How Do Social Information Cues Affect Consumers' Product Choice Experiences? Findings from a Controlled Online Experiment

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Abstract. Social media change the way consumers gather and evaluate information when choosing products. To benefit from this development, online sellers have begun augmenting product presentations with social information cues like sales numbers or product ratings. While such cues can influence consumers' buying behavior, it remains unclear how they affect consumers' product choice experiences. This makes it difficult to use them in a systematic manner. Using the stimulus-organism-response paradigm, we develop a research model to explain how a social information cue affects consumers' satisfaction with their product choice via perceived choice difficulty and enjoyment. We evaluate it in a controlled online experiment, in which 147 participants used versions of an e-commerce website with varying social information cues. The results indicate that the provisioning of social information cues positively affects the choice satisfaction by decreasing the perceived choice difficulty and increasing enjoyment. The effects of individual cues vary considerably, however.

Keywords: Social Information Cues, Electronic Commerce, Product Choice, Stimulus-Organism-Response Model, Controlled Online Experiment.

1 Introduction

Social media such as rating and review forums, community feeds, or like buttons are changing the way consumers gather and evaluate information when choosing products. While this development puts e-commerce companies under pressure to provide social media applications on their platforms, it also provides opportunities to use social information in persuasion tools, which encourage consumers to complete transactions.

A promising approach appears to be to enrich product presentations with social information cues. Such cues depict social information in a highly condensed form, which is generated from the actions and/or opinions of consumers and shared using social media [1], [2]. With the increasing popularity of social media applications, several types of social information cues, among them product ratings, likes, or recent

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consumer activities, have become available [2], [3]. Such social information cues can provide an additional basis from which consumers can infer shopping-relevant characteristics such as the quality or popularity [4]. As products/services often can only be assessed imperfectly online, consumers may be more susceptible to information, which is provided by others or inferred from their behavior when choosing a product/service [5]. Prior studies found that social information cues can indeed help to shape consumers' perception of products/services and influence their purchase intentions [5], [6].

So far, however, the impact of social information cues has only been examined from a product-oriented perspective. Extant studies have analyzed the effects of social information cues on consumers' perception of the product quality [3], [7], the perceived popularity [4], [8], and the product purchase intention [1], [9]. Yet, it has not been examined how social information cues affect consumers' product choice experiences, for instance, with respect to the choice difficulty or the satisfaction with the choice. It hence remains unclear how social information cues can be used to support consumers in their product choice and why some cues may be superior to others in a certain scenario.

For online sellers, ensuring consumers' satisfaction with their choice is an important factor to maximize consumer loyalty, website use, and purchases [10], [11]. By analyzing the differential effects of social information cues, we can better understand how they should be used to support consumers' product choices. Given the lack of empirical evidence regarding the effects of different types of social information cues on consumers' product choice experiences, we examine the following research questions: *How do social information cues affect consumers' product choice experiences? Do different types of social information cues lead to different choice experiences?*

To answer the first question, we develop a research model, which shows how a social information cue influences consumers' satisfaction with their product choice by stimulating cognitive (i.e., perceived choice difficulty) and affective (i.e., perceived enjoyment) factors. We evaluate the research model using data of a controlled online experiment, in which 147 participants used and reported on several versions of an e-commerce website that differed only with respect to the provided social information cues. On this basis, we also analyze the effects caused by different cues to answer the second research question. Our findings advance the current body of knowledge on social information cues in two ways. First, we explain how such cues affect consumers' cognitive and affective choice perceptions and, as a result, influence their choice satisfaction. Second, we show that the effects of social information cues can differ, thus providing a more refined basis to understand which cue is more effective in a certain scenario.

2 The Stimulus-Organism-Response Model as Conceptual Basis

We refer to the stimulus-organism-response (S-O-R) model as conceptual basis to systematically describe the presumed link between a social information cue provided

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on an e-commerce website, consumers' cognitive and affective choice perceptions, and the resulting choice satisfaction. The S-O-R model provides a generic framework to describe how certain signals in the environment (stimuli) affect the cognitive and affective states of an individual (organism) and thereby trigger a reaction (response) [12].

