

# Evaluating the Wisdom of Strangers: The Perceived Credibility of Online Consumer Reviews on Yelp

Young-shin Lim

School of Communication, The Ohio State University, 3041 Derby Hall, 154 North Oval Mall, Columbus, OH 43210

Brandon Van Der Heide

Communication Arts and Sciences Building, Michigan State University, 404 Wilson Road, East Lansing, MI 48824

*This study examined the effects of review valence, the reviewer profile, and the receiver's familiarity with the platform (user/nonuser) on the perceived credibility of a review on Yelp.com and on the receiver's attitude toward the reviewed object. The results demonstrated a difference in cue-taking between users and nonusers. For users, there was an interaction effect of 2 profile cues (number of friends and number of reviews) on competence. Users interpreted the cues in combination, whereas non-users were not influenced by them. The friends  $\times$  reviews  $\times$  platform familiarity interaction indirectly affected attitude through competence. Further, review valence was positively associated with perceived credibility and attitude. The findings support and extend the social information processing theory and cue combination literature.*

**Keywords:** Social Media, Electronic Word-of-Mouth, Online Review, Online Credibility, Consumer Behavior.

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Word-of-mouth (WOM) has been shown to exert great influence on consumer decision-making (Katz & Lazarsfeld, 1955). WOM refers to messages sent and received between consumers about particular products or sellers (Westbrook, 1987). Due to the communicator's independence from the market and the pre-existing relationship between communicator and receiver, receivers tend to view WOM as more reliable and credible than marketer-provided information (Arndt, 1967; Brown, Broderick, & Lee, 2007). Traditionally, WOM communication has been conceptualized as a communicative process whereby information is transferred through interpersonal networks in face-to-face settings (Brown & Reingen, 1987). In other words, WOM was "constrained by consumers' social relations with others" (Brown & Reingen, 1987, p. 351). That is, traditional WOM communication could not occur outside of

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the context of a face-to-face or at very least voice-to-voice social transaction. Due to this interpersonal nature, relational properties such as tie strength and homophily play important roles in face-to-face WOM transfer, because, when one is similar or closely linked to another, it is more likely that a WOM message about a product or a seller would be persuasive (Brown & Reingen, 1987).

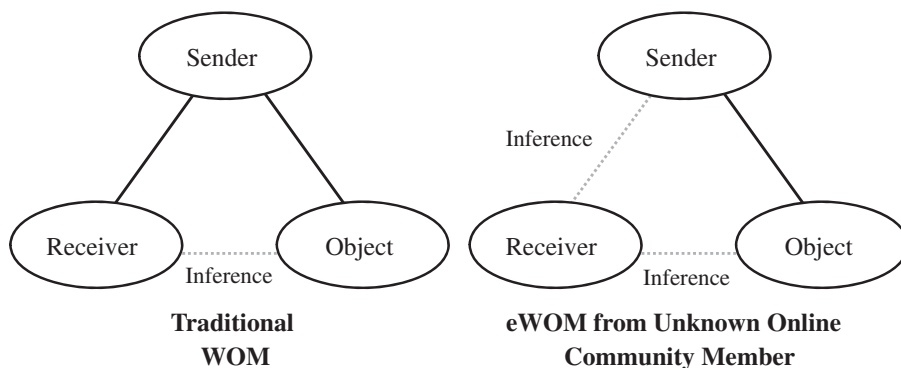
WOM transferred via the Internet is referred to as electronic word-of-mouth (eWOM). A representative type of eWOM messages include consumer reviews posted to online review communities such as Yelp and TripAdvisor, where members of a large online community share their product experiences with fellow consumers. Thus, communities of this kind function as repositories for eWOM communication (De Valck, Van Bruggen, & Wierenga, 2009). In this way, online communities remove the constraints of time and distance (Wang, Yu, & Fesenmaier, 2002), and facilitate eWOM communication among millions of people online. Unlike face-to-face WOM, online consumer reviews are generally transferred among strangers via text. Receivers do not have prior knowledge about the people who posted reviews. Moreover, these receivers cannot rely on nonverbal cues in text-based computer-mediated communication (CMC). In this regard, it may be relatively difficult to assess the credibility of online reviews based on source factors. Therefore, sometimes it is difficult for receivers to fully utilize the wisdom of fellow consumers.

The purpose of the present study is to understand how viewers of online reviews judge the credibility of and form attitudes toward the reviewed product based on these reviews. As social networking sites continue to flourish, many online review communities (e.g., TripAdvisor, Yelp, Rotten Tomatoes) have adopted social networking features. Members of online review communities can become “friends” with each other, and receive updates on each other’s reviews. Members have and may maintain their own profile pages, and a brief version of the profile is presented with their reviews. Profiles often present user information such as a photograph of the reviewer, the number of reviews the reviewer has posted to date, the number of friends the reviewer has in the community, and the reviewer’s self-reported location. In this way, reviewer profiles can compensate for the lack of interpersonal knowledge in the online context to a certain extent. Receivers may use the profiles as a basis for determining the identity, expertise, and trustworthiness of reviewers.

We aim to empirically investigate how people process a review posted by a member of an online community with social-networking features, using the popular review site Yelp.com as the model community. Specifically, we explore the effects of the reviewer profile presented with a restaurant review in respect to how people assess the credibility of review and the review’s influence on receivers’ attitudes toward the restaurant. Moreover, we examine the interaction between the profile elements and the receivers’ familiarity with the online community platform and the effects of review valence on the reviewers’ perceptions of the reviews’ credibility and on the receivers’ attitudes toward the restaurant.

