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To post or not to post: How minority opinion and posting frequency impact online review posting ☆

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ABSTRACT

Consumers are often exposed to prior reviews when considering posting themselves. We examine how finding one's opinion in the minority (vs. majority) of previous ratings affects a consumer's decision to post. Specifically, we contrast the posting decisions of frequent posters with those of less frequent posters. Results from seven experimental studies show that frequent posters prefer review environments in which their opinion belongs to the minority of previously posted ratings. We support these findings with additional evidence from secondary review data. This behavior sets them apart from infrequent posters, who are reluctant to share minority opinions. In addition, we show that this effect is driven by differences in how a minority post is perceived: As an opportunity to signal one's reviewer identity or as socially risky. Based on these insights, we explore how rating platforms can motivate review posting, particularly among infrequent posters. Our findings extend previous research on social influence effects in online reviews and have implications for various stakeholders who rely on and aim to solicit reviews on rating platforms.

1. Introduction

Imagine the following situation: Taylor orders headphones from an online store and, after using them a few times, concludes that the product is not satisfying. A few days later, Taylor receives an e-mail from the store with an invitation to review the purchased product. On the review platform, Taylor sees that the average rating by previous reviewers diverges notably from Taylor's own evaluation. How might finding their own opinion in the minority of previous ratings impact Taylor's decision of whether to post or not? Would this decision vary depending on how frequently Taylor posts reviews, and if so, how, and why?

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In the vast landscape of online reviews, experiencing situations where one's opinion diverges from the majority is common. In a series of 12 exploratory interviews with users of online review platforms (see Web Appendix A for more information and key findings), one interviewee illustrated how her own opinion of expensive pajamas bought as a gift for her fiancé contradicted previous online reviews: "I was really excited about them [the pajamas], like, this is going to be so nice, he'll have these forever. He washes them two times and they totally got the pilling. I mean, they were awful. And then I did look back at the reviews (...) and the other reviews were positive! (Zara, 26 years old, PhD student)."

When visiting online review platforms, consumers typically encounter an average rating that summarises previously posted opinions. Practitioners often emphasize such average ratings by displaying them more prominently than individual opinions (Lei, Yin, Mitra, and Zhang, 2022). Indeed, most of our interviewees mentioned the average rating as a central indicator for prior opinions, as illustrated by Henrietta (38 years old, lawyer): "The first thing I look for is probably just the '4.7 out of 5', for example, so for the stars. I mean, that's also the first thing that you see (...)." The average rating offers a straightforward point of comparison that may not only support but also contradict a user's own opinion, thereby placing them in a minority of previous ratings, as experienced by Zara and Taylor in our examples above. The decision to post a minority opinion creates a unique tension for a consumer: On the one hand, posting a minority opinion might be attractive to signal one's unique identity as a reviewer (Berger and Heath, 2007). On the other hand, holding a minority opinion can also be perceived as socially risky, and social risk perceptions may inhibit online opinion voicing (Noelle-Neumann, 1974).

We investigate how holding a minority (vs. majority) opinion compared to previously posted ratings affects posting decisions. More specifically, we propose that frequent and infrequent posters differ in their perceptions about minority opinion posting and their subsequent posting decisions. While frequent posters may embrace the opportunity to signal their unique identity as reviewers by posting an opposing view, infrequent posters may perceive minority opinion situations as socially riskier and refrain from posting. We focus on posting frequency in terms of how often an individual posts reviews and thereby builds up expertise in review posting. Note that posting frequency is conceptually distinct from product expertise, which we rule out as an alternative explanation in our studies. For example, some infrequent posters might have high product expertise, however, refrain from posting. On the other hand, frequent posters might rate a product for which their product expertise is low.

Our work aims to contribute theoretically and generate implications for different stakeholders. On a theoretical level, we extend the understanding of social influence effects in online review settings. Online reviews are not a pure reflection of consumers' product experiences – they are also shaped by previously posted opinions. Prior research suggests that reviewers may adjust their star rating to assimilate to or differentiate from existing ratings (e.g., Hu and Li, 2011; Moe and Schweidel, 2012; Sridhar and Srinivasan, 2012). In contrast, whether previous reviews can also impact the posting decision itself – 'to post or not to post' – has received scant attention. We extend previous literature by examining whether existing ratings[2] can impact the posting decisions of subsequent reviewers and focus specifically on minority opinion settings. We propose that such posting decisions vary depending on the posting frequency of the focal reviewer. This is managerially important, as many review platforms experience a distortion in their reviewer distribution: A small group of frequent review posters is often responsible for producing most content, while many infrequent reviewers post only occasionally (Blumenthal, 2020; Nguyen, 2018). Such systematic imbalance is problematic for several reasons. If most consumers post reviews only infrequently, other consumers cannot learn from their experiences. Similarly, firms that view online posts as a viable source of customer feedback or use reviews to interact with customers (Bell and Luddington, 2006; Chevalier et al., 2018) draw on a potentially biased sample of consumer opinions. Importantly, we highlight the underlying psychological process of minority opinion posting decisions. Specifically, it entails a trade-off between signaling one's unique reviewer identity and perceptions of social risk which is perceived differently by frequent and infrequent posters. In doing so, we extend previous research based on large-scale modeling that identified differences between types of reviewers (Moe and Schweidel, 2012; Sunder et al., 2019) but does not provide behavioral insights into why these differences occur.

Our results provide insights for various stakeholders. First, both review platforms and brand managers actively try to motivate consumers to share their opinions online (Kim et al., 2019; Motyka et al., 2018). Encouraging minority posts can be especially beneficial, for instance to gather insights that can be used for product improvement and innovation (Goldberg and Abrahams, 2022). Identifying factors that drive or hinder such review posting decisions is therefore a key managerial concern. Our findings suggest that infrequent and frequent posters may require different forms of managerial encouragement to achieve this goal because they react differently to already existing opinions. Specifically, managers can actively emphasize the value of minority opinion postings or change online platform cues to reduce social risk perceptions of infrequent posters. Second, consumers who read online reviews may view them to be a source of representative consumer experiences. However, our findings inform a more cautionary perspective, as consumers' likelihood to share minority opinions is more pronounced among frequent posters. Third, our findings have implications for users who post reviews. While they may view certain environments as more or less suitable for sharing their opinions, increasing awareness of the factors that influence posting behavior may help them overcome their own existing posting biases.

[2] We use the terms review ratings, reviews, and ratings synonymously to refer to consumers' opinions about products and services posted online.

2. Theoretical background

2.1. Social influence effects in online reviews

Extant research suggests that previous reviewers' opinions influence consumers when posting reviews. Table 1 provides an overview of prior empirical research on the effect of social influence on review posting.

Most research in this area examined the impact of previous reviews on the *nature of a new post*, particularly the valence of its star rating, but not on the posting decision itself. Overall, findings show that raters often adjust the star rating of their review considering the collective previous opinion (e.g., Hu and Li, 2011; Karaman, 2021; Moe and Schweidel, 2012; Moe and Trusov, 2011; Schlosser 2005; Sridhar and Srinivasan, 2012). Ratings therefore tend to reflect the customer's own experience with the product as well as the influence of others' posts (Moe and Trusov, 2011). There is also evidence that such adjustment effects carry over to the review text itself and that reviewers may alter the sentiment of a newly written review (Jha and Shah, 2019). How strongly consumers are influenced by previous ratings, and whether they assimilate to previous ratings, can depend on various factors, such as characteristics of the focal reviewer (e.g., gender, Ma et al., 2013), the nature of the product experience (Sridhar and Srinivasan, 2012), or whether previous reviewers are strangers or friends (Lee et al., 2015; Wang et al., 2018).

But could previous reviews also impact the *posting decision* itself? Findings from prior literature provide initial support for this notion. Askalidis et al. (2017) examined retailer e-mails that invite customers to write a review. The authors found that sending those e-mails *without* details about previous reviews encouraged a new segment of reviewers to post (Askalidis et al., 2017). Conversely, this suggests that exposure to previous reviews may sometimes deter consumers from posting. Relatedly, Moe and Schweidel (2012) found evidence in a large-scale dataset that the degree of variance in prior ratings impacted posting incidence, i.e., users differed in their preference for posting in environments with more or less dispersed ratings. This indicates that the composition of the online review environment may impact a consumer's decision to post a review or not. However, these studies do not consider how a consumer's own opinion about a product or service relates to previous ratings in terms of minority (or majority) opinion settings and what impact these settings exert on the posting decision.