Accordingly, we consider the provisioning of a *social information cue* to act as a *stimulus* that shall trigger a desired consumer response. To better inform consumers about the characteristics of products/services, e-commerce websites typically provide a variety of information cues, which can be categorized as intrinsic and extrinsic cues [13]. Intrinsic cues describe physical characteristics of the product/service (e.g., weight, taste). Extrinsic cues represent product characteristics that are not inherent to the product/service (e.g., price, name). While both types can play an important role in consumers' decision-making, prior studies found that online consumers tend to base their decisions on extrinsic cues [13]. In line with Cheung et al. [1], we consider a social information cue to represent information that is generated by the actions and/or opinions of other consumers and that is visualized in a condensed form. Since they are not inherent to the product, social information cues are extrinsic cues. Popular examples of social information cues are product sales numbers (e.g., "bought by over 50 people"), product ratings (e.g., "on average 4.5 stars based on 30 reviews"), and product likes (e.g., "25 people like this") [1], [3]. In the following, we focus on these three types of social information cues as they are used on many popular e-commerce platforms (e.g., Amazon, eBay, Groupon) and all three cues have received attention in literature [2], [3].

Literature particularly discusses two perception-based factors that characterize the product choice and significantly influence consumers' choice satisfaction [14-17]: *perceived choice difficulty* and *perceived enjoyment*. We build upon these factors to represent the internal *cognitive and affective states* of the *organism*, i.e. the consumer. Following prior studies, we use perceived choice difficulty to represent the cognitive state and perceived enjoyment to depict the affective state [18], [19]. Research on consumers' choice-making found that individuals tend to have difficulties managing complex choices [14]. To refer to the extent to which an individual experiences difficulty making a choice, the concept of choice difficulty has been coined [17], [20]. Analogous, enjoyment refers to the extent to which an individual experiences positive feelings like fun, joy, or excitement when making a choice [21]. Enjoyment is a critical aspect in consumers' choice making as it facilitates problem solving, flexibility, and innovation [15].

Following the goal of our study, we consider consumers' *satisfaction with the choice* as the intended *response* to the stimulus. It is an important prerequisite to maximize consumer loyalty, website use, and purchases [10], [11] and defined as the "satisfaction with and confidence in one's choice" [22, p. 2488]. Note that the term choice satisfaction is also used interchangeably with decision satisfaction [10]. Choice satisfaction differs from consumption satisfaction as it is measured after a product or service was chosen, while the latter is measured after a product or service was consumed [10]. Online sellers can significantly influence consumers' choice satisfaction by optimizing website features such as the provided product description [22], [23]. In

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contrast, they only have little influence on consumption satisfaction, which is determined by the characteristics of the product (and hence by the manufacturer) [23].

3 Research Model and Hypotheses

Against this background, we propose a research model, which suggests that providing a social information cue on an e-commerce website influences consumers' cognitive and affective choice perceptions, and consequently, their choice satisfaction (Figure 1). We also include several control variables to account for individual characteristics, which may affect the constructs contained in our model [2], [10]. We controlled for the age, gender, online shopping frequency, product familiarity, and the chosen product.

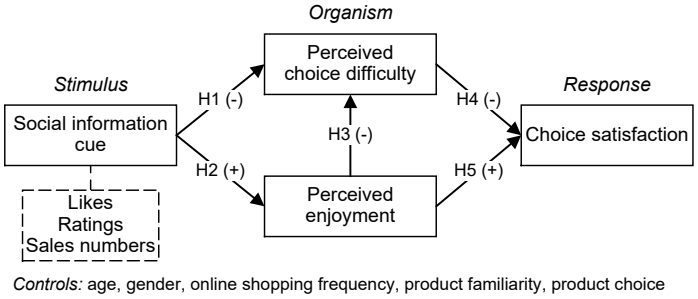

Figure 1. Research model

3.1 Effects of Social Information Cues

The technology-mediated nature of e-commerce makes it difficult for consumers to assess all relevant product characteristics, since products cannot be directly observed [13]. Literature on consumers' choice making has shown that if consumers have insufficient information about the attributes of the potential choice alternatives, choice making becomes more difficult, which can result in choice deferral [20]. To support consumers' product choices, it is hence important to enrich digital product presentations with cues that help to assess characteristics like the product quality [13]. Although social information cues depict highly subjective (and thus potentially biased) opinions, they nevertheless have been found to support the assessment of such product characteristics in at least two ways [7], [9]. On the one hand, cues such as product ratings can directly provide information about a product's perceived quality, albeit in condensed form [8]. Accordingly, a product with an average rating of 4.5 stars may be associated with a higher quality than a product with a rating of 2.5 stars. On the other hand, cues such as product sales numbers or product likes convey information, which can serve as a surrogate to infer the product quality. While both product sales numbers and product likes actually describe how popular a product is among consumers, this information can also signal a certain product quality [24]. Against this background, it can hence be argued that if an e-commerce website provides a social infor-

