

ANTECEDENTS OF CONSUMER LOYALTY EXPRESSIONS IN ONLINE REVIEWS

Prashanth Ravula
Morgan State University, USA

Geetika Jaiswal
Morgan State University, USA

Miguel Ángel Zúñiga
Morgan State University, USA

ABSTRACT

In today's digital landscape, online reviews significantly influence consumer purchase decision-making. This study investigates the antecedents of loyalty expressions in online reviews, addressing a critical research gap. Specifically, we examine reviewers' motivations to convey loyalty in their online reviews, whether through recommendations or repurchase intentions. We use publicly available Yelp reviews. We employ Probit models to model loyalty expressions, incorporating random intercepts to account for variation among reviewers. Our research reveals that experienced reviewers are more inclined to express loyalty through repurchase intentions, while novice reviewers tend to express via recommendations. Additionally, our findings highlight the interaction between product category and evaluation of consumption experience: cognitive evaluations drive repurchase intentions (recommendations) for frequently (infrequently) purchase products, while affective evaluations lead to repurchase intention (recommendation) for infrequently (frequently) purchased products. This study's findings provide crucial insights for retailers, highlighting the intricate interplay between reviewer experience, product category, evaluation of product consumption experience, and loyalty expressions in the context of online reviews.

INTRODUCTION

In today's rapidly evolving digital landscape, online reviews have become readily accessible across a diverse spectrum of products and services (Schuckert, Liu, and Law, 2015) and from a diverse set of consumers (Hong, Kim, and Lennon, 2018). Prior to making a purchase decision, consumer prospects search for information online to learn about the product, examine online review ratings, and read review texts to inform their purchase decisions (Mudambi & Schuff, 2010; Cheema & Kaikati, 2010; Lee, Kim, & Peng, 2013; Packard & Berger, 2017; Ravula, Bhatnagar, and Gauri, 2023). After product consumption, some consumers share their consumption experiences with the product by posting reviews online (Cheung & Lee, 2012; Kuo & Hou, 2017). Therefore, the language and words used in online review text play a crucial role in persuading consumer prospects and assisting retailers in predicting loyalty intentions (Rese, Schreiber, & Baier, 2014; Hong, Kim, & Lennon, 2018).

While the influence of online reviews in shaping consumer prospects' preferences is evident, there has been limited exploration into the psychological processes reviewers undergo

when writing these reviews and how these processes affect the content of the reviews. Specifically, what drives reviewers to express loyalty within online review text? For instance, some reviewers express loyalty by using phrases like "I recommend it", while others convey loyalty through repurchase intentions (Packard & Berger, 2017; Ravula, Jha, & Biswas, 2022). Although these variations may seem subtle, existing literature has demonstrated that these different forms of loyalty expressions have varying persuasive effects on potential consumers (Ravula *et al.*, 2022). Consequently, from both theoretical and practical standpoints, it is crucial to understand the drivers of these loyalty expressions in online reviews.

In this paper, we examined the effect of reviewer experience on loyalty expressions, as well as the interactive role of product category (frequently purchased vs infrequently purchased) and the evaluation of product consumption experience (cognitive and affective). For our empirical study, we analyzed a large dataset of user-generated reviews from Yelp, a well-known online review platform. Our focus was on positive reviews (4 or 5 stars), resulting in a dataset of 3,826,827 reviews. We measured reviewer experience by the number of reviews each reviewer had written before the review in question. We followed the approach outlined in Anderson (1994) to categorize reviews into frequently purchased (e.g., restaurants) and infrequently purchased (e.g., repair services) product categories. We used the Linguistic Inquiry and Word Count (LIWC) software to quantify the presence of cognitive and affective language in the review texts. Further, the review texts were processed in Python to determine whether the reviewers' loyalty was expressed through repurchase intentions or recommendations.

Our analysis involved using Probit models to model loyalty expressions. The findings showed that experienced reviewers are more likely to express loyalty through repurchase intentions and novice reviewers are likely to do so through recommendations. Additionally, the results showed that cognitive evaluations were positively associated with repurchase intentions for frequently purchased products and with recommendations for infrequently purchased products. In contrast, affective evaluations are positively associated with repurchase intention for infrequently purchased products and with recommendations for frequently purchased products. These insights underscore the role of interaction between product category and evaluation type in shaping loyalty expressions in review text.

Our research enriches theoretical understanding by examining loyalty expression in online reviews, focusing on repurchase intentions and recommendations. We contribute to the literature in two significant ways. First, building on existing studies (for a review of articles, see Huy Tuu and Ottar Olsen, 2016) that investigated the satisfaction-loyalty relationship, our research delves into the specific factors influencing repurchase intentions versus recommendations in online reviews. This approach offers a fresh perspective on analyzing loyalty expressions, with particular emphasis on the influence of reviewers' experience on their online reviews. Our results demonstrate that experienced reviewers are more likely to express loyalty through repurchase intentions, an aspect that previous research has not thoroughly addressed.

Second, our study explores the interactive role of product category and cognitive and affective dimensions of reviewer evaluations of product consumption experiences in online reviews. This finding adds an important element to the loyalty literature on how these evaluations influence loyalty expressions across different product categories. Our findings complement previous work, such as that by Packard and Berger (2017), by demonstrating that how reviewers express loyalty – whether through repurchase intentions or recommendations – depends not only on their evaluative style but also on the nature of the product. This underscores the importance of

considering both cognitive and affective evaluations in determining how reviewers express loyalty in online reviews.

Our study offers valuable insights for retailers and online review platforms engaging in review solicitation and online reputation management. First, it emphasizes tailoring review-writing guidelines to reviewers' experience. When the aim is to prompt reviewers to express repurchase intentions in their reviews, focusing on novice reviewers is key, as they are generally less inclined to do so. Conversely, if the objective is to encourage product recommendations, targeting experienced reviewers is more effective, as they are typically less prone to recommending products to others. This strategic differentiation can enhance the effectiveness of online reviews in shaping consumer prospects' behavior. Second, businesses can refine their review solicitation strategies by tailoring prompts based on the desired loyalty expression. For frequently purchased products, encouraging reviewers to provide cognitive feedback about their product consumption experience will yield more repurchase intentions in review text, while guiding reviewers to include affective evaluations will foster recommendations. On the other hand, for infrequently purchased products, focusing on affective components of the evaluation of their product consumption experience will enhance repurchase intentions, while fostering cognitive evaluations will result in stronger recommendations. These strategies, aligned with reviewer experience and evaluation type, can significantly improve how businesses solicit and leverage customer feedback.

BACKGROUND

While satisfaction is defined in several ways, transaction-specific satisfaction results from a specific exchange between a consumer and a firm (Oliver, Rust, and Varki, 1997). Satisfied consumers who share their experiences with others through word of mouth (WOM) are likely to express loyalty toward the products they purchase (Rust & Zahorik, 1993; Lang & Hyde, 2013). Loyalty is defined as “an intention to perform a diverse set of behaviors that signals a motivation to maintain a relationship with the focal firm, including allocating a higher share of the category wallet to the specific service provider, engaging in positive WOM, and repeat purchasing” (Sirdeshmukh, Singh, & Sablo, 2002, p. 20). Based on the foundational study by Dick and Basu (1994, p. 102), loyalty is defined as “the relationship between relative attitude and repeat patronage.” Similarly, Cossío-Silva *et al.* (2016, p. 1622) define loyalty as “a commitment to repurchase a preferred product or service in such a way as to promote its repeated purchase.”

