

To Err is Human?

How Typographical and Orthographical Errors Affect Perceptions of Online Reviewers

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### How Typographical and Orthographical Errors Affect Perceptions of Online Reviewers

Consumers increasingly rely on online product reviews when making purchase decisions. However, assessing the credibility of online reviewers presents consumers with unique challenges. This paper examines how consumer perceptions of reviewer credibility are influenced by the presence and type of textual errors in the review itself. The results of an online experiment indicate that consumers' reactions to textual errors are moderated by their general trust in others. Low-trust consumers are relatively insensitive to textual errors in judging reviewer credibility. However, high-trust consumers are less forgiving of typographical errors (which may signal carelessness) than orthographical errors (which may indicate cognitive challenges). Implications for future research are discussed.

*Keywords:* online reviews, electronic word of mouth, perceived credibility, textual errors, interpersonal trust, message involvement

## 1. Introduction

Word-of-mouth (WOM) communication has long been known to influence consumers' purchasing decisions (Herr, Kardes, & Kim, 1991; Katz, Lazarsfeld, & Roper, 2005). However, the reach of such interpersonal communication has been amplified in recent years by the growth of electronic word-of-mouth (eWOM), (i.e., consumer-to-consumer communication via the Internet). Consumers seeking to profit from peers' experiences can now consult, not only with friends and family, but also with thousands of consumers whom they have never met, by reading online product reviews on websites such as Tripadvisor, Amazon, or Yelp. A 2010 Pew study found that nearly 6 in 10 US adults had engaged in online product research before making purchases, with much of this research using product-user ratings and reviews (Jansen, 2010). A 2012 Nielsen study (Nielsen, 2012) found that "consumer opinions posted online" were the second most-trusted source of product information among consumers worldwide, ranking behind only "recommendations from people I know."

However, online product reviews, like most aspects of the Internet, constitute a mixed blessing--a source not only of information, but also of misinformation (see, e.g., Bower, 2017; Chung et al., 2012; de Barra, 2017). For example, de Barra (2017) found that online consumer reviews of over-the-counter medications tended to greatly overstate the typical effectiveness of these drugs, compared to clinical trial data (see also Bower, 2017; Ioannides, 2017).

Thus, it is important to gain a better understanding of how consumers assess the credibility of online reviews. As noted by Lim and Van Der Heide (2015, p. 68), consumers seeking to assess the credibility of online reviews face unique challenges, since "Unlike face-to-face WOM, online consumer reviews are generally transferred among strangers via text." Thus, users of eWOM are deprived of some credibility cues that are typically available in traditional

WOM, including information gleaned from a prior relationship with the source and nonverbal cues such as the reviewer's facial expression and tone of voice.

However, the textual nature of online reviews also provides consumers with credibility cues that are not available in traditional face-to-face WOM, including the reviewer's writing style, and the presence and type of typographical and spelling errors. Since individuals with varying language skills write online reviews, and since some of these reviews may be written hastily, online reviews often contain spelling or textual errors. While past research has acknowledged the potential impact of textual errors on online credibility (Metzger, Flanagin, & Medders, 2010), all typographical and spelling errors have tended to be combined into a single category. However, is it possible that Internet users make distinctions between different types of textual errors when assessing a reviewer's credibility?

The purpose of this research is to examine how the presence and type of textual errors in an online review influence Internet users' judgments of the reviewer's credibility, and how users' responses to such errors are influenced by their general inclination to trust other people. In the following sections, we examine past research on how consumers' assessments of the credibility of peer-to-peer information on the Internet may be influenced by different types of textual errors. Then, we discuss how interpretation of textual cues may be moderated by consumers' general tendency to trust others. Finally, we present the results of an experiment examining these phenomena, and discuss the implications of our findings and directions for future research.

## **2. Theory and Hypotheses**

### *2.1. Textual Credibility Cues*

As noted above, one potential cue for judging the credibility of an online review is the text of the review itself, including the presence of errors in grammar or spelling. Several studies

have shown that poor grammar and spelling can harm the credibility of professional or corporate websites (Chesney & Su, 2010; Everard & Galletta, 2005; Metzger et al., 2010; Wogalter & Mayhorn, 2008). For example, Fogg et al. (2001) conducted a large-scale study of the factors influencing website credibility and concluded that “even one typo...is damaging” to websites’ perceived credibility (p. 68). Similarly, Everard and Galletta (2005) found that the presence of spelling errors reduced the perceived quality of an online retailer's website.

However, it is less clear whether consumers apply the same standards when evaluating amateur posts, such as online consumers’ reviews. Weiner (2009) states that spelling and grammatical errors in professional web writing undermine the writer's credibility, but goes on to suggest that there may be a different standard for more informal writing, noting that she is more forgiving of typos in quick communications like tweets on Twitter. Wathen and Burkell (2002) declare that even a single misspelled word can signal “amateurism,” which could lead to a decrease in the writer’s perceived expertise. However, several researchers (see, e.g., Willemsen, Neijens, & Bronner, 2012) have noted that amateurism is actually one of the central appeals of online user reviews. Such reviews are valued in part because they are perceived to be written by average consumers, as opposed to slick professional reviewers.