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mation cue, it should become easier for consumers to assess relevant product characteristics such as the quality, which should ease the product choice. Therefore, we hypothesize:

H1. Providing a social information cue decreases perceived choice difficulty.

Research has found that e-commerce websites, which incorporate social design elements such as social texts or social pictures, can significantly increase perceived enjoyment, since consumers associate websites that convey a sense of human warmth and sociability with more pleasure [25]. Social information cues provide additional possibilities to incorporate social design elements into e-commerce websites. Examples are social texts like sales numbers or graphical social content like star ratings and like buttons. It can thus be argued that if an e-commerce website contains such a cue, a greater sense of human warmth and sociability may be conveyed, which may result in increased enjoyment [25]. By enabling consumers to view the actions and/or opinions of others, e-commerce websites can also provide consumers a more social shopping experience, which addresses consumers' hedonic shopping motives [26]. It hence seems reasonable that if an e-commerce website provides a social information cue, it becomes more likely that the website stimulates consumers' hedonic shopping motives, which can result in greater levels of enjoyment when choosing a product. We therefore posit:

H2: Providing a social information cue increases perceived enjoyment.

3.2 Effects of Cognitive and Affective Factors

While the interplay between affect and cognition has been discussed controversially in the literature on consumers' choice making, recent research acknowledges that positive affective reactions can play a significant role in cognitive processes [15], [27]. As shown by Isen [15], positive feelings such as enjoyment can cause individuals to accomplish a choice task faster, to consider more information, and to be less confused by a large set of choice alternatives. In addition, Mosteller et al. [22] suggest that perceptions of enjoyment can stimulate cognitive assessments while processing information. Judging from these findings, it can be argued that if individuals experience enjoyment, it becomes likely that more cognitive resources are activated, which increases the likelihood that a choice can be made with less difficulty. We thus assume:

H3: Higher perceived enjoyment decreases perceived choice difficulty.

Literature also indicates that a negative relationship exists between choice difficulty and choice satisfaction [10], [14], [23]. As shown by Heitmann et al. [10], lower levels of satisfaction are derived from a choice, if individuals associate it with high evaluation costs. According to the "conservation of energy" principle, individuals rather prefer to conserve energy for "action when an appropriate opportunity or need presents itself" [28, p. 140]. As difficult choices require individuals to spend more energy, it is hence likely that they are associated with less satisfaction. Consequently, we formulate:

H4: Higher perceived choice difficulty decreases choice satisfaction.

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Studies that have examined consumers' choice making furthermore indicate that a positive relationship exists between enjoyment and choice satisfaction [16], [22]. As argued by Spassova and Isen [16], perceiving pleasure when making a choice indicates that a choice matches individuals' preferences. This can in turn increase the likelihood that individuals are satisfied with their choice. Accordingly, we hypothesize:

H5: Higher perceived enjoyment increases choice satisfaction.

4 Research Methodology

We evaluated the research model in a controlled online experiment as this enabled us to investigate the effects of different social information cues in isolation, which is difficult in productive environments. This also allowed us to obtain measurements that are more accurate by controlling exogenous variables as much as possible.

Experimental design. The experiment uses a 1x4 between-subjects design including one independent variable (i.e., "social information cue") with four levels of treatment. We designed four versions of a fictitious e-commerce website, which disjoint groups of participants used. Each website version displayed the same products and followed the same design. The only manipulation was the provided type of social information cue. As described before, we decided to focus on three popular social information cues: sales numbers, ratings, and likes. The first version of the website did not provide any social information cues and thus represented the control group. The second version provided sales numbers, showing how often a product was sold. The third version provided ratings that were displayed as the number of ratings together with the overall score as stars. The fourth version provided product likes in the form of like buttons and like numbers. The design of the social information cues was informed by prior studies [3], [9]. To increase the validity of our results, the procedure to provide the social cues was consistent among all treatment groups. We ensured this by randomly assigning the cues to products for each participant. The only restrictions were that the social information cue content had to remain constant within the treatment groups and that half of the products had to be attributed with social information cues for each participant. In line with prior studies [3], [9], one cue represented a rather high number, while the other cue represented a rather low number to reproduce a realistic shopping scenario.

