

**How Consumers Incorporate Variance in Conflicting Online Consumer Reviews into
Judgments: The Role of Causal Attributions**

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This research examines how consumers incorporate the variance in conflicting online consumer reviews into their brand evaluations and explores a cognitive mechanism that underlies variance-seeking and variance-aversion effects on brand evaluations. The data furnished by three laboratory experiments indicate that consumers evaluate a high-variance brand more favorably than its low-variance counterpart when online consumers reviews with extreme variance accompany a high-expectation experience product (experiment 1), and when extremely conflicting online consumer reviews for a high-expectation search product are considered less persuasive (experiment 2), or a few anonymous reviewers provide extremely conflicting online consumer reviews for a high-expectation search product (experiment 3). Our mediation analyses across three experiments on average document supporting evidence for the causal attribution hypothesis that seeking or avoiding extreme variance in online consumer reviews is mediated by reviewer (product) attributions that can increase (decrease) brand evaluations.

As a growing number of online retailers add consumer-generated review systems to their website, online consumer reviews (hereafter OCRs)—defined as *any positive, neutral, or negative statements made by potential, actual, or former customers about their experiences, evaluations, and opinions on products posted on company or third-party websites*—have become one of major informational sources for consumer judgments. Rapid and unrestrained spread of information through the Internet enables consumers to get easier access to an enormous and diverse set of product reviews and recommendations online from weak-tie individuals that reduces decision uncertainty and provides far more credible quality information for consumers than do marketer-controlled advertising and traditional word-of-mouth communications (Schindler and Bickart 2005). To date, most prior research has investigated the effects of OCRs on the adoption and diffusion of products or services, demonstrating that the volume of OCRs is positively associated with product sales (Chevalier and Mayzlin 2006; Elberse and Eliashberg 2003; Eliashberg and Shugan 1997; Liu 2006; Reinstein and Snyder 2005). In addition, recent research has also shown that negative OCRs can hurt product sales (Chevalier and Mayzlin 2006) and future stock returns (Luo 2007), and that OCRs can significantly affect consumers who patronize lesser-known online retailers on price (Chatterjee 2001) and the diffusion and adoption of lesser-known products (Chen, Dhanasobhon, and Smith 2008; Zhu and Zhang 2010).

Relatively little effort, however, has been directed toward investigating the effect of variance in OCRs on consumer choice despite the fact that OCRs sometimes contradict each other to some or greater extent. Suppose, for example, consumers who consider purchasing an MP3 player read OCRs from past buyers prior to making their final choice. If most reviewers liked the MP3 player, it is highly likely that consumers would not hesitate to purchase it. As is often the case, however, consumers observe that summary statistics for the MP3 player indicate similar mean ratings, yet the variance of those ratings differs across

OCR reviewers. For example, although the MP3 player has the same 4-star mean rating out of the maximum 7-star rating from five previous buyers, but the detailed information about the distribution of the product ratings can show either low variance (e.g., two 3-stars, one 4-star, two 5-stars) in the moderate disagreement or high variance (e.g., two 1-stars, one 4-star, two 7-stars) in the extreme disagreement condition. Here, the lack of consensus in the OCRs for the MP3 player rather increases decision risks, thereby creating an important problem for consumers such that consumers are faced with the task of integrating contradictory OCRs and product attribute information into their own preferential judgment.

In the previous decision scenario, one would predict that consumers are more likely to purchase the MP3 player under the moderate rather than the extreme disagreement condition because the greater variance in the conflicting OCRs simply carries much uncertainty and risks (Ellsberg 1961; Meyer 1981), and extreme negative OCRs provide more salient and diagnostic information for their judgment (Fiske 1980; Herr, Kardes, and Kim 1991). For example, Mudambi and Schuff (2010) find that consumers consider extreme OCRs less helpful when it comes to purchasing experience goods such as Apple's iPods, music CDs, and video games. In a related vein, Chevalier and Mayzlin (2006) also demonstrate that the impact of extreme negative reviews on decreasing book sales is greater than that of extreme positive reviews on increasing book sales. On the other hand, it is also a possibility that the extreme disagreement in the OCRs could facilitate the purchase of the MP3 player. Forman, Ghose, and Wiesenfeld (2008), for example, show that consumers find moderate OCRs to be less helpful than extreme OCRs when they buy books. Furthermore, Clemons, Gao, and Hitt (2006) demonstrate that high-end product ratings contribute more to the sales increase of premium craft beers than do low-end product ratings. According to West and Broniarczyk (1998), however, these variance-seeking and variance-aversion behaviors can be moderated by the level of aspiration or expectation that consumers have about a target product's

performance and quality. Their findings indicate that the greater level of disagreement among movie critics can enhance moviegoers' intention to watch a target movie when their prior aspiration or expectation level about the movie is high. Otherwise, moviegoers prefer to watch the movie when there is less variance in the opinions among the movie critics.

In the present research, we aim to provide a positive reconciliation of the mixed findings from previous studies by identifying the conditions under which consumers are likely to seek or avoid the variance in OCRs in order to arrive at their final purchase decision, and uncovering a cognitive mechanism that underlies the variance-seeking and the variance-avoidance effects on consumer judgments in the presence of conflicting OCRs for a target product. In so doing, we develop and test a causal attribution hypothesis that consumers will prefer the extreme to the moderate disagreement when they find it easy to generate reviewer attributions. By contrast, when it is difficult to make reviewer attributions, products are often to blame, and thus the moderate disagreement will be preferred because relatively lower decision risks are involved.

The remainder of this article is organized as follows: We begin by summarizing previous research on the effects of product and review characteristics on consumer use of OCRs in order to build a relevant theoretical foundation for our causal attribution hypothesis. Next, we present our empirical analyses of the data from three laboratory experiments and offer theoretical and practical implications of our findings.

THEORETICAL FRAMEWORK

Product Characteristics

Regardless of whether decisions are made in online or offline settings, consumers commonly seek other people's advice and recommendations in order to reduce purchase risks and uncertainty (Chatterjee 2001; Forsythe and Shi 2003; Murray 1991), cognitive

dissonance (Bone 1995; Hennig-Thurau and Walsh 2003), and to improve the quality and justifiability of their decisions in general (Yaniv 2004; Yaniv and Milyavsky 2007). With regard to consumers' everyday purchase decisions of books, movies, restaurants, and travel packages to MP3 players, cars, and houses, consumer information search for other individuals' experiences and recommendations has been made easier than ever with the proliferation of the Internet and online review systems. However, prior research has empirically shown that the effects of OCRs on consumer decisions can differ across product categories. For example, Reinstein and Snyder (2005) find that the effects of movie critics' reviews on box office revenues are different according to the scope of movie release and genres. Cheema and Papatla (2010) show that online information sources are considered more important for the purchase of utilitarian products such as computer hardware and software than for the purchase of hedonic products such as books, music CDs, and movies. On the other hand, Senecal and Nantel (2004) demonstrate that online recommendations for experience goods such as wines are more influential than those for search goods such as calculators.

Although the differences in the impacts of OCR across product categories are blurred in online environments (Huang, Lurie, and Mitra 2009), OCRs may still be one of the only reliable sources of pre-purchase information with greater accessibility for experience goods such as movies, books, foods, beverages, travel destinations, and medical services whose product quality and performance are often difficult to determine prior to consumption (Zhu and Zhang 2010). Consumers tend to discount others' opinions that are not in accordance with their initial preference regardless of the level of prior performance expectations about experience goods (Hoch and Deighton 1989). In other words, consumers may consider moderate product reviews more helpful and thus respond negatively to either extremely negative or positive reviews when purchasing experience goods because extreme subjective

claims made in OCRs cannot be easily substantiated (Ford, Smith, and Swasy 1990).

By contrast, Sun (2010) articulates that extreme OCRs increase consumer demand for books with low average ratings but decreases demand for books with high average ratings because extremely positive OCRs may provide consumers with much more helpful information about those less-preferred books than moderately positive OCRs (Forman et al. 2008). In a different vein, Clemons et al. (2006) demonstrate that extremely positive reviews lead to greater consumer demand for premium craft beers than do moderately positive reviews with the average evaluative ratings held constant. Interpreted in the West and Broniarczyk's (1998) terms, it is a possibility that beer drinkers may have a higher level of aspirations about the performance of premium craft beers, which leads to the enhanced product evaluations under the extreme disagreement among previous buyers. However, it is also a possibility that beer drinkers may discount the extreme negative evaluations for premium craft beers by attributing the causes of those negative interpretations of experiential attributes to reviewers.

