

The Wisdom of the Crowd Versus the Wisdom *in* the Crowd: Testing the Effects of Aggregate User Representation, Valence, and Argument Strength on Attitude Formation in Online Reviews

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Online review platforms display user-generated content that users rely on to form impressions of unfamiliar objects and experiences. Using the theoretical framework of majority and minority influence and the negativity effect, this research investigates the effects of the argument strength and the valence of review messages as well as their consistency with aggregated user representations on readers' attitudes toward a review object. Results from an experiment demonstrate that review messages that are consistent with the aggregated rating are better at changing readers' attitudes toward the review target than messages that are inconsistent with the overall rating. Moreover, argument strength is found to have a greater effect on readers' attitudes toward the review object when the messages are negative than when they are positive. The results confirm and extend theories on the consensus effect as well as highlight a potential explanation for the negativity effect.

Keywords: consensus, argument strength, valence, online review, Web 2.0

The rapid development of business-to-consumer and consumer-to-consumer (C2C) commerce as well as Web 2.0 platforms has created opportunities for consumers to widely share information about their experiences with products and services. As a result, online reviews, or electronic word-of-mouth (eWOM), have become important sources of information for potential customers' decision making (Gruen, Osmonbekov, & Czaplewski, 2006). Customers perceive user-generated information as more trustworthy

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than editorial content or marketing messages (Dickinger, 2011). Thus, understanding how individuals process online reviews and form attitudes of the review object becomes an incumbent task for marketing professionals, business owners, and scholars alike.

The effects of eWOM on attitude formation have been the subject of many empirical investigations, especially in the field of consumer behaviors. Past research has investigated the effects of the content, valence, and length of the review (e.g., Chevalier & Mayzlin, 2006; East, Hammond, & Lomax, 2008; M. Lee, Rogers, & Kim, 2009; C. Park & Lee, 2009; D.-H. Park, Lee, & Han, 2007; Vermeulen & Seegers, 2009), characteristics of the reviewer (e.g., Chan, Lam, Chow, Fong, & Law, 2017; Shin, Van Der Heide, Beyea, Dai, & Prchal, 2017), the type of product reviewed (e.g., E.-J. Lee & Shin, 2014; C. Park & Lee, 2009; Sen & Lerman, 2007), as well as characteristics of the review readers (e.g., East et al., 2008; J. Lee, Park, & Han, 2008).

When seeking information about a target object, however, users will likely encounter multiple representations of other users' opinions in various forms. In addition to textual reviews of the product, a common form of eWOM is aggregated user representation—computer-generated representations of accumulated user ratings or votes regarding the target (Walther & Jang, 2012). Many review websites display the overall rating in conjunction with individual review messages, creating the potential for the aggregated rating to be consistent or inconsistent with individual reviews of the quality of the review object. Therefore, to fully understand the impact eWOM on attitude formation, it is important to investigate the interplay between individual review messages and other representations of users' opinions toward the review object.

The theoretical significance of studying the interplay between aggregated user representation and individual reviews is that it provides a window to study persuasive evidence that may be leveraged by a majority and a minority. Conceptually, aggregated user representation is a natural manifestation of a majority opinion, because it is based on the inputs of many. By definition, individual review messages, when they are in disagreement with the aggregated rating, represent a minority position.

Although scholars proposed theories on how a majority and a minority may influence attitudes decades ago (Latane & Wolf, 1981; Moscovici, 1980; Nemeth, Wachter, & Endicott, 1977), little empirical investigation has tested these propositions, let alone in new media contexts. The present research bridges this gap in the literature by examining the interaction of consistency among an overall rating and individual review messages and the quality of reviews on users' attitudes toward the review object.

To better understand the interplay between the quality of review messages and the consistency between reviews and aggregated user representation, this research also takes into consideration the valence of the review message. The literature on negativity bias suggests that people are more influenced by negative information than by positive information in impression formation (Fiske, 1980; Kellerman, 1984; Skowronski & Carlston, 1989). Given that the present study concerns the effect of argument quality on attitude formation, it is important to examine the effect of message quality on attitudes using both positive and negative messages.

The Interplay Among Heuristics in Online Reviews

An online review website can be conceptualized as an environment filled with various cues that users may employ to form judgments about a target object. Some cues might be deemed more or less truthful and hence may exert more or less influence on users (DeAndrea, 2014; Walther & Parks, 2002; Walther, Van Der Heide, Hamel, & Shulman, 2009). In other cases, certain cues might enjoy higher priority in cognitive processing over others when people seek to make a decision with the lowest cognitive cost (Chaiken, 1980; Sundar, 2008).

The heuristic-systematic model of information processing provides one theoretical framework to study the interplay among various heuristics in online reviews that may impact readers' attitudes toward the review object. The model proposes that information seekers may process information in two ways: by carefully scrutinizing the arguments in the messages that are relevant to decision making (systematic processing) or by taking mental shortcuts and forming judgments based on heuristics that are quick to process, such as the attractiveness of the source and the number of individuals that endorse a position (Chaiken, 1980; Eagly & Chaiken, 1993). The model also acknowledges that these two routes of information processing may occur simultaneously. That is, while an information seeker may rely on the content of a message to form judgments, factors other than the content of the message may supplement the information seeker's decision making by biasing information processing (Eagly & Chaiken, 1993).

Under the theoretical framework of the heuristic-systematic model of information processing, one could argue that when reading online reviews, information seekers' attitudes toward the review object may be simultaneously influenced by both the content and the quality of other-generated review messages and by system-generated heuristics that indicate an overall evaluation of the review object by many users, such as the overall rating of the review object.

