.5) and 79.4% were educated beyond high school. The respondents first saw the product description and were then exposed to each of the eight cards in random order.

Table 2 contains the details of the measures used in the questionnaire.

Table 2 - Items and alpha values for the measures adopted in the main study

		Cards	1	2	3	4	5	6	7	8
Perceived Usefulness (Purnawirawan et al., 2012)	<ol style="list-style-type: none"> 1. I found this review useful 2. The reviews helped me to shape my attitude toward the GPS 3. The reviews helped me to make a decision regarding this GPS 		$\alpha = .963$	$\alpha = .932$	$\alpha = .967$	$\alpha = .961$	$\alpha = .960$	$\alpha = .965$	$\alpha = .948$	$\alpha = .966$
Review credibility (Soh et al., 2009)	1. This review is not credible/ very credible		N.A.							
Involvement with the product (De Keyzer et al., 2017)	<ol style="list-style-type: none"> 1. A GPS is unimportant – important to me 2. A GPS is meaningless – meaningful to me 3. A GPS does not matter to me – does matter to me 		$\alpha = .956$							

Respondents scored the perceived usefulness of each review (Purnawirawan et al., 2012 α minimum = .932) on a three-item scale and review credibility (Soh et al., 2009) on a single item scale. After assessing all reviews, respondents indicated their involvement with the product (De Keyzer et al., 2017 $\alpha = .956$) by means of a three-item seven-point scale and answered demographic questions (gender, age, and

education). All constructs were measured on seven-point semantic differential scales. For further analysis, an average score across items was calculated for the two multi-item scales.

Results

We used IBM SPSS 25 to compute the relative importance of each attribute for each respondent, based on the estimated part-worth utilities for each attribute's level. The part-worth utilities and relative importance of the attributes are calculated for the total sample by averaging the individual scores. In the total sample, the correlation between the actual and predicted preferences is 1 and significant, indicating a good fit (Hair et al., 1992). Table 3 presents a summary of the utility estimates and the relative importance of the cues for review usefulness and credibility.

Table 3 - Utility estimates and importance values for perceived usefulness and review credibility

		<i>Perceived usefulness</i>		<i>Review credibility</i>	
		<i>Utility Estimate</i>	<i>Importance</i>	<i>Utility Estimate</i>	<i>Importance</i>
Arguments strength	<i>Strong</i>	1.127	35.550	.617	23.569
	<i>Weak</i>	-1.127		-.617	
Sidedness	<i>One-sided</i>	.115	11.610	.109	15.143
	<i>Two-sided</i>	-.115		-.109	
Number of arguments	<i>More</i>	.333	13.488	.202	12.569
	<i>Fewer</i>	-.333		-.202	
Writing quality	<i>Good</i>	.219	13.463	.375	17.962
	<i>Poor</i>	-.219		-.375	
Number of reviews	<i>High</i>	.056	7.892	-.031	9.522
	<i>Low</i>	-.056		.031	
Rated usefulness	<i>High</i>	.237	11.081	.305	13.029
	<i>Low</i>	-.237		-.305	
Star rating	<i>Present</i>	-.001	6.916	.011	8.047
	<i>Absent</i>	.001		-.011	
(Constant)		3.851		4.275	

Answering RQ1, the results show that argument strength is the most important cue for both the perceived usefulness (35.6%) and credibility (23.6%) of a review (respectively). The presence or absence of a star rating (6.9% and 8%) and the number of reviews (7.9% and 9.5%) are the two least important cues for both review usefulness and credibility (respectively). For perceived usefulness, the other cues have the following importance: the number of arguments and writing quality (both 13.5%), message sidedness (11.6%), and the rated review usefulness (11.1%). For review credibility, the other cues have the following importance: writing quality (18%), message sidedness (15.1%), the rated review usefulness (13%), and the number of arguments (12.6%).

Looking at the part-worth utilities, more arguments, stronger arguments, good writing quality and higher rated review usefulness all have positive effects on both review credibility and usefulness. One-sided messages are considered both more useful and more credible than two-sided messages. Fewer reviews (as opposed to more) and the presence of a (positive) star rating causes a review to be perceived as more credible while having more reviews and not presenting a star rating is better for perceived usefulness.