Review Characteristics

When consumers are exposed to OCRs, they pay attention not only to the mere availability (Smith, Menon, and Sivakumar 2005) and the summary statistics of OCRs (Chevalier and Mayzlin 2006), but also to review characteristics such as the quality of review and reviewer characteristics. For example, longer, positive OCRs are strongly associated with greater book sales (Chevalier and Mayzlin 2006), and more helpful, high quality OCRs are considered more impactful and thus significantly increase book sales (Chen et al. 2008; Mudambi and Schuff 2010). In addition to review characteristics, recent investigations on the relationship between OCRs and reviewer characteristics have demonstrated that consumers respond more favorably to OCRs from high-reputation reviewers (Hu, Liu, and Zhang 2008),

and consider OCRs containing reviewer identity more helpful (Forman et al. 2008). Also, a set of OCRs from many anonymous reviewers lead to more favorable brand evaluations than the identical set of OCRs from a few reviewers because exposure to multiple OCR reviewers gives rise to greater conformity pressure and message elaboration (Park and Park 2008). Taken together, it is expected that consumers will find it difficult to ignore or discount OCRs with greater depth and quality provided by multiple reviewers.

The Causal Attribution Hypothesis

The primary objective of this research is to examine how consumers incorporate the variance, either extreme or moderate, in the OCRs from multiple reviewers for their judgment. Bochner and Insko (1966) show that individuals generate more counter-arguments and tend to disparage message sources as messages become more extreme. Likewise, prior research on decision making has shown that the distance between judgments of decision makers and those of recommenders matters (Harries, Yaniv, and Harvey 2004; Yaniv 2004; Yaniv and Milyavsky 2007), indicating that decision makers tend to egocentrically trim others' judgments and thus to place greater weight on their own judgments when a significant deviation exists between the two opinions. Also, according to a recent investigation by Laczniak, DeCarlo, and Ramaswami (2001), the types of causal attributions that consumers make in processing negative word-of-mouth messages can mediate the effects of negative recommendations on their brand evaluations. Drawing on Kelly's (1973) attribution theory and discounting principle, Laczniak and his colleagues demonstrate that consumers evaluate a target brand more positively when they attribute the negativity of word-of-mouth messages toward message providers. If consumers attribute the negativity to the target brand, however, their brand evaluations decrease. Accordingly, we expect that consumers will prefer a high-variance to a low-variance product for which reviewers provide conflicting OCRs as long as

they are able to discount extreme OCRs or the causes of extreme variance in OCRs toward reviewers, and that this variance-seeking effect will be moderated by the experience-search characteristic of a target product and the level of prior expectation about a target brand's performance. Oftentimes, however, it is difficult to discount or ignore others' advice and recommendations or to attribute the causes of extreme variance in OCRs toward reviewers when it comes to purchasing search goods or when a multitude of others provide strongly persuasive arguments in favor of or against such products. Therefore, we expect that consumers will prefer a low-variance to a high-variance product because product attributions are more likely in these occasions, and thus moderate disagreement in OCRs will facilitate product purchase because of lower risks involved with judgments.

EXPERIMENT 1

Experiment 1 tests the causal attribution predictions that extreme disagreement among multiple reviewers can enhance product evaluations only when individuals are able to attribute the causes of reviewer disagreement more toward reviewers (the reviewer attribution) than toward a target product (the product attribution). When it is difficult to make the reviewer attribution, however, individuals prefer to avoid the variance in the opinions of multiple reviewers and thus form a more favorable attitude toward a target product under moderate disagreement than under extreme disagreement. Among several variables that can affect the direction of an individual's causal attributions, the present experiment draws on Nelson's (1970) search-experience product classification. Considering that the evaluations of experience products such as movies, restaurants, travel destinations, and cosmetics are often subject to unverifiable subjective interpretations of others (Ford et al. 1990; Ha and Hoch 1989), we hypothesize that individuals are inclined to discount the opinions of reviewers that significantly deviate from their own judgment of the experience products by attributing the

causes of extreme disagreement to those reviewers. In contrast, individuals are more likely to attribute the causes of extreme disagreement on the evaluations of search products such as computers, digital cameras, and MP3 players toward a target product than toward reviewers because the search products can be easily assessed with less ambiguity based on a set of product information available prior to purchase and use. To address this issue, experiment 1 asks research participants to evaluate an MP3 player (search product) and a unisex perfume (experience product) for which they have either low or high prior expectations about product performance under moderate versus extreme reviewer disagreement condition.

Method

Participants and Design. One hundred and sixty undergraduate and graduate students participated in this experiment in exchange for a \$5 stationery gift. Their mean age was 26 years and 84 were males. Participants were randomly assigned to one of eight conditions in a 2 (variance: moderate vs. extreme disagreement) \times 2 (prior expectation: low vs. high expectation) \times 2 (product type: search vs. experience product) between-subjects design. First, the variance manipulation involved having participants read the content of five OCRs (two positives, two negatives, one neutral) and their respective star ratings for a target product (1-star = extremely negative, 7-star = extremely positive). In the extreme disagreement condition, there were two 1-stars, two 7-stars, and one 4-star OCRs whereas two 3-stars, two 5-stars, and one 4-star OCRs were provided in the moderate disagreement condition. In both treatment conditions, the mean star ratings ($M = 4$ -star) and the content of the five OCRs remained constant, yet the variance of the star ratings was varied ($SD = 1$ -star in the moderate vs. 3-star in the extreme disagreement condition).

Second, the prior expectation and the product type factors were manipulated by varying the level of participants' prior expectations about the performance of different brands in the

product categories of an MP3 player and a unisex perfume. Samsung (high-expectation) and Hyunwon (low-expectation) MP3 players were selected to represent the search product whereas Calvin Klein (high-expectation) and Odyssey (low-expectation) unisex perfumes were chosen to represent the experience product. Both the MP3 players and the unisex perfumes had the equivalent price of \$60.

Procedure and Measures. Upon arrival, participants were randomly assigned to one of the eight between-subjects conditions in which they were asked to read a product description of either Samsung/Hyunwon MP3 player or Calvin Klein/Odyssey unisex perfume in a web page format of a well-known online seller. Included in the product description were a brand name, a product image, five product attributes, and five OCRs along with their respective summary evaluative star ratings. Next, participants evaluated the target product on five 7-point bipolar items: dislike-like, bad-good, unfavorable-favorable, low-high quality, useless-useful. These items were averaged to form a reliable brand evaluation index ($\alpha = .98$), where higher numbers indicated more favorable brand evaluations. Participants were then asked to report how much they would intend to attribute the causes of reviewer disagreement either toward the reviewers of the OCRs or the target product itself. Similar to Laczniak et al. (2001), the following header was used in measuring all causal attribution measures: “Lack of reviewer agreement for [the target product’s brand name] appears to exist because.” Participants’ responses to the following two items were averaged to form a reliable product attribution score ($\alpha = .86$): (1) “The target product has both advantages and disadvantages as the reviewers have pointed out,” (2) “The target product offers a list of benefits that aren’t really appealing to all reviewers.” Participants’ responses to the following two items were averaged to form a reviewer attribution score with acceptable reliability ($\alpha = .89$): (1) “Reviewers evaluate the target product on the basis of their subjective experiences,” (2) “Reviewers do not have sufficient knowledge to evaluate the target product.”

Next, participants completed the following nine 7-point disagreement-agreement scale items for manipulation checks. The first three items that served as the manipulation check for the product type—(1) “It is difficult to evaluate the target product without prior usage experience,” (2) “Product description provides insufficient information for evaluating the target product,” (3) “It is difficult to predict the performance of the target product”—were averaged to form a reliable product type score ($\alpha = .97$). The other three items that served as the manipulation check for the prior expectation—(1) “I expect the target brand will provide a higher quality product than the others,” (2) “I think the target brand will outperform my expectations,” (3) “My expectations about the performance of the target brand are high”—were averaged to form a reliable prior expectation score ($\alpha = .97$). The remaining three items that served as the manipulation check for the variance—(1) “Product reviews seem to conflict each other,” (2) “Star ratings do not appear to converge,” (3) “Product reviews are divided into extremely positive and extremely negative ones”—were averaged to form a reliable variance score ($\alpha = .97$). Last, participants’ responses to the persuasiveness and the positivity of the OCRs were measured.