The Wisdom of the Crowd Versus the Wisdom *in* the Crowd

As forms of persuasion, aggregated user representation and individual review messages may uniquely influence attitudes. These effects have been acknowledged in various strands of persuasion literature. Some literature suggests that a majority position is more influential on attitudes than a minority position, because it signifies consensus, impartiality, and objectivity, which are not easily reflected in individual review messages (Latane & Wolf, 1981), such as in the case of an overall rating of a review object. Indeed, previous research has revealed that the overall rating of a review object serves as the primary cue on which users form judgments about the review object (e.g., Chevalier & Mayzlin, 2006; Flanagin, Metzger, Pure, Markov, & Hartsell, 2014; Houser & Wooders, 2006; Resnick, Zeckhauser, Swanson, & Lockwood, 2006).

On the other hand, individual review messages offer detailed arguments for the advocated position, giving readers an opportunity to acquire more thorough information about the review object than a statistical aggregation can provide (Martin & Hewstone, 2003; Martin, Hewstone, & Martin, 2003; Moscovici, 1980; Nemeth et al., 1977; Ziegler, Diehl, Zigon, & Fett, 2004). The persuasion literature offers ideas on how a minority may exert influence in the face of a disagreeing majority (Moscovici, 1980; Nemeth et al., 1977),

although a strong consensus does not yet exist on what persuasion techniques a minority should use on such occasions. Some findings suggest that a minority should employ high-quality arguments to affect people's attitudes (e.g., Martin & Hewstone, 2003), although such research does not test situations where people are exposed to both majority and minority opinions. In sum, scant evidence is available that assesses the extent to which the argument quality of the minority influences message recipients' attitudes when accompanied by a representation of majority opinion in Web 2.0 contexts.

The following section describes how readers' attitudes may be influenced by the interplay between the quality of review messages and the consistency between reviews and the overall rating of the review object. Before the discussion proceeds, it should be noted that our study examines the interaction of these factors when the review readers have no prior knowledge of the review object. Previous research has established that preexisting knowledge of a product may lead to biases in information processing (Chang, 2004). To experimentally isolate the effects of the focal factors of this research on attitude formation, the discussion here is situated in scenarios where attitudes are formed based on online reviews only without any influence from a prior attitude toward the review object.

The Wisdom of the Crowd: Consensus Effect

A majority opinion is influential on attitudes because of the consensus effect (Latane & Wolf, 1981). Consensus refers to the numerical representation of socially shared agreement about an attitude object (Erb & Bohner, 2001). Based on this definition, a majority position should reflect a higher degree of consensus than a minority position.

Theoretical discussions on the consensus effect have repeatedly recognized that a majority opinion should have a greater impact on attitudes than a minority position because of the underlying implication it carries. For example, it is a commonly held belief that several pairs of eyes are better than one (Mackie, 1987). A position held by a large number of people is often deemed as more reflective of objective reality (Latane & Wolf, 1981). When different perceivers form a similar judgment about an entity, it becomes more likely that the judgment reflects an actual quality of the entity (Kelley, 1973). Based on this position, it would be difficult for a minority position to counteract a majority position, because people attach less credence to the minority position.

Supporting this perspective on majority influence, previous research has revealed significant effects of consensus cues on attitudes (e.g., Van Der Heide & Lim, 2015). In one study, Darke and colleagues (1998) explore the extent to which people's attitudes are prone to the influence of consensus polls regarding an issue. The researchers varied the number of people supporting a position so that it reflected either a majority position or a minority position. The results indicate that people's attitudes are more influenced by a position when that position is framed to be a majority opinion rather than a minority opinion. And this majority opinion effect is particularly pronounced in individuals who are less motivated to process the issue deeply due to lower personal relevance. Evidence for the consensus effect was also discovered with review messages. Review messages that are consistent with other review messages were found to be more credible (Cheung, Sia, & Kuan, 2012) and more helpful (Quaschnig, Pandelaere, & Vermeir, 2015).

In reading online review messages, the overall rating of a review object represents an aggregated opinion of the majority, which individual reviews might either agree with or challenge. Applying the consensus effect in this context, one could argue that when individual review messages are in line with the overall rating, it represents a majority opinion. Such messages should be more influential on readers' attitudes toward the review object than when the reviews disagree with the overall rating, because the latter, by definition, represents a position held by a minority. Based on the consensus effect, we make the following predictions:

H1: The overall rating of a review object positively influences readers' attitudes toward the object.

H2a: Being consistent with the overall rating enhances the persuasive power of individual review messages such that a positive review that is consistent with the overall rating elicits a more positive attitude toward the object than a positive review that is inconsistent with the overall rating.

H2b: Being consistent with the overall rating enhances the persuasive power of individual review messages such that a negative review that is consistent with the overall rating elicits a more negative attitude toward the object than a negative review that is inconsistent with the overall rating.

Statistically, the effects described in H2a and H2b will be reflected as an interaction effect between the valence of review messages and their consistency with the overall rating.

The Wisdom in the Crowd: Minority Cues Enhance the Effects of Argument Quality

Despite people's tendency to comply with the majority, there are persuasive advantages that a minority might leverage to exert influence against a majority. Moscovici (1980) argues that, compared with a majority opinion, a minority opinion has the advantage of attracting attention if it is consistently expressed. On noticing the messages, message recipients may engage in subsequent validation to see how closely the minority message reflects the reality. This proposition suggests that, even in the presence of a disagreeing majority position, messages representing a minority position may exert influence on recipients' attitudes by eliciting more in-depth message processing.

Supporting Moscovici's (1980) argument, empirical studies have discovered that messages representing a minority position receive more systematic processing by message recipients than messages representing a majority position. In one study (Bohner, Dykema-Engblade, Tindale, & Meisenhelder, 2008), participants were presented with messages advocating for the construction of a traffic tunnel. The researchers varied the amount of evidence the messages contained to create strong, ambiguous, and weak arguments. It was found that, when the messages were framed as reflecting a minority of their peers' opinions, the valence of participants' thoughts after reading the messages reflected the quality of the messages they saw, whereas when the messages were framed as reflecting the majority of their peers' opinions, participants accepted the position advocated without processing the messages in-depth.