2.2. Posting in minority opinion settings: A trade-off between social risk and identity signaling opportunity

2.2.1. Social risk involved in posting minority opinions

The tendency to conform to those around us is a powerful mechanism driven by the desire for social inclusion and acceptance (Cialdini and Goldstein, 2004). This makes opinion voicing in minority settings challenging as diverging from others is inherently risky (Bellezza et al., 2014). Voicing a minority opinion is linked to social risk concerns, such as the fear of embarrassment or disapproval from others (Mandel, 2003; Neuwirth et al., 2007). To avoid potential social sanctions, people may choose to either conform to the majority by adjusting their opinion (Asch, 1956), or they may choose to stay silent. The spiral of silence theory explains how the perceived opinion climate impacts individuals' willingness to express their opinion (Noelle-Neumann, 1974). The theory proposes that people assess their environment to discern prevalent majority or minority views to determine if voicing their own opinion would be well-received. The key tenet of this theory is that individuals are more inclined to stay silent when the prevailing climate is unfavorable toward their viewpoint and they perceive themselves to be in the minority, due to the risk of social repercussions (Scheufele and Moy, 2000). Over time, the accumulation of such individual decisions can even gradually impact the proportion of minority and majority opinions in a social setting (Noelle-Neumann, 1974).

Importantly, the spiral of silence theory does not only apply to offline settings but also to computer-mediated environments (e.g., Askay, 2015; Gearhart and Zhang, 2015; Sherrick and Hoewe, 2016; Zerback and Fawzi, 2017). A meta-analysis by Matthes et al. (2018) found that the spiral of silence effect was just as strong in online as in offline environments. The authors theorize that, while online platforms may enable anonymous opinion expression, they also amplify social risk through increased visibility of opinions, unique feedback mechanisms such as likes and comments, and the potential for cyberbullying and harassment (Matthes et al., 2018). Spiral of silence effects were shown on a variety of platforms like social media sites (e.g., Gearhart and Zhang, 2015; Liu et al., 2017), online news websites (Sherrick and Hoewe, 2018; Soffer and Gordoni, 2018), online forums (Woong Yun and Park, 2011), and review websites (Askay, 2015). While the spiral of silence theory traditionally studies voicing of morally loaded, controversial topics such as political opinions (e.g., Gearhart and Zhang, 2018), it extends to consumption-related topics. For instance, in a qualitative analysis of a travel review forum, Askay (2015) discovered that fear of isolation reduced members' tendency to post neutral and negative reviews, as those opinions deviated from the predominantly positive sentiment. Online reviews are often subject to scrutiny and criticism from other users and reviewers were concerned about receiving negative feedback and about their future interactions on the platform (Askay, 2015).

Additional factors that heighten social risk perceptions on review platforms are the presence of a large audience, limited means to explain one's opinion in a single post, and the permanent nature of posted content (Eisingerich et al., 2015; Mandel, 2003). Eisingerich et al. (2015) show that consumers perceive even higher social risk when sharing word-of-mouth on social media sites compared to sharing it offline. In sum, while posting an online review in a minority opinion setting might not be

Table 1
Overview of empirical research on the effect of social influence on review posting.

Study	Research focus	Independent variable/s	Focal reviewer characteristics	Dependent variable/s	Study approach
Schlosser (2005)	Posting adjustment	Public vs. private review, valence of a previous review	Social outcome confidence	Review valence	Two experiments
Hu and Li (2011)	Posting adjustment	Valence of previous reviews	Reviewer name (real name or not)	Review valence	Field study
Moe and Trusov (2011)	Posting adjustment	Volume, valence, variance of previous reviews, price	–	Review volume, valence, variance	Field study
Sridhar and Srinivasan (2012)	Posting adjustment	Product experience, valence of previous reviews	Product experience	Review valence	Field study
Ma et al. (2013)	Posting adjustment	Valence of previous reviews	Posting frequency, geographic mobility, number of friends on platform, gender	Review valence	Field study
Lee et al. (2015)	Posting adjustment	Valence of previous reviews from friends vs. strangers, product popularity	Posting frequency, number of friends on platform, number of profile views, gender, age, membership duration	Review valence	Field study
Wang et al. (2018)	Posting adjustment	Focal reviewer's review before or after friendship formation, friend's review of the same product	Posting frequency, number of friends on platform, platform experience duration	Review similarity with friends, review similarity with the crowd	Field study
Jha and Shah (2019)	Posting adjustment	Product experience, sentiments of previous reviews, similarity of product experience and sentiments of previous reviews	Posting frequency, product, gender, age, shopping frequency, review length	Review sentiment, similarity of sentiments of previous reviews and focal reviewer's review	One experiment
Sunder et al. (2019)	Posting adjustment	Valence of reviews from friends vs. crowd, divergence of friends' vs. crowd's reviews, posting frequency	Posting frequency	Review similarity between friends vs. crowd of a focal reviewer's review	Field study
Karaman (2021)	Posting adjustment	Solicited versus unsolicited (through a survey)	–	Review valence	Field study
Moe and Schweidel (2012)	Posting decision and posting adjustment	Volume, valence, variance of previous reviews, product category interest, posting frequency	Posting frequency	Likelihood that a review is posted, likelihood of posting a particular review (valence)	Field study
Askalidis et al. (2017)	Posting decision and posting adjustment	Self-motivated vs. retailer-prompted reviews, arrival rank of the review	–	Number of reviews, valence of review, review text length, number of helpfulness votes, review variance	Field study
This study	Posting decision	Majority vs. minority opinion (Resulting from own opinion in relation to valence of previous reviews)	Posting frequency	Decision to post a review or not	Field study and seven experiments

subject to the same level of scrutiny as posting a controversial political opinion, the literature clearly suggests a link to social risk perceptions.

2.2.2. Posting minority opinions as an opportunity for identity signaling

Despite the social risk of posting in a minority setting, diverging from the majority can be an attractive opportunity to signal one's unique identity (Berger and Heath, 2007; 2008). People like to think of themselves as special and voicing a minority opinion leads to a clearer self-definition and idea of 'who one is' than voicing a majority opinion (Rios Morrison and Wheeler, 2010). Nonconforming behaviors are positively linked to inferences about one's status and unique competence. For instance, intentionally choosing a casual dress style in a typically formal setting led observers to infer a higher professional status of that person (Belleza et al., 2014). Deviating from the majority can also help to distance oneself from dissimilar and unattractive others (Berger and Heath, 2007; 2008).

Consumers strive to build and express desired identities through buying and consuming products (Belk, 1988; Escalas and Bettman, 2005), but also through posting content online (Grewal et al., 2019). Even prototypical 'anonymous' online spaces allow others to make identity inferences based on how one engages online (Eklund et al., 2022). Identity signaling can therefore be one important driver of review posting decisions.

In sum, research suggests that when presented with the option to post a minority opinion review, users face a trade-off: There are 'costs' associated with such a post (social risk due to diverging from the consensus), but also 'gains' (an opportunity to signal one's unique identity as a reviewer).

2.3. Posting in minority opinion settings – The moderating role of posting frequency

Research indicates that certain groups of people seem to be more at ease defying the strong tendency to conform and may thus be more inclined to voice minority opinions (Moscovici, 1991; Noelle-Neumann, 1974). Prior work suggests that higher status facilitates nonconformity (e.g., Hollander, 1958). High-status actors can afford to deviate from the consensus without fearing immediate social sanctions. They have accumulated social 'credit' that assures them of their social acceptance. Their social 'credit' may allow such experienced actors to focus less on social risk, and more on the benefits of nonconformity, such as competence attributions (Bellezza et al., 2014) and celebrity attributions by other consumers (Rindova et al., 2006). High-status individuals may therefore be more prone to view a 'nonconforming' minority opinion as a chance to signal their unique identity. In the context of review posting, posting frequency is a central means to achieve status on a review platform. Most platforms publicly reward users who post frequently. Measures include featuring frequent reviewers prominently on leaderboards or awarding them with special badges that showcase their status as expert reviewers. Consumers likely build up expertise as reviewers through a learning-by-doing approach with increasing posting frequency (Nokes and Ohlsson, 2005). The resulting body of reviews in turn can serve as a self-presentational means to construct their identity in the digital environment (Jensen Schau and Gilly, 2003).