Results and Discussion

Manipulation Checks. First, a three-way ANOVA indicated that participants perceived greater variance in the OCRs under the extreme disagreement ($M = 4.86$) than under the moderate disagreement condition ($M = 2.82$; $F(1,152) = 498.59, p < .001$). Second, participants had a higher level of prior expectation for the high-expectation brands ($M = 5.22$) than the low-reputation brands ($M = 3.68$; $F(1, 152) = 87.39, p < .001$). Third, the analysis showed that participants found it difficult to predict the performance of the unisex perfumes ($M = 4.82$) than the MP3 players ($M = 2.80$; $F(1, 152) = 162.01, p < .001$) without sufficient knowledge and prior usage experiences. No other significant effects were found. In addition,

participants' responses to the persuasiveness and the positivity of the OCRs did not differ across all the treatment conditions (F 's < 1).

Brand Evaluation. A 2 (variance) \times 2 (prior expectation) \times 2 (product type) ANOVA on the brand evaluation index first revealed a significant variance-aversion tendency such that participants on average evaluated the target products more favorably under the moderate disagreement ($M = 4.49$) than under the extreme disagreement in the OCRs ($M = 3.99$; $F(1, 152) = 9.89, p < .005$). Participants also evaluated the high-expectation brands ($M = 5.21$) more favorably than the low-expectation brands ($M = 3.27$; $F(1, 152) = 143.41, p < .001$). Two significant interactions between the product type-the variance ($F(1, 152) = 7.69, p < .01$) and between the prior expectation-the variance ($F(1, 152) = 8.39, p < .005$) were found, suggesting that the variance-aversion pattern on average emerged for the evaluation of the MP3 players ($M_{\text{moderate disagreement}} = 4.71$ vs. $M_{\text{extreme disagreement}} = 3.75$; $F(1, 156) = 8.75, p < .005$) and for the low-expectation brands ($M_{\text{moderate disagreement}} = 3.76$ vs. $M_{\text{extreme disagreement}} = 2.79$; $F(1, 156) = 16.92, p < .001$). Most importantly, the analysis yielded a significant three-way interaction on the brand evaluation index ($F(1, 152) = 8.57, p < .005$).

Insert figure 1 about here

As shown in figure 1, we then conducted separate 2 (variance) \times 2 (prior expectation) ANOVAs for the unisex perfumes and the MP3 players. First, the ANOVA for the unisex perfumes revealed a significant main effect of the prior expectation ($F(1, 76) = 71.32, p < .001$) and a significant interaction between the variance and the prior expectation ($F(1, 76) = 17.09, p < .001$). Follow-up analysis of simple contrasts indicated that participants avoided the variance in evaluating the low-expectation unisex perfumes ($M_{\text{moderate disagreement}} = 3.79$ vs. $M_{\text{extreme disagreement}} = 2.79$; $F(1, 76) = 9.67, p < .005$) whereas they sought the variance in

evaluating the high-expectation unisex perfumes ($M_{\text{moderate disagreement}} = 4.77$ vs. $M_{\text{extreme disagreement}} = 5.65$; $F(1, 76) = 7.49, p < .01$). Second, the ANOVA for the MP3 players found two significant main effects of the prior expectation ($F(1, 76) = 72.10, p < .001$) and the variance ($F(1, 76) = 17.38, p < .001$). Follow-up simple contrasts indicated that participants avoided the variance in evaluating both the low-expectation ($M_{\text{moderate disagreement}} = 3.73$ vs. $M_{\text{extreme disagreement}} = 2.78$; $F(1, 76) = 8.60, p < .005$) and the high-expectation MP3 players ($M_{\text{moderate disagreement}} = 5.68$ vs. $M_{\text{extreme disagreement}} = 4.72$; $F(1, 76) = 8.78, p < .005$).

The Mediating Role of the Product versus the Reviewer Attribution. To further investigate the underlying process of the variance-seeking and the variance-aversion tendencies, we analyzed the reviewer and the product attribution would mediate the variance effects on the brand evaluation index. In so doing, we ran both the product attribution and the reviewer attribution mediation models for the low-/high-expectation MP3 players and unisex perfumes separately. Following the procedure outlined in Baron and Kenny (1986), we tested the four sets of regression equations: (a) the variance effect on the product (reviewer) attribution score, (b) the effect of the product (reviewer) attribution score on the brand evaluation index, (c) the variance effect on the brand evaluation index, and (d) the variance effect on the brand evaluation index controlling for the product (reviewer) attribution score. Figure 2 summarizes the mediation analyses. First, as shown in part A of figure 2, the mediation analysis for the high-expectation unisex perfume revealed that the variance effect on the reviewer attribution score ($\beta = .65, SE = .27; t(38) = 5.23, p < .001$), the effect of the reviewer attribution score on the brand evaluation index ($\beta = .83, SE = .09; t(38) = 9.25, p < .001$), and the variance effect on the brand evaluation index ($\beta = .42, SE = .31; t(38) = 2.84, p < .01$) were statistically significant. However, the variance effect on the brand evaluation index controlling for the reviewer attribution score ($\beta = -.21, SE = .24; t(38) = -1.79, p = .08$) became marginally significant while the effect of the reviewer attribution score still remained

significant ($\beta = .97$, $SE = .11$; $t(38) = 8.41$, $p < .001$). A Sobel test confirmed this partial mediation ($z = 2.32$, $p < .05$), suggesting that the variance-seeking tendency observed for the high-expectation unisex perfume was mediated by the reviewer attribution score. By contrast, our analysis found that the product attribution score failed to mediate the variance effect on the brand evaluation index for the high-expectation unisex perfume.

Insert figure 2 about here

Second, as shown in part B of figure 2, the mediation analysis for the low-expectation unisex perfume as well as the low- and high-expectation MP3 players indicated that on average the variance effect on the product attribution score ($\beta = .42$, $SE = .20$; $t(117) = 5.07$, $p < .001$), the effect of the product attribution score on the brand evaluation index ($\beta = -.63$, $SE = .09$; $t(117) = -8.91$, $p < .001$), and the variance effect on the brand evaluation index ($\beta = -.34$, $SE = .25$; $t(117) = -3.87$, $p < .001$) were statistically significant. However, the variance effect on the brand evaluation index controlling for the product attribution score became insignificant ($\beta = -.08$, $SE = .23$; $t(117) = -1.05$, $p = .30$) while the effect of the product attribution score still remained significant ($\beta = -.60$, $SE = .09$; $t(117) = -7.63$, $p < .001$). The Sobel test provided a marginal support ($z = -1.70$, $p < .10$), suggesting that the variance-aversion patterns found for the low-expectation unisex perfume and the low- and high-expectation MP3 players could be mediated by the product attribution score. Once again, the analysis found that the reviewer attribution score did not mediate the variance effect on the brand evaluation index for the low-expectation unisex perfume and for the low- and high-expectation MP3 players.

Discussion. The data furnished by experiment 1 provide support for the causal attribution predictions that the moderate disagreement in the OCRs enhances product

evaluations when product attributions are more likely whereas the extreme disagreement in the OCRs contributes to more favorable evaluations of the target products when reviewer attributions are more likely. However, the MP3 players and the unisex perfumes used in experiment 1 can differ on the dimensions other than the types of the causal attributions made such as the level of purchase involvement due to durability and the magnitude of variety seeking tendency. For example, our research participants are focused on the unique positive outcomes of the high-expectation unisex perfume under the extreme disagreement condition, thereby taking risks of accepting those extremely divergent opinions to seek different varieties. Also, it might be argued that unisex perfumes are search goods because of their attribute-driven benefits, and that MP3 players are experience goods because of their experiential characteristics. To rule out this alternative hypothesis, we ask participants to evaluate only the MP3 players in the follow-up experiments in which the product and the reviewer attributions are elicited by manipulating either the quality of the OCRs provided (experiment 2) or the total number of anonymous reviewers providing the OCRs (experiment 3).

