



# The Presentation Format of Review Score Information Influences Consumer Preferences Through the Attribution of Outlier Reviews

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## Abstract

Review score information can be presented in different formats. In three online experiments, we examined consumers' behavior in the context of review scores presented in a *disaggregated* format (individual review scores observed sequentially and individually), an *aggregated* format (review scores summarized into a frequency distribution chart), or both together. Participants tended to attribute outlier review scores to reviewer rather than product reasons. This tendency was more prevalent when reviews were presented in disaggregated format. Moreover, reviews attributed to reviewer reasons tended to be perceived with low credibility. When presented with a choice between two products with equal average review scores but different variances, participants chose as if outlier review scores were discounted when scores were presented in the disaggregated format. This tendency emerged even when disaggregated and aggregated formats were presented together. The number of review scores moderated the effect of format on choice. We argue that disaggregated information allows consumers to better track the number of outliers and, when the number of outliers is small, prompts them to attribute these outliers to reviewer reasons, and subsequently discount them.

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## Introduction

“Word of mouth” (WoM) refers to informal person-to-person communications regarding a brand, product, or service (Arndt 1967; Westbrook 1987). Many have argued that WoM is one of the most powerful forces shaping consumer behavior (Trusov, Bucklin, and Pauwels 2009; Whyte 1954). Correspondingly, a large body of work has focused on WoM antecedents, consequences, and management (Berger 2014; De Matos and Rossi 2008; Lang and Hyde 2013). We focus here on product review scores because prior research has established them as an important source of consumer information that influences purchasing decisions (Chatterjee 2001; Chevalier and Mayzlin 2006; Senecal and Nantel 2004). Much work has examined how consumer responses to reviews are influenced by stimuli (such as volume), communicators (such as expertise), and contextual factors (such as platform) (see Cheung and Thadani 2012, for a review). The focus of the current paper is the influence of review score format on consumer's product preference.

Preliminary research suggests that consumers may form different product preferences depending on whether associated product review scores are presented as an aggregated review score distribution or as disaggregated individual review scores (Wulff, Hills, and Hertwig 2014). This finding is important because managers have the ability to design online platforms that direct consumer attention to different formats of review score information, which may subsequently influence consumer behavior. We contribute by extending this finding to contexts in which both aggregated review score information and disaggregated review score information are presented. We also contribute by explaining this behavior in the light of attribution theory: outlier review scores are attributed to reviewer (vs. product) reasons, discredited, then discounted, and this attribution is more likely when review scores are presented in a disaggregated format.

## Different Information Presentation Formats

Review score information is commonly presented in two basic formats. “Aggregated” information includes formats in which

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multiple pieces of information are obtained and processed collectively and simultaneously (for example, review scores that have been summarized into a frequency histogram at [Amazon.com](#)). “Disaggregated” information includes formats in which multiple pieces of information are obtained and processed individually, sequentially, and over time (such as a list of individual reviews left at [Amazon.com](#)).

Most online websites give consumers access to *both* disaggregated and aggregated review score information. However, consumers naturally have an option of which format of information to focus on, and this focus is likely to vary (Purnawirawan, De Pelsmacker, and Dens 2012). To test this assumption, we conducted a survey of 104 American participants recruited from Amazon’s Mechanical Turk regarding their behavior when looking at online review aggregator websites. The participant’s behavior fell into four categories such that on 38% of occasions the average review score, the distribution of review scores, and the individual review scores were all considered, on 36% of occasions the individual review scores were ignored, and on 11% of occasions both the average review score and the distribution of review scores were ignored. Furthermore, some websites directly limit the format in which reviews are presented. For example, [Zomato.com](#), one of the fastest-growing restaurant search websites, does not provide users with a frequency histogram summarizing review scores. Other websites, such as [HealthGrades.com](#), focus on presenting aggregated data to specifically reviewed service characteristics (e.g., trustworthiness, helpfulness). In sum, consumers will often be exposed to review score information that is in aggregated format, disaggregated format, or both, prior to making a purchase decision.

Wulff, Hills, and Hertwig (2014) compared choices between two alternative products for which review score information was presented in either aggregated or disaggregated format. Each choice pair comprised of a low-variance product for which the review scores clustered tightly around the average score, and a high-variance product for which the review scores clustered widely around the average score. In this study, and in those that follow, the high variance product was associated with an outlier review; that is, a review score left by only a minority of reviewers. Half the participants saw the review scores summarized in a single frequency histogram (an aggregated information format) whereas the others observed the review scores individually and sequentially (a disaggregated information format). Two procedural features are worth noting. First, the disaggregated review scores were not accompanied by a textual elaboration of the score. Second, participants in the latter group were unconstrained in terms of the number of reviews they could sample.

The researchers found significant differences in choices depending on presentation format; namely, those presented with disaggregated reviews tended to make choices as if discounting outlier reviews. The authors attributed their observations primarily to sampling error: those who were sampling individual review scores often failed to sample a sufficient number to ever observe the outlier scores. Indeed, in the aggregated format, each product was associated with 100 review scores (a total of 200 scores per choice). By contrast, in the disaggregated format, on

average, participants considered just 21 reviews per choice, meaning that the two conditions differed considerably in terms of the number of product reviews participants observed. Therefore, it appears that many participants in this study chose *as if* discounting outlier reviews when presented in a disaggregated format because outliers were never observed in the first place.

We believe, despite the confound in information provided, that the general conclusion from Wulff, Hills, and Hertwig (2014) – that there are format-dependent differences in choice – may be accurate. To test this hypothesis directly, in our studies we ensured that participants in different groups were always presented with equivalent information. By ruling out information differences between groups, we were able to directly test the impact of different review score information formats, and eliminate sampling error as an explanation for any observed format dependent differences. We also hypothesized a different underlying mechanism: outlier review attribution.

### Outlier Review Attributions

We argue that consumers form attributions about reviews – particularly outlier review scores – that vary depending on the review score presentation format. Kelley’s (1967) covariation model of attribution theory explains how people make causal inferences to understand why communicators advocate certain positions. According to this theory, two possible attributions relate to whether conveyed opinions are based on external (product) reasons or internal (reviewer) reasons, and one factor that helps determine an attribution is consensus: the extent to which other people behave in the same way in a similar situation (Kelley 1973). A low level of consensus tends to be associated with internal attributions. For instance, if ten reviewers have ten different opinions about a product, then one might conclude that the ten opinions stem more from internal reviewer reasons (e.g., personality) than from external product reasons (e.g., quality). Conversely, if ten reviewers have ten similar opinions about a product, then one might conclude that the ten opinions stem more from product reasons than from reviewer reasons.

Research suggests that consumers are more likely to discount an individual review after reading the reviewer’s comments if they attribute that review to reviewer reasons, which can subsequently affect brand evaluation (Laczniak, DeCarlo, and Ramaswami 2001). Research has also shown that consumers are more likely to attribute a review to reviewer (vs. product) reasons for experience (e.g., cosmetics) versus search (e.g., MP3 player) goods, which can subsequently affect product attitude (Park and Han 2008). Consumers are also more likely to attribute product reasons to negative reviews about utilitarian products but more likely to attribute reviewer reasons to negative reviews about hedonic products, which can subsequently affect attitude towards the review (Sen and Lerman 2007).

To our knowledge, only one previous study has examined the combined effect of an aggregated rating and individual reviews from an attribution perspective. Qiu, Pang, and Lim (2012) presented participants with a single review that was of either negative or positive valence. Half the participants were also shown the average product rating based on a total of 96 reviews,

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