Research suggests that reactions to textual errors in informal Internet communications may depend on how those errors are interpreted. For example, Vignovic and Thompson (2010) found that people were more tolerant of textual errors in an email if they believed that the sender came from another culture, and was writing in a second language. Similarly, Carr and Stefaniak (2012) found that participants were more likely to discount or forgive textual errors when provided with cues indicating that the message had been sent from a smart phone, whose smaller keyboard might make keystroke errors difficult to avoid. In addition, as discussed in the next

section, it is possible that Internet users' interpretation of textual errors may be influenced by the nature of the errors themselves.

## 2.2. *Typographical Errors vs. Orthographical Errors*

Past research indicates that textual errors sometimes influence perceptions of source credibility, but do online consumers make a distinction between different *types* of textual errors? Specifically, can they differentiate between *typographical* errors and *spelling* errors? One blogger on language, Jason Kottke (2007), asked, “Do you make a distinction between typos and misspellings, or is that just me? For example, ‘regualr’ is a typo while ‘refridgerator’ is a misspelling. The former is a mechanical error, while the latter demonstrates a lack of specific knowledge.” Similarly, Min, Wilson, and Moon (2000) make the distinction between what they call *typographical* errors (i.e., mechanical errors such as letter transposition or mis-striking an adjacent letter on the keyboard) and *orthographical* errors (i.e., cognitive errors, such as phonetic misspellings or substituting a homophone). However, while language experts have noted the distinction between typographical and spelling (or orthographical) errors, do readers of online reviews make this distinction?

According to attribution theory (Malle, 2011), people may respond differently to similar phenomena, depending on their attributions of the underlying cause of the phenomena. For example, an orthographical error (e.g., substituting “hite” for “height”) might be attributed to a lack of education, or to a cognitive challenge such as dyslexia, traits over which the writer has little control. Conversely, a typographical error (e.g., substituting “regualr” for “regular”) seems more likely to be attributed to careless writing by one who “knows better,” perhaps indicating a cavalier approach toward writing the review. Boland and Queen (2016) note that “typos are often attributed to carelessness or hurried typing, rather than ignorance of spelling conventions.”

Similarly, Vignovic and Thompson (2010) state that in computer-mediated communication "...typographical errors may be attributed to carelessness" (see also Howe, 2010).

Interestingly, research also indicates that carelessness, or lack of conscientiousness, is often associated with lack of trustworthiness. Vignovic and Thompson (2010) posited that careless textual errors may be viewed as a cue for a writer's general lack of cognitive trustworthiness, i.e., an indication that the writer is not reliable or responsible. Their findings confirmed that email senders whose messages contained textual errors were rated lower not only on perceived conscientiousness, but also on perceived cognitive trustworthiness. This is consistent with broader research findings concerning the "big five" personality trait conscientiousness. Miller, Griffin, & Hart (1999, p. 8) define conscientiousness as a cluster of "individual characteristics such as persistence, planfulness, carefulness, responsibility, and hard [work]..." Empirical research has shown that individuals scoring low on trait conscientiousness are both more likely to make careless errors (see, e.g., Bowling et al., 2016) and to exhibit dishonesty (Evans & Revelle, 2008; Horn, Nelson, & Brannick, 2004; Ones, Viswesvaran, & Schmidt, 1993). For example, Horn, Nelson and Brannick (2004) found that student research subjects scoring low on trait conscientiousness were significantly more likely to dishonestly over-report the time they spent on a research task in order to receive more course credit.

### *2.3. General trust in people*

One factor that may moderate the effect of textual errors on perceived trustworthiness is consumers' dispositional tendency to trust other people. Trust is a concept that is central to interpersonal relationships (Good, 1988) and message acceptance (Mishra, 1996). Rotter (1971, 1980) conducted a seminal series of studies on people's general interpersonal trust, finding that high-trust individuals tended both to behave more honestly themselves (e.g., they were less likely

to cheat) and to expect honest behavior from others. However, while research indicates that high-trust individuals tend to give new acquaintances the benefit of the doubt, they are not simply gullible. In fact, they were found to be more sensitive than low-trust individuals to cues concerning others' trustworthiness. In summarizing this research, Yamagishi (2011, p. 115) noted that high-trust individuals tended to make higher initial estimates of new acquaintances' trustworthiness; however, when they were presented with "negative information indicating that the target person was not trustworthy, high-trusters changed their estimation of the target person's trustworthiness more quickly than did low trusters...[responding] more sensitively to information that potentially indicates others' lack of trustworthiness." Several researchers (Lajoy, 1975; Sabatelli, Buck, & Dreyer, 1983; Yamagishi, Kikuchi, & Kosugi, 1999) have found that high-trusters tend to exhibit greater social intelligence, (i.e., the ability to accurately read others' intentions and predict their behavior.) This ability allows them the luxury of trusting new acquaintances, knowing that they can quickly adjust their assessments if presented with evidence of low trustworthiness. Conversely, since low-trusters tend to be less skilled at reading others' intentions, this seems to lead to a broad attitude of mistrust (Yamagishi, 2011).