The product portfolio consisted of a homogenous set of four unbranded water bottles. We used water bottles for three reasons: first, functional products, such as water bottles, are considered particularly useful to investigate the effects of social information cues [29]. Second, water bottles are appealing to both men and women, which we verified in a pre-test. Third, potential branding effects are avoided. Product characteristics (e.g., price, description, etc.) were derived from real e-commerce websites. Figure 2 shows screenshots of the product overview pages of the different versions of the e-commerce website. Note that the website also provided detailed product pages, which were manipulated in accordance with the product overview page. The website

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was created in German language as we conducted the study with participants from Germany.

Task and procedure. The experiment was conducted online. Participants were first directed to a landing page, on which the experimental setting and task were explained. The instructions asked the participants to purchase a water bottle as present for an upcoming birthday. We deemed such a task to be appropriate since literature indicates that social information cues may be even more effective when purchasing for others [30]. Participants were informed that the product portfolio of the website deliberately was restricted to water bottles so that the offered products can be compared in more detail. Next, the participants were randomly forwarded to one of the four website versions, where they had to select and purchase one water bottle of their choice. Customer data and payment information was pre-filled to ease the task. Note that since the shopping task was only simulated, participants did not have to spend their own money. The shopping task had no time limit to enable participants to browse the website as long as needed. After the shopping task, participants were asked to complete an online questionnaire that measured the relevant constructs of our research model.

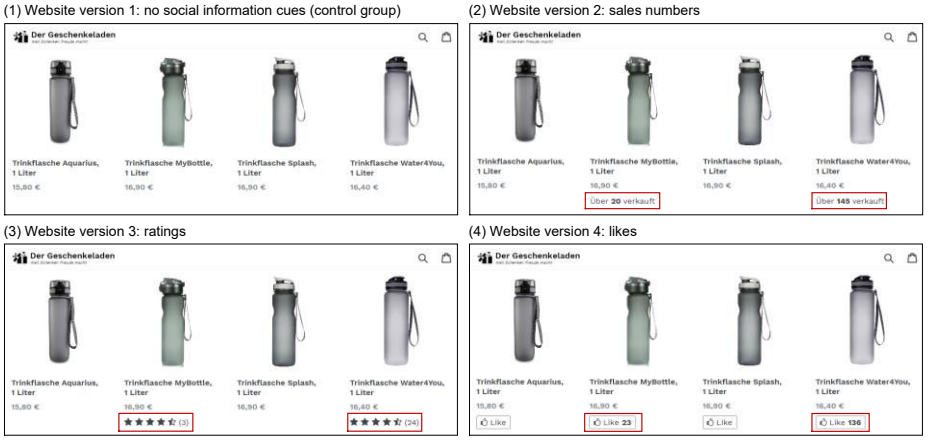

Figure 2. Screenshots of treatment conditions (product overview page)

Measures. The independent variable (i.e., social information cue) was operationalized using a four-level categorical variable to capture the four treatment experimental conditions, which is in line with prior experiment-based studies [31]. To measure the dependent variables, we used validated scales, which we took over from literature with minor wording changes to adapt them to the context of our study. Perceived choice difficulty was measured using the following items [14]: i*) I found it difficult to choose a water bottle; ii) Choosing a water bottle was frustrating; iii) I felt hesitant when choosing a water bottle*. We measured perceived enjoyment using the items [32]: *i) I had fun choosing a water bottle; ii) I found it exciting to choose a water bottle; iii) Choosing a water bottle was enjoyable*. To measure choice satisfaction, we used the items [22]: *i) I am confident that the chosen water bottle best meets my criteria; ii) I think that the person will like the chosen water bottle; iii) Overall, I am satisfied with my product choice*. All dependent variables were operationalized using sev-

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en-point Likert scales. Items for control variables were derived from related studies [2], [6].