EXPERIMENT 2

To rule out the alternative hypothesis that product characteristic differences, not the specific type of causal attributions, may account for the variance-aversion (the high- and the low-expectation MP3 players, the low-expectation unisex perfume) and the variance-seeking tendencies (the high-expectation unisex perfume) observed in the previous experiment, experiment 2 focuses only on the evaluation of the MP3 players. To elicit the product and the reviewer attributions for the MP3 players, we vary the level of persuasiveness of the OCRs because individuals can generate different causal attributions based on their relative persuasiveness (Richins 1983). Following Kelly (1973), we anticipate that individuals will

attribute the causes of reviewer disagreement (the consequence of action) toward the target product (the communication object) when the OCRs presented (the message information) are configured as being highly persuasive whereas individuals will generate the reviewer attribution when the less persuasive OCRs are provided.

Method

Participants and Design. One hundred and sixty graduate students participated in the current experiment in exchange for a \$5 stationery gift. Their mean age was 26 years and 75 were males. Participants were randomly assigned to one of eight conditions in a 2 (variance: moderate vs. extreme disagreement) \times 2 (prior expectation: low vs. high expectation) \times 2 (OCR persuasiveness: less- vs. more-persuasive OCRs) between-subjects design. The variance and the prior expectation manipulations were identical to those of experiment 1. The OCR persuasiveness manipulation involved having participants read the OCRs that varied in terms of their concreteness, logicity, and objectivity. The more-persuasive OCRs contained concrete, logical, and objective reasons whereas the less-persuasive OCRs included abstract, illogical, and subjective reasons.

Procedure and Measures. The experimental procedure and the measures used in the current experiment were identical to those of experiment 1 except that participants were asked to read either less or more persuasive OCRs included in the product description of the MP3 player. The OCR persuasiveness was measured on the following three 7-point items: abstract-concrete, illogical-logical, subjective-objective. These items were averaged to form a reliable OCR persuasiveness score ($\alpha = .95$), where a higher number indicated greater persuasiveness.

Results and Discussion

Manipulation Checks. A three-way ANOVA found that participants perceived greater variance in the OCRs under the extreme disagreement ($M = 4.61$) than under the moderate disagreement condition ($M = 3.10$; $F(1, 152) = 42.45, p < .001$), and that participants set a higher level of prior expectation for the high-expectation brand ($M = 4.83$) than the low-expectation brand of the MP3 player ($M = 3.20$; $F(1, 152) = 47.80, p < .001$). As expected, participants considered the OCRs containing concrete, logical, and objective reasons more persuasive ($M = 4.11$) than those containing abstract, illogical, and subjective reasons ($M = 2.83$; $F(1, 152) = 48.31, p < .001$). No other significant effects were found.

Brand Evaluation. A 2 (variance) \times 2 (prior expectation) \times 2 (OCR persuasiveness) ANOVA on the brand evaluation index exhibited a significant variance-aversion tendency, indicating that participants on average appeared to like the MP3 players more under the moderate disagreement ($M = 4.52$) than under the extreme disagreement ($M = 4.22$; $F(1, 152) = 3.76, p < .06$). Participants also evaluated the high-expectation MP3 player ($M = 5.23$) more favorably than the low-expectation MP3 player ($M = 3.51$; $F(1, 152) = 121.89, p < .001$). Three significant interactions between the OCR persuasiveness-the variance ($F(1, 152) = 5.40, p < .05$), between the OCR persuasiveness-the prior expectation ($F(1, 152) = 7.86, p < .01$), and between the prior expectation-the variance ($F(1, 152) = 9.37, p < .005$) were found, suggesting that the stronger variance-aversion tendency was observed in the more-persuasive OCR condition ($M_{\text{moderate disagreement}} = 4.76$ vs. $M_{\text{extreme disagreement}} = 4.09$; $F(1, 156) = 4.72, p < .05$), and for the low-expectation MP3 player ($M_{\text{moderate disagreement}} = 3.90$ vs. $M_{\text{extreme disagreement}} = 3.12$; $F(1, 156) = 11.17, p < .005$), and that the stronger preference for the high- than the low-expectation MP3 player was observed under the less-persuasive OCRs condition ($M_{\text{low-expectation}} = 3.24$ vs. $M_{\text{high-expectation}} = 5.40$; $F(1, 156) = 83.38, p < .001$). Most importantly, the analysis revealed a significant three-way interaction on the brand evaluation index ($F(1, 152) = 8.79, p < .005$).

Insert figure 3 about here

As shown in figure 3, we then conducted separate 2 (variance) \times 2 (prior expectation) ANOVAs for the less- and the more-persuasive OCR condition. First, the ANOVA for the less-persuasive OCR condition indicated a significant main effect of the prior expectation ($F(1, 76) = 95.07, p < .001$) and a significant interaction between the variance and the prior expectation ($F(1, 76) = 18.01, p < .001$). Follow-up analysis of simple contrasts showed that participants avoided the variance in evaluating the low-expectation MP3 player ($M_{\text{moderate disagreement}} = 3.68$ vs. $M_{\text{extreme disagreement}} = 2.80; F(1, 76) = 7.89, p < .01$) whereas they sought the variance in evaluating the high-expectation MP3 player ($M_{\text{moderate disagreement}} = 4.90$ vs. $M_{\text{extreme disagreement}} = 5.90; F(1, 76) = 10.19, p < .005$). Second, the ANOVA for the more-persuasive OCR condition yielded two significant main effects of the prior expectation ($F(1, 76) = 34.19, p < .001$) and the variance ($F(1, 76) = 9.16, p < .005$). Follow-up simple contrasts revealed that participants avoided the variance in evaluating both the low-expectation ($M_{\text{moderate disagreement}} = 4.12$ vs. $M_{\text{extreme disagreement}} = 3.44; F(1, 76) = 4.79, p < .05$) and the high-expectation MP3 player ($M_{\text{moderate disagreement}} = 5.39$ vs. $M_{\text{extreme disagreement}} = 4.74; F(1, 76) = 4.37, p < .05$).

The Mediating Role of the Product versus the Reviewer Attribution. Similar to the previous experiment, the follow-up mediation analysis was conducted. First, as shown in part A of figure 2, the mediation analysis for the high-expectation MP3 player accompanied by the less-persuasive OCRs indicated that the variance effect on the reviewer attribution score ($\beta = .54, SE = .32; t(38) = 3.90, p < .001$), the effect of the reviewer attribution score on the brand evaluation index ($\beta = .71, SE = .10; t(38) = 6.28, p < .001$), and the variance effect on the brand evaluation index ($\beta = .47, SE = .31; t(38) = 3.28, p < .005$) were statistically

significant. The analysis also showed that the variance effect on the brand evaluation index controlling for the reviewer attribution score ($\beta = .12$, $SE = .29$; $t(38) = .91$, $p = .37$) became insignificant while the effect of the reviewer attribution score still remained significant ($\beta = .65$, $SE = .12$; $t(38) = 4.80$, $p < .001$). The Sobel test, however, provided an insignificant statistics for this perfect mediation ($z = 1.63$, $p < .11$), limiting our previous interpretation that the reviewer attribution score mediated the variance-seeking tendency when participants were more likely to attribute the cause of extreme disagreement in the less-persuasive OCRs for the high-expectation MP3 player.

Second, as shown in part B of figure 2, the mediation analysis for the low-expectation MP3 player with the OCRs from the less-diverse reviewers as well as the low- and the high-expectation MP3 players with the OCRs from the more-diverse reviewers showed that on average the variance effect on the product attribution score ($\beta = .34$, $SE = .21$; $t(117) = 3.98$, $p < .001$), the effect of the product attribution score on the brand evaluation index ($\beta = -.76$, $SE = .06$; $t(117) = -12.84$, $p < .001$), and the variance effect on the brand evaluation index ($\beta = -.28$, $SE = .21$; $t(117) = -3.20$, $p < .005$) were statistically significant. Again, the variance effect on the brand evaluation index controlling for the product attribution score became insignificant ($\beta = -.02$, $SE = .15$; $t(117) = -.35$, $p = .72$) while the effect of the product attribution score remained significant ($\beta = -.76$, $SE = .06$; $t(117) = -11.89$, $p < .001$). The Sobel test was significant ($z = -2.01$, $p < .05$), suggesting that the product attribution score mediated the variance-aversion effects found for the low-expectation MP3 player under the less-persuasive OCRs condition as well as the low- and the high-expectation MP3 players under the more-persuasive OCRs condition.