To analyze the influence of product involvement in determining the relative importance of each review cue, we divided the sample in a low- and a high-involvement subsample, using a median split. We excluded 45 participants that scored on the median (5 on a 7-point scale), resulting in 105 responses in the low-involvement group and 137 responses in the high-involvement one. The results are presented in Table 4.

Table 4 - Utility estimates and importance values for perceived usefulness and review credibility, for high and low involvement groups

		<i>Perceived usefulness</i>				<i>Review Credibility</i>			
		High involvement		Low involvement		High involvement		Low involvement	
		<i>Utility Estimate</i>	<i>Importance</i>	<i>Utility Estimate</i>	<i>Importance</i>	<i>Utility Estimate</i>	<i>Importance</i>	<i>Utility Estimate</i>	<i>Importance</i>
Argument strength	<i>Strong</i>	1.156	35.735	1.125	35.547	.653	24.773	.597	22.311
	<i>Weak</i>	-1.156		-1.125		-.653		-.597	
Sidedness	<i>One-sided</i>	.075	10.950	.141	12.239	.101	15.719	.103	14.105
	<i>Two-sided</i>	-.075		-.141		-.101		-.103	
Number of arguments	<i>More</i>	.378	14.787	.292	12.200	.236	13.437	.160	11.449
	<i>Fewer</i>	-.378		-.292		-.236		-.160	
Writing quality	<i>Good</i>	.165	13.081	.264	13.929	.318	16.829	.488	20.279
	<i>Poor</i>	-.165		-.264		-.318		-.488	
Number of reviews	<i>High</i>	.070	8.194	.050	7.899	-.021	9.143	-.040	9.993
	<i>Low</i>	-.070		-.050		.021		.040	
Rated usefulness	<i>High</i>	.187	10.057	.303	11.937	.264	12.375	.365	13.792
	<i>Low</i>	-.187		-.303		-.264		-.365	
Star rating	<i>Present</i>	-.025	7.195	.008	6.249	-.008	7.723	.035	8.071
	<i>Absent</i>	.025		-.008		.008		-.035	
(Constant)		3.904		3.755		4.377		4.102	

Answering RQ2, the relative importance of argument strength is higher for the high-involvement group than for the low involvement group for perceived credibility (25% > 22%). However, for perceived usefulness, there is no difference between the two groups (37.5% vs. 37.5%). Regarding the sidedness of the message, the results show that it is more important for the high-involvement group for perceived credibility (high-involvement = 15.7% > low-involvement = 14.1%), but not for perceived usefulness (high involvement = 10.9% < low involvement = 12.2%). Writing quality is more important for the low-involvement group than for the high-involvement group for review credibility (16.8% < 20.2%), but for perceived usefulness the difference is, again, negligible (13.1% and 13.9%). The importance of the number of reviews is not different for the high and low involvement individuals, since the difference is

less than 1%, which is negligible, for both dependent variables. The rated review usefulness is more important for less involved individuals (11.9%, 13.8%) than for higher involved people (10.1%, 12.4%) when assessing both perceived usefulness and credibility (respectively). The difference between high and low involvement for the presence or absence of star rating is negligible for perceived usefulness (7.2% and 6.2%) and credibility (7.7% and 8.1%). Looking at how the number of arguments influences the perceived credibility and usefulness of a review, the results show that this cue is more important for the high-involvement group than for the low-involvement group when assessing perceived usefulness (14.7% > 12.2%) and credibility (13.4% > 11.4%).

Discussion

We explored the relative importance of seven review cues in readers' assessment of the perceived usefulness and credibility of online reviews. Argument strength (a central cue) is the most important cue, and the number of reviews and the presence or absence of a summary review star rating are the least important cues for both review usefulness and credibility. Previous research also shows that argument strength is an important predictor of usefulness and credibility (e.g., Wang and Li, 2019, Thomas et al., 2019). Strong arguments contain diagnostic information that is useful for decision making (Filiari et al., 2018a). The second most important cue for perceived usefulness is the number of arguments. This finding supports the suggestion of Schindler and Bickart (2012) that reviews with many arguments contain more details, which can help consumers with their purchase decision (Schindler and Bickart, 2012).