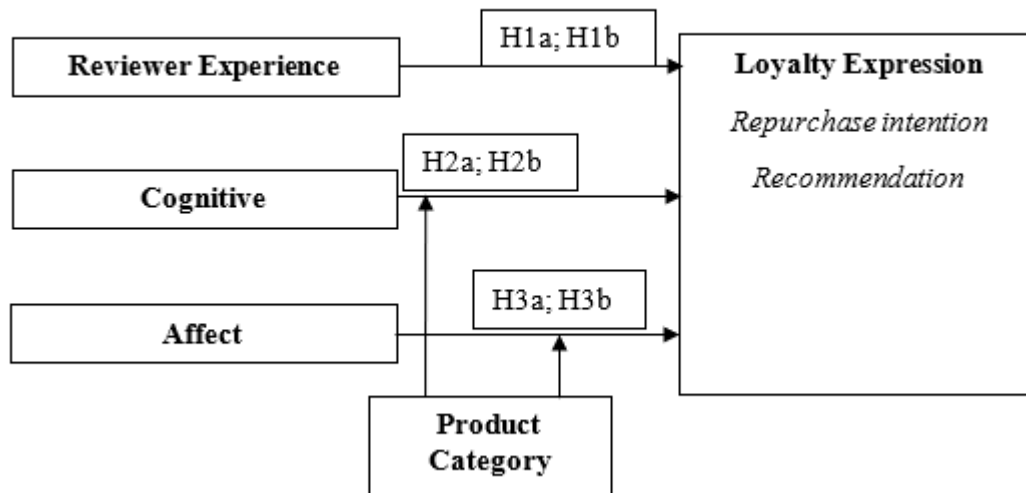
Customer loyalty is considered one of the most attractive intangible assets for organizations. The attitudinal and behavioral dimensions of customer loyalty is a source of differentiation and competitive advantage for retailers (Cossío-Silva *et al.*, 2016). From a managerial perspective, loyalty plays an important role in retailers' success and competitive advantage (Bharadwaj, Varadarajan, and Fahy, 1993). Cost-wise, maintaining a loyal customer is significantly lower than attracting a new one (Ndubisi, 2006). Additional benefits from loyal customers include a higher willingness to pay more for products/services, a higher likelihood to provide positive recommendations, and a greater likelihood to generate higher profits from their long-term customer relationships (Gee, Coates, and Nicholson, 2008).

Although, extant literature has identified several antecedents of consumer loyalty, such as satisfaction (Dick & Basu, 1994; Stoel, Wickliffe, and Lee, 2004; Huy Tuu & Ottar Olsen, 2016), trust (Chaudhuri & Holbrook, 2001; Srivastava & Kalro, 2018), product quality, perceived value (Lai, Griffin, and Babin, 2009), brand reputation (Cretu & Brodie, 2007), switching cost (Dick & Basu, 1994), product category and market place characteristics (Voss, Godfrey, and Seiders, 2010);

Dong, Ding, Grewal, and Zhao, 2011), consumer characteristics (Voss et al., 2010; Dong et al., 2011; Jin & Su, 2009; Bechwati & Nasr, 2011), knowledge (Huy Tuu, Ottar Olsen, and Thi Thuy Linh, 2011), most of these antecedents were studied from consumer, brand, product, or service-related perspectives. Table 1 displays selected research from loyalty literature.

In the context of online reviews, previous research (Packard & Berger, 2017; Ravula et al., 2022) suggests that reviewer experience, knowledge, expertise, and the product category influence loyalty expressions in online review text. Specifically, and more relevant to this research, novice reviewers are more likely to use phrases like "I recommend it" because they are less aware of preferences heterogeneity (Gershoff and Johar, 2006; Naylor, Lamberton, and Norton, 2011). However, reviewers can also express loyalty through repurchase intention (Ravula *et al.*, 2022), and very little is known about the drivers of reviewer choice between two loyalty expressions such as recommendations and repurchase intentions in online reviews. To address this research gap, our study examined the antecedents of reviewer loyalty expressions (repurchase intention and recommendation) in online reviews. We next develop our conceptual framework as shown in Figure 1.

Figure 1
Conceptual Framework



CONCEPTUAL FRAMEWORK

Online reviews serve as a valuable source of information for prospective consumers to gain insight about a product and make informed purchase decisions (Du, Wang, and Wang, 2021; Srivastava & Kalro, 2018). These textual reviews offer vivid descriptions of a consumer's experience about a product (Chatterjee, 2019). As satisfied consumers may express their loyalty in various forms such as repurchase intentions and recommendations, review text may contain these loyalty expressions (Bandyopadhyay & Martell, 2007; Packard & Berger, 2017; Ravula et al., 2022).

Table 1
List of Selected Studies

Study	Antecedents	Loyalty
Dick & Basu, 1994; Stoel <i>et al.</i> , 2004; Huy & Ottar, 2016	Satisfaction	Repeat patronage Repatronage intention Repurchase intention
Chaudhuri & Holbrook, 2001	Trust	
Lai, Griffin and Babin, 2009	product quality; perceived value	Repurchase intention
Yan, Wang and Chau (2013)	product quality, price, value, service quality and atmosphere	
Cretu & Brodie, 2007	brand reputation	Repurchase intention
Dick & Basu, 1994	switching cost	Repeat patronage
Voss <i>et al.</i> (2010)	Product category characteristics (satiation), customer, relational, and marketplace characteristics	Repurchase intention
Dong <i>et al.</i> (2011)	Product category characteristics (purchase importance, hedonic nature), customer and marketplace characteristics	Repurchase intention
Pacakard and Berger (2017)	Customer knowledge	Recommendation
Jin and Su (2009)	Customer characteristics	Repurchase Intention; Recommendation intention
This study	Reviewer experience, Product category, Cognitive and Affective evaluations	Repurchase Intention; Recommendation

Reviewer experience and loyalty expressions

The extant literature suggests that reviewers' characteristics, such as experience, significantly influence how they express loyalty in online reviews (e.g., Naylor and Kleiser, 2018). For instance, Packard and Berger (2017) found that reviewers with different levels of experience and knowledge exhibit different endorsement styles in their reviews. Krugger and Dunning (1999) noted that novice reviewers have limited awareness of preference heterogeneity, less sophisticated tastes, and lesser knowledge about the product than experienced reviewers. For these reasons, they generally presume that if they liked the product, others will too. Consequently, these reviewers often use explicit endorsement styles like "I recommend it" to convince consumer prospects as illustrated in Krugger and Dunning (1999) and Packard and Berger (2017) studies. In addition, these novice reviewers may also recommend products to others as a means of self-enhancement as suggested by Packard, Gershoff, and Woten (2016). Based on this understanding and empirical evidence, we hypothesize that:

H1a: *Novice reviewers are more inclined to express loyalty through recommendations.*

