The Effect of Conflicting Consumer Reviews on the Accuracy of a Purchase Decision

Full Paper

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Abstract
Online consumer review plays an important role in customers’ purchase decisions. However, conflicting online reviews can confuse potential customers. As a result, he/she will take a risk of either selecting a product that is not able to satisfy their needs or not select an appropriate product. This error in purchasing can impose significant tangible and intangible costs on the supply chain. In this paper, a conceptual framework will be proposed to model the effect of three types of conflict among online consumer reviews: including Conflicting opinions among product attributes, Conflicting star ratings and the Disagreement intensity among reviewers (CCD model) on the perceived informativeness and accuracy of a purchase decision. Result of this study may help sellers to analyze and categorize online reviews and publish reviews that would improve the accuracy of a purchase decision, thereby decreasing the overall cost of a wrong purchase.

Keywords
Conflicting opinions about product attributes, conflicting star ratings, disagreement intensity among reviewers, informativeness, accuracy of a purchase decision

Introduction
Online shopping has become a routine behavior for many consumers (Zhang et al. 2010). During the initial years of the Internet age in business-to-consumer (B2C) commerce, there was an asymmetric relationship between sellers and customers, i.e., customers used only the information created by sellers or limited online word of mouth (WOM) to make a purchase decision. This asymmetric channel caused a significant reduction in the accuracy of a purchase decision, which is defined as purchasing a product that meets a buyer’s preferences and requirements. This reduction is due to lack of information and thus imposed significant costs to the supply chain, which is called the cost of a wrong purchase (Chen et al. 2008). Online consumer reviews have been introduced to address this information asymmetry. Thus, not only were consumers able to use sellers provided data, but also previous consumer experience could be used in the decision making process as another source of product information.
However, the differences among users' preferences may lead to conflicting opinions about the target product, which could confuse a potential customer when online reviews are one of the main sources of product information. The conflicting information in online reviews could result from three sources: (1) conflicting opinions of product attributes, when two or more reviewers disagree about a product at least in one attribute (Park et al. 2008); (2) conflicting star ratings, when two or more reviewers rate a single product with different star ratings; for instance, reviewer 1 assigns 3 stars to a product with an overall positive opinion in the content of the reviews, while the second reviewer with a similar opinion in the review assigns 5 stars to the same product (Guillet and Law 2010); and (3) disagreement intensity among reviewers (Chatterjee and Basuroy 2006, Yao et al. 2009). For example, when five reviews out of ten are similar in terms of writers' opinions but different from five other reviews, the disagreement intensity is different from the situation in which nine reviews are similar but the tenth review is different.

Studies have been conducted to investigate the effect of online review properties, such as volume, valence, length, date of submission, etc., on the sellers' sale (Chevalier and Mayzlin 2003), buyers' purchase intention (Park et al. 2011), and buyers' purchasing decision (Smith et al. 2005, Forman et al. 2008). However, the effect of conflicting reviews on perceived informativeness and the accuracy of a purchase decision have not been investigated. Note that any wrong purchasing decision due to conflicting reviews may impose a tremendous cost to the entire supply chain. Warranty, reshipment, and buyer dissatisfaction are samples of the tangible and intangible costs of making a wrong purchasing decision. By increasing the accuracy of a purchase and thus minimizing the cost of a wrong purchase, the entire supply chain starting from manufacturer all the way down to dealers and final users can be positively improved (Christozov et al. 2008).

In this paper, we study the effect of three types of conflicting information among online reviews (i.e. conflicting opinions about product attributes, conflicting star ratings and disagreement intensity among reviewers) on the accuracy of a purchase decision. As a result of this work, we will understand which types of conflicting information would have a more significant effect on the accuracy of a purchase decision. Knowing the most significant factors relative to such accuracy will help sellers take action to release appropriate reviews on websites and thereby reduce the corresponding costs of a wrong purchase. All prior studies in this area have focused on one of the conflict types at a time, but here we focus on multiple types of conflict at the same time in order to assess the interrelationship among conflict types as well.

To see the actual effect of conflict among reviews, we evaluate the customers' perception before and after making a decision. Based on our best knowledge, there has been no research to study these two measures and evaluate the effect of conflicting information on the accuracy of a purchase decision. In this study, we defined two terms: correct purchase before (perceived correct purchase) and correct purchase after (actual correct purchase). The first term measures the extent to which a potential customer thinks the product is able to satisfy her/his needs before actually using it, and the second term measures the actual ability of the product to answer a customer's needs after actually using it.

