



# Understanding the impact of prior reviews on subsequent reviews: The role of rating volume, variance and reviewer characteristics



Bin Guo<sup>a</sup>, Shasha Zhou<sup>b,\*</sup>

<sup>a</sup> School of Management, Zhejiang University, Hangzhou 310058, China

<sup>b</sup> School of Information, Zhejiang University of Finance and Economics, Hangzhou 310018, China

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## ABSTRACT

Extant literature has recognized the impact of previously posted ratings on subsequent ratings but reports inconsistent findings. To reconcile the mixed findings in the literature, this study draws on an integrative view of information diagnosticity and social influence theory to investigate the moderating effect of rating context (characterized by volume and variance of prior ratings) and its interaction with subsequent reviewer characteristics on the relationship between the average of prior ratings and a subsequent rating. The empirical analyses, using a dataset of 70,410 restaurant reviews collected from Yelp.com, reveal that both volume and variance of prior ratings exert negative moderating effects and such moderating effects are contingent on subsequent reviewer connectedness and expertise.

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## 1. Introduction

Online word of mouth (WOM) such as product reviews has played an increasingly important role in the popularity of electronic commerce (Yin et al., 2014). Consumers rely on product reviews to seek information on quality (to mitigate product quality uncertainty) and match of preference (to mitigate product fit uncertainty) (Kwark et al., 2014). Many studies have shown that online product reviews significantly affect consumer purchase decisions and product sales (Chevalier and Mayzlin, 2006; Dellarocas et al., 2007; Duan et al., 2008; Hu et al., 2008; Park et al., 2007; Purnawirawan et al., 2012). Given the importance of online product reviews, substantial research effort has been devoted to understanding its antecedents. Consumer characteristics such as the need for uniqueness (Cheema and Kaikati, 2010), motivational factors embedded in consumers such as self-enhancement (Angelis et al., 2012), and product characteristics such as price and popularity (Dellarocas et al., 2010; Li and Hitt, 2008), have been found to affect consumer rating behavior.

Of even more concern in recent years is the impact of previously posted reviews on consumer rating behavior (e.g., Ma et al., 2013; Moe and Trusov, 2011; Wang et al., 2015). This rating behavior, as argued by Berinsky (2004), may involve two phases: opinion formation and opinion expression. In the formation phase, consumers

form an initial post-purchase evaluation about the product based on its perceived quality and its fit to their preference. In the expression phase, consumers' post-purchase product evaluations are expressed in the form of product reviews. However, extant studies look at the effect of prior reviews separately on either the opinion-formation or opinion-expression phase of subsequent reviews. The formation phase focuses on the diagnosticity of prior reviews that affects subsequent reviewer's understanding and evaluation of the reviewed product (Godes and Silva, 2012; Li and Hitt, 2008), while the expression phase focuses on the social influence of prior reviews that induces subsequent reviewers to give reviews conditional on prior reviews (Moe and Schweidel, 2012; Schlosser, 2005). Given that the two phases coexist in consumer rating behavior, a joint consideration of the two phases should prove intriguing and provide us with a more comprehensive understanding of how prior reviews affect subsequent reviews.

It is worth noting that with regard to the effect of prior reviews on subsequent reviews, if characterized as the relationship between the average rating of prior reviews and the subsequent rating, the extant literature reports contradictory empirical findings. For example, Ma et al. (2013) document a positive relationship between the average rating of prior reviews and a subsequent rating, whereas Wang et al. (2015) find that relationship to be negative. To reconcile such mixed findings, we also consider the potential influence of rating context, which is defined as the external information about a given product (i.e., previous

\* Corresponding author.

E-mail addresses: [guob@zju.edu.cn](mailto:guob@zju.edu.cn) (B. Guo), [zss\\_1224@163.com](mailto:zss_1224@163.com) (S. Zhou).

product evaluations) that a reviewer can observe before rating that product (Hu and Li, 2011). We posit that the relationship between the average rating of prior reviews and the subsequent rating likely depends on the rating context, because situational differences in prior reviews can affect the diagnosticity effect and the social influence effect of prior reviews on subsequent reviews, which we will explain in more detail below. Specifically, we consider the moderating effect of the rating context along two dimensions—the volume of prior ratings and the variance of prior ratings. The former captures the amount of product-related information contributed by prior reviewers, while the latter captures the degree of disagreement on product opinions among prior reviewers. These two measures have important implications because they are implementable in business practices by firms at low cost and effort (Godes and Mayzlin, 2004). It would be beneficial to the managers if they understand how the volume and variance of product ratings shape future consumer rating behavior and how to incorporate these measures for making marketing strategies.