## Credibility

Credibility refers to the extent to which a receiver considers information to be believable (Eisend, 2006). Perceptions of credibility affect a receiver’s intention to alter his or her attitude based on the information presented (Hovland, Janis, & Kelley, 1953). Credibility is, therefore, a crucial concept in regard to considering the influence of WOM. Source credibility refers to a receiver’s attitude about a sender’s believability (McCroskey & Young, 1981). Source credibility is a multidimensional concept, and expertise/competence, trustworthiness, and caring/goodwill are the three most established dimensions. Expertise/competence refers to the receiver’s perception of the communicator’s ability to make valid assertions (Hovland et al., 1953); trustworthiness refers to the receiver’s confidence in the communicator’s intention to make valid assertions (Hovland et al., 1953); and caring/goodwill refers to the receiver’s evaluation of the communicator’s “intent-toward-receiver” (McCroskey & Teven, 1999). The factor



**Figure 1** Conceptual models of traditional WOM and eWOM

structure of credibility depends on context, and it interacts with source, message, and receiver characteristics (Cronkhite & Liska, 1976). Consequently, in the present study, we explore which of the source credibility dimensions are meaningful in the context of eWOM shared by strangers in an online review community and how these dimensions are influenced by specific source, receiver, and message factors.

Traditionally, the effectiveness of WOM is understood as a function of interpersonal influence (Katz & Lazarsfeld, 1955). As shown in Figure 1, in traditional WOM transmission, a receiver makes an inference about an object based on the sender's report about the object and his/her knowledge of the sender. However, in eWOM transmission, receivers lack interpersonal knowledge about the senders. Thus, in eWOM transmission, receivers need to make inferences about both the reviewed object and the reviewer (Figure 1).

Given the relative uncertainty regarding source in eWOM, receivers are likely to assess the credibility of a review based on given pieces of information, and we argue that basic communication factors influence this assessment. We, therefore, aim to examine (1) the effects of the source, receiver, and message factors on the receivers' perceptions of the credibility (competence, trustworthiness, and caring/goodwill) of an online review and (2) which of the source, receiver, and message factors and the perceived credibility dimensions influence receivers' attitudes toward the reviewed restaurant. In the following sections, we will discuss the specific source, receiver, and message factors examined in this study.

### Source Factors: Number of Friends and Number of Reviews in the Reviewer's Profile

Social information processing theory (SIPT) provides ways to explain how the changing CMC environment affects users' perceptions of the credibility of eWOM (Walther, 1992). According to SIPT, in an effort to compensate for the absence of the nonverbal cues used in face-to-face interactions, people use alternative communication cues (Walther, 1992). SIPT has been supported in several CMC settings, and the results suggest that when people communicate online they either put greater emphasis on the remaining text-based cues or use alternative cues provided by the platform (Walther & Parks, 2002). In this sense, user profiles in review communities can function as a set of cues whereby receivers evaluate a reviewer's credibility. User profiles presented with reviews are the most common source information on online review sites. Several studies suggest that profiles posted to online communities provide a basis for evaluating the profile owners (e. g., Walther, Van Der Heide, Kim, Westerman, & Tong, 2008).

In the present study, we aim to test the effects of the profile elements on receivers' perceptions of the credibility of an associated review. We focus on two system-generated profile elements in online review communities: the number of friends a reviewer has and the number of reviews the reviewer has

posted. Number of friends indicates the reviewer's connections in the social network (Donath & boyd, 2004; Tong, Van Der Heide, Langwell, & Walther, 2008), whereas number of reviews can be considered the reviewer's activity in the social network (Jones, Millermaier, Goya-Martinez, & Schuler, 2008). In online review communities, being "friend" means receiving notifications of each other's new reviews. Thus, a user's review-posting and socializing (becoming friends) are closely related activities. It is likely, therefore, that receivers interpret the profile cues in combination.

According to Sundar, Knobloch-Westerwick, and Hastall (2007), when multiple cues are presented together, their effects are more likely to be understood in combination with each other rather than as separate pieces of information (cf. Metzger, Flanagin, & Medders, 2010). Sundar et al. (2007) reported two specific types of cue combination patterns: the cue-cumulation effect (i.e., additive effect) and the primacy of one dominating cue. In the present study, we expect the combination of the cues to be in a complementary fashion. Neither the number of friends nor the number of reviews conveys complete information about a reviewer. For example, a reviewer may have accumulated numerous friends on the review site by writing helpful reviews that prompted numerous receivers to make friend requests. However, a reviewer may not have accumulated friends in this way. Instead, a large number of friends could be the result of the reviewer sending out numerous friend requests. On the other hand, the number of reviews constitutes relatively concrete evidence of the reviewer's activity. Yet, the number does not tell about the quality of the previous reviews. In this regard, we expect the receivers to interpret the two cues in relation to each other.