Similarly, Martin and Hewstone (2003) observed that when presented with a series of messages on the issue of animal experimentation, readers' attitudes are influenced by the strength of message arguments when the messages are framed as representing a minority position. This effect persists regardless of whether the advocated position is consistent or inconsistent with participants' initial attitudes toward the issue. However, when messages are framed as representing the opinion of the majority, argument strength does not affect the readers' attitudes toward the issue. The results from these studies suggest that messages representing a minority position may exert influence on readers' attitudes by eliciting more scrutiny from the readers than messages expressing a majority opinion.

In a review website, individual reviews that disagree with the overall rating of an object, by definition, express a minority position. The results from the research described above suggest that review messages that are inconsistent with the overall rating may elicit more in-depth processing among readers than messages that are consistent with the overall rating. Therefore, we predict the following:

H3: There is an interaction effect between the argument quality of a review message and whether the message is consistent with the overall rating of the review object on readers' attitudes, such that the quality of the argument exerts a stronger influence on readers' attitudes when the message is inconsistent with the overall rating than when it is consistent.

Negativity Enhances the Effects of Argument Quality

In addition to consensus with the overall rating, the effect of the argument strength of review messages on attitudes may be moderated by the valence of the messages. Research on impression formation has repeatedly demonstrated that negative information about a person is more influential than positive information on message recipients' attitudes toward the person. This phenomenon is often referred to as the negativity bias (for reviews, see Kellerman, 1984; Rozin & Royzman, 2001). In the research on eWOM, it has also been observed that negative reviews tend to exert more influence on readers' attitudes toward the review object than positive reviews (M. Lee et al., 2009; C. Park & Lee, 2009)—although in some cases, the negativity effect is observed only on certain types of products (Sen & Lerman, 2007).

Several potential explanations have been offered for the negativity bias, and mixed empirical support has been found for the most frequently tested explanations. The frequency explanation posits that negative information weighs more in the impression-formation process because it is less common and hence more informative (Fiske, 1980). Another explanation is offered by the category diagnosticity approach (Skowronski & Carlston, 1989), which argues that information varies in utility when helping people discriminate the nature of an object between alternative trait categories. Based on this perspective, negative information carries more weight in impression formation because it warrants the bad nature of an object or a person more than good information warrants a good nature.

Both of these explanations hinge on the perceived informativeness of negative information in impression formation. This proposition, however, does not receive favorable support from several studies on the helpfulness of online reviews. In particular, mixed results leave open the question of whether positive or negative review messages are more informative in helping readers make judgments about a review object

(Carlson, Guha, & Daniels, 2011; Muralidharan, Yoon, Sung, Miller, & Lee, 2017; Pan & Zhang, 2011). The somewhat conflicting results from these studies seem to question the validity of informativeness-based explanations of the negativity effect.

If the negativity effect is not caused entirely by the elevated perceived informativeness of negative information, what else may underlie this effect? Rozin and Royzman (2001) propose that negative information attracts more attention than positive information. Based on this proposition, it is possible that the negativity effect is caused, at least partially, by an increase in information processing when encountering negative information about an object. That is, it is not that negative information itself is perceived as more informative due to its higher diagnosticity or rare occurrence. Rather, negatively valenced information draws message recipients' attention to the actual content of the message, hence creating the opportunity for the quality of the message to further influence readers' attitudes. Based on this possibility, the present research makes the following prediction.

H4: The valence of a review message moderates the effect of its argument strength on readers' attitudes toward the review object, such that the effect of argument strength on readers' attitudes is greater when the review is negative than when it is positive.

Method

Pilot Study

Because one of the factors we examine in the main study is argument strength, a pilot study served to select review messages containing strong and weak arguments to use in the main study. The pilot study features a mixed-factor design. The two between-subjects factors were message valence (positive vs. negative) and argument strength (strong vs. weak). Each participant in the pilot study rated five messages that were designed to reflect one combination of the two between-subjects factors (i.e., positive strong, positive weak, negative strong, or negative weak), making the message a within-subjects factor.

Eighty undergraduate students from a large Midwestern university in the United States participated in the pilot study through a participant pool in exchange for extra course credits. The data from five participants were excluded from the analyses due to incomplete responses ($N = 75$). Each participant viewed five hotel reviews. Afterward, they rated the messages on the strength of their arguments on a scale from 1 to 7 scale (Zhang, 1996). Items from the scale are described in detail in the Measurement section.

Following prior research, argument strength was operationalized by varying the relevance and the specificity of the rationales for a reviewer's attitude toward the hotel (E.-J. Lee & Shin, 2012; S. Lee & Cappella, 2013; Petty, Harkins, & Williams, 1980). Based on this operationalization, a strong review message provides specific and relevant justifications of the quality of the hotel, such as its location, facilities, and service. In contrast, a weak argument offers information not directly related to the quality of the hotel by, for example, describing the reviewer's encounters with other guests.

Based on the results of the pilot test, 12 messages were selected for the main study based on their adherence to the rationales of the scholars mentioned above (i.e., E.-J. Lee & Shin, 2012; S. Lee & Cappella, 2013; Petty et al., 1980) and the descriptive statistics generated by the pilot study. These included three positive messages with strong arguments, three positive messages with weak arguments, three negative messages with strong arguments, and three negative messages with weak arguments. For messages containing weak arguments (both positive and negative), the three messages with the lowest perceived argument strength scores were selected of the five tested. For messages containing strong arguments (both positive and negative), the three messages with the highest argument strength scores were selected of the five tested.