Based on the general-trust research discussed above, one would expect that individuals with high dispositional trust would tend to perceive online reviewers as trustworthy, *in the absence of specific evidence of low trustworthiness*. However, this body of research also suggests that high-trust individuals are especially sensitive to cues indicating that a particular person may not be trustworthy. Thus, it follows that Internet users scoring high on dispositional trust will be especially sensitive to cues indicating that a specific online reviewer may not be trustworthy. Specifically, since typographical errors are often attributed to carelessness (Boland & Queen, 2016; Howe, 2010; Vignovic & Thompson, 2010), and carelessness is associated with



lack of trustworthiness (Horn et al., 2004; Vignovic & Thompson, 2010), we hypothesize that high-trust individuals will be especially likely to perceive writers of reviews containing typographical errors to be low on trustworthiness.

Based on the preceding discussion, we hypothesize the following:

H1: There will be a significant interaction between general trust and textual errors.

Specifically, we expect that:

- a. high-trust consumers will give higher perceived *carelessness* ratings to reviewers whose posts include typographical errors than to reviewers whose posts include orthographical errors.
- b. high-trust consumers will give lower perceived *trustworthiness* ratings to reviewers whose posts include typographical errors than to reviewers whose posts include orthographical errors.
- c. low-trust consumers' perceptions of reviewers will be relatively insensitive to the presence or absence of different types of textual errors.

#### 2.4. *Message Involvement*

Message involvement is the depth with which an individual attends to, and is mentally engaged with, a message at the time of exposure (Greenwald & Leavitt, 1984). Research has found that message involvement plays an important role in overall message effectiveness (Baker & Lutz, 2000; Batra & Ray, 1985; Greenwald & Leavitt, 1984). Increased levels of message involvement are often associated with increased attitude change (see, e.g., Karmarkar & Tormala, 2010). In addition, attitude changes that occur under conditions of high (vs. low)

message involvement tend to be more durable and predictive of future behavior (Greenwald & Leavitt, 1984; see also Shrum, Liu, Nespoli, & Lowrey, 2013).

One important antecedent of message involvement is the perceived credibility of the message source (Hamby, 2014; Karmarkar, & Tormala, 2010). For example, Hamby (2014) found that a strong determinant of whether consumers became mentally engaged with other consumers' online product reviews was whether they found the reviewers to be credible. Since textual errors (especially typographical errors) are expected to reduce the credibility of online reviewers, it follows that such errors would also diminish consumers' involvement with the reviews themselves.

Therefore, we hypothesize:

H2a: There will be a significant interactive effect of textual errors and general trust on message involvement, such that high-trust consumers will report lower involvement with online reviews that include typographical errors than with reviews that include orthographical errors.

H2b: In contrast, we expect that low-trust consumers' level of message involvement will be relatively unaffected by the presence or absence of different types of textual errors.

To examine these hypotheses, we conducted an online experiment in which a national sample of US adults evaluated reviews of a fictitious over-the-counter (OTC) medication to reduce stomach acid. This product-category context was selected for several reasons. First, consumers' decisions to use OTC drugs can have important health consequences (Brody, 2015). Second, OTC drugs are frequently the subject of online consumer reviews, on websites ranging

from Amazon.com to Walmart.com. Third, OTC medications, unlike prescription drugs, can be purchased online directly by the consumer, without consultation with a physician, often from the same websites which post online consumer reviews.

### **3. Method**

#### *3.1. Overview*

The purpose of this study was to assess consumers' responses to online product reviews that contained orthographical errors vs. typographical errors. Participants were randomly assigned to one of three different textual-error conditions, using a between-subjects design: no errors, typographical errors, or orthographical errors. All participants were shown a brief description of the product, its average user rating (3 out of 5 stars), and one of three versions of a user review of the product. Participants then answered a series of questions about their perceptions of the review and reviewer (see *Measures*). The entire research protocol was approved by the institutional review board at the first author's university.

Different review versions were adapted from an actual online review of the over-the-counter drug Prilosec, but varied in terms of textual errors, containing either no errors, typographical errors, or orthographical errors. As shown in Figure 1, reviews with orthographical errors contained consistent phonetic misspellings (e.g., "sevrall" instead of "several" or "useing" instead of "using"), whereas reviews with typographical errors included common mechanical or keystroke errors, including transposition of letters ("wsa" instead of "was") and missed keystrokes ("mydoctor" instead of "my doctor"; for further discussion of these distinctions, see Min, et al., 2000). As will be discussed later, manipulation checks confirmed that participants were able to distinguish between these two types of errors.

[PLACE FIGURE 1 HERE]

### 3.2. *Sample*

An initial sample of 282 adult participants was recruited from a national online survey panel purchased from a commercial sample vendor, Survey Sampling International (SSI). SSI maintains a national panel of over 6 million potential participants. For each study, SSI sends email invitations to a random subset of panel members meeting the study's demographic criteria. SSI places volunteers into a lottery to win a monetary prize, in order to increase response rates.

After initial recruitment by SSI, potential participants were directed to a web survey, where they were asked a screening question confirming their age (between ages 35 and 55). Ten individuals did not fall into this age range and were screened out, resulting in a final usable sample of 272. Adults between 35 and 55 were used in the sample, because they were more likely to have used or be familiar with an acid-reducing medication (Simmons, 2014).