In contrast, experienced reviewers, recognizing the diversity in other's taste and exhibiting fewer social biases, often share more personal subjective insights in their reviews (Liu, Ozanne, and Mattila, 2018; Wisniewski, 2002). Moore's (2015) study illustrates that these reviewers provide detailed evaluative explanations of their purchases and articulate the rationale behind their future purchase intentions, reflecting their level of product knowledge. With their ability to acknowledge preference heterogeneity and substantial product knowledge, experienced reviewers often use less socially biased statements (Moore, 2012, 2015). From these considerations, we infer that experienced reviewers are likely to use distinctive review language, distinct from that of novice reviewers, to express loyalty. Given that the repurchase intention is indicative of stronger commitment, willingness to spend their own money in the near future (Ravula et al., 2022), and a deeper understanding of preference heterogeneity (Packard & Berger, 2017), it reflects a less socially biased and more personal stance of the reviewer. Hence, we hypothesize:

H1b: *Experienced reviewers are more inclined to express loyalty through repurchase intentions.*

Interactive Effect of Product Category and Evaluation of Consumption Experience on Loyalty Expression

Product Category and Loyalty Expression. Extant literature on the impact of product category on consumer-brand relationships (Albert et al., 2008; Chaudhuri, 1998; Fetscherin et al., 2014; Veloutsou, 2015; Srivastava & Kalro, 2018) suggests that consumers perceive and interact with different product categories in varied ways, influencing how they develop relationships with brands. Furthermore, Bloemer and Ruyter (1999) highlight that the role of emotions in shaping loyalty can vary significantly across different product categories (high vs. low involvement services), underscoring the importance of considering product category in understanding the dynamics of consumer loyalty. Although products can be categorized in different ways, they are often classified into frequently and infrequently purchased categories based on purchase frequency (Anderson, 1994). We posit that reviewers may treat product categories differently based on their

frequency of purchase, and this can significantly affect how they express loyalty in review text such as repurchase intention or recommendation.

We argue that frequently purchased products (e.g., restaurants) offer opportunities for reviewers to express loyalty through repurchase intention, since these products are more likely to be repurchased in the near future. Research by Ravula *et al.*, (2022) highlights that repurchase intention requires greater commitment, as it involves spending one's own money repeatedly on the same product. Reviewers form habitual relationships with frequently purchased products, and the likelihood of future purchase allows them to express their loyalty through a commitment to buy again – repurchase intention. In contrast, infrequently purchased products (e.g., healthcare services) offer fewer opportunities for immediate repurchase or usage due to their longer purchase cycles. Reviewers may still express loyalty to these products, but often do so by recommending products to consumer prospects rather than expressing repurchase intentions. Because repurchasing infrequently purchased products is unlikely in the near future, expressing loyalty through a recommendation becomes a more credible option (Ravula *et al.*, 2022).

Thus, product category serves as a significant determinant of how reviewers express loyalty in review text. For frequently purchased products, reviewers tend to demonstrate loyalty through repurchase intention because near-future purchases are practical. For infrequently purchased products, reviewers are more likely to express loyalty through recommendations.

Moderating Role of Evaluation of Consumption Experience. Extant literature suggests that consumers engage in both cognitive and affective evaluations when reflecting on their product consumption experiences (Ravula *et al.*, 2023). Cognitive evaluations involve a rational, analytical process where consumers assess product attributes such as functionality, quality, and value (Bagozzi, Gopinath, and Nyer, 1999). This type of evaluation allows consumers to form judgments based on specific objective criteria. In contrast, affective evaluations are driven by emotions, focusing on the feelings and personal experiences associated with the product (Holbrook & Hirschman, 1982). Affective evaluations capture the emotional bond and experiential enjoyment that consumers derive from using a product. We argue that the interplay between these two evaluation styles significantly moderates how reviewers express loyalty toward frequently and infrequently purchased products.

Cognitive Evaluation. When reviewers engage in cognitive evaluations, as discussed earlier, they rely on rational assessments of product features, performance, and overall value. Cognitive evaluation involves analytical thinking, in which reviewers meticulously process information before reaching a decision. We argue that when reviewers cognitively evaluate their consumption experiences, they tend to express loyalty in line with the established norms of the product category (as discussed earlier), whether through repurchase intention or via recommendation.

Specifically, we posit that cognitive evaluations of frequently purchased products lead to expressions of repurchase intention. When reviewers rationally assess the consistent performance, utility, and value-for-money of these products, their evaluations strengthen their commitment to repurchase in the near future. Since these products are purchased regularly, repurchase is a feasible and practical way to express loyalty (Ravula *et al.*, 2022). Frequent exposure to these products enables reviewers to form consistent purchasing patterns, in which rational assessment justifies continued purchase (i.e., repurchase intention).

Conversely, for infrequently purchased products (e.g., appliance repair, healthcare services), cognitive evaluations are more likely to strengthen loyalty expression through recommendations rather than through repurchase intentions. Given the long purchase cycle and

the unlikelihood of repurchase in the near future, reviewers may express loyalty by recommending products to others. Hence, recommendation rather than repurchase intention is a feasible and practical way to express loyalty for infrequently purchased products, and rational assessment justifies recommendation.

H2: *Cognitive evaluation a) leads to repurchase intention for frequently purchased products, while b) it drives recommendations for infrequently purchased products.*

Affective Evaluation. In contrast, when reviewers engage in affective evaluations, they rely more on their emotional responses to the product. Affective evaluations are more experiential, reflecting personal satisfaction or dissatisfaction derived from the consumption experience (Holbrook & Hirschman, 1982). Prior literature (e.g., Ou and Verhoef, 2017; MacInnis & Folkes, 2017; Rychalski & Hudson, 2017) consistently suggests that positive emotional experiences are positively associated with loyalty intentions. However, findings by Bloemer and Ryter (1999) indicate that the impact of emotions on loyalty is not uniform across contexts: positive emotions significantly moderate the satisfaction-loyalty relationship in high-involvement service settings but not in low-involvement settings. Building on this, we argue that affective evaluations lead to different loyalty expressions (repurchase intentions vs. recommendations) across product categories.

For infrequently purchased products, we posit that affective evaluations may lead to repurchase intentions, despite the impracticality of repurchasing the product in the near future. Broaden-and-build theory posits that customers with positive emotional experiences broaden their thoughts and consider broader factors in loyalty decisions (Fredrickson & Levenson, 1998; Fredrickson, 2001; Ou & Verhoef, 2017). Positive emotional experience may help reviewers develop an emotional bond with these products, and this emotional attachment may override the rational consideration of not needing to repurchase soon, leading the reviewers to express a desire to repurchase infrequently purchased products in the near future.

In contrast, for frequently purchased products, we posit that affective evaluations may lead to recommendations. The positive emotional experience compels reviewers to share their loyalty via recommendations, overriding the rational considerations. The familiarity and routine use of these products further enhances the relevance of emotional recommendations. Rather than expressing their own intention to repurchase, reviewers use recommendations as a way to transfer their emotional attachment to products to others, encouraging them to experience the same positive emotions (Mugge *et al.*, 2010). The loyalty expressed via recommendation serves as a form of emotional endorsement (Chung & Darke, 2006). We, therefore, propose that:

H3: *Affective evaluation a) leads to repurchase intention for infrequently purchased products, while b) it drives recommendations for frequently purchased products.*

METHOD

Data

In our empirical analysis, we used a publicly accessible Yelp review dataset, a prominent online review platform featuring user-generated reviews of various businesses, such as restaurants. Following the literature (Packard & Berger, 2017; Ravula *et al.*, 2022; Sirdeshmukh *et al.*, 2002), we specifically focused on positive reviews, those with star ratings of 4 or 5. Our dataset comprised

a substantial sample of 3,826,827 reviews, all of which included data on the variables under consideration. In the following section, we will provide a detailed account of how these key variables were measured.