Discussion. The findings of experiment 2 document further support for our causal attribution predictions that the reviewer attribution enhances the product evaluation under the extreme disagreement whereas the product attribution undermines it. Nevertheless, it is still a

possibility that individuals who evaluate the high-expectation MP3 player may find it easier to generate arguments against those extreme negative OCRs while using the extreme positive OCRs as information to confirm their own initial judgment. To eliminate this alternative account of our data, we decide not to vary the persuasiveness of OCRs in the follow-up experiment.

EXPERIMENT 3

According to past research on the multiple message sources effect (Calder, Insko, and Yandell 1974; Harkins and Petty 1987), the greater number of message sources can increase message persuasiveness. When many anonymous past buyers with dissimilar backgrounds leave their product reviews in favor of or against a target product, the presence of a greater number of positive or negative product reviews can increase convergent validity of the advocated message position. Because multiple OCRs from different review sources can simply carry much information (“the set-size effect”), however, cautions should be taken in manipulating the number of OCR review sources. In the current experiment, we decide to hold the persuasive quality and the total amount of the OCRs constant while varying only the number of anonymous OCR review sources as illustrated in figure 4 in order to control both the content and the set-size effect.

Insert figure 4 about here

As figure 4 indicates, we reconfigure the OCRs used in experiment 1 as either a set of the OCRs provided by five anonymous reviewers or the identical set of the OCRs provided by nine anonymous reviewers. Two positive, two negative, and one neutral OCRs are provided in the five-reviewer condition whereas four positive, four negative, and one neutral

OCRs are presented in the nine-reviewer condition. We anticipate that the reviewer attributions are more likely in the five-reviewer condition and the product attributions are more likely in the nine-reviewer condition.

Method

Participants and Design. One hundred and forty-four participants participated in the current experiment in exchange for a \$5 stationery gift. Their mean age was 26 years and 72 were males. Participants were randomly assigned to one of eight conditions in a 2 (variance: moderate vs. extreme disagreement) \times 2 (prior expectation: low- vs. high-expectation) \times 2 (the number of OCR reviewers: five vs. nine) between-subjects design. Once again, both the variance and the prior expectation manipulations were identical to the previous two experiments, and the manipulation of the number of the OCR review sources was administered as described above.

Procedure and Measures. The experimental procedure and the stimuli were identical to those of the previous experiments except that participants read the OCRs from either five or nine anonymous reviewers. Participants rated the perceived diversity of the OCR sources on the basis of the following two 7-point bipolar measures: “The number of the OCR reviewers was a few-many,” “The OCR reviewers were less-more diverse.” Participants’ responses to these items were averaged to form a reliable perceived diversity score of the OCR review sources ($\alpha = .93$), where a higher number indicated greater diversity of the OCR reviewers.

Results and Discussion

Manipulation Checks. A three-way ANOVA revealed that participants perceived greater variance in the OCRs under the extreme disagreement ($M = 4.59$) than under the moderate disagreement condition ($M = 3.09$; $F(1, 152) = 36.20$, $p < .0001$), and that their prior

expectation was higher for the high-expectation ($M = 4.66$) than the low-expectation MP3 player ($M = 3.33$; $F(1, 152) = 40.41, p < .0001$). As expected, the analysis showed that the set of the OCRs provided by the nine-reviewers ($M = 3.93$) was considered more diverse than the identical set of the OCRs provided by the five-reviewers ($M = 2.48$; $F(1, 152) = 29.26, p < .0001$). No other effects were found significant.

Brand Evaluation. A 2 (variance) \times 2 (prior expectation) \times 2 (the number of OCR reviewers) ANOVA on the brand evaluation index yielded a significant main effect of the variance, suggesting that the extreme disagreement ($M = 4.09$) undermined the evaluation of the MP3 players compared with the moderate disagreement condition ($M = 4.41$; $F(1, 152) = 3.94, p < .05$). Participants also liked the high-expectation MP3 player ($M = 5.03$) more than the low-expectation MP3 player ($M = 3.47$; $F(1, 152) = 96.62, p < .001$). Similar to experiment 2, three significant interactions between the number of OCR reviewers-the variance ($F(1, 152) = 5.44, p < .05$), between the number of OCR reviewers-the prior expectation ($F(1, 152) = 3.94, p < .05$), and between the prior expectation-the variance ($F(1, 152) = 3.94, p < .05$) emerged, indicating that the stronger variance-aversion tendency was found in the more-diverse OCR reviewer condition ($M_{\text{moderate disagreement}} = 4.55$ vs. $M_{\text{extreme disagreement}} = 3.86$; $F(1, 156) = 5.51, p < .05$), and for the low-expectation MP3 player ($M_{\text{moderate disagreement}} = 3.82$ vs. $M_{\text{extreme disagreement}} = 3.12$; $F(1, 156) = 8.96, p < .005$), and that the stronger preference for the high- than the low-expectation MP3 player was found under the less-diverse OCR reviewers condition ($M_{\text{low-expectation}} = 3.36$ vs. $M_{\text{high-expectation}} = 5.23$; $F(1, 156) = 63.15, p < .001$). Again, the analysis yielded a significant three-way interaction on the brand evaluation score ($F(1, 152) = 5.29, p < .01$).

Insert figure 5 about here

As figure 5 indicates, separate 2 (variance) \times 2 (prior expectation) ANOVAs for the less- and the more-diverse OCR source condition were conducted. First, the ANOVA for the less-diverse OCR condition found a significant main effect of the prior expectation ($F(1, 76) = 66.43, p < .001$) and a significant interaction between the variance and the prior expectation ($F(1, 76) = 10.49, p < .005$). Follow-up analysis of simple contrasts showed that participants avoided the variance in evaluating the low-expectation MP3 player ($M_{\text{moderate disagreement}} = 3.70$ vs. $M_{\text{extreme disagreement}} = 3.01; F(1, 76) = 4.50, p < .05$) whereas they sought the variance in evaluating the high-expectation MP3 player ($M_{\text{moderate disagreement}} = 4.83$ vs. $M_{\text{extreme disagreement}} = 5.63; F(1, 76) = 6.05, p < .05$). Second, the ANOVA for the more-diverse OCR source condition revealed two significant main effects of the prior expectation ($F(1, 76) = 32.41, p < .001$) and the variance ($F(1, 76) = 9.81, p < .005$). Follow-up simple contrasts indicated that participants avoided the variance in evaluating both the low-expectation ($M_{\text{moderate disagreement}} = 3.93$ vs. $M_{\text{extreme disagreement}} = 3.23; F(1, 76) = 5.12, p < .05$) and the high-expectation MP3 player ($M_{\text{moderate disagreement}} = 5.16$ vs. $M_{\text{extreme disagreement}} = 4.49; F(1, 76) = 4.69, p < .05$).

The Mediating Role of the Product versus the Reviewer Attribution. Once again, our follow-up mediation analysis documented supporting evidence for the causal attribution hypothesis. First, as shown in part A of figure 2, the mediation analysis for the high-expectation MP3 player accompanied by the OCRs from five reviewers found the variance effect on the reviewer attribution score ($\beta = .59, SE = .31; t(38) = 4.56, p < .001$), the effect of the reviewer attribution score on the brand evaluation index ($\beta = .80, SE = .09; t(38) = 8.17, p < .001$), and the variance effect on the brand evaluation index ($\beta = .37, SE = .33; t(38) = 2.45, p < .05$) to be significant. The analysis also indicated that the variance effect on the brand evaluation index controlling for the reviewer attribution score ($\beta = -.16, SE = .26; t(38) = -1.35, p = .19$) became insignificant while the effect of the reviewer attribution score still remained significant ($\beta = .89, SE = .11; t(38) = 7.44, p < .001$). The Sobel test was marginally

significant ($z = 1.85, p < .07$), suggesting that the reviewer attribution score seemed to mediate the variance-seeking tendency when participants were more likely to attribute the cause of extreme disagreement in the less-diverse OCR review source condition.