The second most important cue for perceived credibility (and third for perceived helpfulness) is the writing quality. This is consistent with previous findings that show that poor grammar makes readers question the competence of the author and dismiss the review's credibility as a result (Clare et al., 2018)

and that readability (i.e., writing quality) is one of the most important variables determining review helpfulness (Singh et al., 2017). The low importance attributed to peripheral cues such as the number of reviews, rated usefulness, and summary review star rating is consistent with previous studies in that the effects of peripheral review cues on review impact are limited when central cues are present (Cheung et al., 2012, Chevalier and Mayzlin, 2006, De Pelsmacker et al., 2018), especially for a single review. For instance, De Pelsmacker et al. (2018) found that summary review star rating does not affect review impression when people have a review text to rely on.

Previous research was inconclusive concerning the effect of message sidedness on review usefulness and credibility. In the current study, we found that consumers perceive one-sided review messages as both more helpful and more credible than two-sided messages. The unambiguous advice provided in one-sided reviews seems more useful to readers, which is consistent with the finding of Cao et al. (2011) that reviews with extreme opinions (be it positive or negative) receive more helpfulness votes than the ones with mixed opinions (two-sided). Our study also shows that, contrary to what was found by Cheung et al. (2012), one-sided messages affect credibility more positively than two-sided messages. This is in line with what was found by Pentina et al. (2018), as one-sided positive reviews are perceived as more credible than two-sided reviews. Since reviews are written by consumers who have no stake in the brand, the positive effect of two-sided messages in advertising on credibility does not occur (Schlosser, 2011). This is in line with Metzger et al. (2020), that state that one-sided messages can sometimes be perceived as more credible due to the confirmation bias in information processing.

The effect of the number of reviews differs between credibility and usefulness. Readers perceive the availability of more reviews as more useful. This finding is consistent with the idea that, by seeing that a high number of reviews are available, the consumers' confidence in them increases, as they see that many others are interested in that product (Purnawirawan et al., 2012). On the other hand, having fewer reviews causes a review to be perceived as more credible. In line with Thomas et al. (2019), our

results suggest that a high number of reviews may be perceived by readers as unrealistic or fabricated, damaging the credibility of the reviews.

The central cue 'argument strength' is more important to determine perceived review credibility for highly involved than for lowly involved individuals. This finding is in line with previous research (Cheung et al., 2012, Filieri et al., 2018a). The peripheral cues 'writing quality' and 'rated review usefulness' are more important for low-involvement individuals than for highly involved ones. These cues serve as mental shortcuts (Petty and Cacioppo, 1986) for individuals that are not highly motivated to process the information in the reviews.

When evaluating review credibility, message sidedness is more important for highly involved individuals than for lowly involved ones. In this case, high-involvement individuals may be focusing on sidedness as a way to assess the completeness of information in the review (Cheung et al., 2012). On the other hand, and contrary to our expectations, message sidedness (a central cue) is more important for perceived usefulness of a review for lowly involved individuals than for highly involved ones. The reason for this may be that a clear-cut message is more helpful for low involvement individuals as they would not spend much cognitive effort to process dissenting opinions (Petty and Cacioppo, 1986), which is also consistent with the positive utility attributed to one-sided messages.

The number of arguments is also more important for higher involved than for less involved readers. This suggests that, in the context of the present study, the number of arguments is rather used as a central cue to assess usefulness. In agreement with the findings of Willemsen et al. (2011) and Schindler and Bickart (2012), reviews with more arguments contain more information, which helps review readers with their decision about the product or service. Besides, the arguments used in this study are presented in short sentences, making it easier for the reader to process the information.

Finally, there is no difference between the relative importance of the number of reviews and summary review star rating in high and low involvement individuals when evaluating the perceived usefulness and credibility of the review. The differences in the relative importance of the number of arguments and rated review usefulness are also negligible between high and low involvement when assessing review credibility.