Repurchase Intention. RPI_{ijt} is an indicator variable that represents whether the reviewer i expressed repurchase intention for business j in review t . Reviewers express repurchase intentions in different ways, such as using any of the following phrases: ‘come back,’ ‘coming back,’ ‘go back,’ ‘going back,’ or ‘be back.’ We processed the full text of the reviews using an automated Python program to identify those that exhibited repurchase intention. We identified the reviews that contained repurchase intentions and set RPI_{ijt} to 1, otherwise 0.

Recommendation. REC_{ijt} is an indicator variable representing whether reviewer i recommended business j in review t . Reviewers recommend businesses in different ways, such as using any of the following words: ‘recommend,’ ‘recommendation,’ or ‘recommended.’ We identified the reviews that contained recommendations and set REC_{ijt} to 1, otherwise 0.

Reviewer Experience. $Experience_{it}$ is a continuous variable representing the reviewer’s experience. Following the literature (Packard & Berger, 2017), we operationalize $Experience_{it}$ as the number of reviews posted by reviewer i before posting focal review t .

Evaluation of Consumption Experience. For capturing reviewers’ cognitive and affective evaluations of their consumption experiences reflected in review text, we operationalized two text variables— $Cognitive_{ijt}$ and $Affective_{ijt}$ —using linguistic inquiry and word count (LIWC), a text analysis tool that counts words in psychologically meaningful categories. $Cognitive_{ijt}$ represents the level of cognitive text of review t posted by reviewer i for business j . The cognitive process category encompasses words related to causality and insight (Pennebaker, Chung, Lavergne, & Beaver, 2014). Examples of cognitive words are: *cause, hence, ought, because, and effect*. The text variable $Cognitive_{ijt}$ was measured on a 100-point (percentage) scale ranging from 0 to 100. $Affective_{ijt}$ represents the level of emotion expressed by the reviewer through the text of the review t posted by the reviewer i for business j . Affective text is measured using LIWC as the percentage (0 to 100) of the total words in a review that reflect positive and/or negative emotions (Pennebaker et al., 2014). Examples of affective words are *happy, good, anxious, awful, and sad*.

Gender. $Gender_i$ is a binary variable representing the gender of reviewer i . We set $Gender_i$ to 1 if the reviewer was a female, and 0 if male. We used gender-guesser, a Python package to detect a reviewer’s gender by his/her name displayed in the Yelp profile.

Elite. $Elite_i$ is a binary variable representing the Yelp Elite status of reviewer i . We set $Elite_i$ to 1 if the reviewer i was designated as Elite by Yelp, and 0 if not.

Number of Friends. $Freinds_i$ is a count variable that represents the number of friends reviewer i has on the Yelp platform at the time of data collection.

Number of Fans. $Fans_i$ is a count variable that represents the number of fans reviewer i has on the Yelp platform at the time of data collection.

Star Rating. $Stars_{ijt}$ represents the star rating given by reviewer i for business j in review t .

Business Number of Reviews. $BusinessReviews_j$ a count variable representing the number of reviews business j has on Yelp at the time of data collection.

Business Average Stars. $BusinessAvgStars_j$ represents the average star rating for business j , rounded to the nearest half-star on the data collection date.

Product Category. Category_j is an indicator variable representing the product category to which business *j* belongs. We used managerial judgment to assess the product category characteristic, similar to Anderson's (1994) conceptualization of the frequency of usage as a product category characteristic. We set *Category_j* to 1 if the business belonged to frequently purchased product category. We considered different food businesses, such as restaurants, coffee and tea shops, bakeries, ice-cream shops, and snack bars and nightlife such as bars to be in the frequently purchased product category. We set *Category_j* to 0 if the business belonged to the infrequently purchased product category. We considered arts and entertainment services, automotive services, beauty and spas, event planning services, health and medical services (e.g., doctors, dentists, health care providers), home garden services, homer services (e.g., repairs of appliances), and hotels to be businesses in the infrequently purchased product category.

The cross-tabulation results for repurchase intentions and recommendations are shown in Table 2. The Pearson chi-square for the two dichotomous variables was 1650.3, which is significant at the 0.01 level. This result indicates diverse patterns of loyalty expression among satisfied customers. Despite high satisfaction ratings (4 or 5 star ratings), a significant number of customers did not express loyalty through repurchase intentions or recommendations, which may suggest factors unrelated to satisfaction influencing loyalty expression behaviors. Conversely, there are distinct segments of customers who expressed loyalty by including a repurchase intention, recommending the business, or both. Table 3 presents the descriptive statistics pertinent to our study. We find that 15.4% of reviews contain repurchase intentions, slightly lower than the 15.8% that of recommendations. Further, the relationship between repurchase intentions and recommendations shows a small negative correlation of -0.021, suggesting that these two aspects of customer behavior may not always align.

Table 2
Cross-Tabulation for Repurchase Intentions and Recommendations

	Recommendation		Total	
	0	1		
Repurchase Intention	0	2,714,482	523,700	3,238,182
	1	505,820	82,825	588,645
Total		3,220,302	606,525	3,826,827

Additional analysis reveals a slight positive correlation of 0.001 between reviewer experience and repurchase intentions, suggesting that greater experience may be marginally associated with the likelihood of expressing loyalty through repurchase intentions. Conversely, the correlation between reviewer experience and the propensity to recommend is slightly negative at -0.023, indicating that novice reviewers may be more inclined to recommend a product. The positive (negative) correlation between product category and repurchase intention (recommendation) indicates that reviewers express loyalty differently depending on whether a product is frequently or infrequently purchased. This correlation-based evidence, independent of any model assumptions, suggests that product category plays a significant role in shaping loyalty expressions in review text. This divergence extends to loyalty expressions: cognitive evaluations are positively associated with both repurchase intention (0.004) and recommendation (0.013),

Table 3
Descriptive Statistics

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Repurchase Intention	1												
2. Recommendation	-0.021	1											
3. Cognitive	0.004	0.013	1										
4. Affect	-0.041	-0.071	-0.140	1									
5. Reviewer Experience	0.001	-0.023	0.015	-0.073	1								
6. Reviewer Gender	0.047	0.018	0.004	0.012	0.009	1							
7. Elite	0.031	-0.018	0.036	-0.152	0.290	0.046	1						
8. Reviewer #Friends	-0.001	-0.007	0.016	-0.081	0.247	-0.016	0.317	1					
9. Reviewer #Fans	-0.006	-0.006	0.007	-0.067	0.273	-0.013	0.235	0.684	1				
10. Star Rating	-0.009	0.082	-0.094	0.111	-0.091	0.021	-0.173	-0.082	-0.070	1			
11. Product Category	0.048	-0.119	-0.041	0.085	0.033	-0.064	0.080	0.028	0.017	-0.161	1		
12. Business #Reviews	-0.002	-0.012	0.011	-0.012	-0.034	-0.005	0.031	0.024	0.009	-0.020	0.195	1	
13. Business Average Stars	0.014	0.066	0.003	0.016	-0.015	0.026	-0.003	-0.005	-0.006	0.220	-0.080	0.113	1
Mean/Proportion	0.154	0.158	9.431	8.681	28.025	0.579	0.202	132.856	14.101	4.647	0.816	482.397	3.940
Min	0	0	0	0	0	0	0	1	0	4	0	5	1
Max	1	1	100	100	6071	1	1	14995	12116	5	1	9185	5