An analysis of variance (ANOVA) tested the differences in perceived argument strength of the selected messages across message types. In the analysis, message valence, argument strength, and an interaction term between them acted as the predicting factors. The dependent variable was the mean score of the selected three messages of each type. Results reveal a main effect of argument strength, $F(1, 73) = 63.24, p < .001$. As desired, positive messages with strong arguments ($M = 5.80, SD = 0.66$) have significantly higher perceived argument strength than positive messages with weak arguments ($M = 3.54, SD = 1.04, p < .001$) and negative messages with weak arguments ($M = 3.58, SD = 1.41, p < .001$). But positive messages with strong arguments are not statistically different from negative messages with strong arguments ($M = 5.60, SD = 1.30, p = .61$). Also, as desired, the perceived argument strength of negative messages with weak arguments does not significantly differ from that of positive messages with weak arguments ($p = .93$). As such, the selected messages were deemed to adequately reflect the desired induction on argument strength and were subsequently used in the main study.

Main Study

Design and Stimuli

The main study features a web-based experiment with a $2 \times 2 \times 2$ between-subjects factorial experimental design. Participants saw three reviews of a hotel, of which three aspects were manipulated to reflect the focal factors of the present research: (1) valence (positive vs. negative), (2) consensus (consistent vs. inconsistent with the aggregated rating of the hotel), and (3) argument strength (strong vs. weak). Each participant was randomly assigned to one of the eight experimental conditions.

Study participants were presented with a TripAdvisor-like interface that featured three reviews of a fictitious hotel that were either all positive or all negative. The decision to use three reviews rather than one was made to reflect Moscovici's (1980) proposition that a minority may attract attention by consistently advancing an opinion. Depending on the conditions, the three review messages either contained relevant or irrelevant information about the quality of the hotel, which constituted the manipulation of argument quality (E.-J. Lee & Shin, 2012; S. Lee & Cappella, 2013; Petty et al., 1980). In addition to the messages, an overall rating of the hotel was displayed in the upper right corner of the screenshot. Depending on the condition, the rating was either consistent or inconsistent with the review messages. That is, the factor of consensus was operationalized as the agreement between the valence of the three reviews and the overall rating, where a negative rating was represented by two and a half stars and a positive rating was represented by four and a

half stars. Previous research testing the perceptions of different star ratings (Bente, Baptist, Leuschner, 2012; Dai, Viken, & Bente, 2018; Flanagin et al., 2014) guided the selections of two and a half and four and a half stars as representations of bad and good ratings, respectively. In addition to a star rating, the stimuli displayed a ranking of the hotel, which was designed to make more apparent whether the overall rating was good or bad. A positive star rating was accompanied by a ranking of 29 of 458, and a negative star rating was accompanied by a ranking of 395 of 485.

Participants


A total of 377 undergraduate students at a large Midwestern university in the United States participated in the study in exchange for extra course credit. Twenty-seven participants were excluded due to incomplete responses. Another 153 participants were excluded due to failing the induction check on consensus, leaving a final sample of 197. The detailed exclusion procedure is described in the Results section. The final sample consisted of 34.2% men. Most participants were White (82.7%), followed by Asian (7.1%), African American (5.6%), and Hispanic (1.5%). The average age of the sample was 20.39.

Procedure

Each participant was randomly assigned to one of eight experimental conditions during the experiment. Participants viewed a screenshot containing three reviews of a hotel and reported their attitudes toward the hotel afterward. The screenshots were modeled after the interface of the popular travel advice website TripAdvisor (see Figures 1, 2, and 3 for examples of the screenshots).


Distrikt Hotel Ranked #29 of 458 hotels in New York City
 342 West 40th Street, New York City, NY 10018 ★★★★☆ 3,321 Reviews

[Click for phone number](#) | [Hotel website](#) | [E-mail hotel](#) | [Offers & Announcements](#) **BOOK NOW! UP TO 15% OFF**

 A TripAdvisor Member


“Great Location”
★★★★★

The hotel is close to everything! There is a Starbucks next door and a good diner right on the first floor. The staff was very friendly and helpful. They would greet you with a smile all the time and help you carry luggage. Not to mention that their beds were so comfortable. Their mattress is even more comfortable than the one I have at home! I'm very impressed with the facilities and the nice people here. Had such a great time staying at this hotel. Highly recommended!

 A TripAdvisor Member

“Good Value”
★★★★☆

Fantastic hotel. I really liked the convenience factors about this hotel. The train station is only a 15 minutes' walk and there is a diner on the first floor that serves affordable and decent food 24 hours! They've got great folks working here. I called the front desk because my air conditioner wasn't working and they sent the repair guys within 5 minutes. Overall great value for money. Would recommend it to everyone!

 A TripAdvisor Member


“Quality Rooms”
★★★★★

Liked their facilities. Their Wifi was so fast you could stream HD movies with no difficulty. The number one thing I look for in a hotel is a comfortable mattress and they definitely nailed it. You can't feel the movements of the other person in bed at all. Oh, and even the shower had multiple settings of water speed! What an unexpected luxury. Absolutely great value for money. Getting ready to reserve my next stay!

Figure 1. Example stimuli featuring strong positive review messages that are consistent with the aggregated rating.

Distrikt Hotel Ranked #29 of 458 hotels in New York City
 342 West 40th Street, New York City, NY 10018 3,321 Reviews


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A TripAdvisor Member

“Disappointed”
 ●○○○○


My wife and I were in route back to Miami and we saw the hotel. My wife said it was getting late so we better get a place before it goes dark. Both of us were so exhausted from a whole day of driving. So I pulled in and they said they did in fact have a king Size bed available. We didn't like the room and I was too darn tired from driving to find another hotel.