Research on information inconsistency also provides insights about how the two profile cues may be combined to form impression of the reviewer and the review. Past researches suggest that when people encounter information inconsistency, they often discount the inconsistent information (Anderson, 1971; Wyer, 1970). In the contexts of social network sites, Westerman, Spence, and Van Der Heide (2011) examined the effects of the ratio between the number of Twitter followers and the number of users a profile owner followed on credibility judgments, and demonstrated that viewers evaluate a Twitter user more credible when the ratio between the numbers are narrow than when the ratio is wide. Similarly, for the two profile cues, it is likely that viewers perceive it as more consistent when a reviewer to have a high number of reviews and a high number friends or a low number of reviews and a low number of friends than when the person shows a high number for only one of the elements and a low number for another. Feeling the inconsistency, the viewers may discount the high number in one of the cues, considering the ambiguity of the meanings. Thus, we hypothesize the following interaction:

H1: Number of friends and number of reviews interact such that a greater number of friends has a positive effect on perceived credibility (competence, trustworthiness, and caring/goodwill) when the number of reviews is large, but the number of friends has a negative effect on perceived credibility when the number of reviews is small.

### **Familiarity With the Platform**

The receivers' familiarity with the community platform is examined herein as a potential moderator of their processing of the profile cues. Studies have reported that users' community behavior is influenced by how much time they spend in online communities and the level of their familiarity with the Internet (Assmann, Sandner, & Ahrens, 2009; Kozinets, 1999). Thus, the present study aims to examine the effects of the receivers' familiarity with the online community platform (Yelp users vs. nonusers). Through a comparison between the users and the nonusers, we aim to provide an explanation about receiver's processing of user profiles as a product of learning. If the users' processing of reviews and profile cues are different from nonusers' processing, this would suggest that people adapt to different CMC settings and

develop ways of processing information over time. Thus, we hypothesize the following interaction: The receiver's familiarity with the community platform (user/nonuser) moderates the effect of the number of friends and the number of reviews on perceived credibility (competence, trustworthiness, and caring/goodwill).

H2: For a receiver familiar with the community platform, there is an interaction between the number of friends and the number of reviews such that a greater number of friends has a positive effect on perceived credibility when the number of reviews is large, but the number of friends has a negative effect when the number of reviews is small. For a receiver unfamiliar with the platform, there is no interaction or main effect pertaining to the number of friends and the number of reviews.

## Review Valence

Message factors also influence source credibility. According to Slater and Rouner (1996), source credibility can be based on three types of data: the receiver's prior knowledge and impressions of the source, the reputation or credentials of the source, and the message itself. When the receiver does not know anything about the source, the presentation and plausibility of the message and how convincing the supports are influence a receiver's perception of source credibility (Slater & Rouner, 1996). Overall, Slater and Rouner (1996) demonstrated the effect of message evaluation on the subsequent perception of source credibility.

Message factors are likely to influence people's perceptions of the credibility of online reviews. When people browse online reviews from unknown community members, they are not likely to have a prior attitude toward the source. Therefore, the receivers form attitudes toward the reviewer and toward the product or service discussed by the reviewer simultaneously. Thus, the message, i.e., "what the person says" and "how the person says it," influences the receiver's attitude toward the source. In this regard, the present study examines the effect of message factor on perceptions of the reviewer's credibility and on attitude toward the object under review.

The specific message factor that this research focuses on is message valence—whether the review offers a positive or negative evaluation of a product. Valence is an important message factor in WOM literature. Negative WOM has been shown to have more impact than positive WOM does (Arndt, 1967). It has been reported that consumers give more weight to negative information in their decision making (Sen & Lerman, 2007), and that unfavorable product information leads to stronger attribution to product performance, belief strength, and affect toward products (Mizerski, 1982). The research on the impact of negative WOM mostly focused on message attribution controlling for source credibility. In this study, therefore, we intend to examine the effect of valence on the perceived credibility of WOM and how perceived credibility mediates the effect of review valence on the receiver's attitude toward the product.

Kelley's covariation attribution model (1967) explains how people make causal attributions of occurrences that involve two entities. For example, if a message receiver were to see a product review that indicated that a reviewer, Paul, was dissatisfied with the restaurant, users in receipt of such information could attribute the message to the person (Paul does not like restaurants), the stimulus (this particular restaurant is bad), or the circumstance (there is something unique about this restaurant that Paul does not like) (Kelley, 1967; Lipe, 1991).

According to the covariation attribution model, there are three types of information people consider in determining how to attribute the occurrence: consensus (i.e., whether other people have responded in a similar way), distinctiveness (i.e., whether the person has responded similarly to other restaurants), and consistency (i.e., whether the person has responded similarly to this specific restaurant across time and

situations) (McArthur, 1972; Hesketh, 1984). A previous study demonstrated that consumers attribute negative WOM toward the brand or toward the communicator based on the configuration of negative WOM in terms of consensus, distinctiveness, and consistency (Laczniak, DeCarlo, & Ramaswami, 2001).