Note: Repurchase Intention: 1=yes, 0=no; Recommendation: 1=yes, 0=no; Product Category: 1=Frequently purchased, 0=Infrequently purchased; Gender: 1=female, 0=male

Number of reviews: 3,826,827

Correlations >|0.001| are significant at the 0.05 level

whereas affective evaluations are negatively associated with repurchase intention (-0.041) and recommendation (-0.071). While the correlations provide foundational, model-free evidence of these relationships, the interaction between product category and evaluation type (cognitive or affective) is essential to understanding how these variables jointly influence loyalty expressions.

MODELS

We examined H1–H3 using Probit models. We followed the standard random-utility approach to formulate, the model for repurchase intentions relative to recommendations. In our model, RPI_{ijt} and REC_{ijt} are indicator variables denoting whether reviewer i expressed loyalty to business j in the content of review t through repurchase intentions and recommendations, respectively. The latent variables rpi_{ijt}^* and rec_{ijt}^* represents the unobserved utility that a reviewer derives from expressing repurchase intention and recommendation. Based on the above considerations, we specify our Probit models as follows:

$$P\{RPI_{ijt} = 1\} = P\{rpi_{ijt}^* > 0\} \tag{1}$$

$$\begin{aligned} rpi_{ijt}^* = & \alpha_0^1 + \alpha_1^1 \text{Log}(\text{Experience}_{it}) + \alpha_2^1 \text{Category}_j + \alpha_3^1 \text{Log}(\text{Cognitive}_{ijt}) + \\ & \alpha_4^1 \text{Log}(\text{Affective}_{ijt}) + \alpha_5^1 \text{Category}_j * \text{Log}(\text{Cognitive}_{ijt}) + \alpha_6^1 \text{Category}_j * \\ & \text{Log}(\text{Affective}_{ijt}) + \alpha_7^1 \text{Gender}_i + \alpha_8^1 \text{Elite}_i + \alpha_9^1 \text{Log}(\text{Freinds}_i) + \alpha_{10}^1 \text{Log}(\text{Fans}_i) + \\ & \alpha_{11}^1 \text{Stars}_{ijt} + \alpha_{12}^1 \text{BusinessReviews}_j + \alpha_{13}^1 \text{BusinessAvgStars}_j + \varepsilon_{ijt}^1 \end{aligned} \tag{2}$$

$$P\{REC_{ijt} = 1\} = P\{rec_{ijt}^* > 0\} \tag{3}$$

$$\begin{aligned} rec_{ijt}^* = & \alpha_0^2 + \alpha_1^2 \text{Log}(\text{Experience}_{it}) + \alpha_2^2 \text{Category}_j + \alpha_3^2 \text{Log}(\text{Cognitive}_{ijt}) + \\ & \alpha_4^2 \text{Log}(\text{Affective}_{ijt}) + \alpha_5^2 \text{Category}_j * \text{Log}(\text{Cognitive}_{ijt}) + \alpha_6^2 \text{Category}_j * \\ & \text{Log}(\text{Affective}_{ijt}) + \alpha_7^2 \text{Gender}_i + \alpha_8^2 \text{Elite}_i + \alpha_9^2 \text{Log}(\text{Freinds}_i) + \alpha_{10}^2 \text{Log}(\text{Fans}_i) + \\ & \alpha_{11}^2 \text{Stars}_{ijt} + \alpha_{12}^2 \text{BusinessReviews}_j + \alpha_{13}^2 \text{BusinessAvgStars}_j + \varepsilon_{ijt}^2 \end{aligned} \tag{4}$$

where ε_{ijt}^1 and ε_{ijt}^2 in Equations (2) and (4) represent the error terms following standard normal distribution with a 0 mean and variance 1. To address the issue of positive skewness in the continuous variables of the reviewer's experience, the level of cognitive and affective text, the number of friends, and the number of fans, we employed their natural logarithms in both models. To facilitate this, we incremented these variables by one, ensuring that taking the natural log of zero was avoided.

RESULTS

For model estimation, we used the glmmTMB package in R, a free software environment for statistical computing and graphics. For each proposed model, we estimated two versions – one with a fixed intercept and another with a random intercept. Several reviewers have posted multiple reviews. A random-intercept model allows the intercept to vary across reviewers in the data. This means each reviewer has his/her own intercept, which can account for the variability among them. The log-likelihoods for the models indicate that the random-intercept model fits the data better and explains more variability. We presented the parameter estimates in Table 4. While we report results from both versions in the table, we discuss the findings from the random-intercept models in the

Table 4
Results for Antecedents of Loyalty Expression Model

Variable	Repurchase Intention				Recommendation			
	Beta	SE	Beta	SE	Beta	SE	Beta	SE
Fixed Intercept	-1.881***	0.015			-1.910***	0.014		
Random Intercept			-2.051***	0.017			-2.125***	0.016
Reviewer Experience	0.017***	0.001	0.020***	0.001	-0.064***	0.001	-0.059***	0.001
Product Category	0.332***	0.013	0.351***	0.015	-0.359***	0.011	-0.394***	0.013
Log (Cognitive)	0.070***	0.004	0.070***	0.004	0.115***	0.003	0.125***	0.004
Log (Affect)	0.061***	0.004	0.061***	0.004	-0.192***	0.003	-0.223***	0.003
Product Category X Log(Cognitive)	0.024***	0.004	0.023***	0.004	-0.042***	0.003	-0.055***	0.004
Product Category X Log(Affect)	-0.098***	0.004	-0.104***	0.005	0.066***	0.004	0.076***	0.004
Gender	0.152***	0.002	0.167***	0.002	0.035***	0.002	0.046***	0.002
Elite	0.109***	0.003	0.077***	0.004	0.139***	0.003	0.135***	0.004
Log (# Friends)	0.010***	0.001	0.010***	0.001	0.010***	0.001	0.009***	0.001
Log (# Fans)	-0.038***	0.001	-0.034***	0.002	-0.024***	0.001	-0.033***	0.002
Star Rating	0.008***	0.002	0.008***	0.002	0.180***	0.002	0.205***	0.002
Log (# Business reviews)	0.018***	0.001	0.023***	0.001	0.008***	0.001	0.008***	0.001
Business Average Stars	0.041***	0.002	0.043***	0.002	0.116***	0.001	0.127***	0.002
Number of Reviews	3,826,827							
-Log Likelihood	1,627,736		1,585,810		1,624,012		1,573,857	

Significance *** 0.01 ** 0.05 *0.10

following section. We discuss the results for the control variables and the effect of reviewer experience, followed by the interactive effect of product category and the evaluation of consumption experience (cognitive and affective) on loyalty expressions through repurchase intentions and recommendations.