### 3.2. *Measures*

To measure participants' perceptions of the trustworthiness and expertise of the online reviewers, we used a modified version of the Ohanian (1990) scale, which contained a series of 7-point semantic differential scales assessing perceived reviewer trustworthiness and expertise. These individual items were analyzed in a principal components analysis with a varimax rotation, which resulted in two orthogonal factors with eigenvalues above 1.0, which together explained 75.9% of the combined variance of the original items. The first factor captured perceived reviewer *trustworthiness*; the items loading ( $> .80$ ) on this factor were: "trustworthy/not trustworthy," "sincere/insincere," "honest/not honest," "dependable/not dependable," and "genuine/artificial." The second factor captured perceived reviewer *expertise*; the items loading ( $> .74$ ) on this factor were: "expert/not an expert," and "well-educated/poorly-educated."

We also included two additional 7-point bipolar adjectives that would serve as a manipulation check on whether participants could distinguish between different types of textual errors (“good speller/poor speller,” and “poor typing skills/good typing skills.”) For all semantic-differential items, we alternated the polarity of the positive and negative descriptors to discourage acquiescence bias.

*General interpersonal trust* was measured with a 4-item series of Likert scales from Naef and Schupp (2009) (e.g., “You can trust people”; “Nowadays, you can’t rely on anybody” [R]; “When dealing with strangers, it is better to be cautious before trusting them” [R]; and “When you first meet people, it is hard to trust them” [R]). This measure was reliable, with a coefficient alpha of .71.

Perceived reviewer *carelessness* was measured using four semantic differential scales: “not careful/careful,” “hurried/not hurried,” “hasty/not hasty,” and “lazy/not lazy.” These items were combined to form a mean scale with a coefficient alpha of .86.

*Message involvement* was measured with a 3-item 5-point Likert scale adapted from Cox and Cox (2001). Items in the involvement scale were: “I got involved in what the reviewer wrote,” “I felt strong emotions while reading the review,” and “The review was relevant to me.” These items were combined to form a mean scale with a coefficient alpha of .84.

## **4. Results**

### *4.1. Sample Characteristics*

In the final sample of 272 participants, there were slightly more females than males (52% vs. 48%) and participants were fairly equally distributed across the 35-55 age range. About 54% of participants had read an online product review in the last month, while 39% had posted an online review themselves at some point. About 33% of participants had only a high school

education or less. About 66% had taken or had a family member take a non-prescription antacid. Chi-squared analyses from cross tabulations of the sample characteristics and experimental conditions revealed no significant differences in age, gender, or prior use of online reviews. However, educational levels differed slightly but significantly ( $p = .03$ ) across the experimental conditions. Therefore, education was controlled as a covariate in the analyses.

#### 4.2. Manipulation Checks

The first manipulation check assessed whether participants could distinguish between the error-free message and the messages containing errors (either orthographical or typographical). An ANOVA was conducted on the semantic differential item, “poor speller/good speller,” with the textual-error conditions as the independent variable. Results showed a significant main effect ( $F_{(2,265)} = 14.58, p < .001, \eta^2 = .100$ ). Tukey post hoc tests showed that the spelling ability of reviewers in the orthographical-error ( $M = 3.60, SD = 2.13, p < .001$ ) and typographical-error ( $M = 3.76, SD = 1.86, p < .001$ ) conditions were rated significantly lower than in the error-free condition ( $M = 4.87, SD = 1.32$ ). However, there was no significant difference between the orthographical and typographical error conditions.

The second manipulation check assessed whether participants could distinguish between orthographical errors and typographical errors. To check this, we ran an ANOVA on the semantic differential item, “poor typing/good typing.” There was a significant main effect of error condition on responses to this item ( $F_{2,263} = 21.87, p < .001, \eta^2 = .144$ ). A Tukey post hoc test revealed that the writer of the review containing typographical errors was rated significantly lower ( $M = 3.36, SD = 1.71$ ) on perceived typing ability than the reviewer in either the orthographical error condition ( $M = 4.14, SD = 1.75, p = .007$ ) or the error-free condition ( $M = 4.89, SD = 1.36, p < .001$ ). These findings indicate that, while participants were equally likely to

perceive spelling errors in both error-prone messages, they were significantly more likely to attribute these errors to mechanical/typographical issues in the typographical-error condition. Thus, the manipulation of orthographical vs. typographical errors appears to have been successful.

### *4.3. Experimental Results*

#### *4.3.1. Overview of Experimental Analysis*

The experimental data were analyzed using a series of analyses of variance (ANOVAs), in which the two independent variables were textual errors (no errors, orthographical errors, or typographical errors) and participants' general interpersonal trust. General trust is conceptualized as a stable individual trait, and analysis confirmed that it was not influenced by the textual error manipulation ( $F_{(2, 266)} = .34, p = .71$ ). Since general trust and the textual error manipulation were uncorrelated, and the study was focused on examining group differences (between high-trusters vs. low-trusters), a median split was performed on the general trust scale, and this variable was entered in the ANOVAs as a dichotomous factor. For an excellent discussion of the expository benefits and statistical appropriateness of median splits under these circumstances, see Iacobucci, Posavac, Kardes, Schneider, & Popovich (2015a; 2015b).