Participants. We invited students of a large German university as participants for the experiment. Using student participants is appropriate as they typically are highly familiar with online shopping, of younger age, and higher educated, which corresponds to the characteristics of online consumers [13]. Apart from a personal motivation, no incentive was given as we wanted to recruit intrinsically motivated individuals.

5 Results

We collected data from 164 participants. After sorting out incomplete responses, we retained 147 responses. Of the participants, 57.1% were male and 42.9% female. All of them were students from business administration, information systems, or computer science programs. On average, they were 23.2 years old. To verify that the participants were equally distributed over the four treatment groups, we conducted a one-way analysis of variance for each individual characteristic. Group sizes ranged from 35 to 38 participants. There were no significant differences in age (F = 0.322, p>0.05), gender (F = 0.088, p>0.05), online shopping frequency (F = 0.632, p>0.05), product familiarity (F = 0.382, p>0.05), and product choice (F = 1.029, p>0.05) between the groups.

5.1 Measurement Validation

We performed several tests to evaluate the validity and reliability. Specifically, we tested for common method bias (CMB) as all measures were collected from one questionnaire. We therefore conducted a Harman's one factor test and ran an explorative factor analysis for choice difficulty, enjoyment, and choice satisfaction. The result showed that multiple factors are present, and that the most covariance explained by one factor was 46.79%, which is below the threshold of 50% [33]. In addition, we performed a CMB factor test by calculating and comparing the average variance explained by the substantive constructs to the average variance explained by the CMB factor [33], [34]. The result showed that the CMB factor variance is smaller than the substantive constructs variance (i.e., 0.002 vs. 0.769) and that the CMB factor loadings are non-significant. Overall, the results hence indicate that CMB is not likely a serious concern.

To validate the reflective measures, we determined the construct reliability, convergent validity, and discriminant validity. Regarding the construct reliability, composite reliability (CR) and Cronbach's alpha (CA) should be higher than 0.7 [35]. Regarding the convergent validity, standardized item loadings should be higher than 0.7 and the average variance extracted (AVE) from a construct should be higher than 0.5 [35]. As regards the discriminant validity, the square root of the AVE from a construct should be higher than 0.707 and higher than the construct's correlations to other

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constructs [35]. All values of our measurement model met the thresholds (see Table 1).

Table 1. Reliability and validity statistics

Construct	Loading range	CR	CA	AVE
Choice difficulty	0.758-0.916	0.896	0.823	0.742
Enjoyment	0.855-0.893	0.909	0.849	0.769
Choice satisfaction	0.859-0.912	0.918	0.866	0.788

5.2 PLS Analysis Results

We analyzed our theoretical model using partial least squares structural equation modeling (PLS-SEM) as our model is comparably complex and includes various control variables. Using PLS-SEM is also in line with related experiment-based studies [22], [25], [31]. With 147 participants, we deemed the sample size to be sufficient for a robust PLS calculation considering the number of variables and paths in our model [35]. For the PLS analysis, social information cue was coded as a 0/1 dummy variable to specify if the website provided a cue (1) or not (0). Figure 3 shows the results of our PLS analysis. As recommended, we performed bootstrapping (i.e., bias-corrected and accelerated) with 5.000 subsamples [35]. While the control variables were linked to all dependent variables, Figure 3 shows only the significant effects to reduce complexity.

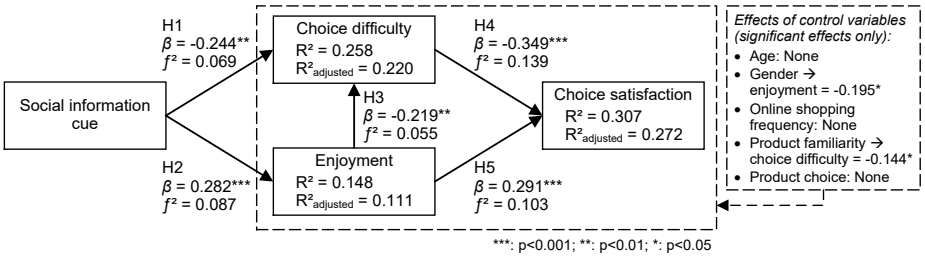

Figure 3. Results of PLS analysis (control variables included)