Second, as shown in part B of figure 2, the mediation analysis for the low-expectation MP3 player supported by the less-persuasive OCRs as well as the low- and the high-expectation MP3 players accompanied by the more-persuasive OCRs found that on average the variance effect on the product attribution score ($\beta = .48, SE = .23; t(117) = 5.87, p < .001$), the effect of the product attribution score on the brand evaluation index ($\beta = -.59, SE = .07; t(117) = -7.94, p < .001$), and the variance effect on the brand evaluation index ($\beta = -.29, SE = .23; t(117) = -3.24, p < .005$) were statistically significant. Again, the variance effect on the brand evaluation index controlling for the product attribution score became insignificant ($\beta = -.01, SE = .22; t(117) = -.08, p = .94$) while the effect of the product attribution score still remained significant ($\beta = -.59, SE = .08; t(117) = -6.92, p < .001$). The Sobel test, however, did not reach the conventional significance level ($z = -1.60, p < .12$).

GENERAL DISCUSSION

Consumers seek opinions and recommendations from friends, families, experts, and other consumers prior to making their purchase decisions. As a growing number of specialized product review websites and online retailers host consumer-generated review systems, consumers are granted an easy access to a multitude of online consumer reviews and summary evaluative ratings for and against products from many anonymous reviewers with dissimilar backgrounds. When most reviewers agree to evaluate a target brand either favorably or unfavorably in their OCRs, chances are that consumers are heavily influenced by the OCRs providing judgment-relevant information with high convergent validity. When reviewers disagree on the evaluation of a target brand to a certain degree, however,

consumers need to take both the content and the variance of the OCRs into account to arrive at their final judgment. In this regard, the present research identifies conditions under which consumers avoid or seek the variance in the opinions of multiple reviewers and explored the cognitive mechanism that underlies the variance-seeking and the variance-aversion effects on brand evaluations. The data furnished by three experiments suggest that consumers evaluate the high-variance brand more favorably than the low-variance counterpart because the reviewer attributions are more likely when the extremely conflicting OCRs are provided for the high-expectation experience product (experiment 1), and when the extremely conflicting OCRs for the high-expectation search product are considered less persuasive (experiment 2), or when a few anonymous reviewers provide the extremely conflicting OCRs for the high-expectation search product (experiment 3). Other than these occasions, the causes of the extreme variance in the OCRs are attributed to the target brands, thereby undermining the brand evaluations. Consistent with Laczniak et al. (2001), our mediation analyses across three experiments document supporting evidence for the causal attribution hypothesis that the reviewer (product) attributions can increase (decrease) the brand evaluations.

The present research contributes to our understanding of how consumers integrate conflicting opinions of multiple others into their preferential judgment. Replicating Kahneman and Tversky's (1979) loss-aversion and West and Broniarczyk's (1998) reference-dependent model, this research demonstrates that a consumer's reference point or prior expectation indeed moderate the variance effects on brand evaluations such that consumers avoid the variance in the domain of gains where their prior expectation is lower than the average of reviewers' opinions whereas they seek the variance in the domain of losses where the average of reviewers' opinions is lower than their prior expectation. This implies, when extreme variance is expected, increasing a consumer's prior expectation about a target brand, especially if the target brand belongs to the category of experiential goods such as cosmetics,

movies, books, travel destinations, music, foods, and restaurants, can lead to a more favorable evaluation. The present research, however, shows that a consumer preference for a high-variance option can be observed only when it is easier to generate reviewer attributions for the causes of such extreme variance with regard to the evaluation of a high-expectation brand. Furthermore, the variance-seeking tendency for a high-expectation brand under the extreme variance in the OCRs is not just limited to an experience good. Regardless of the product characteristic of a target brand, a consumer may prefer a high-variance brand as long as the causes of the extreme variance in the OCRs can be attributed to reviewers.

The present research also contributes to the management of online review systems. First, considering a consumer with the high prior expectation about a target brand tend to ignore the opinions of reviewers that stand in sharp contrast to his or her own evaluation, online marketers should pay special attention to factors influencing reviewer characteristics that facilitate the generation of reviewer attributions. For example, prior research has demonstrated that the expertise and credibility of reviewers (Hu et al. 2008; Smith et al. 2005), the identity and geographical location of reviews (Forman et al. 2008), and the overall agreement rate between past opinions of the reviewers and those of their own (Gershoff, Mukherjee, and Mukhopadhyay 2003, 2007; Weiss, Lurie, and MacInnis 2008) are positively associated with consumers' use of OCRs. Therefore, granting consumers easy access to the previous OCRs and the summary evaluative ratings that reviewers have left for other products as well as the identity-descriptive information of reviewers can help them decide whether or not to incorporate the OCRs into their judgments. Second, online marketers need to encourage reviewers to post their OCRs in a much-detailed fashion by setting a minimum length limit to each OCR and providing incentives such as special discount coupons, membership point rewards, and prizes for the use of multimedia information in their OCRs in order to increase the depth or persuasiveness of the OCRs (Huang et al. 2009; Mudambi and

Schuff 2010). For example, lesser-known or start-up online retailers can benefit much from these persuasiveness-enhancing attempts because the lack of trustworthiness resulting from extremely conflicting OCRs posted to their online review systems can increase purchase risks.

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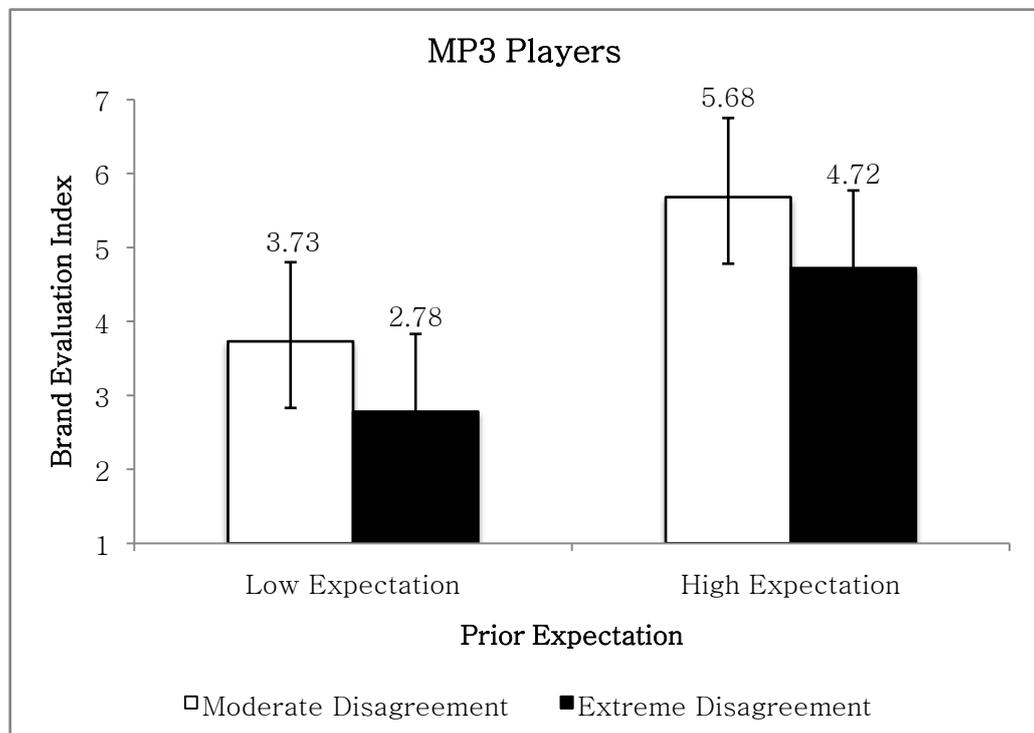
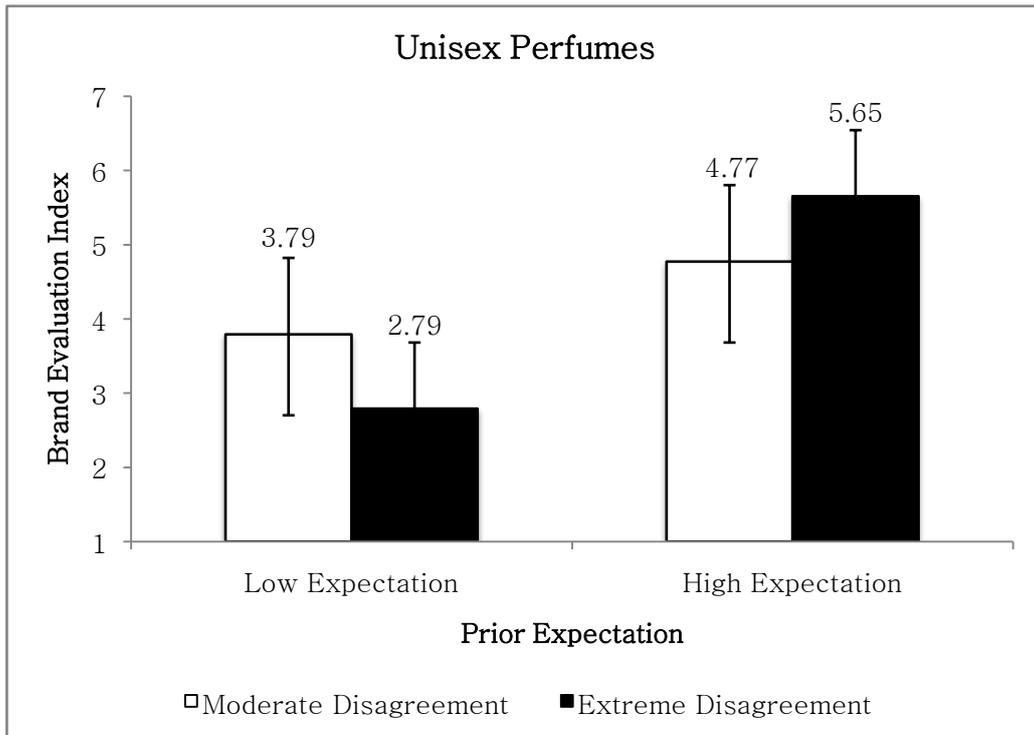
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FIGURE 1