When people read a review posted by a member of the community about whom they do not have interpersonal knowledge, there is uncertainty of consensus, distinctiveness, and consistency. It is difficult for receivers to locate the cause of the reviewer's satisfaction or dissatisfaction, and thus, receivers may attribute the response to all three—the person, the restaurant, and the circumstance—rather than considering it to be caused by one. For example, in reading about Paul's dissatisfaction with a restaurant, receivers might conclude that the restaurant is of low quality, but at the same time, they cannot rule out the possibility that Paul might be a person who complains a lot, or that the restaurant was not performing to its usual standards. Receivers are likely to assume that the reviewer's negative or positive response is partially due to the person's own characteristics, and such impression is likely to influence perceived credibility of the reviewer. This is also consistent with Heider's conceptualization of phenomenal causality that “communicator or vehicle of a message is often seen to be the causal agent of the message and is affectively assimilated to the valence of the message” (Rosen & Tesser, 1972, p. 126; Heider, 1944). Moreover, previous studies report that people tend to like a person who makes positive evaluations of others or products, more than a person who makes negative evaluations, even when receivers themselves are not the object of evaluations (Folkes & Sears, 1977; Tesser & Rosen, 1975; Kamins, Folkes, & Perner, 1997). Thus, we hypothesize positive relationships between the review valence and source credibility dimensions:

H3: Receivers perceive a positive review to be more credible (competent, trustworthy, caring/goodwilled) than a negative review.

### Perceived Credibility Dimensions as Mediators

In addition to the hypotheses stated so far, the present study examines the mediation effects of the perceived credibility dimensions (competence, trustworthiness, and caring/goodwill). (See Figure 2 for a visual illustration of the overall research model.)

RQ: How do perceived credibility dimensions mediate the relationships between review valence, the number of friends, the number of reviews, and the receiver's familiarity with the platform and receiver's attitude toward the reviewed restaurant?

## Methods

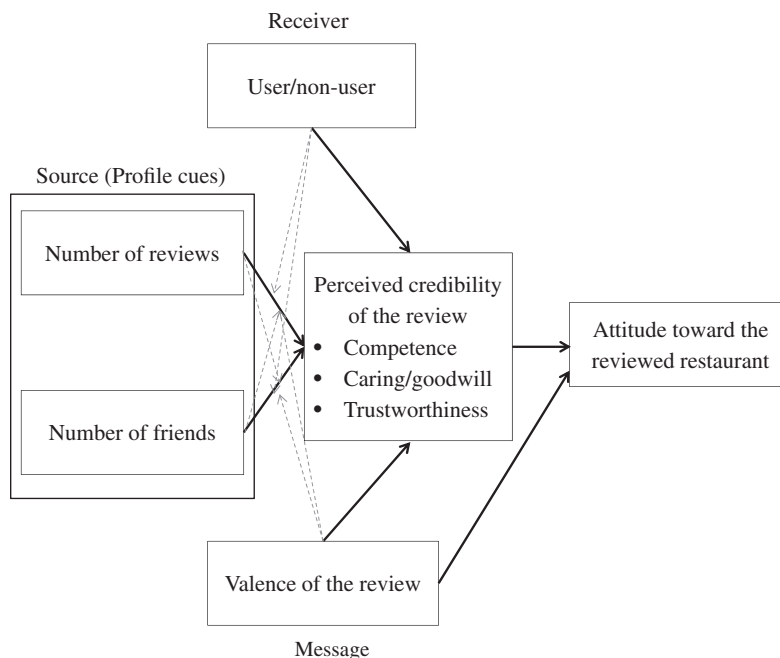
### Participants

The participants were 241 college students (73.9% female;  $M_{\text{age}} = 20.98$ ,  $SD = 4.02$ ) enrolled in communication courses at a large U.S. university. The ethnic composition was as follows: 77.6% Caucasian, 6.6% African-American, 1.7% Hispanic or Hispanic-American, 10.0% Asian or Asian-American, and 4.1% multiracial or other. The participants received extra credit for participating in the study.

### Design

To test the research question and hypotheses, a 2 (valence: positive vs. negative)  $\times$  2 (number of friends: few friends vs. many friends)  $\times$  2 (number of reviews: few reviews vs. many reviews)  $\times$  2 (platform familiarity: users vs. nonusers) web-based experiment was conducted. Each participant was exposed to a





**Figure 2** Conceptual research model

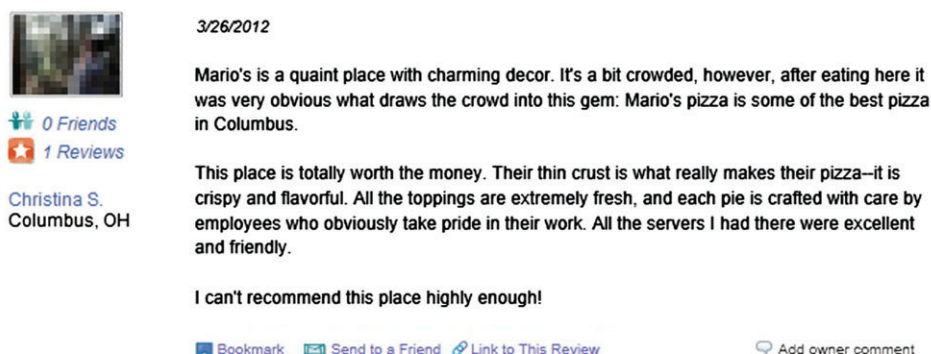
restaurant review accompanied by a reviewer's profile, and completed a measure of credibility of the review and a measure of attitude toward the restaurant. In addition, the participants answered a question about whether they had experience using Yelp.com (40.6% users and 59.3% nonusers).