The results of our PLS analysis show that the provisioning of a social information cue has a significantly negative effect on choice difficulty (-0.244, $p<0.01$) and a significantly positive effect on enjoyment (0.282, $p<0.001$). Accordingly, the results support H1 and H2. Moreover, enjoyment significantly negatively influences choice difficulty (-0.219, $p<0.01$), thus lending support to H3. Choice satisfaction is significantly negatively influenced by choice difficulty (-0.349, $p<0.001$) and significantly positively influenced by enjoyment (0.291, $p<0.001$), which supports H4 and H5. Regarding the R^2 values, choice difficulty, enjoyment, and the controls explain 30.7% of the variance of choice satisfaction. Social information cue combined with enjoyment and the control variables explain 25.8% of the variance of choice difficulty. Furthermore, social information cue together with the control variables determine 14.8% of the variance of enjoyment. The results are in line with the recommendation that the R^2

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values should be above 0.1 [36]. Referring to the controls, male gender has a significantly negative impact on enjoyment (-0.195, $p<0.05$). Moreover, product familiarity has a significantly negative effect on choice difficulty (-0.144, $p<0.05$). All other relationships between the control variables and the dependent variables were non-significant. For transparency, we also calculated the model without control variables (results see Figure 4).

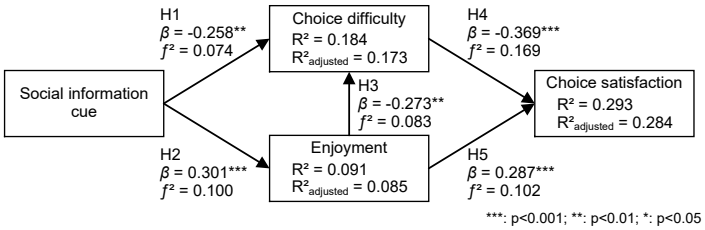

Figure 4. Results of PLS analysis (control variables excluded)

We furthermore conducted a mediator analysis to explore to what extent the cognitive and affective factors mediate the relationship between social information cue and choice satisfaction. To assess the mediation, we followed the procedure of Hair et al. [37]. First, we assessed the significance of the direct path between the independent variable (i.e., social information cue) and the main dependent variable (i.e., choice satisfaction) without the mediator variables (i.e., choice difficulty, enjoyment). As illustrated in the left-hand side of Figure 5, the result showed a significant positive effect of social information cue on choice satisfaction (0.296, $p<0.001$). We then included the mediator variables (i.e., cognitive/affective factors) and assessed the significance of the indirect paths between the independent variable and dependent variable through the mediator variables. As shown in the right-hand side of Figure 5, all indirect paths were significant at the $p<0.05$ level, while the direct path between social information cue and choice satisfaction was non-significant (0.095, $p>0.05$). All significant indirect paths were then added and divided by the total effect (i.e., sum of indirect and direct effect) to calculate the variance accounted for (VAF), which determines how much the mediator variables absorb of the direct effect [37]. The result yielded a VAF value of 81.2%, which indicates that choice difficulty and enjoyment fully mediate the relationship between social information cue and choice satisfaction.

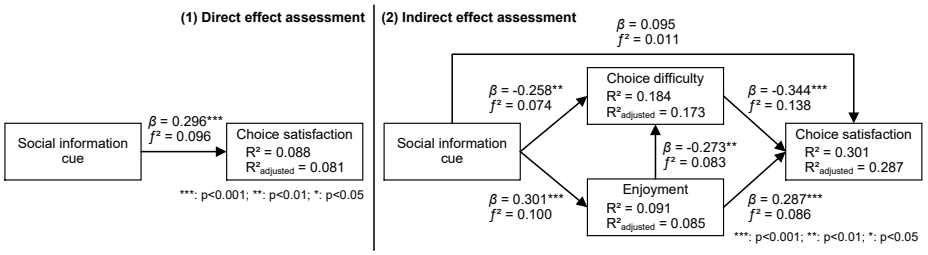

Figure 5. PLS mediator analysis

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5.3 Group Comparisons

To test if the effects vary between the different types of social information cues, we performed a multivariate analysis of covariance (MANCOVA). First, we verified that our data meets the statistical requirements for conducting a MANCOVA. Box's test and Levene's test statistics were non-significant ($p>0.05$), which indicates that the covariance matrices are nearly equal, and that the assumption of homogeneity is met. For the MANCOVA, social information cue represented the independent variable, while choice difficulty and enjoyment represented the dependent variables. Control variables were included as covariates. MANCOVA test statistics (i.e., Pillai's Trace, Wilk's Lambda, Hotelling's Trace, and Roy's Largest Root) were significant ($p<0.001$) across all four treatment groups. The F-statistic was significant for choice difficulty ($F = 9.110$, $p<0.001$) and enjoyment ($F = 9.565$, $p<0.001$), which means that for each of the dependent variables significant differences exist across the treatment groups. Contrast analysis results, which are summarized in Table 2, show where these differences are.