Previous research provides initial support that posting frequency may alter the social influence of online reviews (e.g., Lee et al., 2015; Ma et al., 2013; please see Table 1). Studies about the *nature of a new post* have shown that *if* infrequent posters decide to post a review, they seem to display more conforming behavior than frequent posters by assimilating their rating (Moe and Schweidel, 2012; Sunder et al., 2019). Frequent raters, in contrast, who enjoy a higher status on a review platform, will likely be more at ease posting a nonconforming review that falls into the minority of previously voiced opinions. These reviewers may focus more on the benefits of such a minority post and regard it as an attractive opportunity to signal their identity as a reviewer who shares interesting and important content. Other users are likely to infer status and expertise from a reviewer who posts a nonconforming review that falls into the minority of previous opinions. A minority post would thus allow frequent posters to further increase their recognition on the platform (Mathwick and Mosteller, 2017). Consequently, frequent posting may make the identity signaling opportunity side (rather than the social risk side) of a minority opinion post more salient. Thus, we propose that posting frequency moderates the impact of holding a minority opinion on the decision to post a review:

H_1: Individuals who post frequently are more inclined to share a minority opinion compared to those who post infrequently.

Furthermore, we propose that the relationship between holding a minority opinion, posting frequency, and the decision to post is mediated by perceptions of the trade-off between identity signaling and social risk.

H_2: Frequent posters are more inclined to view a minority opinion as an identity signaling opportunity, thereby increasing their likelihood to post such opinions, compared to infrequent posters who perceive it more as a social risk, reducing their inclination to post a minority opinion.

2.4. Overview of studies

We assess these predictions across a secondary review dataset and seven experimental studies. We operationalize posting frequency both in terms of a consumer's objective number of previous posts as well as their subjective perception of how

often they post reviews on online rating platforms. First, we present field data from a consumer review platform to illustrate differences in posting likelihood for frequent and infrequent reviewers in different opinion climates (Pilot study). Second, we investigate the effect of holding a minority opinion and review posting frequency on the posting decision in four experiments (Studies 1a-d). Study 2 examines the mediating role of the trade-off between reviewer identity signaling and social risk perceptions as the central underlying mechanism. Finally, Studies 3a and 3b investigate how rating platforms can motivate consumers to post minority reviews.

3. Pilot study: Evidence from Yelp reviews

To provide initial evidence that frequent reviewers are more likely to post reviews in opinion climates characterized by discrepancies in existing opinions, we rely on field data from the Yelp Open Dataset (https://www.yelp.com/dataset). This dataset has been used in previous research on online reviews (e.g., Chen and Lurie, 2013; Schoenmueller et al., 2020). There are two noteworthy limitations to this dataset regarding our focal research question. First, the data does not contain information about those users who never post opinions. Therefore, it does not reveal the choice between posting vs. not posting, a prevalent problem when studying online review data (Moe and Trusov, 2011). Second, the data suffers from similar issues when considering the behavior of users who have posted reviews (i.e., observable reviewers), as we only observe their choice to post a review but not their choice to withhold opinions. Given the lack of ability to investigate the decision not to post, we investigate the relationship between review frequency and existing variation in posted opinions (i.e., ratings) and its impact on the incidence of new reviews. This allows us to explore whether frequent and infrequent reviewers differ in their likelihood to post their opinions when there is no clear majority in existing opinions. We obtained data from the 2021 dataset for the city of Boston (MA). We matched reviews to restaurants and users to reviews, providing us with a dataset of all reviews for a given restaurant posted by different reviewers over time. The final dataset consisted of 393,511 reviews for 1,612 restaurants posted between June 2005 and February 2021.

Measures. The dependent variable was the review count for each restaurant in the dataset. The count increased when a reviewer posted a new review on the platform. The key independent variables of interest were posting frequency and the variation in existing review ratings. To capture users' posting frequency, we relied on the number of reviews posted by a given reviewer as provided by Yelp. Since the posting frequency distribution was heavily right-skewed, we normalized using the natural logarithm. To determine the degree of variation in the valence of existing reviews we constructed the standard deviation in existing ratings for each restaurant at each point in time. To account for temporal ordering, i.e., the extent to which the variation in the valence of previous ratings affected the posting of a new review, we took the first lag of the rating standard deviation. We included each restaurant's overall average star rating before a given review was posted to control for heterogeneity in restaurant quality. Further, to control for reviewer characteristics, we included the average number of useful votes for reviews posted by a given reviewer, whether the reviewer was an 'Elite' reviewer during the sample period, and the number of fans for each reviewer.

Model specification. Given the panel nature of the dataset, the fact that the dependent variable captured the count of reviews for a restaurant over time, and considering that the variance in the dependent variable exceeded its mean ($SD_{\text{across restaurants}} = 750.83$, $M_{\text{across restaurants}} = 462.65$), we specified a Negative Binomial Panel regression (Cameron & Trivedi, 2013). We estimated restaurant-level fixed effects to account for heterogeneity at the restaurant level, such as relevant unobserved characteristics (e.g., location, price) (Abadie et al., 2017). Equation (1) specifies the formal model.

$$\log(ReviewCount_{it}) = \alpha_i + \beta_1 \times PostingFrequency_j + \beta_2 \times RatingDeviation_{it-1} + \beta_3 \times PostingFrequency_j \times RatingDeviation_{it-1} + Controls + \varepsilon_{ijt} \quad (1)$$

where i indexes the restaurant, j indexes the reviewer who posted a review, t indexes the time component, *Controls* captures the restaurant- and reviewer-specific control variables, and ε_{ijt} represents the error term.

Model results. Web Appendix C, Table C1 displays the descriptive statistics, and Table 2 presents the model results for the main effects model (Model 1), the interaction effect model (Model 2), and the full model including controls (Model 3). We focus the discussion of our results on the fully specified model. We found a significant negative effect of posting frequency (β_1 = -0.089, *IRR* = .914, *SE* = .003, z = -30.81, $p < 0.001$) and a significant positive effect of the lagged rating standard deviation (β_2 = 3.191, *IRR* = 24.309, *SE* = .011, z = 270.82, $p < 0.001$) on restaurant review count. Specifically, a one-unit increase in posting frequency decreased the incidence rate of an additional review while a one-unit increase in the lagged rating standard deviation increased the incidence rate. More importantly, the interaction between posting frequency and the lagged rating standard deviation indicates that the incidence of restaurant reviews increased with increasing levels of review frequency as the lagged standard deviation increased (β_3 = 0.048, *IRR* = 1.049, *SE* = .002, z = 20.03, $p < 0.001$). Web Appendix C reports robustness checks using alternative model specifications and alternative operationalizations of posting frequency.

Discussion. The analysis of Yelp restaurant reviews provides initial evidence that frequent posters are more likely to post reviews in settings where the standard deviation of existing ratings is high (i.e., no clear majority in existing opinions has emerged). More specifically, with increasing levels of posting frequency, the expected incidence of a new review occurring is higher with increasing variation in previous ratings. In summary, these findings indicate that posting frequency impacts preferences for posting opinions in settings more reflective of a variation in existing opinions.

Table 2
Model results of Pilot Study.

Variable	Model 1 Coeff. (SE)	z-statistic	Model 2 Coeff. (SE)	z-statistic	Model 3 Coeff. (SE)	z-statistic
Posting frequency	−0.347 (0.001)	−74.19***	−0.099 (0.003)	−34.23***	−0.089 (0.003)	−30.81***
Rating standard deviation$_{t-1}$	2.852 (0.007)	398.91***	2.656 (0.011)	237.25***	3.191 (0.012)	270.82***
Posting frequency × Rating standard deviation			0.055 (0.002)	22.64***	0.048 (0.002)	20.03***
Controls						
Avg. restaurant star rating$_{t-1}$					0.596 (0.004)	133.02***
Avg. number of "Useful" votes					−0.059 (0.001)	−66.86***
Number of fans					< 0.001 (<.001)	24.80***
Yelp "Elite" status (1 = yes)					0.082 (0.002)	33.12***
Restaurant-level fixed effects	Yes		Yes		Yes	
Log-Likelihood	−2,441,459.6		−2,441,202.8		−2,428,298	
Wald Chi-Square	176,288.17***		173,626.86***		203,551.65***	

***Significant at 1% level.

4. Studies 1a-d: The effect of minority opinion and posting frequency on review posting

Our experiments allow us to test the causal impact of minority opinion and posting frequency on review posting in a controlled setting. In Study 1a, we focus on respondents in a minority opinion situation and manipulate their perceived posting frequency. In Studies 1b-1d, we measure posting frequency based on respondents' actual number of prior posts on review platforms or based on their subjective posting frequency and manipulate whether respondents are in a minority (vs. majority) opinion situation. We test whether our findings generalize across review platforms and product categories by varying these factors across our experimental studies. Furthermore, we examine both posting intention and actual posting behavior. Finally, we control for relevant context factors that potentially impact posting behavior: Consumers' expertise with the product or service is likely to increase certainty in one's rating which has been shown to increase minority opinion voicing (Matthes et al., 2010). Gender and age are relevant as females have been shown to shy away from voicing minority opinions (Maslach et al., 1987) and younger consumers are more likely to post online reviews in general (GWI, 2019). Further, we control for consumers' attitudes toward eWoM as holding a positive attitude might increase general intentions to post a review, irrespective of the average opinion.