A TripAdvisor Member

“So Crowded!”
 ●○○○○

Was in the area for a wedding of my best buddy in high school. It happened to be the peak travel season. I had a long flight and decided to stay at the closest hotel from the wedding place. God I never imagined that there'd be so many people in a single hotel. I waited for 40 minutes just to check in. I was so annoyed. Try your best to avoid travelling in the peak season!



A TripAdvisor Member


“Bad Experience”
 ●○○○○

I was on a business trip and planned to stay at the hotel for 2 nights. There was a little diner around the corner around the block so I had dinner there on the first day. Terrible decision! I got food poisoning. Think could be due to the oyster not being fresh. Ended up staying in bed in the hotel room for 4 days! I got sick staring at the wall paper in the hotel room cuz that was the only thing I could do while lying in bed with a bad stomachache. Gosh that was such a horrible experience!

Figure 2. Example stimuli featuring weak negative review messages that are inconsistent with the aggregated rating.

Distrikt Hotel Ranked #395 of 458 hotels in New York City
 342 West 40th Street, New York City, NY 10018 3.321 Reviews


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A TripAdvisor Member

“Great Location”
●●●●●


The hotel is close to everything! There is a Starbucks next door and a good diner right on the first floor. The staff was very friendly and helpful. They would greet you with a smile all the time and help you carry luggage. Not to mention that their beds were so comfortable. Their mattress is even more comfortable than the one I have at home! I'm very impressed with the facilities and the nice people here. Had such a great time staying at this hotel. Highly recommended!



A TripAdvisor Member

“Good Value”
●●●●●

Fantastic hotel. I really liked the convenience factors about this hotel: The train station is only a 15 minutes' walk and there is a diner on the first floor that serves affordable and decent food 24 hours! They've got great folks working here. I called the front desk because my air conditioner wasn't working and they sent the repair guys within 5 minutes. Overall great value for money. Would recommend it to everyone!



A TripAdvisor Member

“Quality Rooms”
●●●●●

Liked their facilities. Their Wifi was so fast you could stream HD movies with no difficulty. The number one thing I look for in a hotel is a comfortable mattress and they definitely nailed it. You can't feel the movements of the other person in bed at all. Oh, and even the shower had multiple settings of water speed! What an unexpected luxury. Absolutely great value for money. Getting ready to reserve my next stay!

Figure 3. Example stimuli featuring strong positive review messages that are inconsistent with the aggregated rating.

Measurement

Attitude toward hotel. Participants' attitudes toward the hotel were measured with a six-item semantic differential scale (Burgoon, Miller, Cohen, & Montgomery, 1978). Items from the scale are foolish-wise, unacceptable-acceptable, unfavorable-favorable, wrong-right, bad-good, and negative-positive ($\alpha = .98$, $M = 4.25$, $SD = 2.13$).

Argument strength. A four-item semantic differential scale (Zhang, 1996) measured participants' perceived quality of the arguments in the three reviews. The same scale was used in the pilot test and in the main study to select appropriate messages for the stimuli as well as to assess the effectiveness of the induction on argument strength, respectively. Items from the scale are weak-strong, unpersuasive-persuasive, not convincing-convincing, bad argument-good argument ($\alpha = .95$, $M = 4.87$, $SD = 1.70$).

Perceived consensus between review messages and overall rating. To assess the effectiveness of the manipulation on consensus, participants reported the extent to which they thought the reviews were in consensus with the overall rating of the hotel. Responses to three items were measured on a scale from 1 to 7, where 1 = *strongly disagree*, and 7 = *strongly agree*. The three items are: "The reviewers I saw agree with most reviewers on TripAdvisor about the quality of the hotel," "The reviewers I saw are in consensus with most reviewers on TripAdvisor about the quality of the hotel," and "The reviewers I saw have the same opinions about the hotel as the other reviewers on TripAdvisor." Participants' scores on the three items were averaged to form an index perceived consensus score ($\alpha = .93$, $M = 4.67$, $SD = 1.46$).

Results

Induction Check

Before checking whether the consensus induction was successful, we removed data from participants whose answers indicated a lack of understanding about the connection between aggregate ratings and review ratings of the hotel. The removal criteria were as follows: First, participants who viewed the aggregated rating as consistent with the review messages but still reported they did not see the consistency by choosing a lower score on the perceived message consensus scale (1 to 3 on a 7-point scale) were removed. Second, participants who viewed the aggregate rating as inconsistent with the review message ratings but still reported they did not see the inconsistency by choosing a higher score on the perceived message consensus (5 to 7 on a 7-point scale) were removed. The final sample after the data cleaning was $N = 197$.

An ANOVA assessed the effectiveness of the induction on consensus on the final sample. The results reveal a significant impact of the induction on participants' perceived consensus, indicating a successful induction of consensus, $F(1, 196) = 372.41$, $p < .001$, $\eta^2_p = .66$, $M_{\text{inconsistent}} = 3.16$, $SD_{\text{inconsistent}} = 0.99$, $M_{\text{consistent}} = 5.60$, $SD_{\text{consistent}} = 0.79$.

Another ANOVA assessed the effectiveness of the induction on argument strength. A categorical variable representing the argument strength acted as the predicting factor, and participants' perceived argument strength in the stimuli acted as the dependent variable in the analysis. Results reveal that

participants who saw strong arguments perceived the arguments to be significantly stronger than participants who saw weak arguments, $F(1, 196) = 46.45, p < .001, \eta^2_p = .19, M_{\text{weak}} = 4.19, SD_{\text{weak}} = 1.77, M_{\text{strong}} = 5.69, SD_{\text{strong}} = 1.61$. As such, the induction on argument strength was also deemed successful.