The positive association of gender with both repurchase intentions and recommendations suggests there are gender-based differences in propensity to express loyalty in online review text. Specifically, it is found that women, compared to men, are more likely to express loyalty through both repurchase intentions and recommendations. Similarly, we found that Elite reviewers, compared non-elite reviewers, are more likely to express loyalty through both repurchase intentions and recommendations. Further analysis reveals that the logarithm of the number of friends a reviewer has is positively related with both repurchase intentions and recommendations. Conversely, the logarithm of the number of fans a reviewer has is negatively related with both repurchase intentions and recommendations. The impact of star rating on loyalty expressions is positive for repurchase and recommendation, indicating that highly satisfied customers (star rating 5 vs 4) are more inclined to express their loyalty. Finally, the coefficients related to two business variables - the number of reviews a business has and its average star rating - are both positive and significant. This indicates that these factors positively influence consumer loyalty, as seen through both repurchase intentions and recommendations.

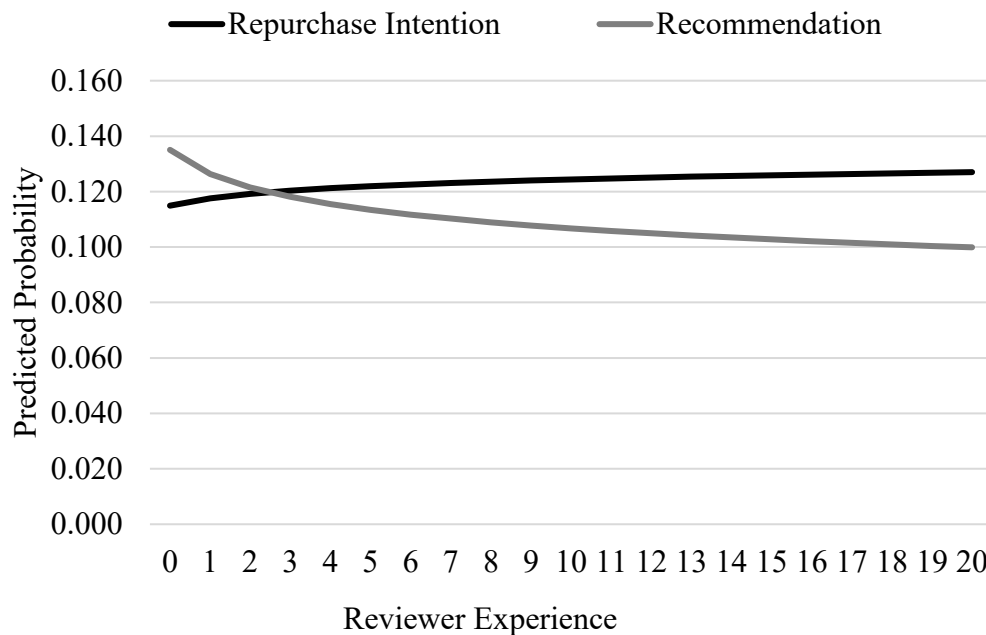
Effect of Reviewer Experience on Loyalty Expressions. The analysis of the relationship between reviewer experience and loyalty expressions, as measured through repurchase intentions and recommendations, yields insightful findings. The results indicate that experienced reviewers are indeed more inclined to express loyalty via repurchase intentions, as evidenced by a positive and significant coefficient (0.020, sig.=0.01) for reviewers' experience in relation to repurchase intentions. This supports hypothesis H1a, suggesting that experienced reviewers, who are presumably more knowledgeable and discerning, show their loyalty through a willingness to repurchase. Contrary to this, the novice reviewers demonstrate a tendency to express loyalty through recommendations, as shown by the negative and significant coefficient (-0.059, sig.=0.01) for reviewer experience in the recommendation model. This finding supports hypothesis H1b, indicating that novice reviewers are more likely to endorse products through recommendations. To gain a deeper understanding of these effects, we calculated the predicated probabilities of expressing repurchase intentions and recommendations. Utilizing the observed average values for all other variables, we estimated these probabilities across various levels of reviewer experience, as depicted in Figure 2. The results of our analysis revealed that, with an increase in level of experience, reviewers were more inclined to express loyalty through repurchase intentions rather than recommendations.

Interactive Effect of Product Category and Evaluation of Consumption Experience on Loyalty Expressions. We proposed and tested hypotheses regarding the interactive effects of product category (frequently vs. infrequently purchased products) and evaluation type (cognitive vs. affective) on how reviewers express loyalty, either through repurchase intention or recommendation. The findings clearly demonstrate that this interaction plays a crucial role in shaping how reviewers express their loyalty in review texts.

Cognitive Evaluation and Product Category. The results reveal that cognitive evaluation interacts with product category in shaping loyalty expression as expected, aligning with our hypotheses (H2a and H2b). Specifically, the coefficient related to the interaction of product category and cognitive evaluation is significant and positive in repurchase intention model (0.023, sig=0.01). This finding suggests that when reviewers cognitively evaluate frequently purchased products,

they are more likely to express loyalty by committing to purchase again – repurchase intention. Conversely, the coefficient related to interaction of product category and cognitive evaluation is significant and negative in recommendation model (-0.055, sig=0.01). This aligns with our hypothesis H2b, indicating that for products with longer purchase cycles, where repurchasing is unlikely to occur in the near future, and cognitive evaluation lead reviewers to express loyalty through recommendation rather than repurchase intentions.

Figure 2
Consumer Experience and Predicted Probability of Loyalty Expressions



Affective Evaluation and Product Category. The results also provide strong support for the hypothesized interaction effect between affective evaluations and product category (H3a and H3b). The coefficient for the interaction between product category and affective evaluation is significant and negative in the repurchase intentions model (-0.104, sig=0.01). This finding indicates that affective evaluations are more likely to drive repurchase intentions for infrequently purchased products as hypothesized in H3a. In contrast, the coefficient for the interaction between product category and affective evaluation is significant and positive in the recommendation model (0.076, sig=0.01), supporting our hypothesis H3b. This finding indicates that when consumers experience positive emotional responses to frequently purchased products, they are more likely to express loyalty through recommendations.

To delve further into the impact of cognitive and affective evaluations on loyalty expressions, we computed the predicted probabilities of expressing repurchase intentions and recommendations for both frequently and infrequently purchased product categories. Using the observed average values for all other variables, we estimated these probabilities across different levels of cognitive and affective evaluations, as illustrated in Figures 3-6.

The graphical representation in Figure 3 clearly shows that cognitive evaluation is a stronger driver of loyalty for frequently purchased products, with repurchase intentions increasing

significantly as cognitive evaluation increases. For infrequently purchased products, as shown Figure 4, the likelihood of a recommendation increases as cognitive evaluation increases, reinforcing our hypothesis.