The dependent variables in the ANOVAs included participants' perceptions of the reviewer's carelessness, trustworthiness and expertise, as well as participants' reported involvement with the message. Participants' age significantly affected perceptions of the reviewer's trustworthiness ( $r = .17, p < .01$ ), while education affected both perceptions of reviewer expertise ( $r = -.15, p < .05$ ) and participants' involvement with the message ( $r = -.14, p < .05$ ). As a result, these were included as covariates in the analyses of covariance (ANCOVAs)

that were performed. Please see Table 1 for the means and standard deviations for all conditions and dependent variables.

[PLACE TABLE 1 HERE]

#### 4.3.2. *Perceived reviewer trustworthiness*

The first ANCOVA analyzed the effect of textual errors and general trust on participants' perceptions of reviewer trustworthiness. This analysis revealed a significant main effect of general trust on perceived trustworthiness ( $F_{(1, 249)} = 4.97, p = .027, \eta^2 = .02$ ), in which participants scoring high on general interpersonal trust tended to perceive the reviewer as more trustworthy ( $M = .14, SD = 1.05$ ) than low-trust participants ( $M = -.14, SD = .93$ ). Textual errors did not have a significant main effect on perceived reviewer trustworthiness. However, there was a significant interaction between textual errors and general trust ( $F_{(2, 249)} = 5.80, p = .003, \eta^2 = .045$ ). This interaction is shown in Figure 2. Analyses of simple effects revealed that, among low-trust participants, textual errors had no significant effect on perceived trustworthiness ( $F_{(2, 126)} = .45, p = .641$ ), confirming Hypothesis 1c. However, among high-trust participants, there was a significant effect of textual errors on perceived reviewer trustworthiness ( $F_{(2, 127)} = 5.98, p = .003$ ). Tukey post hoc tests revealed that those who read the review with the typographical errors ( $M = -.22$ ) rated the reviewer significantly lower on trustworthiness than those who read the review with orthographical errors ( $M = .56, p = .002$ ). Thus, Hypothesis 1b was confirmed.

[PLACE FIGURE 2 HERE]

#### 4.3.3. *Perceived reviewer expertise*

The second ANCOVA analyzed the effect of textual errors and general trust on participants' perceptions of reviewer expertise. General trust had no main or interactive effect on



perceived expertise. However, there was a significant main effect of textual errors on perceived expertise ( $F_{(2,249)} = 3.73, p = .025, \eta^2 = .029$ ). Tukey post hoc tests revealed that the perceived expertise of the reviewer who made typographical errors ( $M = -.15$ ) was significantly lower than that of the reviewer who made no errors ( $M = .21, p = .041$ ). Orthographical errors also resulted in lower mean expertise scores ( $M = -.12$ ) than the no-error condition ( $M = .21$ ); however, this difference did not reach statistical significance ( $p = .087$ ).

#### 4.3.4. *Perceived carelessness*

The next ANCOVA analyzed the effect of textual errors and general trust on participants' perceptions of reviewer carelessness. This analysis revealed a significant main effect of textual errors on perceived carelessness ( $F_{(1, 252)} = 5.17, p = .006, \eta^2 = .04$ ) in which a reviewer committing typographical errors was perceived to be significantly more careless ( $M = 3.96$ ) than a reviewer committing no errors ( $M = 3.34, \text{Tukey } p = .005$ ). There was also a significant interaction between general trust and textual errors ( $F_{(2, 252)} = 3.03, p = .05, \eta^2 = .024$ ). Analyses of simple effects revealed that, among low-trust participants, textual errors had no significant effect on perceived carelessness ( $F_{(2, 129)} = .40, p = .67$ ), confirming Hypothesis 1c. However, among high-trust participants, there was a significant effect of textual errors on perceived reviewer carelessness ( $F_{(2, 127)} = 7.35, p = .001$ ). Tukey post hoc tests indicated that high-trust participants who read the review with typographical errors rated the reviewer as significantly more careless ( $M = 4.10$ ) than those who read the review with no errors ( $M = 3.04, p = .001$ ). As predicted by Hypothesis 1a, typographical errors also resulted in higher mean perceived carelessness ( $M = 4.10$ ) than orthographical errors ( $M = 3.46$ ); however, this difference did not reach statistical significance at the .05 level ( $p = .098$ ).

#### 4.3.5. *Message involvement*

The final ANCOVA analyzed the effect of the independent variables on participants' involvement with the message/review. This analysis revealed a significant main effect of general trust on message involvement ( $F_{(1, 254)} = 8.24, p = .004, \eta^2 = .03$ ) in which high-trust participants reported greater message involvement ( $M = 3.21, SD = .93$ ) than low-trust participants ( $M = 2.90, SD = .960$ ). Textual errors did not have a significant main effect on message involvement. However, there was a significant interaction between textual errors and general trust ( $F_{(2, 254)} = 4.81, p = .009, \eta^2 = .036$ ). Analyses of the simple effects found that textual errors had no significant effect on message involvement among low-trust participants ( $F_{(2, 130)} = 2.25, p = .11$ ), confirming Hypothesis 2b. However, textual errors did influence message involvement among high-trust participants ( $F_{(2, 128)} = 3.92, p = .02$ ). Tukey post hoc tests indicated that high-trust participants reported lower involvement with a review containing typographical errors ( $M = 2.91$ ) than with one containing orthographical errors ( $M = 3.42, p = .036$ ). Thus, Hypothesis 2a was confirmed. Involvement with the review containing typographical errors ( $M = 2.91$ ) was also somewhat lower than with the error-free review ( $M = 3.34$ ). However, this difference was not significant at the .05 level ( $p = .056$ ).