4.1. Study 1a: Manipulation of posting frequency

260 Prolific respondents from the U.S. participated in a one-factorial (posting frequency perception: frequent vs. infrequent) between-subjects experiment. Prior to hypothesis testing and to increase data quality, we employed selection and accuracy screeners (Arndt et al., 2022; see Web Appendix B, Table B1 for details), resulting in a final sample of 240 respondents (53 % female, M_{Age} = 39.2 years).

Based on the Prolific settings, all respondents had a user profile on Amazon.com. First, respondents were asked how many reviews they had already posted on Amazon.com and were provided with a hint on where to find this information on their Amazon.com profile. Next, we manipulated respondents' perceived posting frequency. Respondents read about a recent market research study about the review behavior of Amazon customers. Based on the (fictitious) results of this study, respondents received feedback that they belonged to the group of users who review very frequently (vs. very infrequently) (see Web Appendix B, Figure B1 for details).

In the second part of the study, respondents were asked to imagine that they had purchased a fiction novel and had a very negative product experience. We created a minority opinion situation by informing participants that their evaluation of the fiction novel belonged to the minority of other reviewers' evaluations on Amazon. Next, respondents stated their intention to post a review, their minority opinion perception, their posting frequency perception, their expertise about fiction novels, and their eWoM attitudes. Finally, after completing an attention check, respondents indicated their gender and age and received a debriefing (see Web Appendix B, Table B2 for all key constructs and measurement items, and Table B3 for the descriptive statistics of our focal variables).

Results. As intended, respondents perceived themselves in a minority opinion situation, with the rating of perceived minority opinion being significantly below the scale midpoint (M_{Rating} = 2.03, SD = 1.44, $t(1, 239)$ = 21.26, p <0.001). Further, when respondents received feedback that they belonged to the group of review posting users who post very frequently (infrequently), they perceived their posting frequency to be accordingly ($M_{Infrequent}$ = 1.55, SD = 1.10, $M_{Frequent}$ = 4.89, SD = 2.28, $F(1, 238)$ = 212.60, p <0.001).

We conducted an analysis of variance (ANOVA) to examine how the perception of review posting frequency influenced the intention to post reviews. We also included product expertise, eWoM attitudes, gender, age, and the actual number of prior Amazon review postings as control variables (see Table 3 and Web Appendix B, Table B4). Our results showed a significant main effect of perceived posting frequency on the intention to post a review. Specifically, respondents who perceived

Table 3
Results of Studies 1a-d.

Dependent variable	Posting intention			Posting intention			Posting intention			Posting behavior		
	Study 1a			**Study 1b**			**Study 1c**			**Study 1d**		
Independent variables	ß	SE	p	ß	SE	p	ß	SE	p	ß	SE	p
Minority opinion (MO)	n.a.			−0.411	0.23	0.070	0.302	0.29	0.299	0.335	0.41	0.412
Posting frequency	1.005	0.23	***	0.157	0.04	***	0.106	0.03	***	0.437	0.11	***
MO×Posting frequency	n.a.			−0.054	0.02	*	−0.067	0.03	*	−0.322	0.12	*
Controls:												
eWoM attitudes	0.206	0.11	0.059	0.286	0.11	**	0.119	0.12	0.323	0.119	0.12	0.323
Age	−0.012	0.01	0.178	0.014	0.01	0.094	0.017	0.01	0.101	−0.023	0.01	*
Gender female (vs. male)	0.374	0.24	0.121	0.338	0.22	0.133	0.769	0.27	**	0.074	0.25	0.766
Gender other (vs. male)	−1.939	0.92	*	0.005	0.01	0.993	0.170	0.89	0.848	0.708	1.04	0.496
Expertise	0.359	0.07	***	0.231	0.07	***	0.341	0.08	***	−0.001	0.08	0.987
Actual posting frequency	0.020	0.01	***	n.a.			n.a.			n.a.		
N	240			383			243			385		
F	10.92			8.82			6.96			n.a.		
p	< 0.001			< 0.001			< 0.001			n.a.		
R^2 adj.	0.225			0.141			0.165			n.a.		
Df	7, 232			8, 374			8, 234			8, 376		
−2 LL	n.a.			n.a.			n.a.			474.40		
χ^2										25.663		
p										***		
Nagelkerkes R^2	n.a.			n.a.			n.a.			0.089		

Note: n.a. = not applicable, * Significant at 5 % level, ** 1 % level, ***.1% level.

themselves as frequent posters ($M_{Frequent}$ = 4.31, *SD* = 2.00) were more likely to post compared to those who saw themselves as infrequent posters ($M_{Infrequent}$ = 3.49, *SD* = 1.99), with this difference being statistically significant ($F(1, 239) = 18.66$, $p < 0.001$). As expected, in situations where respondents felt their opinion was in the minority, those who perceived themselves as frequent posters had a significantly higher intention to post a review compared to those who perceived themselves as infrequent posters.

To ensure the robustness of our findings, we conducted a more conservative analysis by focusing on respondents with at least two prior Amazon reviews, as those with fewer reviews might doubt the validity of the (fictitious) study results of being frequent posters. In this reduced sample (n = 159), the effect remained significant. Respondents who saw themselves as frequent posters still had a higher intention to post ($M_{Frequent}$ = 4.83, *SD* = 1.70) compared to those who considered themselves infrequent posters ($M_{Infrequent}$ = 4.10, *SD* = 1.91), with the difference being statistically significant ($F(1, 158) = 9.75$, $p = 0.002$).

4.2. Study 1b: Review posting intention for a fictitious product experience

406 Prolific respondents from the U.S. participated in a 2 (average rating: positive vs. negative) × 2 (own product experience: positive vs. negative) between-subjects study with posting frequency as an additional continuous factor. The between-subjects factors served to induce perceptions of holding an opinion that is in the minority (or majority) relative to previously posted opinions. Employing screeners (see Web Appendix B, Table B1) resulted in a final sample of 383 respondents (65.2 % female, M_{Age} = 33.3).

Based on the Prolific settings, all respondents had a user profile on Amazon.com. First, respondents were asked how many reviews they had already posted on Amazon.com and were provided with a hint on where to find this information on their Amazon.com profile. The indicated number of previously posted reviews on this platform served as our measure for posting frequency. Next, respondents were asked to imagine that they had purchased new headphones on Amazon.com and had a very positive (vs. negative) product experience. Then, respondents read that these headphones had been rated by 484 other customers and were shown a positive (vs. negative) average rating. We coded respondents as holding a minority opinion when they had a positive experience and saw a negative average rating or had a negative experience and saw a positive average rating. If the respondent's product experience and average rating matched (both negative or both positive), they were coded as being in a majority opinion situation (Coding: 0 = minority, 1 = majority).

Next, respondents stated their intention to post a product review (1 = not at all likely, 7 = very likely), their minority opinion perception (1 = my opinion reflects the minority of opinions, 9 = my opinion reflects the majority of opinions), their product expertise (one item from Thompson et al., 2005, "I am an expert when it comes to headphones", 1 = not at all, 7 = very much), and their attitude toward eWoM on Amazon.com (adapted from Jiménez and Mendoza, 2013; 4 items, e.g., "I think consumer reviews on Amazon.com are helpful", 1 = strongly disagree, 7 = strongly agree). Finally, respondents completed an attention check and indicated their gender and age.

Results. As intended, when respondents had a positive (negative) experience but were shown a negative (positive) average rating, they perceived their opinion to be in the minority ($M_{Minority}$ = 2.57, *SD* = 2.09, $M_{Majority}$ = 7.68, *SD* = 1.70, $F(1, 381) = 700.09$, $p < 0.001$).

We analyzed how this minority or majority perception (0 = minority, 1 = majority) influenced the likelihood of posting a review. Our regression analysis considered various factors, including how frequently respondents posted reviews, their expertise with the product, gender, age, and attitudes toward electronic word of mouth (eWoM). The overall model was significant ($F(8, 374) = 8.818$, $p < 0.001$, $R^2 = 0.159$, see Table 3 and Web Appendix B, Table B5). Interestingly, while posting frequency had a positive impact on the intention to post a review ($\beta = 0.16$, *SE* = .04, $p < 0.001$), simply holding a minority or majority opinion did not significantly affect this intention (β = -0.41, *SE* = .23, $p = 0.07$). More importantly, the interaction between minority opinion and posting frequency was significant (β = -0.05, *SE* = .02, $p = 0.03$).