BRAND EVALUATION INDEX (EXPERIMENT 1)

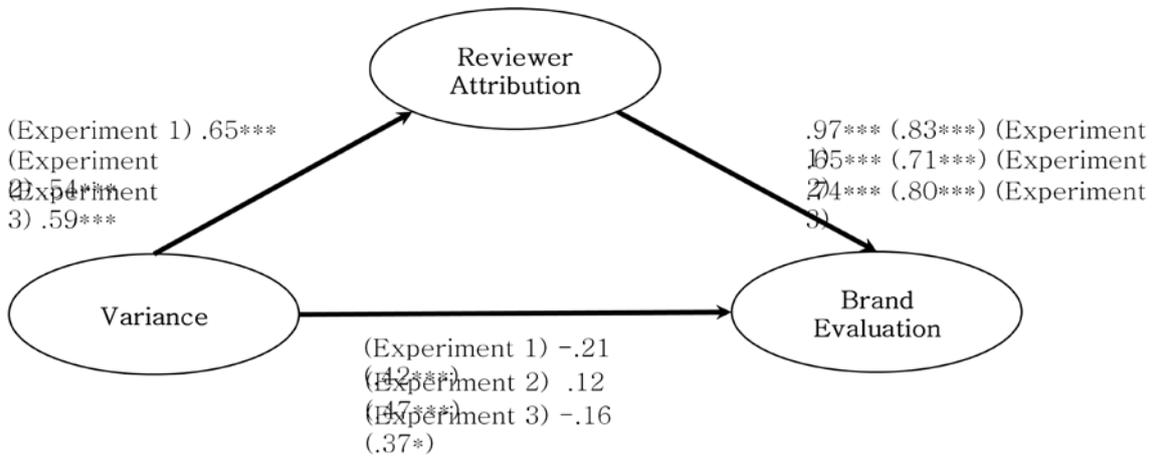


NOTE. – Error bars denote standard deviations.

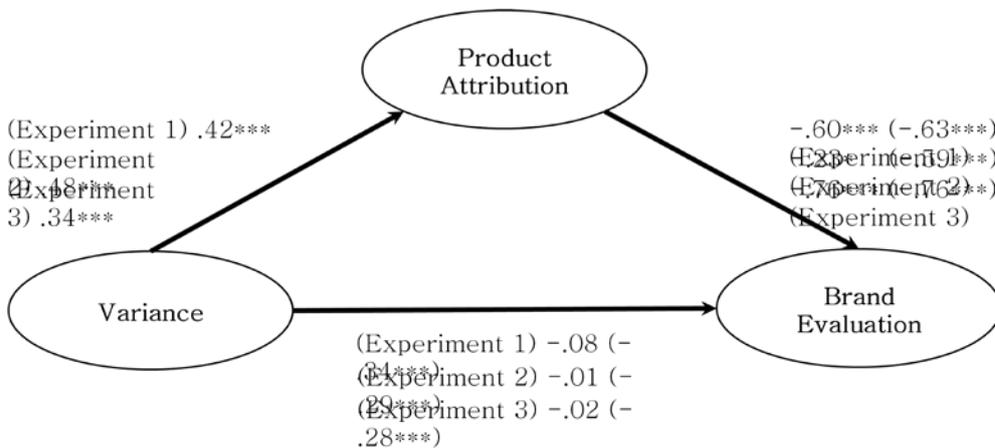
FIGURE 2

THE MEDIATING ROLE OF THE PRODUCT AND THE REVIEWER ATTRIBUTION

A. Reviewer Attribution Model: High-expectation unisex perfume (Experiment 1); high-expectation MP3 player with more-persuasive OCRs (Experiment 2); high-expectation MP3 player with more-diverse OCR source (Experiment 3)



B. Product Attribution Model: Low-expectation unisex perfume, low- and high-expectation MP3 players (Experiment 1); low-expectation MP3 player with less- and more-persuasive OCRs (Experiment 2); low-expectation MP3 player with less- and more-diverse OCR source (Experiment 3)