Table 2. Contrast analysis results

	Choice difficulty				Enjoyment			
Manipulation	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Mean	4.35	3.60	2.85	3.21	3.06	3.65	3.88	4.49
(2) Sales no.	-0.72*	-			0.53*	-		
(3) Ratings	-1.52***	-0.80*	-		0.82**	0.30	-	
(4) Likes	-1.17***	-0.45	0.35	-	1.41***	0.89**	0.59*	-

***: $p<0.001$; **: $p<0.01$; *: $p<0.05$. (1) Control group, (2) Sales numbers, (3) Ratings, (4) Likes.

A comparison of the mean values of each treatment group with the control group shows a significant decrease in choice difficulty and a significant increase in enjoyment for each treatment group (see Table 2). Moreover, comparing the ratings group to the sales numbers group results in a significant decrease in choice difficulty (-0.80, $p<0.05$), while the difference in enjoyment is non-significant. Contrarily, when comparing the likes group to the sales numbers group, the result shows a non-significant difference in choice difficulty, but a significant increase in enjoyment (0.89, $p<0.01$). A comparison of the likes group to the ratings group also yields a non-significant difference in choice difficulty, but a significant increase in enjoyment (0.59, $p<0.05$).

6 Discussion

Regarding our first research question, we found that the provisioning of social information cues on an e-commerce website can significantly increase consumers' satisfaction with their product choices. Social information cues are hence an effective tool to support consumers in their product choices. We could also show that social information cues can affect cognitive as well as affective choice perceptions. Specifically, they can reduce the perceived difficulty and increase the perceived enjoyment of choices. A social information cue can effectively reduce the difficulty of choices by

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delivering condensed information about product characteristics such as its quality or popularity, which is relevant for consumers when deciding which product/service to choose [4]. A social information cue can increase the enjoyment of choices by notifying consumers of relevant actions and/or opinions of others, which induces social warmth and provides an emotional basis when making a product choice [5]. We also found that enjoyment is negatively related to perceived choice difficulty. Enjoyment seems to affect cognitive processes and let a product choice appear to be less difficult for consumers [15].

Regarding our second research question, we determined that the effect on the perceived difficulty and enjoyment of choices can vary considerably between different social information cues. Among others, we observed that ratings have a stronger effect on choice difficulty than sales numbers and likes. This may be explained by the observation that ratings provide richer information about relevant product characteristics than the other cues. In particular, they can signal both product popularity (through the number of ratings) and quality (through the number of stars). Cues that provide richer information about product characteristics may hence be more effective in reducing choice difficulty. In contrast, product likes had a stronger effect on enjoyment than ratings and sales numbers. Considering that a like expresses an emotional reaction, it seems conceivable that cues, which convey emotional expressions, generate greater levels of enjoyment. Compared to ratings and likes, sales numbers had the lowest impact on choice difficulty and enjoyment. While the effects on both factors still were significant, the observation seems plausible as sales numbers provide less information about product characteristics than ratings and provide less emotional content than likes.

Regarding the control variables, our results corroborate the observation that women tend to feel more enjoyment than men when choosing products online [38]. We also observed that product familiarity negatively affects perceived choice difficulty, which is reasonable as consumers who are familiar with the products/services should have less cognitive effort to evaluate and compare them [10].