In addition, to provide a more fine-grained understanding of the moderating effects of the rating contextual factors, we take subsequent reviewers' characteristics into consideration by examining the interaction effects of rating contextual factors and subsequent reviewer characteristics on the relationship between the average rating of prior reviews and the subsequent rating. Because both diagnosticity judgment and response to social influence can vary across reviewers with different characteristics (e.g., self-confidence and knowledge level) (Ahluwalia, 2002; Bearden et al., 1989; Hoffmann and Broekhuizen, 2009), failing to account for reviewer difference may under- or over-estimate the role of rating context. In this research, we characterize reviewer difference by two factors—reviewer connectedness and reviewer expertise which are the key measures for a reviewer's influence (Goldenberg et al., 2009). Reviewer connectedness refers to a reviewer's connectivity with other users in the product review system, while reviewer expertise refers to a reviewer's product knowledge level and ability to provide accurate product information (Racherla and Friske, 2012). The interaction effects, if supported, can also provide additional support to our theoretical arguments.

In sum, this study departs from previous work in two significant ways. First, unlike prior studies that examine the diagnosticity effect and social influence effect of prior reviews on subsequent reviews separately, we integrate these effects to provide a more comprehensive understanding. Second, we reconcile the mixed findings in previous research regarding the relationship between the average rating of prior reviews and the subsequent rating by introducing the moderating effect of rating context and its interaction with subsequent reviewer characteristics for the first time.

## 2. Theory and hypotheses

### 2.1. Research background

Research on the effect of prior reviews on subsequent consumer rating behavior (including opinion-formation and opinion-expression phases) can be classified into two categories. One category focuses on the effect of prior reviews on the opinion-formation phase of subsequent reviews based on the theoretical perspective of information diagnosticity, which posits that diagnostic information can assist consumers in evaluating the quality of a product and reaching more accurate predictions of whether the product fits their needs well (Chu et al., 2015; Jiang and Benbasat, 2004). When making purchase decisions, consumers often seek product reviews to help understand product quality and product fit to reduce decision risks (Kwark et al., 2014). With diagnostic information from product reviews, consumers can make

good purchase decisions and form positive attitudes toward the purchased product. Godes and Silva (2012) and Li and Hitt (2008) provide evidence that the diagnosticity of prior reviews can influence subsequent reviewers' product performance and post-purchase product evaluation. However, it is important to note that diagnosticity assessment is subjective in nature and situation dependent (Ahluwalia, 2002). Incorporating factors that affect diagnosticity assessment may enhance the prediction accuracy of the diagnosticity effect of prior reviews on subsequent reviews.

The other category focuses on the effect of prior reviews on the opinion-expression phase of subsequent reviews from the perspective of social influence, which refers to the modification of an individual's response (attitude, behavior, and/or belief) in reaction to those of others (Kuan et al., 2014; Leenders, 2002). Many studies show that subsequent reviewers adjust their personal product evaluations according to prior reviews (Moe and Schweidel, 2012; Schlosser, 2005). The social influence from prior reviewers can cause subsequent reviewers to conform to the majority opinion of prior reviews (Lee et al., 2015). Such conformity is mainly driven by two motives. One motive is to form accurate product evaluation because people tend to believe others' interpretations of the product can be more accurate. The other motive is to be identified by others or gain social benefits such as being liked or accepted by others (Deutsch and Gerard, 1955; Kuan et al., 2014). The impact of social influence is a function of the factors relating to the sources (e.g., the number and consensus of the social source) and targets of social influence (e.g., the targets' self-confidence and knowledge level) (Bearden et al., 1989; Latané and Wolf, 1981). Incorporating such factors in our research can improve the prediction accuracy of the social influence effect of prior reviews on subsequent reviews.

Taken together, considering the diagnosticity effect and the social influence effect of prior reviews on subsequent reviews separately may lead to biased conclusions. Thus, it is quite necessary and important to integrate the above two perspectives to obtain a more comprehensive understanding of the relationship between prior reviews and subsequent reviews. To achieve this goal, incorporating conditional factors that may weaken or strengthen the diagnosticity effect and the social influence effect is needed. In the following, we develop the rationale for the moderating effects of the rating context and its interaction with subsequent reviewer characteristics on the relationship between the average rating of prior reviews and a subsequent rating, as illustrated in Fig. 1.

### 2.2. Hypotheses

#### 2.2.1. The relationship between prior reviews and subsequent reviews

As a measure of the effect of prior reviews on subsequent reviews, the relationship between the average rating of prior reviews and a subsequent rating is subject to controversy in the literature. Ma et al. (2013) report that relationship to be positive and argue that the average rating of prior reviews can serve as a signal for subsequent consumers to form initial expectations, and thus positively affect their post-consumption evaluations. In contrast, Wang et al. (2015) find that relationship to be negative but without explanations; and in many cases this negative relationship is consistent with the downward trend in product ratings (Li and Hitt, 2008). Despite the inconsistent findings in the literature, we follow the theory that the average rating of prior reviews can be positively associated with a subsequent rating, based on the following considerations. The average rating of a product reflects the utility that consumers can receive from consuming the product (Hu and Li, 2011). With product information from prior reviewers that may help predict product quality (dealing with common utility) and product fit (dealing with idiosyncratic utility), subsequent reviewers are likely to achieve the product utility as the average rating

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