To understand this interaction better, we examined how holding a minority opinion affected the intention to post a review at different levels of posting frequency (Mean +/- 1 SD; Krishna, 2016). For those who posted reviews infrequently, the intention to post was not significantly influenced by whether their opinion was in the minority or majority (β = -0.41, *SE* = .23, $p = 0.07$). However, among frequent posters, those with a minority (vs. majority) opinion were significantly more likely to post a review (β = -1.20, *SE* = .38, $p = 0.002$). This suggests that the more experienced individuals become with posting reviews, the more they intend to share their minority views (see Fig. 1).

4.3. Study 1c: Review posting intentions for an experimentally induced product experience

252 Prolific respondents from the U.S. participated in a one-factorial (opinion: minority vs. majority) between-subjects study with posting frequency as an additional continuous factor. After employing screeners (see Web Appendix B, Table B1), we obtained a final sample of 243 respondents (42 % female, M_{Age} = 39.2 years). This study provided respondents with an actual and identical product experience to evaluate: All respondents watched the same video showing an animated short story about animals (2:45 min; https://youtu.be/YiC3Q2VtSCo). We created two opinion conditions (minority vs. majority) by informing participants that their video evaluation belonged to the minority (vs. majority) of other reviewers' evaluations.

First, respondents read that there are various opportunities for consumers to post reviews, such as about products, services, videos, and movies. We asked respondents to write down how many reviews they had posted in the last twelve months which served as our measure of review posting frequency. Next, respondents watched the video and were asked for an evaluation (1 = very poor, 5 = very good) before receiving information that the video had been rated by 79 other reviewers on the (fictitious) platform "Video Central" which allows people to watch and review videos. Respondents read that, compared to their evaluation, most viewers on "Video Central" held a different opinion (minority opinion condition) or that most viewers on "Video Central" held a similar opinion (majority opinion condition = 1). Next, respondents stated their intention to post a review on "Video Central" and their minority opinion perception. Finally, after an attention check about the video's details, respondents rated their expertise about videos and movies, their attitudes toward eWoM, and their gender and age.

Results. The manipulation of being in the majority or minority with one's video evaluation was successful ($M_{Minority}$ = 2.79, *SD* = 1.57, $M_{Majority}$ = 6.25, *SD* = 1.10, $F(1, 241) = 395.79$, $p < 0.001$).

We regressed posting intention on minority opinion (0 = minority, 1 = majority), posting frequency, and their interaction and included our control variables ($F(8, 234) = 6.961$, $p < 0.001$, $R^2 = 0.192$, see Table 2 and Web Appendix B, Table B6). Consistent with Study 1b, we found a significant interaction between minority opinion and the frequency of posting reviews (β = -0.07, *SE* = .03, $p = 0.03$). Specifically, for individuals who did not post reviews often, their intention to post did not significantly differ whether they held a minority or majority opinion ($\beta = 0.32$, *SE* = .29, $p = 0.27$). However, for those who frequently posted reviews, having a minority opinion significantly increased their intention to post (β = -0.74, *SE* = .36, $p = 0.04$, see Fig. 1). This suggests that frequent posters are more motivated to share their views when they believe their opinion is in the minority, highlighting the role of posting experience in driving the willingness to express dissenting opinions online.

4.4. Study 1d: Actual review posting behavior for a movie

402 Prolific respondents from the U.S. participated in a one-factorial (average rating: positive vs. negative) between-subjects study with posting frequency as an additional continuous factor. After employing screeners (see Web Appendix B, Table B1), we obtained a sample of 385 respondents (66 % female, M_{Age} = 41.3 years).

Based on the Prolific settings, all respondents had a user profile on Amazon.com. First, respondents were asked to write down the last movie they had watched and enjoyed, to rate the movie from 1 to 5 stars, and to write a short review. Next, respondents read that this movie had been rated by other reviewers on Amazon Prime video and were shown a negative (vs. positive) rating based on 484 prior ratings. This study design served as our manipulation of minority (vs. majority) opinion. Specifically, respondents who had a positive experience and saw a negative (positive) average rating were coded as being in a minority (majority) opinion situation (Coding: 0 = minority, 1 = majority). Next, participants were provided with the option to share their review with other people on the platform Amazon Prime Video, by clicking on a "Prime Video" button. We informed respondents that posting would only take a few seconds. This decision to post their review was our key dependent variable (for the flow of the behavioral posting set-up and stimuli see Web Appendix B, Figure B2). If participants clicked the

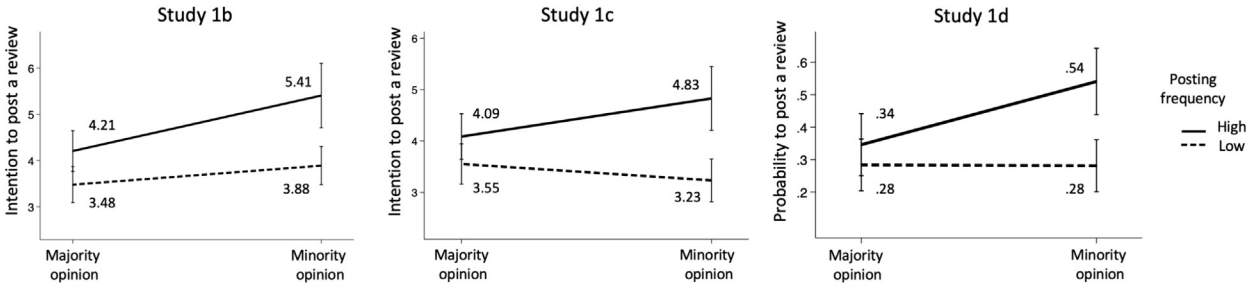

Fig. 1. Posting frequency moderates the relationship between minority opinion and intention to post a review (Studies 1b-1d). Note: High (low) posting frequency is reported at 1 SD above (below) its mean. Bars represent 95% confidence intervals.

"Prime Video" button, they saw a screen informing them that the connection to Amazon Prime Video was not possible. Respondents received an apology for the technical inconvenience and were asked to continue with the survey (similar to Akpinar et al., 2018). This setup allowed us to record actual review posting. Next, respondents indicated how often they post reviews on Amazon.com (1 = never, 7 = always), the perceived valence of the average rating stimulus (1 = very poor, 5 = very good), and their minority opinion perception. Finally, we asked about their expertise in movies, attitudes toward movie reviews, gender, and age. Before receiving their study completion code, respondents completed an attention check, were debriefed, and probed for suspicion. No respondent suspected the study's actual purpose.

Results. As intended, when respondents were confronted with a negative (vs. positive) average rating they perceived their opinion to be in the minority ($M_{Minority}$ = 3.47, SD = 2.16, $M_{Majority}$ = 7.00, SD = 1.92, $F(1, 383)$ = 288.00, p <0.001).

We conducted a binary logistic regression to understand what influences the decision to post a review. Our dependent variable was whether respondents chose to post a review (1 = posting, 0 = not posting), and we examined the effects of holding a minority opinion, posting frequency, their interaction, and our set of control variables. The model was significant (χ^2 (8) = 25.663, p < 0.001, *Nagelkerke's* R^2 = 0.089, see Table 3 and Web Appendix B, Table B7).

Consistent with our previous studies, the interaction between minority opinion and posting frequency was significant (β = -0.32, SE = .16, *Wald* = 4.29, p = 0.04). For respondents who did not post reviews frequently, their decision to post did not differ significantly between holding a minority or majority opinion (β = 0.01, SE = .29, p = 0.97). However, among frequent posters, those with a minority opinion were significantly more likely to post a review compared to those with a majority opinion (β = -0.82, SE = .31, p < 0.01, Fig. 1). This finding reinforces the idea that frequent reviewers are more inclined to share their opinions when they feel they are in the minority, underscoring the influence of posting experience on the willingness to voice dissenting views online.

4.5. Discussion

In support of H1, a pilot study with review field data and four experimental studies provide consistent evidence that the influence of consumers' posting frequency on their intention to review a product or service varies as a function of their perception of their opinion relative to that of others. Specifically, those who review frequently are more intent on posting a review in environments where their opinion is in the minority. Frequent posters' preference for posting minority opinions sets them apart from infrequent posters who are reluctant to post in minority opinion situations. We also show that this effect is robust when controlling for relevant context factors, such as consumers' expertise with the product and their attitudes toward online reviews.