Hypothesis Testing

Hypothesis 1 predicts a positive effect of the overall rating of a hotel on review readers' attitudes toward the hotel. An independent sample t test compared participants' attitudes toward the hotel when the overall rating is positive and when it is negative. The results reveal that participants' attitudes toward the hotel are significantly more positive ($M = 5.01, SD = 1.89$) when the overall rating is positive than when it is negative ($M = 3.17, SD = 2.01$), $t(195) = 6.55, p < .001, d = 0.94$. As such, H1 is confirmed. Table 1 presents the descriptive statistics of participants' attitudes toward the review object in all experimental conditions.

Hypotheses 2 and 3 were assessed with an analysis of variance model. To reflect the factor of consensus, a variable was created based on the valence of the individual review messages and the overall rating (0 = *negative overall rating + positive reviews or positive overall rating + negative reviews*; 1 = *positive overall rating + positive reviews or negative overall rating + negative reviews*). In the ANOVA model, the dependent variable was participants' attitudes toward the hotel used in the stimuli. The predictors include consensus, valence, and argument strength as well as three two-way interaction terms between each pair of them. Although a three-way interaction among the three factors was not predicted, it was included in the initial analysis to rule out its possibility. Because there was no statistically significant impact of the three-way interaction term on the dependent variable, it was excluded from the subsequent analyses, leaving only the main effect terms and the two-way interaction terms.

Table 1. Summary of Means and Standard Deviations of Participants' Attitudes Toward the Review Object in All Experimental Conditions.

	Positive		Negative	
	Strong argument <i>M (SD)</i>	Weak argument <i>M (SD)</i>	Strong argument <i>M (SD)</i>	Weak argument <i>M (SD)</i>
Consistent	6.28 (0.98)	6.11 (0.97)	1.82 (1.26)	2.72 (1.69)
Inconsistent	5.35 (1.32)	5.03 (1.37)	2.61 (1.62)	3.70 (1.51)

Hypothesis 2 predicts an interaction effect between review valence and consensus, such that on reading positive reviews, participants' attitudes toward the hotel should be more positive if the reviews are consistent with the overall rating of the hotel than if they are inconsistent; on reading negative reviews, participants' attitude toward the hotel should be more negative if the reviews are consistent with the overall rating than if they are inconsistent.

The analysis first reviews a main effect of review valence on participants' attitudes toward the hotel, $F(1, 196) = 208.86, p < .001, \eta^2_p = .53$. When the three reviews are positive, participants evaluate the hotel more positively than when the reviews are negative, regardless of the overall rating ($M_{\text{negative}} = 2.72, SD_{\text{negative}} = 0.14, M_{\text{positive}} = 5.69, SD_{\text{positive}} = 0.15$). The analysis also reveals a statistically significant

interaction between consensus and review valence on the dependent variable (see Figure 4), $F(1, 196) = 20.65$, $p < .001$, $\eta^2_p = .10$. Planned simple effect analyses were conducted to further decompose the interaction effect. Specifically, the analyses examine the effect of the review and overall rating consistency on participants' attitudes toward the hotel when the reviews were positive and negative, respectively. Results reveal that, as predicted, participants who read negative reviews evaluate the hotel more negatively when the reviews are consistent with the overall rating ($M = 2.21$, $SD = 1.51$) than when the reviews are inconsistent with the overall rating ($M = 3.38$, $SD = 1.61$), $t(102) = -3.82$, $p < .001$, $d = 0.75$. Participants who read positive reviews provide more positive evaluations of the hotel when the reviews are consistent with the overall rating ($M = 6.19$, $SD = 0.97$) than when the reviews are inconsistent with the overall rating ($M = 5.17$, $SD = 1.33$), $t(91) = 4.10$, $p < .001$, $d = 0.88$. As such, H2 is supported.

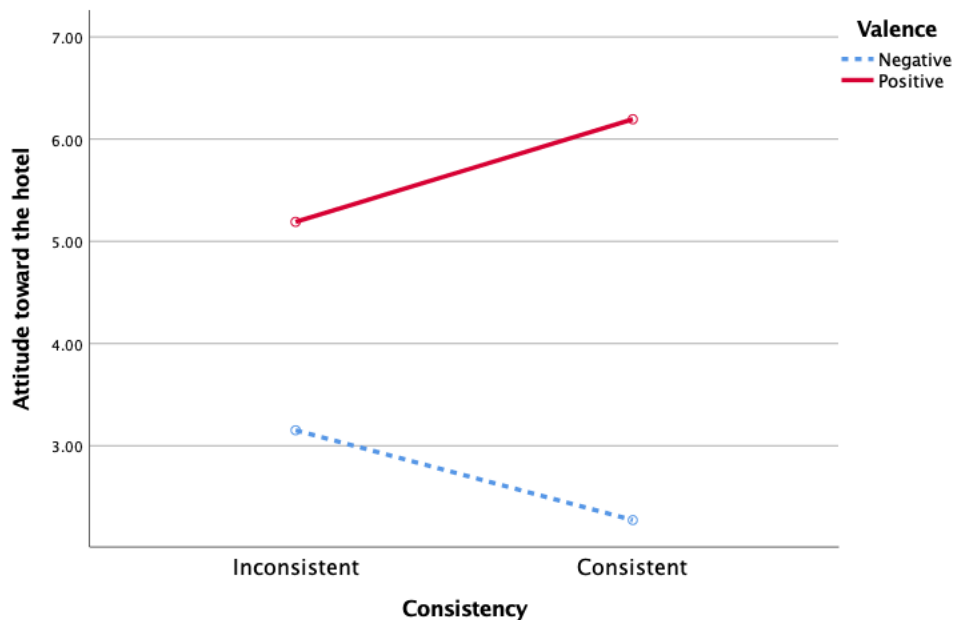


Figure 4. Interaction effect between review valence and consistency with the overall rating on participants' attitudes toward the review object.