Theoretical and Managerial implications

The results shed light on the relative importance of the most frequently studied online reviews cues, in each other's presence. Therefore, the contribution of this paper to theory is threefold. First, we look into the relative importance of cues that are well studied in the context of online reviews offering a comprehensive analysis that not only allows to compare the relative importance of several cues, but also simulates a realistic context where consumers make (implicit or explicit) trade-offs between cues in a review. We confirm the importance of the review text over other cues, such as star rating (e.g., De Pelsmacker et al., 2018, Thomas et al., 2019), and the limited importance of peripheral cues in the presence of central cues, at least when readers are only exposed to a single review (Cheung et al., 2012, Chevalier and Mayzlin, 2006, De Pelsmacker et al., 2018). Second, we study the relative importance of cues whose role was not clear in previous literature and found that consumers perceive one-sided reviews as more useful and credible than two-sided reviews, which sheds new light onto the role of sidedness in online reviews. The fact that review volume contributes positively to usefulness, but negatively to credibility is also an important contribution. Consumers could perceive a higher number of online reviews as less credible because they suspect that they may be getting fake reviews (Wu et al., 2020). Third, this study provides a test of the principles of the ELM to explain the effects of a set of characteristics of online reviews on persuasion. How review readers elaborate on certain cues will also

depends on what other information is available in the review and competing for their attention. For instance, contrary to previous research that could not prove that peripheral cues (such as star rating and rated usefulness) were relatively more important for low involvement individuals (Kolomiets et al., 2016), we find that the peripheral cues (for instance 'writing quality' and 'rated review usefulness') are more important for low involvement individuals than for highly involved ones. This confirms what could be expected based on the ELM (Petty and Cacioppo, 1986), namely that individuals who are not highly motivated take mental shortcuts to process the information. Another contribution to the use of the ELM to study online reviews is the role of the number of arguments in a review. Previous research showed contradictory findings for this review characteristic but, according to our results, the number of arguments appears to be processed centrally, being more important for highly involved individuals.

The current study provides insights for administrators of online review sites and marketers. As consumers often have many, sometimes contradicting, online reviews at their disposal (Gottschalk and Mafael, 2017), they need to simplify the processing of these reviews as they cannot consider all the available information. Perceived usefulness and credibility are important 'gatekeepers' to the further decision-making process. In general, considering the importance attributed to the text-related elements of a review, managers should request reviewers to write something, rather than merely provide a star rating, for example. Importantly, the reviews should contain strong arguments and should be impeccably written. Managers could incentivize strong arguments by rewarding reviews with a higher-rated usefulness or by suggesting important attributes or aspects that the review could mention. Writing quality could be ensured by providing automatic grammar and spelling controls. Reviewers should also be encouraged to write 'rich' reviews, with a sufficiently large number of arguments. Review platforms could for example provide people with a template or a set of criteria for reviewers to comment on or rate.

The rated review usefulness is relatively important and should, therefore, be highlighted, for example, by sorting reviews based on their helpfulness by default, or allowing users to do so. One-sided arguments create more favorable perceptions of credibility and usefulness than two-sided ones. By explicitly asking reviewers to write both positive and negative arguments, which some platforms (such as TripAdvisor) do, practitioners may be impairing the perceived credibility and usefulness of the review. A system in which reviewers are instructed to give their opinion, without specifically asking for positive and negative aspects would be preferable in this case. Importantly, each cue positively contributes to helpfulness and credibility, which means that reviewers should combine them to increase the helpfulness and credibility of their review. It is also possible that the cues would further reinforce each other, or could be reinforced by other cues not included here, a possibility which we could not explore within the current set-up. Ma et al. (2018), for example, showed that joining review texts and user-provided photos shaped the maximum performance, compared to text or photos alone. A few peripheral cues, such as the number of reviews and the presence of a star rating, are relatively unimportant and should thus not necessarily be included in case of single short reviews, as in the current study. Both these elements could become more useful, though, when people are exposed to a larger set of reviews and/or longer reviews.