**Literature Review and Theoretical Background**

*Effect of Online Consumer Review and Review Informativeness*

As noted earlier, few research studies have been conducted to examine the value of online consumer reviews on a potential buyer's purchase decision (Senecal and Nantel 2004, Smith et al. 2005, and Lee et al. 2011). Although a positive relationship could exist between a customer's purchase intention and a seller's sale, high-seller sales do not mean that customers always purchase the right products. Thus, we depart from prior studies by looking at the effect of online consumer reviews on the accuracy of a purchase decision.

In this research, we assume that online consumer review is one of the main sources to collect product information to decide if s/he would purchase a product (or not). Therefore, review informativeness is an important variable that significantly affects the quality of a purchase (Chen et. al 2008). Review informativeness refers to the overall information that can be captured by reading a text. Some variables to measure the informativeness of a single text are the sentence length, number of used brands, and referred attributes (Liu et al. 2007, Chen and Xie 2008, Jiang and Wang 2007, Park et al. 2011).
Studies have shown that potential customers read more than one review during the product search phase. Thus, any conflicting information among product reviews will affect the overall informativeness of the reviews read online (Park et al. 2011). Although very few scholars have tried to study the effect of conflict online market performance in several directions (Park et al. 2008, Guillet and Law 2010, Ding et al. 2008, Smith et al. 2005, Wang 2008, West and Broniarczyk 1998, Qiu et al. 2012, Al-Natour and Benbasat 2010), considerable work is needed to answer the numerous research questions, including the following: What are the potential types of conflict among consumer reviews? Do all types have the same effect on a potential customer’s purchase decision? How do the different types of conflicting information influence review informativeness? The answers to these questions will help both customers and sellers improve the accuracy of a purchase decision which eventually will reduce the overall imposed cost of wrong purchase.

Conflicting Opinion Regarding Product Attributes

People have different tastes. As a result, an attribute that is important for one person might not be interesting for another person. Conflict among product attributes has been studied previously (Park et al 2008, Decker and Trusov 2010). Reviewers write their opinions about a product’s attributes. Due to their different preferences, it is common to see reviews commenting on the same attributes but in different ways. The following example from a Google Shopping website relative to a mechanical pencil shows conflicting opinions about the same attributes.

. . . The lead doesn’t break like other mechanical pencils, and the eraser works perfectly as well . . .

. . . The lead breaks immediately, and the erasers on these pencils are totally worthless . . .

Conflict among Star Ratings

Conflicting star ratings are the second type of conflict (Guillet and Law 2010, Mudambi and Schuff 2010, Park and Han 2008) that will be examined in this study. Although this type of conflict has been studied by several scholars, to date there has not been a study to analyze the effect of this conflict information in the presence of other types of dissonance, since according to cognitive dissonance theory, different types of conflict could have different effects in the presence of other conflict types (Festinger 1962). Conflict among review ratings occurs when different reviewers rate a product in a contradictory manner. Figure 1 from Google Shopping show this type of conflict.
Disagreement Intensity among Reviewers

Additionally, we propose a third type of conflict in this study: “disagreement intensity among reviewers’ opinions”. For instance, among five different reviews, two of them are similar in terms of writers’ opinion regarding the product attributes and the remaining reviews are still similar but different from the first two. This set of reviews is more conflicting than a situation when four reviews are similar but different from only one single review (Yao et al. 2009, Chatterjee and Basuroy 2006).

As table 1 shows, these types of conflict have been identified in the literature and analyzed separately but, there is no study considering the effect of these three conflict types together, or examining their effects from the customer’s correct purchase perspective. The need for such a study is raised when a buyer reads a group of reviews and capture conflicting information (star rating, content and reviewers’ overall perceptions) among provided information by each reviewer. This phenomenon somehow intensifies the created cognitive dissonance which directly affects the customer’s decision quality (Festinger 1962).