Figure 3
Cognitive Evaluation and Predicted Probability of Repurchase Intention for Frequently Purchased Product Categories

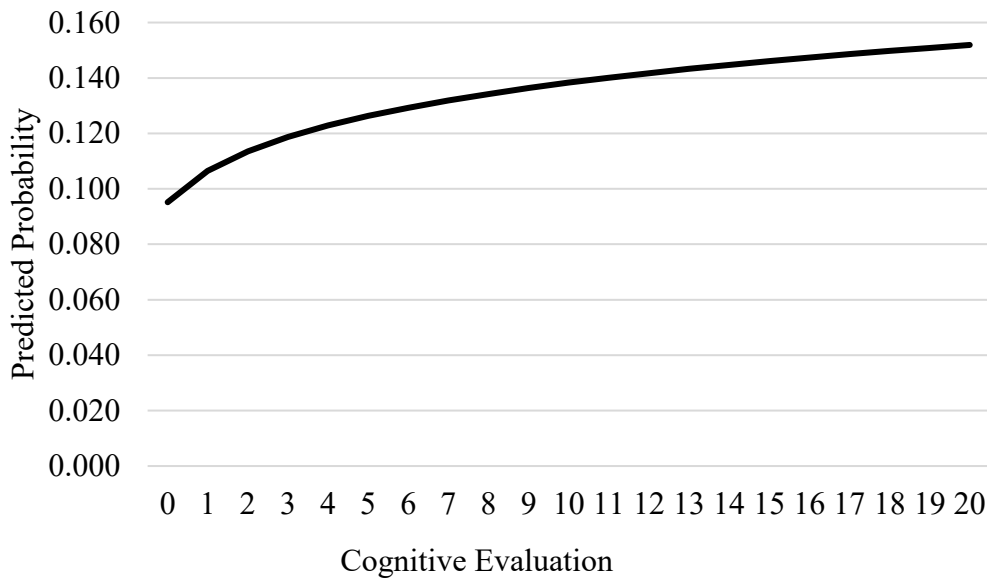
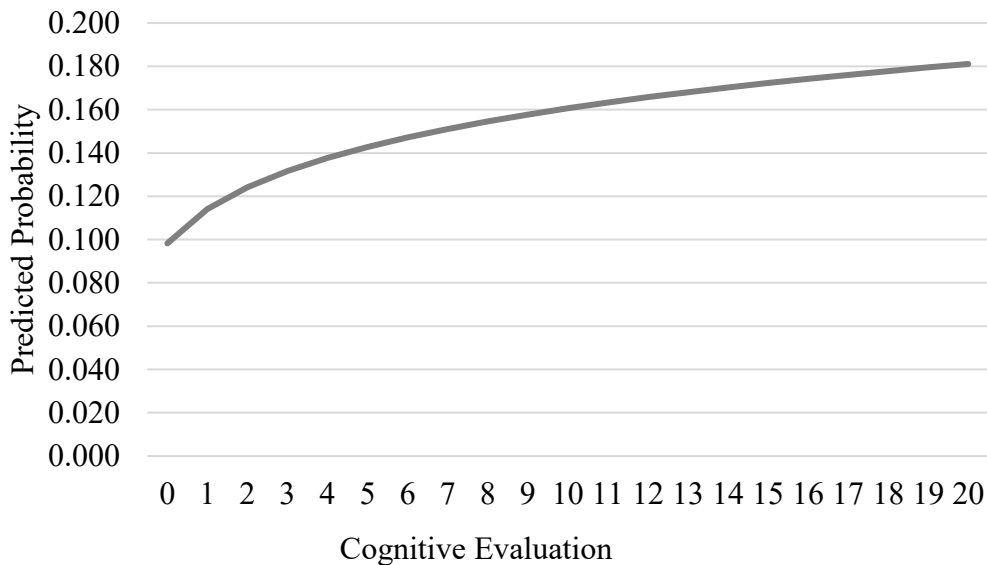
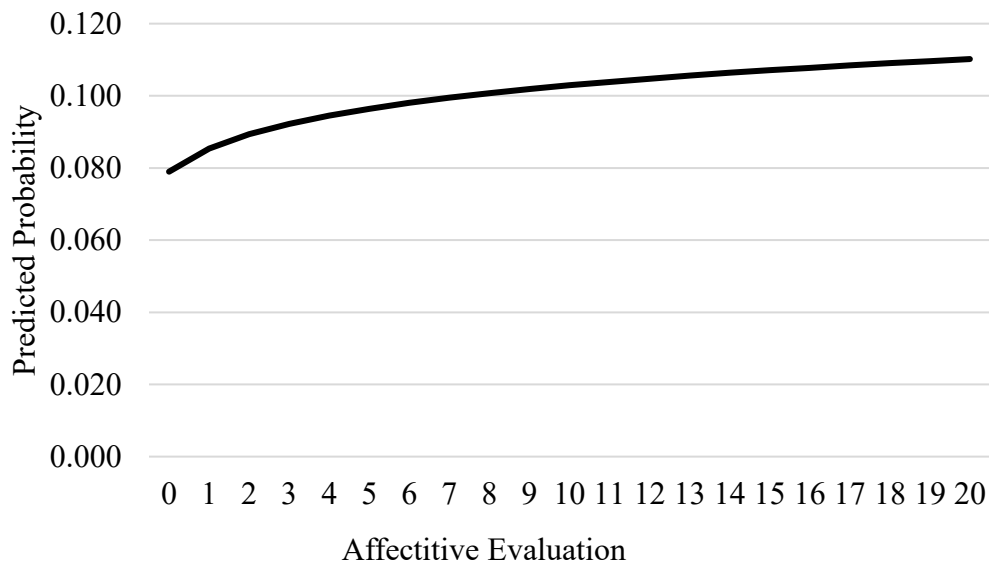


Figure 4
Cognitive Evaluation and Predicted Probability of Recommendation for Infrequently Purchased Product Categories



Conversely, Figures 5 and 6 show that affective evaluation leads to a contrasting pattern of loyalty expression in review text. Affective evaluation is associated with increased repurchase intention for infrequently purchased products (Figure 5) as affective evaluation increases. For frequently purchased products, loyalty is expressed more through recommendations, as shown in Figure 6. However, this relationship shows a decreasing rate as affective evaluation increases, indicating that while affective evaluation initially drives recommendations, its influence weakens as the emotional intensity of the review text increases. This decreasing rate suggests there is a threshold beyond which additional affective engagement does not significantly increase the likelihood of recommending frequently purchased products.

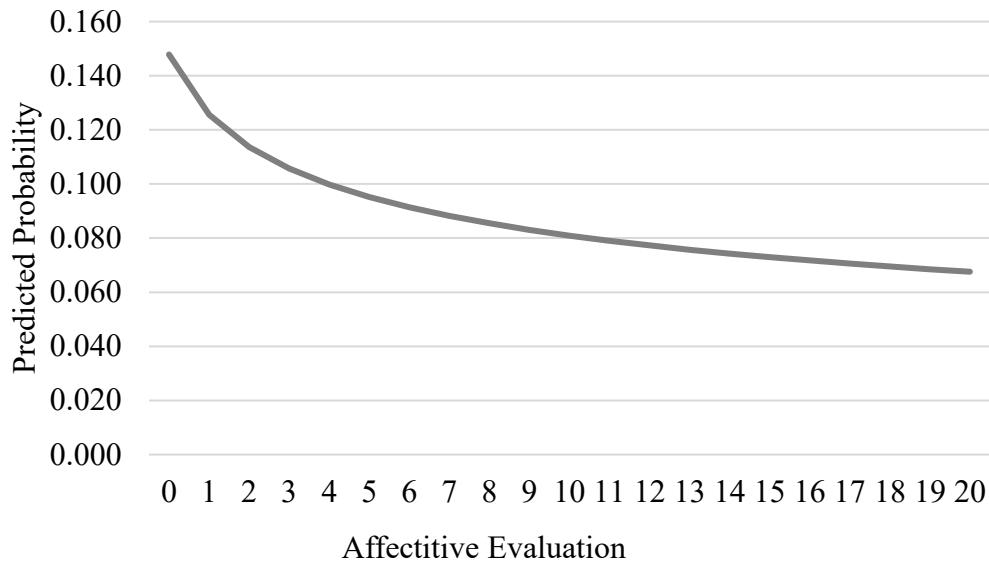
Figure 5
Affective Evaluation and Predicted Probability of Repurchase Intention for Infrequently Purchased Product Categories