#### 4.3.6. *Tests of Mediation*

Next, we conducted a mediation analysis to determine if the effects of typographical (vs. orthographical) errors on the message involvement of high-trust consumers were mediated by their perceptions of reviewer trustworthiness. To perform these analyses, we used the PROCESS macro for SPSS (Hayes & Preacher, 2014). This analysis revealed that the relationship between textual error type and message involvement was totally mediated by perceived reviewer trustworthiness. As Figure 3 illustrates, the standardized regression coefficient between

typographical errors and perceived trustworthiness ( $b = -.80$ ) was statistically significant ( $p < .001$ ) as was the standardized regression coefficient between perceived reviewer trustworthiness and message involvement ( $b = .33, p = .002$ ). The standardized indirect effect was  $(-.80)(.33) = -.26$ . We tested the significance of this indirect effect using bootstrapping

[PLACE FIGURE 3 HERE]

procedures. Unstandardized indirect effects were computed for each of 5,000 bootstrapped samples. The bootstrapped unstandardized indirect effect was  $-.26$  and the 95% confidence interval ranged from  $-.55$  to  $-.07$ . In addition, results indicated that the direct effect of typographical errors on message involvement became non-significant ( $b = -.23, p = .30$ ) when controlling for perceived reviewer trustworthiness. Thus, the indirect effect was statistically significant and there was full complementary mediation (Zhao, Lynch, & Chen, 2010).

## 5. Discussion

Consumers increasingly rely on online product reviews when making purchase decisions. However, they face unique challenges in assessing the credibility of such reviews. This study sought to shed light on how consumers evaluate the credibility of online reviews, by examining how different types of textual errors (typographical vs. orthographical) influence consumers' perceptions of the online reviewer. The results suggest that consumers did distinguish between the two types of errors, but that the impact of this distinction on perceived reviewer trustworthiness was moderated by the consumers' general tendency to trust other people. High-trust study participants appeared to be more sensitive to the different types of textual errors in judging perceived reviewer trustworthiness and carelessness, while participants with low general trust were not sensitive to such differences. Specifically, high-trust participants perceived reviewers who made typographical errors as less trustworthy than reviewers who made

orthographical errors, and they reported lower involvement with reviews which contained typographical errors. Tests of mediation revealed that, among high-trust participants, the effects of typographical errors on message involvement were completely mediated by perceptions of reviewer trustworthiness. Typographical errors created perceptions of low reviewer trustworthiness, which in turn led to lower involvement with what the reviewer had to say.

These findings are consistent with broader findings in psychology suggesting that those with a higher level of general trust take a different approach to assessing others in social situations (Lajoy, 1975; Rotter, 1971, 1980; Yamagishi, 2011). Research on the effects of general trust (Rotter, 1971; 1980) suggests that people with higher levels of general trust tend to be more comfortable in social situations, more honest, and more likely to give others the benefit of the doubt. However, a high level of general interpersonal trust does not appear to indicate gullibility, or social naïveté. Rather, while high-trust individuals are more likely to initially judge new acquaintances as trustworthy, they are more likely to revise those judgments based on cues indicating a lack of trustworthiness. Research also suggests (Yamagishi, 2011) that general trust plays a particularly important role in interpersonal judgments when one has little prior knowledge about the person one is assessing, a condition that often holds in the online world.

As noted earlier, readers of online reviews and other forms of eWOM are deprived of many of the credibility cues that are typically available in traditional WOM (e.g., a prior relationship with the reviewer, and nonverbal cues such as facial expression and tone of voice). However, online reviews provide consumers with cues that are not available in traditional WOM, most notably the reviewer's writing style, including the presence and type of textual errors. Consistent with past research on interpersonal trust (Yamagishi, 2011), this study found that high-trusters were especially sensitive to such textual cues in judging reviewer trustworthiness.

High-trusters seemed to be more attuned to the distinction between “errors of carelessness” vs. “errors of knowledge.” Whereas consistent phonetic misspellings did not diminish perceived reviewer trustworthiness, high-trusters seemed to interpret repeated careless typographical errors as indicating something fundamental about the writer, i.e., a general lack of conscientiousness that harmed reviewer credibility, and reduced involvement with the content of the review.

These findings are especially interesting in light of the fact that past research (e.g., Evans & Revelle, 2008; Horn et al., 2004) suggests that low conscientiousness is correlated with dishonest behavior. For example, Horn et al. (2004) found that college students scoring low on trait conscientiousness were more likely to dishonestly over-report the number of hours they spent on a research task in order to receive more extra credit points than they had actually earned. In addition, there is some evidence that company-sponsored mass-produced fraudulent reviews (Addady, 2016) often contain distinctive textual errors. As noted by one expert on such fake reviews (Dicker, 2011), “mercenary review-writing is a volume business” with little time for proofreading, which sometimes leads to hasty textual errors.