### Stimuli: Restaurant Reviews with Reviewer Profiles

The valence (positive vs. negative), the number of friends of the reviewer (few-friends vs. many-friends), and the number of reviews posted by the reviewer (few-reviews vs. many-reviews) were operationalized through eight mock user reviews of a fictitious Italian restaurant. The stimuli reviews were created by emulating the structure of the user reviews on business pages on Yelp.com (Figure 3). Each stimulus was comprised by a reviewer profile on the left and a review on the right.

The valence of the review (positive vs. negative) was operationalized by manipulating the message. The respective structures of the positive and negative reviews were the same with the exception of some statements that were specific to the review valence but that were parallel to each other. For example, the positive review included sentences such as "Mario's is a quaint place with charming decor. It's a bit crowded, however, after eating here it was very obvious what draws the crowd into this gem: Mario's pizza is some of the best pizza in Columbus," whereas the negative review included "Mario's is a small place with strange decor. It's a bit crowded, however, after eating here it was not obvious what draws the crowd into this hole: Mario's pizza is some of the worst pizza in Columbus." With the exception of the negative and positive adjectives, the reviews were nearly identical in complexity and length, such that the positive review was 97 words long whereas the negative review was 96 words long.

The number of friends of the reviewer and the number of reviews posted by the reviewer were operationalized by the numbers indicated in the profile. For the few-friends condition, the number of friends



**Figure 3** Sample stimulus: Positive  $\times$  few-friends  $\times$  few-reviews condition

was set to 0, whereas for the many-friends condition, the number was 539. Operationally, our few-friends condition was a zero-friends condition. Zero was chosen, because it was the smallest number of friends a user can have in the community. The number of reviews was also manipulated into two conditions: few reviews and many reviews. For the few-reviews condition, the number of reviews was set to 1, indicating that the review presented was the only review posted by the reviewer, whereas for the many-reviews condition, the number was 217.

## Procedure

First, the participants were informed that the research was about people's perceptions of online reviews. After the consent process, the participants were randomly exposed to one of the eight stimuli. After reading the assigned reviews, they were asked to respond to a questionnaire to measure perceived credibility of the reviews. We measured perceived credibility using McCroskey and Teven's (1999) scale of source credibility. The scale is composed of three dimensions of source credibility: competence, caring/goodwill, and trustworthiness. Each dimension was measured with a 9-point semantic differential scale with six adjective-opposite pairings (i.e., informed-uninformed). For analysis, the items were later averaged into indices for the corresponding dimensions. The reliability of these measures was acceptable ( $\alpha_{\text{competence}} = .88$ ;  $\alpha_{\text{caring/goodwill}} = .83$ ;  $\alpha_{\text{trustworthiness}} = .85$ ).

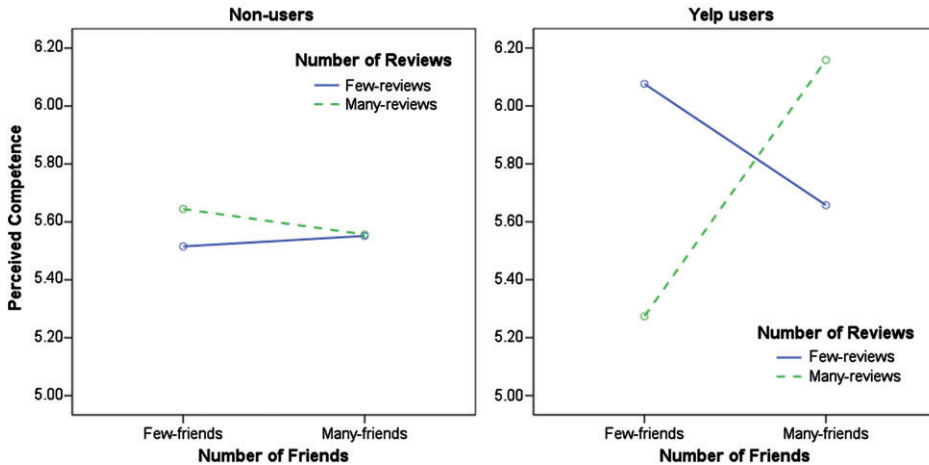
Attitudes toward the restaurant were measured with a semantic differential scale with six pairs of adjectives adapted from Burgoon, Miller, Cohen, and Montgomery (1978). Similar to the source credibility items, attitude was measured with a 9-point scale. The specific items were foolish-wise, unacceptable-acceptable, unfavorable-favorable, wrong-right, bad-good, and negative-positive. For analysis, the six items were averaged into one attitude index. The reliability of the attitude measure was also acceptable (Cronbach's  $\alpha = .98$ ).

## Results

### Effects on Perceived Credibility

To test the effects of review valence, the number of friends, the number of reviews, and the receiver's familiarity with the platform and the interactions on the three source credibility dimensions, three 2 (review valence)  $\times$  2 (number of friends)  $\times$  2 (number of reviews)  $\times$  2 (platform familiarity) ANOVA's were conducted.





**Figure 4** Three-way interaction effect of number of friends, number of reviews, and the receiver's familiarity with Yelp on perceived competence of the review

Hypothesis 1 predicted an interaction effect between the number of friends and the number of reviews on three dimensions of perceived credibility. The friends  $\times$  reviews interaction was not significant on any of the three credibility dimensions (competence:  $F(1, 225) = 2.75, p = .10, \eta_p^2 = .01$ ; caring/goodwill:  $F(1, 225) = 1.78, p = .18, \eta_p^2 = .01$ ; and trustworthiness:  $F(1, 225) = 1.82, p = .18, \eta_p^2 = .01$ ).