Considering the differences between high and low involvement individuals, it may be interesting for practitioners to consider different website layouts depending on consumers' involvement. Personalization of web layout and content is increasingly feasible through artificial intelligence. Involvement could be deduced from, for example, previous searches for products in the same category, or likes or interests on social media. For more highly involved individuals, the central arguments of a review should be easily accessible and could be highlighted using bold font. For more lowly involved individuals, it would be more useful to see an overall assessment of the review, such as the rated review usefulness.

Limitations and future research

Our study has some limitations that should be taken into account in future research. In conjoint analysis, the relative importance of attributes is determined by the selection of attributes and their levels. For example, for “star rating”, we opted for the presence of a 4-star (out of 5) rating, versus no rating. A more extreme rating (5 out of 5 stars), or a comparison with a 1-star rating instead of “no rating” might lead to different results. Further research should, therefore, examine other levels of the cues to test the stability of our findings. For instance, in De Pelsmacker et al. (2018), peripheral cues became irrelevant in the presence of a central cue. Further research should test the relative importance of cues (attributes) in the presence or absence of other cues.

Our sample is highly educated (71.3% were educated beyond high school), so the demographic characteristics of our participants may influence our results. It is possible that due to their high level of literacy, the individuals of our sample were more attentive to the writing quality of the reviews than a sample with other demographics. As such, future research should replicate our study in other demographic segments, such as lower educated individuals.

The present study considers how review cues differ in their relative importance depending on people’s level of involvement with the product. Future studies should complement our findings by studying other product categories and other product types, for instance, search, credence and experience products, or utilitarian versus hedonic products, and compare the results across these types of products and product

categories. For instance, central cues may be more important when reading reviews for search than for experience products since previous research found that consumers determine the credibility of a review for search products by the level of detail in the review (Jiménez and Mendoza, 2013). Besides, both sender and receiver characteristics, and the relationship between them may play a role in the perceived relative importance of review cues. In this study, we included involvement with the product as a receiver characteristic. Future research could also incorporate sender characteristics, such as whether the sender is a verified buyer or not. On social network sites, relational characteristics, such as homophily and tie strength, play an important role. For instance, it might be the case that the relative importance of the review cues, such as the role of writing quality on review credibility, is different when the reader has some connection with the reviewer. Future research should study the effects of these relational factors.

The stimuli presented to the participants were static, which means that respondents read eight static reviews. Reviews were therefore not displayed in their natural environment in which numerous reviews are accessible simultaneously, competing for the readers' attention. Other approaches may consider looking at the relative importance of these cues when multiple reviews are assessed simultaneously as it is possible that other elements, such as summary review star rating, will gain importance, as it provides a summary of the information available (Petty and Cacioppo, 1986).

Finally, considering that the orthogonal design adopted in this study does not account for interaction effects, further studies may look at how the different review attributes interact with each other. For example, while Ma et al. (2018) found that user-provided photos did not have the same influence as review texts, joining both elements shaped the maximum performance. In the current study as well, it is possible that some cues could be less important themselves, but could serve to reinforce the effect of other cues. Brand-related aspects should also be considered, as Wen et al. (2020) document a three-way interaction between review valence, brand familiarity, and price.

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Appendixes

Appendix 1 – Product description and cards

(Translated from the original in Dutch)



Tomo

Tomo Spirit 7500 – Western-Europe
€128,00

5 inch (13 cm) | free map updates | 3 months of free flash updates

Product description

Are you looking for a simple navigation system? Then this GPS is for you. This model is equipped with driver guidance so you know exactly where you have to drive on motorways and in the city. You receive lifelong map updates for Western Europe. In addition, this GPS gives you spoken navigation instructions so that you can keep your eyes on the road.

Product specifications

Internal memory	8 GB	Charging time	120 hours
Screen size	5 inch (13cm)	Includes USB cable	Yes
Screen resolution	480x272 pixels	Traffic information	Yes
Battery life	Up to 1 hour	Manufacturer's warranty	2 years



Card 1

- *Argument strength: strong arguments*
- *Sidedness: two-sided*
- *Number of arguments: high*
- *Writing quality: poor*
- *Number of reviews: low*
- *Rated review usefulness: high*
- *Star rating: absent*

Review (2 reviews)


- + good price/quality
- + fast routing
- + voice recognition works well
- + screen has a high resolution
- no automatic updates
- not compatible with my mobile phone

price / quality good, for price good navigation system that leads you to destination.also fast routing; voice good recognition + high resolution screen. Disadvantage to Gps no automatic updates and not compatible with gsm.