5. Study 2: The mediating trade-off between social risk and reviewer identity signaling

Our previous studies suggest that review posters differ in the extent to which they interpret minority opinion environments as attractive for posting their opinion. In Study 2 we investigate the underlying mechanism behind these effects—namely, how a minority post is perceived: As an opportunity to signal one's reviewer identity or as socially risky (H2). To rule out two alternative mechanisms, we examine whether signaling one's product category expertise and one's perceptions of previous raters' product expertise influence our effects.

5.1. Method and materials

370 Prolific respondents from the U.S. participated in a one-factorial (average rating: positive vs. negative) between-subjects experiment with posting frequency as an additional continuous factor. After employing screeners (see Web Appendix B, Table B1), our final sample consists of 327 respondents (54 % female, M_{Age} = 39.1 years).

Based on the Prolific settings, all respondents had a user profile on Yelp.com. First, respondents were asked to imagine that they went out for dinner in an Italian restaurant and found the food to be very poor. Then, respondents read that this

restaurant had been rated by 364 other customers on Yelp.com and were shown a positive (vs. negative) average rating. We coded respondents who saw a positive (vs. negative) average rating as being in a minority (vs. majority) opinion situation (majority opinion condition = 1).

After reading the scenario, respondents were asked to consider adding a rating to the existing ratings and indicate their perceptions in three statements reflecting the trade-off between social risk and identity signaling (7-point scale with bipolar endings; $\alpha = 0.92$). On one pole, every statement described the social risk involved in adding a rating (e.g., "Adding my rating would make me worried that other people may disapprove of me", items adapted from Eisingerich et al., 2015). On the other pole, every statement described that adding a rating would be an opportunity to signal one's reviewer identity (e.g., "Adding my rating would portray my unique identity as a reviewer", items adapted from Grewal et al. 2019). The order of the trade-off concepts ("social risk" vs. "reviewer identity signaling") as being placed on the scale's left or right end was rotated to avoid anchoring effects. The variable was coded such that lower values represent a stronger focus on social risk and higher values represent a stronger focus on signaling one's reviewer identity when considering adding a rating.

Next, respondents indicated their intention to post a product review on Yelp.com, their minority opinion perception, their service experience (1 star – very poor, 5 stars – very good), their posting frequency on Yelp.com (number of reviews they had already posted on Yelp.com), and our previous control variables, i.e., expertise, attitudes toward eWoM, their gender, and age.

We controlled for two additional variables that are conceptually linked to our trade-off concepts. Respondents rated a) the focal product's identity relevance (two items, e.g., "How much do people use the choice of a restaurant to make inferences about others—i.e., people think they know a lot about a person based on their choice in this domain?", Berger and Heath, 2007; $\alpha = 0.74$). We assumed that identity relevance of the product/service domain increases the willingness to signal one's reviewer identity. Respondents rated b) their perceptions of anonymity when posting a review on Yelp.com (3 items, e.g., "I believe that my personal identity remains unknown to others", Hite et al., 2014; $\alpha = 0.74$). Beliefs of low anonymity are likely to increase social risk perceptions. Finally, the study included an attention check and a question on whether respondents have a Yelp.com account.

We were interested in ruling out two alternative explanations. First, we asked respondents about their motivation to signal their expertise in the product/service domain when potentially adding their rating (expertise signaling, three items, e.g., "Adding my rating would allow me to show my knowledge about restaurants.", $\alpha = 0.80$). Frequent posters might be particularly attracted to post minority opinions because this might serve as a signal for their expertise in the product/service category. Presumably, evaluating products or services differently from the majority potentially reflect one's specific knowledge and expertise.

Second, we measured respondents' perceptions of previous reviewers' product expertise (1 item, "The consumers that have already rated the product on Yelp.com are experts when it comes to restaurants", 1 = not at all, 7 = very much, $M = 3.33$, $SD = 1.47$). When one holds a minority (majority) opinion, one may perceive the previous reviewers' expertise as low (high) due to the low (high) overlap with one's own evaluation. When an audience is perceived as less competent, the advice-seeking motive that can underlie eWoM sharing (Hennig-Thurau et al., 2004) is inhibited which is likely to decrease the attractiveness to engage in information exchange. Consequently, perceptions that previous reviewers possess low levels of expertise might reduce review posting behavior.

5.2. Results

Respondents rated the service experience with an average of 1.48 stars (out of 5 stars, $SD = .85$), indicating that they successfully recalled a negative service experience. Furthermore, respondents' perceptions of their opinions were aligned with our manipulation, with minority opinions rated significantly lower than majority opinions ($M_{\text{Minority}} = 1.97$, $SD = 1.39$, $M_{\text{Majority}} = 6.28$, $SD = 1.15$, $F(1, 325) = 934.26$, $p < 0.001$).

To test our hypotheses (H1 and H2), we utilized PROCESS model 8 (5000 bootstrap samples and heteroscedasticity-consistent standard-errors, Hayes, 2022). In this model, we included respondent's minority opinion (0 = minority, 1 = majority) as the independent variable, the trade-off-variable (perceived social risk vs. reviewer identity signaling), expertise signaling, and perceptions of other reviewers' expertise as three parallel mediators, posting frequency as the moderator, and intention to post as the dependent variable, along with our control variables.

Our analysis provided support for H1, revealing a significant interaction between minority opinion and posting frequency on the intention to post ($\beta = -0.04$, $SE = .01$, $p < 0.001$, see Table 4). For respondents with low posting frequency (Mean – 1 SD), the intention to post increased when they held a majority opinion ($\beta = 0.51$, $SE = .24$, $p = 0.03$). Conversely, for those with high posting frequency (Mean + 1 SD), the intention to post was higher when holding a minority opinion ($\beta = -0.62$, $SE = .25$, $p = 0.01$, see Fig. 2 and Table 4).

Next, we analyzed the indirect effects. We found a significant moderated mediation via the trade-off variable (Index: −0.020, SE_{Boot}: 0.008, CI95: −0.0384; −0.0076, see Table 5). Specifically, the indirect effect of minority opinion on posting intention, mediated by the trade-off variable, was significant at high levels of posting frequency ($\beta = -0.42$, $SE_{boot} = 0.17$, CI95: −0.796, −0.134]), but not at low levels ($\beta = 0.17$, $SE_{boot} = 0.12$, CI95: −0.039; 0.441]). This indicates that the trade-off between social risk and reviewer identity signaling is particularly relevant for frequent posters when considering posting minority opinions.

Table 4
Regression results of Study 2.

Dependent variable	Trade-off social risk – reviewer identity signaling			Expertise signaling			Perceived expertise of prior raters			Posting intention		
Independent variables	ß	SE	p	ß	SE	p	ß	SE	p	ß	SE	p
Minority opinion (MO)	0.348	0.23	0.136	0.360	0.17	*	0.412	0.16	*	0.510	0.24	*
Posting frequency	0.025	0.01	*	0.009	0.01	0.317	−0.001	0.01	0.913	0.038	0.01	***
MO×Posting frequency	−0.041	0.01	**	−0.015	0.01	0.143	−0.007	0.01	0.423	−0.039	0.01	***
Trade-off social risk – reviewer identity signaling										0.493	0.06	***
Expertise signaling										0.293	0.08	***
Perceived expertise of prior raters										−0.020	0.09	0.828
Controls:												
eWoM attitudes	0.169	0.08	*	0.258	0.07	***	0.216	0.06	***	−0.040	0.10	0.688
Age	0.004	0.01	0.521	0.003	0.01	0.597	−0.001	0.01	0.949	0.001	0.01	0.915
Gender female (vs. male)	−0.051	0.19	0.791	−0.229	0.14	0.110	−0.245	0.14	0.074	0.190	0.21	0.363
Gender other (vs. male)	0.021	0.37	0.956	−0.148	0.59	0.804	−0.880	0.52	0.091	0.302	1.04	0.772
Service expertise	0.053	0.06	0.394	0.212	0.05	***	0.472	0.05	***	0.132	0.09	0.123
Product identity relevance	0.037	0.08	0.627	0.200	0.06	***	0.146	0.05	**	−0.114	0.09	0.195
Perceived anonymity	−0.022	0.06	0.731	−0.004	0.05	0.937	−0.037	0.04	0.386	0.037	0.07	0.583
N	327			327			327			327		
F	2.4121	**		11.844	***		30.290	***		14.278	***	
R^2	0.063			0.270			0.450			0.301		
Df	10, 316			10, 316			10, 316			13, 313		

Note: * Significant at 5% level, ** 1% level, ***.1% level, results are based on a PROCESS analysis (model 8, 5000 bootstrap samples and heteroscedasticity-consistent standard-errors).