Hypothesis 2 predicted a three-way interaction among the number of friends, the number of reviews, and the receiver's familiarity with Yelp on the three dimensions of credibility. The results revealed a significant three-way interaction (friends  $\times$  reviews  $\times$  platform familiarity) for perceived competence,  $F(1, 225) = 4.03, p = .046, \eta_p^2 = .02$ . In other words, Yelp users and non-users showed a difference in their processing of profile cues (see Figure 4). In this regard, two 2 (review valence)  $\times$  2 (number of friends)  $\times$  2 (number of reviews) ANOVA's were conducted for non-users and Yelp users. As predicted for nonusers, there was no significant effect for the number of friends,  $F(1, 135) = 0.01, p = .91, \eta_p^2 = .00$ , the number of reviews,  $F(1, 135) = 0.09, p = .76, \eta_p^2 = .00$ , or the friends  $\times$  reviews interaction on competence,  $F(1, 135) = 0.08, p = .78, \eta_p^2 = .00$ . However, for Yelp users, there was a significant friend  $\times$  review interaction,  $F(1, 90) = 5.28, p = .024, \eta_p^2 = .06$ . When the number of reviews written by the reviewer was large, the participants exposed to the many-friends condition profile ( $M = 6.19, SD = 1.36$ ) perceived the review to be more competent than did the participants exposed to the few-friends condition profile ( $M = 5.38, SD = 1.58$ ). However, when the number of reviews written by the reviewer was small, the participants exposed to the few-friends condition profile ( $M = 6.05, SD = 1.47$ ) perceived the review to be more competent than did the participants exposed to the many-friends condition profile ( $M = 5.72, SD = 1.41$ ). (Table 1 provides detailed comparisons between nondiagonal cells.) There was no significant main effect for the number of friends,  $F(1, 90) = 0.67, p = .41, \eta_p^2 = .01$ , or the number of reviews,  $F(1, 90) = 0.28, p = .60, \eta_p^2 = .00$ . Thus, the data were consistent with Hypothesis 2 for competence.

The three-way interaction of friends  $\times$  reviews  $\times$  platform familiarity was not significant for caring/goodwill,  $F(1, 225) = 1.07, p = .30, \eta_p^2 = .00$ , or for trustworthiness,  $F(1, 225) = 1.12, p = .29, \eta_p^2 = .00$ . The data were not consistent with Hypothesis 2 for caring/goodwill or trustworthiness.

Hypothesis 3 predicted a positive relationship between review valence and the perceived credibility of the review. As predicted, the results revealed a significant main effect for review valence on all three

**Table 1** Yelp users' perception of review competence: friends  $\times$  reviews interaction

Number of reviews	Number of friends	
	Few	Many
Few		
<i>M</i>	6.05 <sub>aA</sub>	5.72 <sub>aA</sub>
<i>SD</i>	1.47	1.41
Many		
<i>M</i>	5.38 <sub>aB</sub>	6.19 <sub>bA</sub>
<i>SD</i>	1.58	1.36

$F(1, 90) = 5.28, p = .02, \eta_p^2 = .06$  controlling for message valence.

Note: Within rows, means with no lower case subscript in common differ at  $p < .05$ ; within columns, means with no upper case subscript in common differ at  $p < .05$ .

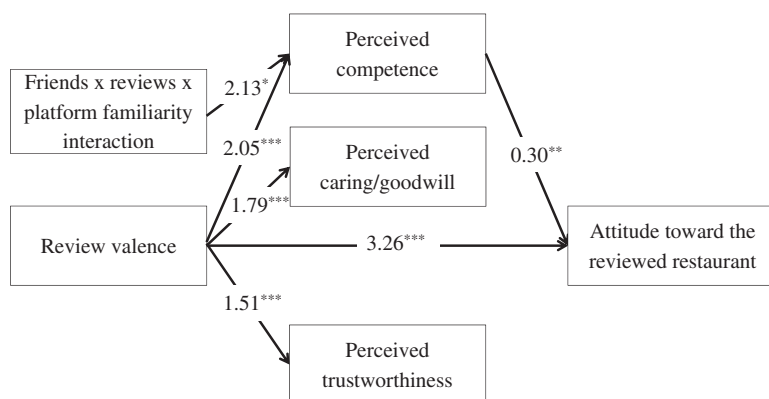
dimensions of credibility in the direction of a positive review leading to higher perceived credibility. The participants exposed to the positive review ( $M = 6.38, SD = 1.29$ ) perceived the review to be more competent than did those exposed to the negative review ( $M = 4.85, SD = 1.35$ ),  $F(1, 225) = 63.89, p < .001, \eta_p^2 = .22$ . Moreover, the participants exposed to the positive review ( $M = 6.46, SD = 1.16$ ) perceived the review to be high in caring/goodwill than did those exposed to the negative review ( $M = 4.79, SD = 1.20$ ),  $F(1, 225) = 99.70, p < .001, \eta_p^2 = .31$ . Lastly, the participants exposed to the positive review ( $M = 6.81, SD = 1.19$ ) perceived the review to be more trustworthy than did those exposed to the negative review ( $M = 5.62, SD = 1.04$ ),  $F(1, 225) = 55.80, p < .001, \eta_p^2 = .20$ . Therefore, Hypothesis 3 was supported.