Did you find this a useful review?  235  7

Card 2

- *Argument strength: weak arguments*
- *Sidedness: two-sided*
- *Number of arguments: high*
- *Writing quality: good*
- *Number of reviews: low*
- *Rated review usefulness: low*
- *Star rating: present*

Review (2 reviews) 



+ fun accessories available - the purple arrow should be yellow

+ beautiful design - does not fit in old GPS holder

+ extension available for America

+ fast food restaurants standard on the map

This GPS has a nice design. Furthermore, there are nice accessories available with this model. There is also an Expander available for America and all fast food restaurants are standard on the map. A disadvantage of this device is that the purple arrow on the screen should be yellow in my personal opinion. In addition, this model does not fit in my old GPS holder.

Did you find this a useful review?  7  235

Card 3

- *Argument strength: weak arguments*
- *Sidedness: one-sided*
- *Number of arguments: low*
- *Writing quality: poor*
- *Number of reviews: low*
- *Rated review usefulness: high*
- *Star rating: present*

Review (2 reviews) 

+ fun accessories available

+ beautiful design

GPS has nice design and nice accessories available.

Did you find this a useful review?  235  7

Card 4

- *Argument strength: weak arguments*
- *Sidedness: two-sided*
- *Number of arguments: low*
- *Writing quality: good*
- *Number of reviews: high*
- *Rated review usefulness: high*
- *Star rating: absent*



Review (274 reviews)

+ fun accessories available

- the purple arrow should be yellow

+ beautiful design

This GPS has nice design and nice accessories are available with this model. A disadvantage of this device is that the purple arrow on the screen should be yellow in my personal opinion.

Did you find this a useful review?  235  7

Card 5



- *Argument strength: strong arguments*
- *Sidedness: one-sided*
- *Number of arguments: low*
- *Writing quality: good*
- *Number of reviews: low*
- *Rated review usefulness: low*
- *Star rating: absent*

Review (2 reviews)

+ good price/quality


+ fast routing

The price/quality of this GPS is good, for this price you have a good navigation system that leads you to the destination.

Did you find this a useful review?  7  235



Card 6

- *Argument strength: strong arguments*
- *Sidedness: two-sided*
- *Number of arguments: low*
- *Writing quality: poor*
- *Number of reviews: high*
- *Rated review usefulness: low*
- *Star rating: present*

Review (274 reviews) 


+ good price/quality - no automatic updates
+ fast routing

The price/quality of this GPS is good, for this price you have a good navigation system that leads you to the destination. Disadvantage to Gps no automatic updates.

Did you find this a useful review?  7  235



Card 7

- *Argument strength: strong arguments*
- *Sidedness: one-sided*
- *Number of arguments: high*
- *Writing quality: good*
- *Number of reviews: high*
- *Rated review usefulness: high*
- *Star rating: present*

Review (274 reviews) 

+ good price/quality
+ fast routing
+ voice recognition works well
+ screen has a high resolution

This GPS is easy to operate and therefore user-friendly. The price / quality is good, for this price you have a good navigation system that leads you to the destination. In addition, this model has good voice recognition and the screen of the GPS has a high resolution.

Did you find this a useful review?  235  7

Card 8

- *Argument strength: weak arguments*
- *Sidedness: one-sided*
- *Number of arguments: high*
- *Writing quality: poor*
- *Number of reviews: high*
- *Rated review usefulness: low*
- *Star rating: absent*

Review (274 reviews)



+ fun accessories available

+ beautiful design

+ extension available for America

+ fast food restaurants standard on the map

gps has nice design. by model has nice acesoires; also expansion for America and fast foed restourants as standard on the map.

Did you find this a useful review?  7  235