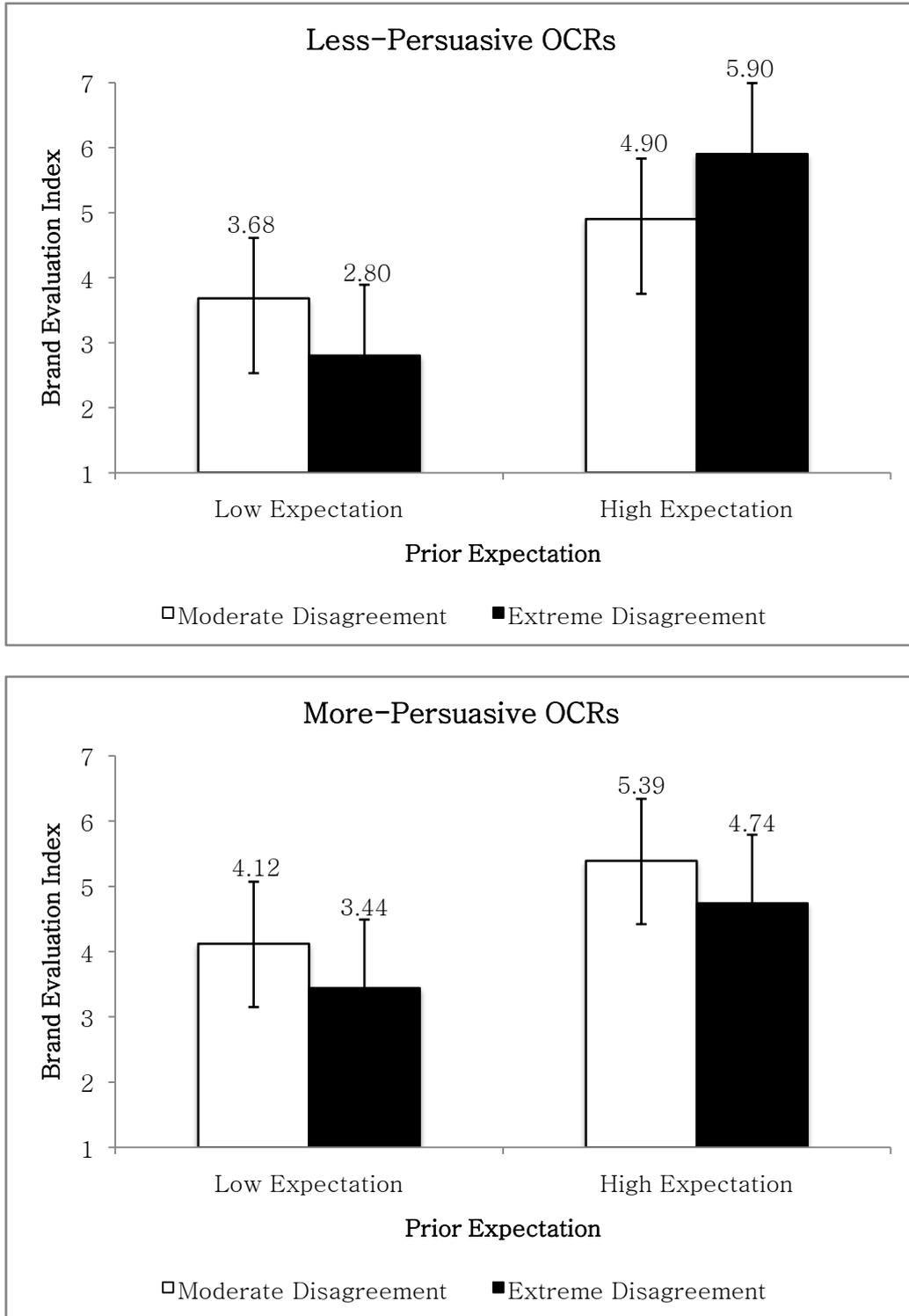


NOTE. – The numbers are standardized betas and those in the parentheses are the estimates from the simple regression analyses.

*** $p < .005$. ** $p < .01$. * $p < .05$.

FIGURE 3

BRAND EVALUATION SCORE (EXPERIMENT 2)



NOTE. – Error bars denote standard deviations.

FIGURE 4

THE NUMBER OF THE OCR REVIEW SOURCES MANIPULATION (EXPERIMENT 3)

Nine Review Sources

Five Review Sources

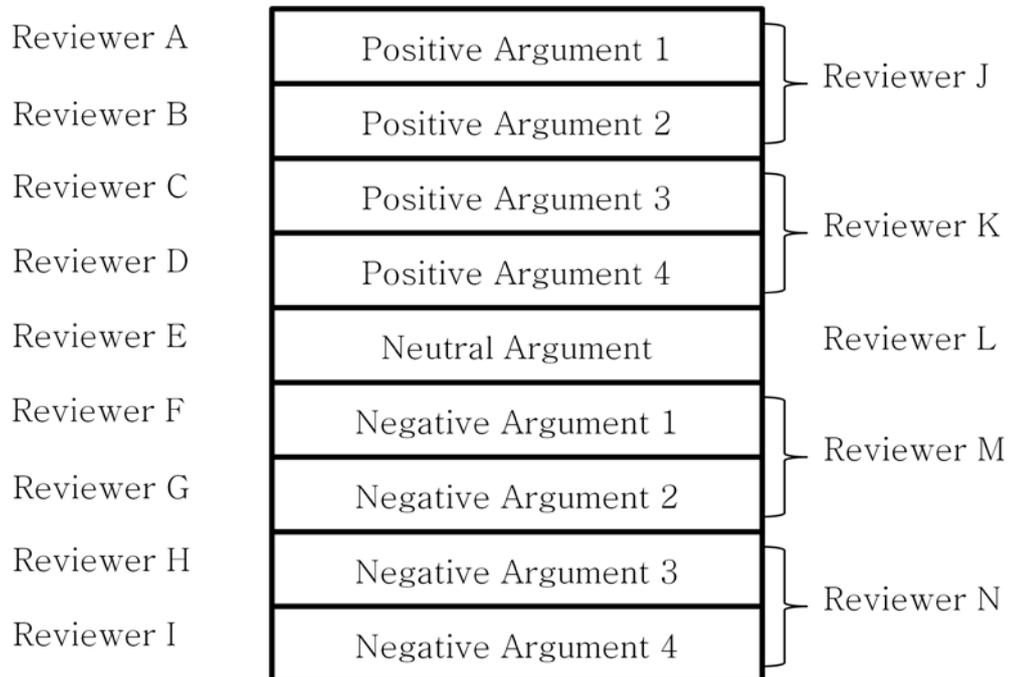
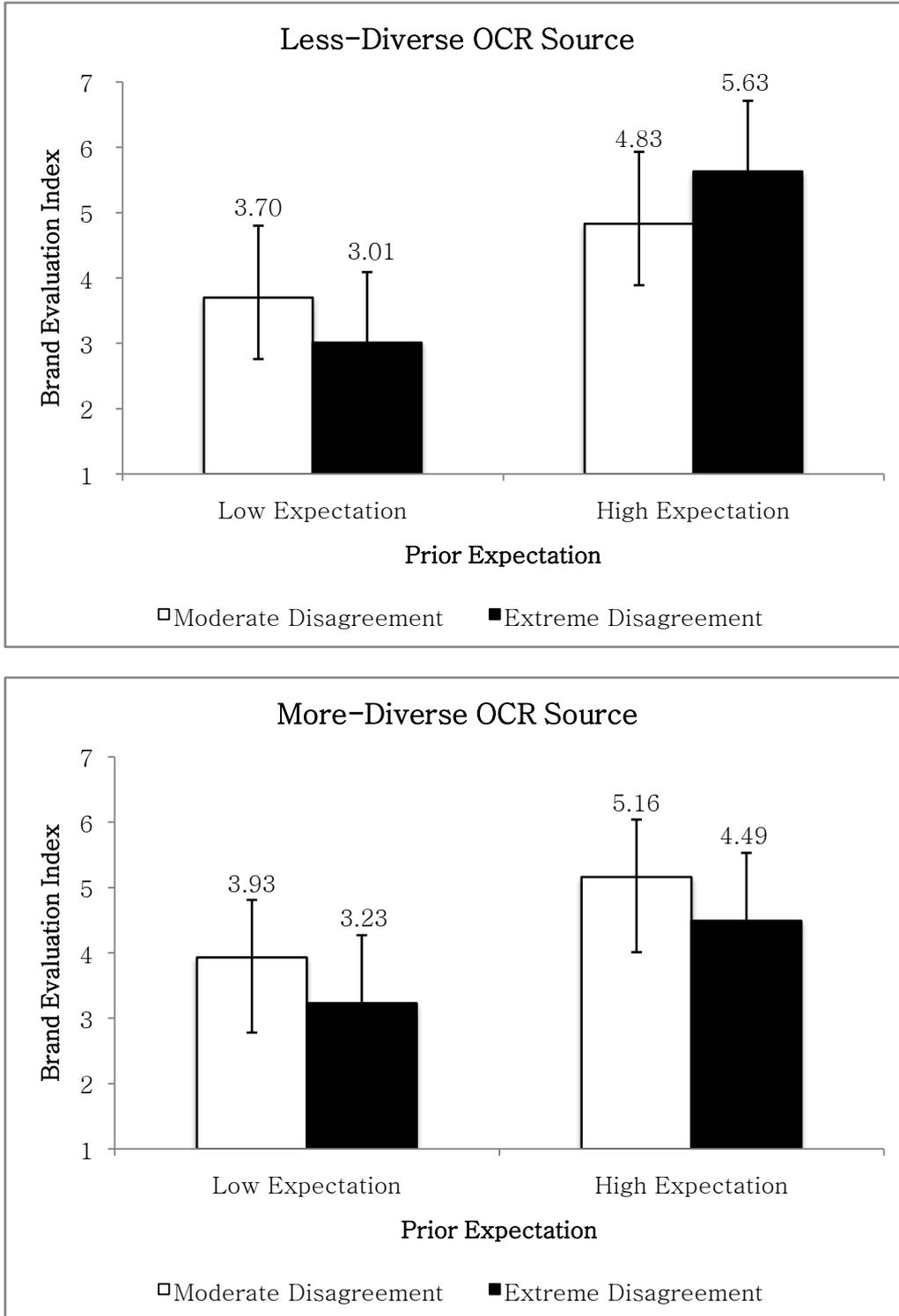


FIGURE 5

BRAND EVALUATION SCORE (EXPERIMENT 3)



NOTE. – Error bars denote standard deviations.