### Effects on Attitudes Toward the Reviewed Restaurant

Before the tests for the mediation effects of the three perceived credibility dimensions (RQ), a regression analysis was conducted to examine which of the following directly influence the receiver's attitude toward the reviewed restaurant: review valence, the number of friends, the number of reviews, the receiver's familiarity with the platform, and the interactions among the independent variables, and the three perceived credibility dimensions. The four independent variables, the two-way, three-way, and four-way interactions among them, and the three credibility dimensions were included as the predictors. The results indicated review valence ( $b = 3.26, t(222) = 7.41, p < .001$ ) and perceived competence ( $b = .30, t(222) = 3.39, p < .001$ ) as the only significant predictors of attitude toward the reviewed restaurant at the .05 level.

### Mediation Analyses

To test the mediation effects of the credibility dimensions (RQ), we conducted a multiple mediation analysis using bias-corrected bootstrapping as recommended by Preacher and Hayes (2008). In specific, Model 4 of SPSS macro PROCESS was used to test the mediation (Hayes, 2013). Based on the results of the regression analysis in the previous section, we aimed to test the significance of the indirect paths (1) between review valence and attitude through perceived competence of the review and (2) between the friends  $\times$  reviews  $\times$  platform familiarity interaction and attitude through perceived competence. For each mediation analysis, the four independent variables and the two-way, three-way, and four-way interactions among them were entered as the predictor/covariates, and three credibility dimensions were included as the mediators.



**Figure 5** Significant paths to the perceived credibility dimensions and attitude. The numbers indicate unstandardized regression coefficients. All direct paths and indirect paths indicated are significant at the .05 level

The results confirmed the indirect effect of review valence on attitude toward the restaurant through perceived competence of the review to be significant, 95% bias-corrected confidence interval of [0.24, 1.17]. Further, the indirect effect of friends  $\times$  reviews  $\times$  platform familiarity interaction on attitude toward the restaurant through perceived competence of the review was significant, 95% bias-corrected confidence interval of [0.12, 1.56]. In accord with the results from the previous section, perceived caring/goodwill and trustworthiness did not mediate the relationships. The results of the mediation and overall analyses are shown in Figure 5.

In sum, all four independent variables—review valence, number of friends, number of reviews, and the receiver's familiarity with the platform—influenced perceived competence of the review and attitude toward the restaurant in some way. Yet, of the three credibility dimensions, only competence had a significant effect on attitude toward the restaurant and mediated the relationship between the independent variables and attitude. Review valence had main effects on competence, caring/goodwill, trustworthiness, and attitude toward the restaurant. The effect of valence on attitude was through two paths: a direct path and an indirect path through competence. There was a significant interaction among the number of friends, the number of reviews, and the receiver's familiarity with the platform on perceived competence, and the interaction indirectly affected attitude toward the restaurant.

## Discussion

This research illustrates how source, receiver, and message factors influence receivers' perceptions of the credibility of an online review and their attitudes toward the reviewed object.

First, there was a difference between the receivers familiar with Yelp and the receivers unfamiliar with Yelp, in terms of their utilization of the profile cues for assessments of the review and the reviewed restaurant. The receivers unfamiliar with Yelp (i.e., non-users) were not influenced by the number of friends, the number of reviews, or the interaction between the two. However, for the receivers familiar with Yelp (Yelp users), there was a significant friends  $\times$  reviews interaction in regard to perceived competence. These results suggest that the receiver's familiarity with the platform functions as a moderator of cue-taking in CMC.

Social information processing theory (SIPT) (Walther, 1992) claims that in CMC environments in which nonverbal cues are not available, people adapt and employ available cues. Adding to this, the results showing differences between users and nonusers in cue-taking suggest that people's cue-taking involves learning and that people's adaptation to an environment takes time. The nonusers were not influenced by the profile cues even though there were clear text indications of what the cues meant (e.g., "539 Friends," "217 Reviews"). It can be assumed that either they did not pay attention to the alternative cues or that they did not ascribe any meaning to the cues. While this tenet of SIPT is often mentioned as a part of the social information processing theory canon, it has rarely been tested empirically in a way that shows how a user's familiarity with a system affects his/her perceptions of the social information available. This effect should be examined in greater detail in future research.

Second, for Yelp users, the hypothesis of complementary cue-combination effect of the number of friends and the number of reviews was supported for perceived competence. For the reviewer who had written many reviews, the number of friends was positively related to perceived competence. However, for the reviewer who had written few reviews, the number of friends was negatively related to perceived competence. The results suggest that receivers familiar with the platform use profile cues to assess competence and their interpretation of the two profile cues depends on each other, due to the ambiguity of the meanings of the cues.

For the reviewer with many friends and many reviews, the Yelp users may have viewed the reviewer as a person with considerable experience and enthusiasm pertaining to food, and they may have thought that other community members highly valued the reviews accordingly. Therefore, they may have assessed the review to be more competent than they otherwise would have. On the other hand, for the reviewer who had many reviews but only few friends, the Yelp users may have concluded that the community members did not think highly of the reviews. Moreover, for the reviewer who had few reviews but many friends, the Yelp users may have concluded that the reviewer had many friends because she/he had sent out lots of friend requests. Finally, it is likely that the reviewer who had few friends and few reviews was considered to be a relatively new member of the community. Therefore, the Yelp users may have considered it reasonable that this reviewer had few friends, and have assessed the competence more based on the review itself rather than discounting competence based on the small numbers of friends and reviews.