<p>| Table 1. Conflict Types of Review in Literature |
|---------------------------------------------|-----------------|-----------------|-----------------|-----------------|</p>
<table>
<thead>
<tr>
<th>Conflicting Attributes</th>
<th>Conflicting Star Ratings</th>
<th>Disagreement Intensity</th>
<th>Dependent Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Park and Han 2008</td>
<td>X</td>
<td>X</td>
<td>Product evaluation, perceived product attributes</td>
</tr>
<tr>
<td>Park et al. 2011</td>
<td>X</td>
<td></td>
<td>Consumer purchase decision</td>
</tr>
<tr>
<td>Decker and Trusov 2010</td>
<td>X</td>
<td></td>
<td>Review rating</td>
</tr>
<tr>
<td>Guillet and Law 2010</td>
<td></td>
<td>X</td>
<td>Consistency of star rating in different distribution channels</td>
</tr>
<tr>
<td>Matz and Wood 2005</td>
<td></td>
<td>X</td>
<td>Dissonance discomfort</td>
</tr>
<tr>
<td>West and Broniarczyk 1998</td>
<td></td>
<td>X</td>
<td>Consumer response to critics</td>
</tr>
<tr>
<td>This research</td>
<td>X</td>
<td>X</td>
<td>Informativeness and Correct purchase</td>
</tr>
</tbody>
</table>

Cognitive Dissonance Theory (CDT)

Cognitive dissonance theory (CDT) describes the conflict between an individual’s attitude and actual behavior that creates an uncomfortable psychological state (i.e., dissonance), which in turn motivates the individual to engage in activities that help reduce the dissonance. Main reaction while facing with inconsistency includes: changing behavior/cognition, justifying behavior by changing the conflicting cognitions, justifying behavior by adding new cognition and ignore any information that conflicts with existing beliefs (Festinger 1962).

According to CDT, the main source of conflict is between an individual’s beliefs and other sources of information (Festinger 1962). Not only does conflict between individual beliefs and other sources of information cause people to take action to reduce the dissonance, but it has been investigated that the conflicting information among different sources of information will also create an uncomfortable state (Yao et al. 2009). We believe that in the online market content, different ideas provided by review writers create an uncomfortable situation for a potential customer at the point of purchase therefore he/she tries to reduce the dissonance by taking actions described in the CDT.

Research Model and Research Hypotheses Development
In this research, three types of conflict among reviews (conflicting attributes, conflicting ratings, and disagreement intensity) are the independent variables. Dependent variables are overall informativeness and correct purchase. Figure 2 shows this CCD research model.

Although, it has been shown that more informative reviews positively affect the customer’s purchase intention (Park et al. 2011), no study has been done to evaluate the effect of informativeness on the accuracy of a purchase decision. It has also been argued that review informativeness will increase a potential customer’s purchase decision accuracy as well as purchase intention (Chen and Xie 2008; Park et al. 2011). Chen and Xie (2008) introduced a mathematical model and assumed a positive relationship between the informativeness ratio and the accuracy of a purchase decision, however, there is no empirical study investigating this relationship. More information provided by other consumers about a product features will help a potential customer to analyze the strengths and weaknesses of a sample product and therefore can increase the accuracy of making a purchase decision.

**H1a:** More informativeness will increase the perceived correct purchase.

**H1b:** More informativeness will increase the actual correct purchase.

Products with more inconsistent ratings are less likely to be selected than those with less conflicting ratings (Park and Han 2008). Also, the positive relationship between overall rating and potential customers’ purchase intention will be stronger for products with lower rating conflict (Yao et al. 2009). Conflict among star ratings and overall disagreement among reviewers can be easily captured, while the conflicting attributes in the reviews contents is harder to detect.

Chatterjee and Basuroy (2006) have argued that disagreement among information is more helpful for a customer where capturing more information is highly relevant, i.e., when a potential buyer expects to see an outstanding movie and then reads reviews about the movie, more conflicting reviews will be more informative. Although the overall disagreement had been used in that study to assess the effect of conflict, we expand their work to all different types of conflict with some modifications.

According to persuasion theory, there are two basic routes of persuasion: the central route is based on the thoughtful consideration of arguments, whereas the peripheral route is based on peripheral cues in the
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persuasion situation (Petty and Cacioppo, 1981). Based on Petty and Cacioppo’s study, in the case of high personal relevance, customers look at the detailed information provided in the contents, while in the case of low personal relevance, customers focus on summary information only.

A customer with high relevance who selects the central route tends to think about most of the given information. Here, people are more motivated to devote the cognitive effort required to evaluate the true merits of an issue or product (Petty and Cacioppo, 1984). On the other hand, when the peripheral route is selected, the information is not thoroughly scrutinized; moreover, a change in attitude can result from fewer resources with a minimum of effort.