Thus, there may be some empirical justification for high-trust consumers' tendency to use careless textual errors as a cue for low reviewer trustworthiness. This would be consistent with a broader finding in the trust literature, that high-trust individuals are not only more sensitive to interpersonal cues, but more accurate in their interpretation of those cues, compared to low-trust individuals. For example, Yamagishi et al. (1999) found that high-trust individuals were more accurate in predicting others' behavior in prisoner's dilemma games, and Sabatelli et al. (1983) found that high-trusters were more accurate in interpreting others' non-verbal cues (e.g., correctly inferring others' emotions based on their facial expressions). In light of this, future research should examine whether high-trust consumers are able to more accurately distinguish between

genuine and fraudulent online reviews, and how general interpersonal trust affects Internet users' ability to assess the credibility of online information.

Like any empirical work, this study had limitations in scope. It examined responses to a particular set of credibility cues (textual errors) in a particular online context (online product reviews) for a particular product category (over-the-counter medications). We encourage future researchers to examine the generalizability of these findings to other credibility cues, online settings, and product categories. First, future research should explore whether Internet users' general tendency to trust influences their sensitivity to other online credibility cues, in addition to textual errors, such as reviewers' online credentials (e.g., "top reviewer" status) or reviewers' explicit claims of product-category expertise (cf. Karmarkar & Tormala, 2010). Second, future research should examine how general trust influences credibility judgments in other online contexts. For example, Toma and Hancock (2012) examined credibility judgments in the context of online dating services, and found that people had difficulty judging the trustworthiness of information in dating profiles, and tended to use non-predictive cues (e.g., sentence length) in making such credibility judgments. It would be interesting to examine whether the accuracy of such judgments is influenced by the judges' general disposition to trust others. Finally, future research should examine the generalizability of the present findings to online reviews for other product categories, including products that may be less emotionally involving than the selection of a medication to treat one's illness.

Most broadly, we encourage continued research on how consumers assess the credibility of the information they find on the Web. The proliferation of Internet use means that a growing proportion of the population is thrust into situations that require them to interact with strangers online, encountering unfamiliar, sometimes anonymous individuals, with limited access to

traditional cues for credibility assessment. Understanding online credibility assessment is particularly important in light of the fact that many individuals increasingly rely on web-based information in making truly consequential decisions, including decisions that can affect their health. In a Pew survey (Rainie & Fox, 2014), 70% of respondents stated that the Internet influenced their decisions about how to treat their medical condition, but only about 50% of those respondents actually verified the veracity of the source and the information presented. Thus, understanding how consumers of online medical information judge the credibility of this information is a particularly important area of research.

Future research should also explore connections between the findings of this study, and existing theories of online credibility assessment, particularly warranting theory (DeAndrea, 2014; Walther & Parks, 2002). One tenet of warranting theory is that Internet users tend to give greater weight to credibility cues that are perceived to be outside of the control (or manipulation) of the person whose credibility is being evaluated. However, it is not clear whether textual errors are perceived to be within or outside the control of the reviewer. In theory, reviewers have control over what they write. However, they may have less conscious control over how they write. A reviewer's writing style, including the number and types of textual errors, may convey information about that reviewer's abilities and personality that the reviewer did not intend to communicate, similar to what Ekman and Friesen (1969) called "nonverbal leakage." Future research should continue to examine the ways in which such unintentional textual "tells" influence how consumers assess the credibility of the information they receive on the Internet.

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**Table 1**  
**Means (and Standard Deviations)**  
**for all Experimental Conditions and Dependent Variables**

<u>Dependent Variables</u>	<u>Experimental Conditions</u>					
	<u>Low Trusters</u>			<u>High Trusters</u>		
	<u>Ortho. Errors</u>	<u>Typo. Errors</u>	<u>No Errors</u>	<u>Ortho. Errors</u>	<u>Typo. Errors</u>	<u>No Errors</u>
Perceived Trustworthiness	-.23 (.89)	-.04 (.97)	-.16 (.92)	.56 (.97)	-.22 (1.02)	.13 (1.03)
Perceived Expertise	-.10 (.93)	-.03 (1.08)	.17 (.89)	-.11 (1.02)	-.25 (.99)	.25 (1.01)
Perceived Carelessness	3.89 (1.33)	3.81 (1.49)	3.65 (1.04)	3.46 (1.60)	4.10 (1.38)	3.04 (1.13)
Message Involvement	2.66 (1.0)	3.11 (1.0)	2.93 (.87)	3.42 (.92)	2.91 (.97)	3.34 (.83)



Figure 1. Experimental stimuli (Note: italicized text was shown in all experimental conditions)

*Zerosa® Acid Reducer*

**Manufacturer's product description:**

*Zerosa (omeprazole) belongs to a group of drugs called proton pump inhibitors. Zerosa decreases the amount of acid produced in the stomach. Zerosa is used to treat and prevent stomach and intestinal ulcers, erosive esophagitis (damage to the esophagus from stomach acid), and upset stomachs.*

**Average user rating:** \*\*\*\*\* (rated by 10 customers)

\*\*\*\*\*

**Reviewer ID:** Anonymous255

**Date Reviewed:** May 30, 2013

**[Review version with no errors]**

I started using Zerosa after several months (actually years) of severe heartburn getting increasingly worse. I was crossing more and more foods off the list of what I could eat without getting severe heartburn. After several kinds of tests from my doctor, I started taking Zerosa. I couldn't believe how quickly and permanently my heartburn went away.