Hypothesis 3 predicts an interaction effect between consensus and argument strength, such that the effect of argument strength should have a greater influence on participants' attitudes toward the hotel when the reviews are inconsistent with the overall rating than when they are consistent with the overall rating. However, the analysis does not reveal a significant interaction effect between consistency and argument strength, $F(1, 196) = 0.02$, $p = .90$, $\eta^2_p < 0.01$. As such, H3 is not supported.

H4 proposes an interaction effect between valence and argument strength, such that argument strength should have a greater impact on participants' attitudes toward the hotel when the reviews are negative than when they are positive. This hypothesis was tested with a planned contrast analysis. Following

the guidelines for the computation of contrast coefficients provided by Keppel and Wickens (2004), the set of contrast coefficients assigned for each condition is: 11 (strong positive), 3 (weak positive), -1 (weak negative), and -13 (strong negative). This set of contrast coefficients is designed to reflect the hypothesized difference in the magnitude of the impact of argument strength on participants' attitudes depending on the valence of the review message while fulfilling the other requirements of contrast coefficients in planned contrast analyses. In this set of the contrast coefficients, the difference between strong and weak arguments is 8 when the message is positive, whereas the difference between strong and weak arguments is 12 when the message is negative. The planned contrast analysis yields a significant result, $t(193) = 14.94, p < .001$, which suggests that the pattern of the data is consistent with the pattern specified in the contrast coefficients. That is, the data suggest that participants' attitudes toward the hotel are more influenced by the strength of the argument in a review when the message is negative than when the message is positive (see Figure 5). The descriptive statistics of participants' attitudes toward the hotel are as follows: $M = 6.02, SD = 1.15$ (strong positive review); $M = 5.79, SD = 1.20$ (weak positive review); $M = 3.29, SD = 1.65$ (weak negative review); and $M = 2.09, SD = 1.41$ (strong negative review). As such, the data support H4.

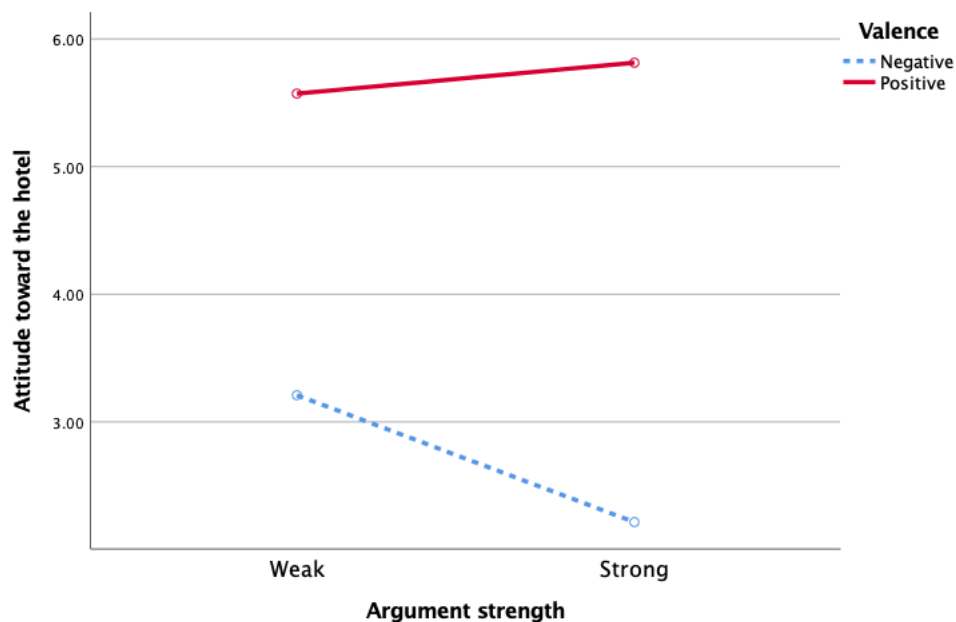


Figure 5. Interaction effect between review valence and argument strength on participants' attitudes toward the review object.

Discussion

The research reported in this article examines how the attitudes of readers of online reviews are influenced by the interplay between consensus cues and the characteristics of review messages. The factors examined include the valence of review messages, the strength of the argument contained in the reviews, and whether the review messages are consistent with the overall rating of the review object displayed on

the website. The findings provide empirical support to theoretical discussions about the consensus effect and minority influence. From a broader perspective of persuasion research, the findings also contribute to the understanding of heuristic and systematic processing in the context of reading user-generated information online.

Theoretical Implications

The findings from this research provide support for the consensus effect as well as theories on majority versus minority influence. The results indicate that the overall rating has a direct positive influence on participants' attitudes toward the review object, with positive ratings eliciting significantly more positive attitudes toward the hotel in the stimuli. These results provide baseline evidence for the majority influence in the context of reading online reviews, and they are consistent with previous research that discovered that a position held by many is influential on attitudes (e.g., Darke et al., 1998; Van Der Heide & Lim, 2015). Regarding the majority influence, the results indicate that participants form more positive (or negative) judgments about the review object when they are exposed to positive (or negative) review messages that are consistent with the overall rating than when they are exposed to reviews that are inconsistent with the overall rating. This finding is consistent with the theoretical proposition on the consensus effect, which argues that a position adopted by many warrants correctness and accuracy and is hence influential on attitudes (Erb & Bohner, 2001; Kelley, 1973; Latane & Wolf, 1981; Mackie, 1987). This effect is also consistent with prior findings about the consensus effect in online reviews. For example, Van Der Heide and Lim (2015) discovered that consensus among review messages has an indirect impact on readers' attitudes toward the review object through the perceived credibility of the review source.