By relying on the psychological behavior presented by Petty and Cacioppo (1981) and Lee et al. (2008), we expect a customer with higher relevance who focuses on detailed information in the review content to obtain more information by reading more conflicting reviews. By assuming a high relevance (this assumption will be validated in the discussion section), for subjects who are presented with conflicting ratings, we hypothesize the following:

H2a: More conflict among the attributes explained in reviews contents will increase the perceived informativeness by customers.

Based on the peripheral route of persuasion theory, when review ratings are the main information source for making a purchase decision for a customer with low relevance (this assumption will be validated in the analysis section), more conflicting ratings will be more confusing because the logic behind the ratings will not be assessed and understood. As a result, the delivered information would be a group of conflicting numbers which will not provide any additional insight about the product. By combining the idea of peripheral route of persuasion and cognitive dissonance theory, we hypothesize:

H2b: More conflict among star ratings will reduce the perceived informativeness by customers.

The third type of conflict, which is overall disagreement intensity among reviewers (Chatterjee and Basuroy 2006), can be captured by quickly scanning of the reviews; therefore, detailed information is not the main source of data. As a result, we expect that less information gets delivered to a potential customer with low relevance (this assumption will be validated in the discussion section) by reading reviews that are not consistent.

H2c: Higher disagreement among reviewers’ overall opinions will reduce the perceived informativeness of a potential customer.

After studying the effect of the three conflicting types on perceived informativeness, then in the next step we examine the effect of the presence of both intensive overall disagreement among reviewers and conflicting star ratings. In H2b and H2c we proposed negative effects for both conflict types. Here, since both factors with negative effect are present at the same time we expect a negative effect on the perceived informativeness. According to CDT, when conflict is presented in a source of information, a customer feels uncomfortable situation. As a potential solution to eliminate this feeling, s/he will look for another source of information. Without missing generality, if the second source is also conflicting then the uncomfortable feeling could get even worse.

H3: In the presence of higher conflicting ratings (higher disagreement between reviewers), the higher disagreement among reviewers (higher conflicting ratings) has a greater negative effect on the perceived informativeness.

Research Method

Study Setting

To test the proposed hypotheses, we employed a $2 \times 2 \times 2$ factorial design. (See Appendix 1)
Subjects were asked to decide if they wanted to buy a pencil or not, based on five reviews on a website. We provided all subjects with four pencil attributes: ease of use, eraser, refillability, and grip handling. Prior to the study, subjects were informed that they would receive a 1% extra point as a reward for participation. In addition, as in many other experimental studies, we offered one $50 Best Buy gift card through a drawing. To ensure that the results of this study are reliable and can be generalized, we ensured that reviews follow the J-distribution (Aral 2004). A website builder was utilized to design eight different websites, each containing five reviews. The differences between these websites were in the low and high levels of three conflict types. Each subject was assigned randomly to one of eight websites. Appendix 2 shows a group of manipulated reviews. Appendix 3 presents measurements used in this study.

The experimentation session proceeded as follow: all subjects were first provided with the seller provided data about the product and four selected attributes. Then they were asked to answer general questions regarding their attitude toward online reviews, product knowledge, personal relevance, etc. Then, subjects were asked to read the provided reviews, answer questions about those reviews and decide if the study product could be a correct purchase or not. Regardless of the subject’s decision, everybody was provided with a pencil and asked to try it for few minutes. At the end of this time period, they were asked to evaluate their initial purchase decision and answer additional questions.

Data Analysis

In this study, we recruited 101 student subjects from a public university; including three faculties/schools and ten majors, representing diverse backgrounds. According to a power analysis for the between-subject design, a minimum of 11 subjects for 8 groups (hence 88 subjects) can assure enough statistical power of 0.8 for a medium effect size (Cohen, 1992). Among subjects, 82 were males and 19 were females, six graduate students, and the rest undergraduates. The average age was 24.2. In general, the subjects were familiar with online shopping (5.4/7). We also compared all groups in terms of the average perceived informativeness (See Appendix 4).