**[Review version with orthographical errors]**

I started using Zerosa after several months (acually years) of sever heartburns getting increseingly worse. I was crossing more and more foods off the list of what I could eat without getting sever heartburns. After several kinds of tests from my doctor, I started taking Zerosa. I couldn't believe how quickly and permently my heartburns went away.

**[Review version with typographical errors]**

i started using Zerosa after several months (actuallly years) of severe heartburn getting increasingly worse/ i wsa crossing more and more foods off the list of what i could eat without getting severe hearburn. after several kinds of tests form mydoctor, I started taking Zerosa. i couldnt believe how quickly and permanently my heartburn went away.

Figure 2. Interactive effect of general trust and textual errors on perceived reviewer trustworthiness

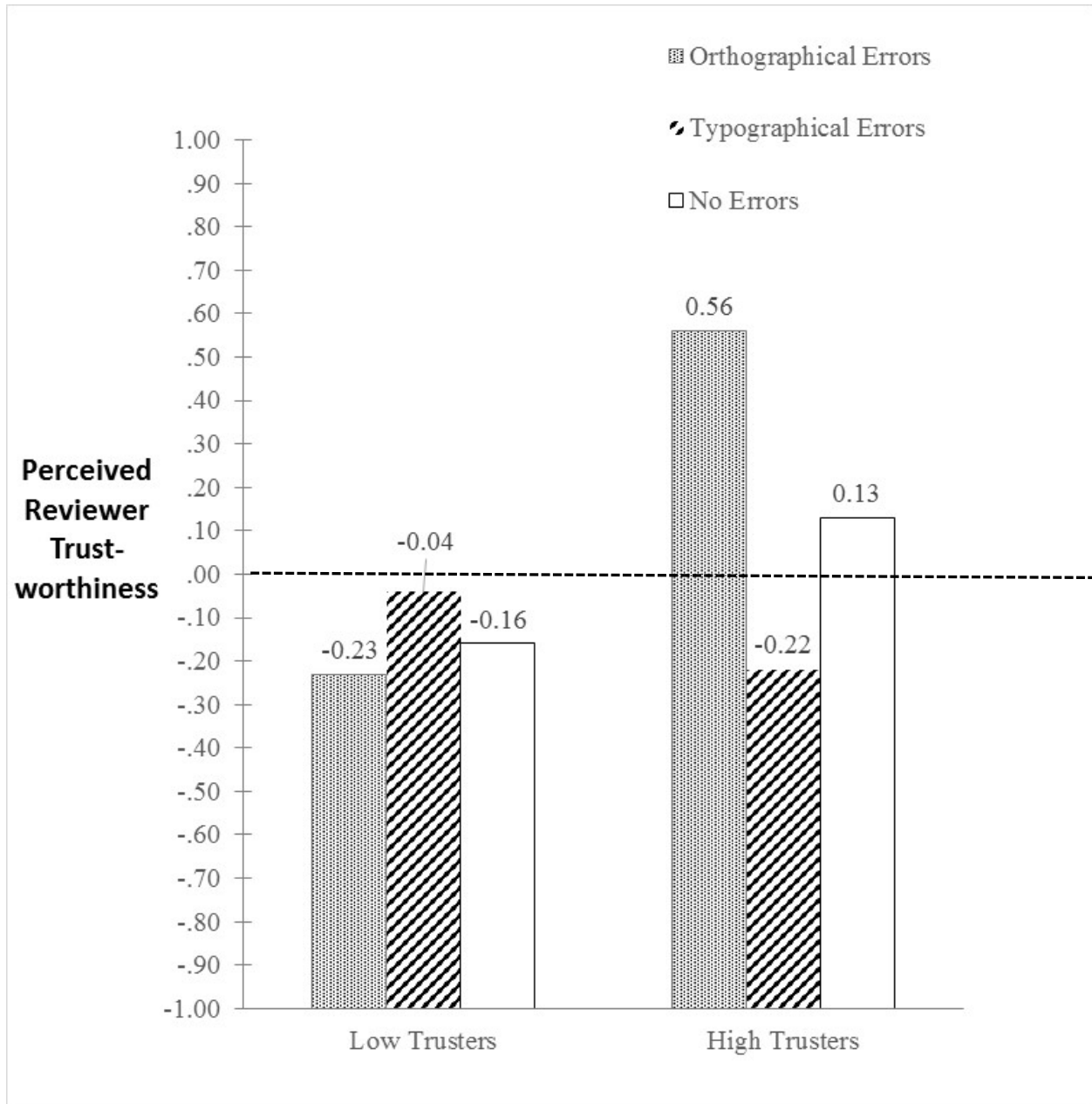


Figure 3. Effect of typographical errors on message involvement, mediated by perceived trustworthiness.