These results are consistent with Sundar et al.'s (2007) claim of the combinatory effect of cues. Further, the results suggest the complementary combination of cues as the third type of cue-combination in addition to the cue-cumulation and the primacy of one dominant cue demonstrated by Sundar et al. (2007). Such combination patterns are also consistent with inconsistency discounting in information integration (Anderson, 1971; Wyer, 1970). This is especially meaningful due to the increasing implementation of social networking features in online review communities. The social networks in those communities are mediated by reviews, and users seem to be aware of this fact. The results of the present study suggest that the community users attach specific meanings to the profile cues and that they compensate for the ambiguity associated with the respective meanings of the cues by interpreting the two related cues together.

Third, the three-way interaction among the number of friends, the number of reviews, and the receiver's familiarity with Yelp did not have a direct influence on the receiver's attitude toward the reviewed restaurant. However, the interaction influenced the receiver's attitude indirectly through perceived competence. This is consistent with previous findings that credibility influence persuasion outcome (Hovland et al., 1953). It should be noted that the present study (consistent with most of the literature exploring the effects of eWOM on products) was conducted with an attitude object that was entirely unknown to the subjects. In future work, researchers should examine whether credibility factors

continue to mediate the relationship between source factors and product evaluations when there is an extant, albeit potentially less-accessible, attitude toward a product.

Finally, review valence had positive main effects on all three credibility dimensions and on attitude toward the restaurant. We assume that the results can be explained by the receivers' attributing the positive/negative review messages to both the reviewer and the restaurant. Thus, receivers evaluate a reviewer who shares complaints as less credible than a reviewer who shares compliments. These results suggest that negative WOM has a high impact despite having less credibility than positive WOM. Future research should examine whether such effects may be due to negativity phenomena (Kellerman, 1984) or nonnormativity effects (D'Angelo & Van Der Heide, *in press*).

Overall, the present study provides a good illustration of how people make sense of consumer reviews posted by unknown others in online communities with social networks. The findings support and extend social information processing theory (Walther, 1992) and the literature on the combinatory effect of cues (Sundar et al., 2007). Moreover, the present study demonstrates that the receiver's familiarity with a community platform is a moderator of people's cue-taking, and further demonstrates the user's complementary combination of the profile cues. Further, we have also demonstrated that review valence is a predictor of perceived credibility and attitude toward the reviewed object.

The findings are also meaningful in a practical sense. Online review communities and their incorporation of social networking features have become prevalent. The present study suggests that the adoption of social-networking features for online review community platforms can help users' assessment of the credibility of reviews. Thoughtful adoption of social networking features can help the credibility judgment of the information transferred through the community as well as stimulating community activities.

### Limitations and Future Research

This study has some limitations. First, there is an issue with regard to ecological validity. In our study design, each stimulus condition presented only one review. However, when people browse reviews in online communities, they may read over multiple reviews. The purpose of our study design was to assess the effects of specific review characteristics on review credibility judgments and their attitudinal outcomes. Although this design allowed us to isolate theoretically important variables, we acknowledge that the single-review stimulus design may have inflated the effects of the review valence, because the participants had to rely on a single review in evaluating the review's credibility and the restaurant instead of being afforded the opportunity to take multiple reviews (representing multiple opinions) into consideration. The dynamics between communication factors might differ in the presence of multiple reviews, such that receivers may rely more on the profile cues. Further, although the purpose of this study was not to examine the effects of consensus as they interact with other profile elements, it is possible that the findings presented here may be moderated by the consensus of one particular product review with other reviews of the particular product or business. Moreover, because valence was not the primary independent variable of interest, we considered the inflation of this factor's effects to be a necessary difficulty in the study design. Future research should explore this possibility by testing the findings with multiple-review stimuli.

The present study examined only review valence among many message factors and only familiarity with the platform among receiver factors. Other factors such as argument strength and the receiver's predisposition may be moderators of current findings. For example, arguments that are both lengthy and strong may make profile cues less important. Also, if receivers read an online review about a restaurant with which they are already familiar, their evaluation of the review and the reviewer would largely depend on their prior attitude toward the restaurant. Future studies are needed in these areas.

In conclusion, the major communication factors (source, message, and receiver factors) influence the perceived competence of an online review and the attitude toward the reviewed object. The current

study provides novel insights about the dynamics between the communication factors involved in the persuasion process associated with online reviews.

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## About the Authors

**Young-shin Lim** (M.S., Pennsylvania State University) is a doctoral candidate in the School of Communication at the Ohio State University. Her research interests include communication technologies, social media, and persuasion.

**Address:** School of Communication, The Ohio State University, 3041 Derby Hall, 154 North Oval Mall, Columbus, OH 43210.

**E-mail:** lim.956@osu.edu

**Brandon Van Der Heide** (Ph.D., Michigan State University) is an assistant professor in the College of Communication Arts and Sciences at Michigan State University. His research interests primarily concern how social influence processes are affected when people interact with one another using communication technologies.

**Address:** 404 Wilson Road, Communication Arts and Sciences Building, Michigan State University, East Lansing, MI 48824.

**E-mail:** bvheide@gmail.com