GENERAL DISCUSSION

Consumer loyalty is a vital factor in business success, and numerous studies in the loyalty literature have explored its various antecedents. Although some research in the realm of online reviews has examined the persuasiveness of loyalty expressions in the digital age, there remains a gap in understanding the specific antecedents and processes that lead to loyalty expressions, particularly through repurchase intentions and recommendations. In this research, we examined the roles of reviewer experience, product category (frequently vs. infrequently purchased products), and evaluation of consumption experience (cognitive vs. affective) in shaping how reviewers express loyalty in their review texts. The empirical analysis of Yelp reviews, guided by our hypotheses H1-H3, deepens the understanding of how reviewer experience, product category, and evaluation styles influence loyalty expressions in the context of online reviews.

Figure 6
Affective Evaluation and Predicted Probability of Recommendation for Frequently Purchased Product Categories



Our analysis began with an examination of the effect of reviewer experience on loyalty expressions. Experienced reviewers were more likely to express loyalty through repurchase intentions and less likely to do so through recommendations than novice reviewers. The study then examined the interaction effect of product category and the evaluation of consumption experience on loyalty expressions. The findings revealed a clear pattern in how cognitive and affective evaluations interact with product category to influence loyalty expressions. Cognitive evaluation aligns more predictably with product categories, driving repurchase intentions for frequently purchased products and recommendations for infrequently purchased products, as anticipated. However, affective evaluations appear to override these expected norms. Specifically, affective evaluations drive repurchase intentions for infrequently purchased products, even when repurchase is not imminent, and lead to recommendations for frequently purchased products, although at a diminishing rate. This suggests that affective engagement disrupts the typical match between loyalty expression (repurchase intention vs. recommendation) and product category (frequently vs. infrequently purchased), underscoring the powerful role that emotions play in shaping loyalty expressions beyond rational considerations. Overall, this study sheds light on the complex interplay between product category, evaluation methods, and loyalty expressions. To the best of our knowledge, this study is the first to directly explore the role of cognitive and affective evaluations in consumer loyalty expressions in online reviews.

THEORETICAL IMPLICATIONS

This paper enhances our understanding of the factors influencing loyalty expressions, such as repurchase intentions and recommendations, in online reviews. Our study contributes to existing literature in two significant ways.

First, while previous research, discussed in a review article by Huy and Ottar (2016), has explored the satisfaction-loyalty relationship and identified various factors influencing loyalty, there is limited research on the specific determinants of repurchase intentions versus recommendations in online reviews. Our study offers a foundational framework for systematic exploration in this area. We found that reviewer experience plays a vital role in determining how loyalty is expressed, with experienced reviewers more inclined towards expressing loyalty through repurchase intentions rather than recommendations. This finding expands the current literature, which has largely focused on different aspects of loyalty (e.g., Jin & Su's 2009 work on repurchase vs. recommendation intentions).

Second, our research makes a significant theoretical contribution to the consumer loyalty and online reviews literature (e.g., Packard & Berger, 2017) by advancing our understanding of how the interaction between product category (frequently vs. infrequently purchased) and evaluation consumption experience (cognitive vs. affective) shapes consumer loyalty expression, specifically through repurchase intentions and recommendations. This research extends cognitive-affective processing theory by demonstrating that the impact of cognitive and affective evaluations on loyalty expression is not uniform across product categories.

By integrating these insights, the study advances theoretical frameworks of loyalty expression antecedents, particularly in the context of online reviews. Specifically, it highlights the context-dependent nature of loyalty expressions, in which reviewer experience, product category, and evaluation of the consumption experience act as key antecedents.

PRACTICAL IMPLICATIONS

These results have significant practical implications, especially for retailers and online review platforms. Businesses are increasingly focusing on "review solicitation" and "online reputation management," encouraging past customers to write reviews (Reich & Maglio 2020). This often involves prompting customers to recommend products in their reviews (Best Buy; Target) or through referral programs (Reichheld, 2003; Schmitt et al., 2011). Prior research (Ravula *et al.*, 2022) suggests that repurchase intention is more influential for frequently purchased products, whereas recommendations are more compelling for rarely purchased items in shaping potential customers' purchase decisions. Our study found that experienced reviewers express loyalty through repurchase intentions, while novice reviewers do so through recommendations. Thus, businesses should tailor their approach based on the product category and customer experience level. For frequently purchased items, businesses should encourage novice reviewers to express their loyalty through repurchase intentions as they are less likely to express repurchase intentions. Conversely, for infrequently purchased items, they should motivate experienced reviewers to recommend the products to others, as they are likely to do so.

Businesses can further refine their review solicitation strategies by prompting either cognitive or affective evaluations, depending on the desired loyalty expression and product category. For frequently purchased products, encouraging cognitive feedback will likely yield stronger repurchase intentions, whereas emphasizing affective feedback will foster

recommendations. For infrequently purchased products, focusing on affective evaluation will enhance repurchase intentions, while fostering a cognitive evaluation will lead to stronger recommendations.

LIMITATIONS AND FUTURE RESEARCH

This study enhances our knowledge of the factors leading to expressions of loyalty in online reviews – repurchase intentions and recommendations. However, we recognize its limitations and emphasize the necessity for more empirical research. The sample in this study primarily comprises reviews of services, suggesting that future research could broaden its scope to include various tangible product categories, such as consumer-packaged goods (e.g., groceries) and durable goods (e.g., digital cameras), to further elaborate on these findings. One limitation of our study is the lack of data on store-provided incentives, which could potentially affect both the review text and frequency of reviews. Such incentives, such as discounts or free products, may encourage customers to write reviews and express loyalty. For future research, we suggest investigating how store-provided incentives influence the nature and frequency of customer reviews. Additionally, this study relies on secondary data, which limits our ability to establish causal relationships. Future research could employ controlled laboratory experiments to better understand causality. Moreover, this study focused on the satisfied consumer group (i.e., consumers providing reviews with 4- and 5-star ratings). Future research can consider incorporating dissatisfied consumers (i.e., those providing 1- to 3-star ratings) to examine whether the relationships observed in this study hold across levels of satisfaction or differ in the presence of negative experiences.

CORRESPONDING AUTHOR:

Miguel Ángel Zúñiga, Ph.D.
Associate Professor of Marketing
Department of Business Administration
Earl G. Graves School of Business and Management
Morgan State University
Baltimore, MD 21251, USA
Phone: +1-443-885-4587
Email: Miguel.Zuniga@Morgan.edu

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