Moreover, the results from the current research extend the consensus theories by revealing a channel to online minority influence, as Moscovici (1980) proposed. In our study, participants were exposed to review messages that were either consistent or inconsistent with the hotel's overall rating. Although participants were aware that the three review messages clearly contradicted the position held by the majority of the reviewers, they were nonetheless influenced by the content of the messages. This finding supports Moscovici's argument that a minority may exert influence by consistently arguing for a position. It is noteworthy that the two-way interaction between valence and consensus persists across all levels of argument strength. In other words, regardless of how strong the argument is for a minority position, people's attitudes are influenced by minority messages when they see several messages that consistently advocate for the position.

Regarding the predicted interaction between argument strength and consensus, the study finds no evidence that the consensus of the review messages with the overall rating influences the degree to which participants' attitudes are influenced by the strength of the arguments contained in the messages. This finding does not lend support to the argument that a minority message may exert influence by attracting more attention and by eliciting more in-depth information processing (Moscovici, 1980; Nemeth et al., 1977). This finding is also inconsistent with previous research that finds that people are influenced by the argument strength of messages more when the messages are framed as representing a minority position than when they represent a majority position (e.g., Bohner et al., 2008; Martin & Hewstone, 2003). One potential explanation for such inconsistencies is that in studies that discover enhanced message processing

for minority sources (Bohner et al., 2008; Martin & Hewstone, 2003), participants were informed that the messages they saw represent the majority or minority opinions of their peers. However, in the present research—and as is typically the case in online review contexts—participants read messages that presumably were written by strangers. The inconsistencies between this and earlier studies suggest a boundary condition to enhanced information processing for minority information might be found in the relationship between the message source and the message recipients. It is possible that individuals only accept messages that represent the majority of their peers' opinions without processing the messages in detail, but they would process messages from strangers in-depth regardless of the majority or minority status of the source. This potential moderator deserves exploration in future research.

The interaction effect between message valence and argument strength reveals that people's attitudes toward a review object are more influenced by the argument strength of the review messages when the messages make negative claims about the review object than when they make positive claims. These results lend support to a differential attention explanation to the negativity effect (Rozin & Royzman, 2001), which argues that negative information is weighed more in the impression-formation process because it draws recipients' attention to the message itself, and thereby influences the recipients' attitudes through more in-depth information processing. This explanation circumvents the presumed link between message valence and perceived informativeness reflected in the other explanations (Fiske, 1980; Skowronski & Carlston, 1989), which is challenged by the highly inconsistent findings on the perceived informativeness of positive and negative review messages. In addition, the differential attention explanation provides one reason that positive information is sometimes found to exert more influence on attitudes than negative information by suggesting a potential moderator—the quality of the information. Given that this study does not present measures of information processing to fully support the differential attention claim, future research should examine the effect of message valence on the amount of message processing to further test the validity of this explanation to the negativity bias.

Practical Implications

In addition to the several theoretical contributions, the findings from this study inform industrial practices—in particular, of sellers on consumer-to-consumer platforms. In many C2C platforms, such as Amazon.com, readers can choose to read only the critical reviews about a product. Our findings suggest that it is important for C2C sellers to actively address critical reviews, because it is possible for critical reviews to dominate potential buyers' views toward a product even if the product receives overwhelmingly positive ratings from past buyers. Active management of critical reviews is particularly important if the reviews make strong arguments for why the product is unsatisfactory. On the other hand, our findings suggest that even if a product has garnered a relatively negative rating, potential buyers' attitudes toward the product can be swayed positively from reading a few positive reviews. This finding suggests an impression management technique that C2C sellers could leverage to compensate for negative product ratings.

Limitations and Conclusion

Despite its contributions to the literature on social influence in online contexts, the present research suffers from several limitations that should be addressed in future research. First, participants read three

reviews that were consistent with one another but that, as a whole, either agreed or disagreed with the aggregated user representation of the hotel. While this design was employed for a theoretical reason, it may have artificially suppressed the effects of the aggregated rating. The study excluded many participants because they did not correctly recognize the (in)consistency manipulation between review messages and the aggregated rating—possibly because in the web page interface employed in the study, the overall rating was visually subtle against the three review messages. Future research should measure participants' perception of the overall rating to investigate whether this is due to a weak effect of the overall rating against opposing review messages or participants' lack of attention to the overall rating.

Second, the study employs only one product (i.e., a hotel) as the review object. Given that previous research discovered that review readers are influenced differently depending on the type of product in the reviews (such as goods vs. experiential goods; E.-J. Lee & Shin, 2014), it is important to examine the effects of argument strength and consensus on review objects that are less easily evaluated from reading review messages than hotels.

Third, this study tests the effects of certain factors in ideal situations. For example, it does not take into consideration the fact that visitors to a review website often find both positive and negative reviews that are either consistent or inconsistent with the overall rating of the review object. It also does not take into consideration the fact that overall ratings often do not convey a clear good or bad evaluation of the product, such as the rating of three and a half stars. Future research should seek to replicate the findings using a mixture of positive and negative review messages and more ambiguous aggregated user representation.

Finally, the present research relies on a sample of undergraduate college students. It does not consider how the message factors examined may exert influence on other populations that have different motivations to evaluate hotel reviews. Given that motivation and personal relevance have been identified in previous research as factors that affect the depth of information processing (Darke et al., 1998), future research should examine the effects of argument strength and consensus on other populations.

In sum, this article examines how people's attitudes toward a review object are influenced by the valence of the review messages, the quality of the arguments contained in the messages, and whether the reviews are consistent with the overall rating of the product. These findings inform theories on the consensus effect and the negativity effect as well as support and extend the literature on majority and minority influence.

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