6.1 Implications

Our findings have implications for both academia and practice. Regarding academia, we introduce a new theoretical perspective through which the effects of social information cues on consumers' product choice experiences can be investigated systematically. While prior studies have shown the potential of social information cues to influence consumers purchase decisions [1], [9], it has not yet been examined how these cues affect consumers' product choice experiences. To bridge this gap, we propose a novel research model, which is based on the S-O-R paradigm and establishes a link between the provisioning of a social information cue on an e-commerce website, consumers' cognitive and affective choice perceptions, and their satisfaction with the choices made. The findings of our study do not only advance the current body of knowledge on social information cues, but also contribute novel insights to the research stream on consumers' choice making. Prior choice-making studies have mainly focused on how differences in assortment sizes or product descriptions can affect

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consumers' cognitive/affective choice perceptions [10], [16], [22], [23]. With our study, we provide first empirical evidence that social information cues are also an important antecedent of consumers' cognitive/affective choice perceptions.

The results of our study indicate that the effects of social information cues on consumers' product choice experiences vary considerably. Specifically, we found that cues such as ratings, which convey rich information about product characteristics, seem to address the cognitive dimension more effectively. In contrast, cues incorporating emotional content, such as likes, seem to address the affective dimension more effectively. While initial evidence is given that social information cues can generate differential effects, the effects have only been examined from a product-oriented perspective [1], [3], [7], [9]. By focusing on consumers' product choice experiences, our study provides new insights on the differential effects of social information cues.

The results of our study also help to better classify social information cues. Current attempts to classify social information cues focus on the provided content. For instance, related studies propose to distinguish cues according to whether their information is derived from the actions or the opinions of others [1]. The results of our study provide a foundation to classify social information cues with respect to their effects on cognitive and/or affective choice perceptions. Such a classification may be useful to determine which cues to use or to combine to effectively support the product choice.

Regarding practice, we show that the use of social information cues can increase the effectiveness of e-commerce websites by making consumers more satisfied with their product choices. Increasing choice satisfaction is a critical success factor for online sellers considering its positive effects on consumer loyalty, website use, and purchase decisions [10], [11]. With the results of our experiment, we provide practical guidelines on how e-commerce websites can be made more effective. Considering that the effects of different types of social information cues can vary, the results of our study provide hints, which cues might be more effective in a specific scenario. For instance, if an e-commerce website offers products that are mainly chosen because of rational considerations, it might be more effective to provide cues that especially support the cognitive dimension. If an e-commerce website offers products that are rather chosen because of their emotional appeal, it might be more effective to provide cues that especially support the affective dimension. In case both dimensions matter, the effect of social information cues may be strengthened by combining cues that mainly influence cognitive factors with those that primarily influence affective factors. Yet, further empirical investigations are necessary to verify the predicted effects.

6.2 Limitations

Several limitations pertain to our study. Some originate from our decision to conduct a controlled online experiment, which enabled us to systematically manipulate the stimulus and to reduce the impact of confounding variables. While we took care to simulate a realistic case, we had to make some reasonable but strict assumptions. To advance the external validity of our findings, future studies are hence particularly

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encouraged to complement our findings by incorporating additional objective measures (e.g., time spent on website) and behaviors (e.g., non-buying as a choice option), as well as using field data obtained from productive e-commerce websites. Moreover, we chose students of a German university as participants for our experiment. We hence cannot claim that the reported effects are straightforwardly generalizable to other types of consumers. With respect to our experimental design, we set the numbers for the ratings condition deliberately lower than in the likes and the sales numbers conditions as this is also commonly the case in practical settings, in which not each sold product receives a rating. However, the differences in the numbers across the treatment conditions could have also affected consumers' product choice experiences, which we did not take into account and which could have been mitigated if the numbers were kept constant across the treatment conditions. The presented differential effects of social information cues, especially with respect to the ratings conditions, must hence be interpreted with caution.

7 Conclusion

This study investigated how the provisioning of social information cues can affect consumers' product choice experiences. With the proposed research model, we introduced a novel theoretical perspective through which the causal relationship between a social information cue, consumers' cognitive and affective choice perceptions, and their satisfaction with the choice made can be analyzed systematically. The results of our study show that social information cues seem to cause differential effects on the studied factors. The introduced perspective thus builds a basis to explain why some cues may be particularly effective in a specific scenario. Future studies could include additional factors (e.g., trust) into the presented research model. Moreover, they could analyze the effects of additional social information cues, compare the effects to other types of cues, and confirm our results in settings with other products/services or on different platforms. Future studies should also vary the size of the product sample to account for potential changes of the observed effects on larger e-commerce websites. With the presented study, we intend to provide a starting point for such activities.

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