We analyzed our proposed research model using partial least squares (PLS) structural equation modeling. To support individual item reliability, we examined the loadings of the individual measurement items on their intended constructs and compared these to recommended tolerances of 0.60 or, ideally, 0.70 (Barclay et al. 1995, Chin 1998). To support the internal consistency of the constructs, we calculated Cronbach’s alpha for each construct. All met suggested tolerances (>0.70, Fornell and Larcker, 1981) with results reported in Appendix 5. Factor analysis demonstrated that all items load higher on their constructs than they load on any other constructs measured at the same time, indicating good discriminant validity.

Analysis of Structural model

Next we analyzed the structural model to examine the significance and strength of the relationships of each of the hypothesized effects. All five paths were statistically significant (See Figure 3). Statistical analysis shows that the average personal relevance for subjects who were presented with high conflicting attributes is five out of seven which is relatively high, so the assumption of high relevance in H2a was valid. The assumption of low relevance in both H2b and H2c is also valid since the average relevance for groups in both hypotheses was four out of seven and indicated relatively low relevance. We statistically compared the two means for personal relevance in H2a and H2b and the hypotheses of difference in personal relevance was significant at 95% confidence level (t-value = 3.05).

H3 tested the extent to which conflicting ratings and overall intensive disagreement among reviewers moderated the main effects hypothesized in H2b and H2c. As Figure 3 shows, the corresponding path to H3 which is the interaction between intensive disagreement and conflicting ratings significantly affects the perceived informativeness and the value of the coefficient of this interaction is relatively higher than the coefficients of each of the contributing factors (β = -0.214, p<0.05 comparing to -0.182 and -0.195).

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1 These four attributes were selected after reading 50 online reviews in Amazon.com and Google Shopping.
Discussion:

Overall, we found support for all hypothesized relationships in our proposed model. Our results support the idea that different types of conflict in online reviews have different effects on the overall perceived informativeness. The significant effect of informativeness on correct purchase both before and after actual use indicates that the overall information captured through reviews is a valid measure to predict the accuracy of a purchase decision especially since the correlation before and after actual use is significant at 99% confidence level. Chen and Xie (2008) assumed a linear relationship between the probability of a correct purchase and informativeness; however, they never validated this assumption.

Relative to significant relationship among conflicting attributes and informativeness, H2a, is consistent with the persuasion and cognitive dissonance theories. Conflicting attributes positively affect the perceived informativeness when readers have a higher personal relevance. Customers with high relevance which is a valid assumption in this study are able to analyze the collected data, as a result conflicting info will help them to understand the strengths and weaknesses of a product in a better extent.

Significant effect of conflicting ratings and overall disagreement in the case of low relevance can be also explained by persuasion theory when customers with low relevance are less interested in detail information provided in the content, as a result, conflicting overall info is not helpful to analyze the product strengths and weaknesses. This conflict instead increases the confusion and reduces the overall perceived information.

The result of analysis for H3 is also consistent with our arguments. When a potential customer with low relevance is exposed to a group of reviews which have confliction star ratings, per CDT, he/she will feel uncomfortable situation. If the second source of information which is supposed to be used to reduce the dissonance is also conflicting, the customer feeling will get even worse.

Contributions

Theoretical Contribution:
This study makes several theoretical contributions. First, it is the first study to evaluate the effect of different types of conflicting information among reviews on the overall perceived informativeness and accuracy of a purchase decision. Second, the accuracy of a purchase decision is introduced and measured by considering both pre-purchase and post-purchase phases. All studies in this area have focused on either pre-purchase or post-purchase phase, but not both phases together. The result of this work will also provide managerial insights for online sellers to the consumer reviews to increase the accuracy of purchase decisions. Improvement in this area will help the supply chain in both tangible and intangible ways. The warranty and guarantee costs, reshipment and return expenses, customers’ satisfaction and sellers’ reputation are some supply chain measurements that can be improved by applying the results of this study.

In this paper, we propose the CCD model to evaluate the effect of different types of conflict (conflicting attributes, conflicting ratings and disagreement intensity among reviewers) as well as their interactions on the perceived informativeness and correct purchase as the ultimate dependent variable. Although previous marketing research studies have investigated the effect of conflicting ratings and conflicting review content on sellers’ profit or purchase intention, we extended this stream of research by including disagreement intensity among reviewers to predict the perceived informativeness as well as actual correct purchase by examining customers’ opinions regarding the target product before and after actual use. To do this, we simulated a purchase condition by providing an actual product and actual money for customers and asking them to compare their purchase decision before and after using the product. In other words, not only did we looked at the purchase intention based on the provided information, but also all subjects were asked to validate their decision (either to purchase or not to purchase) by using the target product. This new pre/post purchase algorithm helped us to validate the idea that higher review informativeness increase the accuracy of a purchase decision, and this informativeness can be captured by reviews even if they are not consistent.