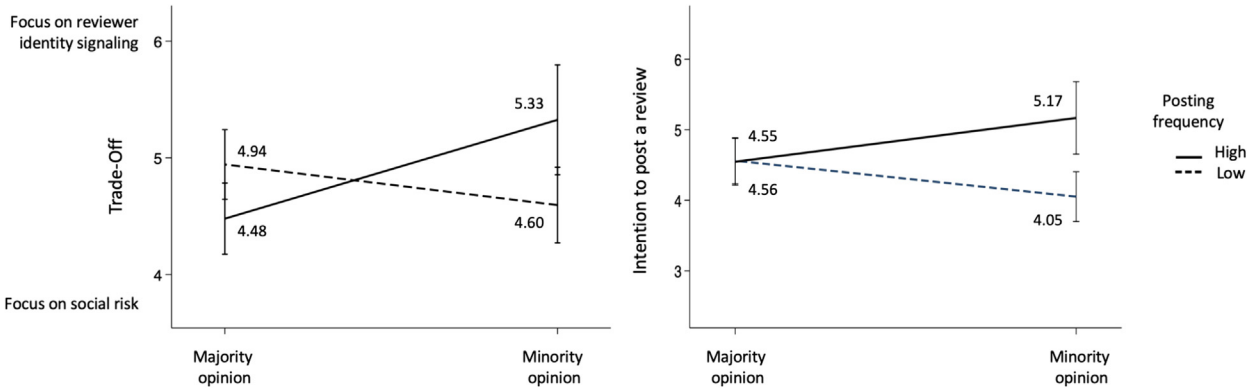

Fig. 2. Posting frequency moderates the relationship between minority opinion and trade-off perceptions between reviewer identity signaling vs. social risk (Study 2). Note: High (low) posting frequency is reported as 1 SD above (below) its mean. Error bars represent CI95.

Table 5
Results of moderated mediation analysis (Study 2).

Mediation	Level of posting frequency (moderator)	Bootstrapping results Indirect effect	Boot SE	Boot LLCI	Boot ULCI
Minority opinion → Trade-off social risk – reviewer identity signaling → Posting intention (Index: −0.020, SE_{Boot}: 0.008, CI95: −0.0384; −0.0076)	Low	0.172	0.121	−0.039	0.441
	High	−0.418	0.168	−0.796	−0.134
Minority opinion → Expertise signaling → Posting intention (Index: −0.004, SE_{Boot}: 0.004, CI95: −0.0128; 0.0013)	Low	0.105	0.062	0.010	0.251
	High	−0.020	0.073	−0.179	0.120
Minority opinion → Perceived expertise of prior raters → Posting intention (Index: 0.001, SE_{Boot}: 0.001, CI95: −0.0019; 0.0024)	Low	−0.008	0.042	−0.093	0.080
	High	−0.005	0.028	−0.066	0.056

To further illuminate these results, we examined the interaction effect of minority opinion and posting frequency on the trade-off variable, and how this trade-off variable influenced posting intention. The PROCESS results showed a significant interaction (β = -0.04, SE = .01, p = 0.003). At high levels of posting frequency (Mean + 1 SD), respondents perceived posting a minority opinion as an opportunity to signal their reviewer identity (β = -0.85, SE = .30, p = 0.01), whereas at low levels of posting frequency (Mean – 1 SD), there was no significant difference between posting a minority or majority opinion (p = 0.14, see Fig. 2). Additionally, the trade-off variable positively impacted posting intention (β = 0.49, SE = .06, p < 0.001). These findings suggest that frequent reviewers are driven by the opportunity to signal their reviewer identity, especially when their opinion is in the minority, thus supporting our H2.

Lastly, our analysis of the indirect effects for expertise signaling and perceptions of previous reviewers' product expertise showed no significant moderated mediation effects on posting intention (see Table 5).

5.3. Discussion

Study 2 indicates that the proposed trade-off between social risk perception and the opportunity to signal reviewer identity is the underlying mechanism for our effects, in support of H2. In a minority opinion environment, frequent (vs. infrequent) reviewers perceived a minority opinion situation more as an opportunity for reviewer identity signaling rather than as socially risky and indicated higher intentions to post a minority opinion. Infrequent posters appear to be held back by social risk perceptions when considering posting a minority opinion. These findings suggest that the same online review environment is perceived differently in terms of social risk and the opportunity to signal one's reviewer identity, depending on how accustomed people are to reviewing products online. Next, we investigate how to motivate minority opinion reviews by e-mail invitations (Study 3a) and how social feedback cues on the rating platform can help mitigate social risk perceptions (Study 3b).

6. Studies 3a and 3b: Managerial measures to encourage review posting

Online reviews have a strong influence on purchase decisions (Chevalier and Mayzlin, 2006; Spiegel Research Center 2023). What measures can platforms take to increase the participation of users in review content generation? A common tool is solicitation through e-mail invitations. Firms and platforms increasingly send customers e-mails encouraging them to rate a recent purchase to spur review creation (Karaman, 2021). The contents of such e-mail messages are easily adaptable and offer a strategic managerial opportunity.

Study 3a investigates the wording of such an invitation to review a product. Specifically, we test whether the active encouragement to post unique opinions increases customers' posting. Highlighting that unique and diverse posts and opinions are valuable and highly appreciated on a platform should resonate with both – frequent and infrequent posters. On the one hand, such a framing may reassure infrequent posters that diverging from the majority is acceptable. On the other hand, it may remind frequent posters of the value of posting a non-conforming and unique post. We therefore expect that a uniqueness framing will encourage review posting of both groups of reviewers. Importantly, encouraging to post a unique opinion is in line with current retailer guidelines on how to solicit reviews, which oppose practices like soliciting positive reviews, fake reviews, or offering compensation (Shopify Help Center, 2023). We measure actual review posting behavior resulting from either a "uniqueness"-review solicitation message or a "standard"-review solicitation message.

Moreover, managers of online platforms can decide whether to display certain cues on their websites or not (Das et al., 2021). This includes cues that allow users to give social feedback to others, such as functions that allow rating others' posts as helpful or unhelpful, or comment functions (Pu et al., 2020). For example, Amazon.com has reduced the number of social feedback cues on its platform. In December 2020 the online retailer eliminated the public comments feature on reviews that allowed both positive and negative social feedback (Amazon Services, 2021). Currently, users can only vote a review as "helpful". This example illustrates that review platform managers make strategic decisions about the presentation of social feedback cues. Following our reasoning that social risk perceptions are at least in part responsible for some users' silence, Study 3b examines whether managing these cues can mitigate social risk perceptions and encourage review posting.

6.1. Study 3a: The impact of the wording of an invitation to review on review posting

300 Prolific respondents from the U.S. participated in a one-factorial (e-mail message: uniqueness vs. standard) between-subjects study with posting frequency as an additional continuous factor. After employing screeners (see Web Appendix B, Table B1), we obtained a final sample of 279 respondents (47 % female, M_{Age} = 40.4 years).

First, respondents were asked to remember the last electronic product that they had purchased and disliked and to rate the product from 1 to 5 stars. Next, respondents read that this product had been rated on bestbuy.com, a large US electronic retailer. Specifically, respondents read that 265 reviewers had rated the product who seemed to hold a different opinion, thus putting all respondents in a minority opinion situation. Next, participants read that they received an e-mail from bestbuy.com inviting them to review the product. The message emphasized the value of unique and diverse perspectives on review platforms (uniqueness message) or simply invited feedback on the platform (standard message, see Web Appendix B, Figure B3 for the messages). Next, participants were provided with the option to share their review on the platform best-

buy.com, by clicking on the "bestbuy.com" button. We informed respondents that posting would only take a few seconds. This decision to post their review was our key dependent variable (similar to Study 1d). If participants clicked the "bestbuy.com" button, they saw a screen informing them that the connection was not possible and received an apology for the technical inconvenience. Next, respondents indicated the number of reviews that they had posted in the last 12 months, rated their minority opinion perception (1 = my opinion reflects the minority of opinions, 7 = my opinion reflects the majority of opinions), and statements about the e-mail message ("The message tried to make me feel more comfortable sharing my feedback", "The message invited me to write a product review", 1 = not at all, 7 = very much). Next, respondents rated their product category expertise, attitudes toward reviews, gender, and age. Finally, respondents completed an attention check, were debriefed, and probed for suspicion. No respondent suspected the actual purpose of the study.