**Practical Contribution**

It has been a discussion topic for some time to evaluate when and what reviews should be released to improve sellers’ sales (Chevalier and Mayzlin 2003; Jiang and Wang 2007; Chen and Xie 2008). In all of these studies, the focus was on improving the immediate sales without taking the future costs of a wrong purchase into the account, which can impose an enormous cost to the supply chain. The results of this study have important implications for online sellers firms, especially within the context of managing online reviews. Firms often invest tens of thousands of dollars in websites with the goal of generating profits and returning customers by providing correct offers. Online sellers can benefit from knowing what group of online reviews should be released so customers can perceive the maximum amount of information by reading the correct group of reviews. The result of this study can be used to develop a business model in which buyers can be exposed the most appropriate reviews which are categorized by sellers based on customer’s preferences and personal relevance.

**Limitations and Future Research**

The limitations of this research and possible future research suggestions are as follows: First, the parsimony of our proposed model suggests that some additional variables might help explain key variables and moderate the strength of relationships within the model. For example, product type, product knowledge (Xu et al. 2009) and personal relevance might also moderate the impact of conflicting information on the informativeness. Second, we selected an inexpensive product. By selecting a more expensive product, we might see different customers’ behaviors. Further research is necessary to test the model with different types of products in different price ranges to determine the effect of product value as well as product type.

Third, to simulate a real purchasing condition, all subjects were provided with actual money from the research team. Since that money became their own money, there is a concern that subjects did not seriously consider buying the product but simply wanted to take the money; however, the 50% purchase rate increased our confidence that subjects would actually consider purchasing the study product. Finally, we provided five reviews for each subject, which is usually the minimum number of reviews that
customers consider. We might see different results by increasing the group size of reviews to a larger number.

**Conclusion**

The present research proposed the CCD model by considering conflicting ratings, conflicting attributes, and disagreement intensity among review writers on the quality of a product. We highlight the importance of the effect of informativeness on making a correct purchase before and after actual use. Based on persuasion and cognitive dissonance theories, we posit that conflicting star ratings and overall disagreement among reviewers have a negative effect on the perceived informativeness, while conflicting opinions regarding product attributes are positive in terms of capturing information. We also observe that in one particular case, one conflict type can moderate the effect of the other type. In other words, when conflicting ratings and overall intensive disagreement among reviewers are present, the perceived informativeness is negatively affected, while the presence of conflicting ratings and conflicting attributes, or conflicting ratings and overall intensive disagreement among reviewers together do not affect the perceived informativeness.

**REFERENCES**


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APPENDIX

### Appendix 1. Research Independent Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>levels</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disagreement intensity among reviewers</td>
<td>Low</td>
<td>In ten online reviews, five writers think exactly similarly but differ from the other five writers. Disagreement intensity is 5/10 = 50%.²</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>In ten online reviews, nine writers think exactly similarly but differ from the other one writer. Disagreement intensity is 9/10 or 1/10.</td>
</tr>
<tr>
<td>Conflicting opinions about attributes</td>
<td>Low</td>
<td>In ten online reviews explaining four different attributes, one writer has a contradictory opinion about one attribute compared to the others.</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>In ten online reviews explaining four different attributes, one writer thinks differently about three attributes compared to the other writers.</td>
</tr>
<tr>
<td>Conflicting star ratings</td>
<td>Low</td>
<td>In ten online reviews, one writer gives a star rating of 4 to the product while the other writers give a star rating of 5.</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>In ten online reviews, one writer gives a star rating of 1 to the product, while the other writers give a star rating of 5.</td>
</tr>
</tbody>
</table>

Appendix 2. Disagreement Intensity among reviewers = Low, Conflicting Opinion Regarding Product Attributes = Low, Conflict among Star Ratings= Low

<table>
<thead>
<tr>
<th>Ease of Use</th>
<th>Eraser</th>
<th>Refill</th>
<th>Grip</th>
<th>Overall Stars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Just a quick twist and it is ready to go</td>
<td>I love the eraser</td>
<td>No need to refill the pencil</td>
<td>Correct size to feel comfortable</td>
<td>5</td>
</tr>
<tr>
<td>Very simple to operate</td>
<td>Erases completely without black mark</td>
<td>No need for lead replacement</td>
<td>This pencil grip is uncomfortable</td>
<td>4</td>
</tr>
<tr>
<td>Retracting allows you to get just right amount of lead</td>
<td>The best eraser ever</td>
<td>Don’t have to worry about refilling</td>
<td>Comfortable to write with</td>
<td>5</td>
</tr>
<tr>
<td>Twist lead advancement versus clicking is a giant plus</td>
<td>The erasers work very well</td>
<td>The lead doesn’t break, no need to refill it</td>
<td>Comfortable grip</td>
<td>5</td>
</tr>
<tr>
<td>I find them easy to use</td>
<td>Effective erasers</td>
<td>The economical pencil, so no need for refilling</td>
<td>The pencil is comfortable to hold</td>
<td>5</td>
</tr>
</tbody>
</table>

Appendix 3. Measurement Items for Constructs

<table>
<thead>
<tr>
<th>Construct</th>
<th>Measure</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disagreement intensity among</td>
<td>Reviews tended to disagree over all attributes (similarity among reviews).</td>
<td>Shaila and Bostrom, (1994)</td>
</tr>
</tbody>
</table>

²The level “low” for “ratio of conflicting reviews” cannot be less than 50%. In the lowest level, half of the reviews are different from the other half. In other words when a small numbers of reviews are different from others (for example 2 out of 10), the other portion (8 out of 10) could be interpreted as a high level.
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<table>
<thead>
<tr>
<th>reviewers</th>
<th>Reviews advocated different points of view.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The difference among writers’ opinions is significantly high.</td>
</tr>
<tr>
<td>Conflicting opinions about product attributes</td>
<td>Online consumer reviews provide inconsistent information regarding attributes.</td>
</tr>
<tr>
<td></td>
<td>Online consumer reviews provide different opinions about the product attributes.</td>
</tr>
<tr>
<td></td>
<td>Online consumer reviews provide too many different opinions regarding the product attributes.</td>
</tr>
<tr>
<td>Conflicting star ratings</td>
<td>Online consumer reviews provide inconsistent star ratings.</td>
</tr>
<tr>
<td></td>
<td>Online consumer reviews provide different opinions due to inconsistent star ratings.</td>
</tr>
<tr>
<td></td>
<td>Online consumer reviews provide too many different opinions regarding the overall star ratings.</td>
</tr>
<tr>
<td>Informativeness</td>
<td>Overall, I would give the information from these online reviews high marks for the pencil selection task.</td>
</tr>
<tr>
<td></td>
<td>In general, these online reviews provided me with high-quality information for the pencil selection task.</td>
</tr>
<tr>
<td></td>
<td>The reviews provide useful information about the product.</td>
</tr>
<tr>
<td>Correct Purchase</td>
<td>This product will be the correct pencil for me.</td>
</tr>
<tr>
<td></td>
<td>This pencil will be the best buy.</td>
</tr>
<tr>
<td></td>
<td>The selected pen is the closest product to my ideal choice.</td>
</tr>
</tbody>
</table>

**Appendix 4. Comparison Analysis Among Study Groups**

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>Level</th>
<th>Perceived Informativeness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conflicting Opinions About Product Attributes</td>
<td>Low</td>
<td>5.11</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>5.42</td>
</tr>
<tr>
<td>Conflicting Star Ratings</td>
<td>Low</td>
<td>5.43</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>5.13</td>
</tr>
<tr>
<td>Overall Disagreement Intensity Among Reviewers</td>
<td>Low</td>
<td>5.39</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>5.17</td>
</tr>
</tbody>
</table>

**Appendix 5. Internal Consistency of Constructs**

<table>
<thead>
<tr>
<th>Construct</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conflicting Attributes</td>
<td>0.711</td>
</tr>
<tr>
<td>Conflicting Ratings</td>
<td>0.802</td>
</tr>
<tr>
<td>Overall Disagreement Intensity</td>
<td>0.765</td>
</tr>
<tr>
<td>Perceived Informativeness</td>
<td>0.845</td>
</tr>
<tr>
<td>Correct Purchase Before Use</td>
<td>0.853</td>
</tr>
<tr>
<td>Correct Purchase After Use</td>
<td>0.939</td>
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</table>