Results. Respondents who received the "uniqueness" message felt more comfortable sharing their minority opinion compared to those who received the standard message ($M_{\text{Uniqueness}} = 4.60$, $SD = 1.94$, $M_{\text{Standard}} = 3.68$, $SD = 1.95$, $F(1, 277) = 15.362$, $p < 0.001$). Yet, both messages were rated equally on the statement "The message invited me to write a product review" ($M_{\text{Uniqueness}} = 6.29$, $SD = 1.21$, $M_{\text{Standard}} = 6.39$, $SD = 1.18$, $F(1, 277) = 0.443$, $p = 0.51$).

To ensure that respondents successfully recalled a negative product experience, we asked them to rate the product, resulting in an average rating of 2.58 out of 5 stars ($SD = 1.08$). Additionally, because of reading the scenario, respondents perceived that their opinion was in the minority ($M = 2.93$, $SD = 1.81$ on a 7-point scale).

To understand what influences the decision to post a review (1 = posting, 0 = not posting), we conducted a binary logistic regression. We examined two main factors: the type of email message (uniqueness condition = 1) and posting frequency and we included our control variables. The overall model was significant ($\chi^2(7) = 54.945$, $p < 0.001$, *Nagelkerke's* $R^2 = 0.239$, see Web Appendix B, Table B8). Our findings revealed that the "uniqueness" message had a significant impact on encouraging people to post reviews. Specifically, respondents who received the "uniqueness" message were significantly more likely to post a review compared to those who received the standard message ($\beta = 0.59$, $SE = .27$, *Wald* = 4.72, $p = 0.03$). Additionally, individuals who frequently post reviews were also more likely to post their review on bestbuy.com ($\beta = 0.17$, $SE = .04$, *Wald* = 19.89, $p < 0.001$).

We further explored whether there was any interaction between the type of email message and posting frequency. Another binary logistic regression model including this interaction term showed no significant interaction effect ($\beta = -0.07$, $SE = .08$, *Wald* = 0.93, $p = 0.33$, see Web Appendix B, Table B9). In summary, these results suggest that the "uniqueness" message is effective in encouraging respondents to share their minority opinions. This effect operates independently of how often respondents usually post reviews.

Discussion. Study 3a suggests that e-mail messages are feasible to motivate the posting of minority opinions. Compared to a standard e-mail invitation, the uniqueness message increased posting behavior. Importantly, this message did not only appeal to frequent posters, infrequent posters were similarly encouraged to post their unique opinion. Thus, Study 3a highlights an actionable managerial lever to increase the diversity of opinions on their review platform. Next, Study 3b aims at attenuating social risk concerns among posters and examines another actionable managerial lever: the extent of social feedback cues on a review platform.

6.2. Study 3b: The impact of the presence of social feedback cues on review posting intentions

Study 3b examines how the presence of social feedback cues on a rating platform influences users' social risk perceptions and posting intentions. Social feedback cues are opportunities for users to respond to an individual review, e.g., by rating a review as helpful or unhelpful, or by commenting on it. We suggest that review platforms that provide more social feedback cues increase users' social risk perceptions which may decrease posting intentions. We further assume that this effect is stronger for infrequent posters because – as shown in Study 2 – they appear to be held back by social risk perceptions when considering posting a minority opinion compared to frequent posters.

602 members of a subject pool at a European public university participated in a 3 (social feedback cues: many vs. few vs. no) $\times$ 2 (average rating: positive vs. negative) between-subjects study with posting frequency as an additional continuous factor. After employing screeners, we obtained a final sample of 587 respondents (45.8 % female, $M_{\text{Age}} = 32.4$ years, see Web Appendix B, Table B1).

First, we asked respondents to recall and evaluate their last online purchase (1 = very poor, 5 = very good). Next, respondents read that other consumers had rated the product on the (fictitious) rating platform "TheReview". They either read that the product had been rated positively by prior reviewers and were shown a positive average rating (4.7 out of 5 stars) or they read that the product had been rated negatively and were shown a negative average rating (1.7 out of 5 stars).

Next, we asked respondents to imagine that they had a user account at the online rating platform "TheReview". Respondents either read that other users can neither comment on reviews nor evaluate them as helpful or unhelpful ("no social feedback cues" condition), or that other users can evaluate a review as 'helpful' but are not able to evaluate a review as 'unhelpful' or comment on the review ("few social feedback cues"), or that other users can comment on the review and evaluate the review as both, 'helpful' or 'unhelpful' ("many social feedback cues"), potentially yielding both positive and negative feedback from other reviewers.

Next, respondents stated their intention to post a product review on the rating platform (1 = not at all likely, 7 = very likely), and how they would evaluate the product (1 = very poor, 5 = very good). Respondents were also given the opportunity to write a short review. Next, respondents indicated their review posting frequency (1 = never, 7 = always), the per-

ceived extent of social feedback cues on the rating platform (2 items, e.g., "To what extent can other users provide feedback to you", 1 = very little, 7 = very much, α = 0.91), social risk perceptions (3 items, α = 0.92), and their minority opinion perception. Finally, we assessed further control variables: gender, age, product category experience (3 items, α = 0.91), and product identity relevance (2 items, α = 0.82).

Results. Respondents perceived the extent of available social feedback cues on the platform as intended (M_{Many} = 5.33, SD = 1.53; M_{Few} = 3.44, SD = 1.29; M_{No} = 1.98, SD = 1.44, $F(2, 584) = 256.40$, $p < 0.001$, all pairwise comparisons: $p < 0.001$).

We conducted a 3 (social feedback cues: many vs. few vs. no) $\times$ 2 (average rating: positive vs. negative) analysis of variance both on social risk perceptions and intention to post. Since there were no significant main effects or interactions resulting from the average rating ($\beta < 0.2$, $ps > 0.21$; $Fs < 1.8$, $ps > 0.17$), we collapsed this factor and included it as a control variable in all further analyses.

Next, we examined how social feedback cues and posting frequency influenced social risk perceptions. Our regression analysis included social feedback cues, posting frequency, their interaction, and the average rating as a covariate. The model was significant ($F(4, 582) = 7.977$, $p < 0.001$, $R^2 = 0.052$, see Web Appendix B, Table B10). We found that more social feedback cues increased social risk perceptions (β = 0.44, SE = .14, p = 0.002), while posting frequency and the interaction term had no significant effect. This indicates that social risk perceptions rise with more social feedback cues, regardless of how often someone posts reviews.

Similarly, we analyzed the impact of social feedback cues on posting intention. The regression model was significant ($F(4, 582) = 65.075$, $p < 0.001$, $R^2 = 0.309$, see Web Appendix B, Table B10). Increasing social feedback cues decreased posting intention (β = -1.04, SE = .19, $p < 0.001$), while posting frequency alone did not have a significant effect (p = 0.28). However, the interaction between social feedback cues and posting frequency was significant (β = 0.28, SE = .06, $p < 0.001$). For infrequent posters (Mean – 1 SD), more social feedback cues significantly reduced their intention to post (β = -0.75, SE = .13, $p < 0.001$), In contrast, for frequent posters (Mean – 1 SD), social feedback cues had no significant effect on posting intention (p = 0.72). This suggests that infrequent posters are discouraged from posting when there are many social feedback cues, whereas frequent posters are unaffected by them (see Fig. 3).

We also conducted a moderated mediation analysis using PROCESS model 8 (5000 bootstrap samples and heteroscedasticity-consistent standard-errors, Hayes, 2022). The analysis included the extent of social feedback cues as the independent variable, social risk perceptions as the mediator, posting frequency as the moderator, intention to post as the dependent variable, and our control variables as covariates (for detailed results see Web Appendix B, Tables B11 and B12). The results showed a significant moderated mediation effect (Index CI95: 0.0001, 0.0322). Specifically, the indirect effect of social feedback cues on posting intention, mediated by social risk perceptions, was significant at low levels of posting frequency (β = -0.06, SE_{boot} = 0.03, CI95: −0.126, −0.004]), but not at high levels (β = -0.02, SE_{boot} = 0.01, CI95: −0.054; 0.001]).

These findings suggest that infrequent posters are intimidated by social feedback cues due to higher social risk perceptions, leading to a decreased intention to post. On the other hand, frequent posters' intention to post remains unaffected by social feedback cues, despite increased social risk perceptions, indicating that – in line with Study 2 – social risk is less relevant to their posting behavior.

Discussion. Study 3b provides insights on how to counter social risk perceptions and positively influence posting intentions, particularly of infrequent review posters. Both frequent and infrequent reviewers judged a review environment that allowed other users to provide feedback on their review as more socially risky. Yet, providing further support for the dominant role of social risk perceptions for infrequent posters, social risk perceptions only influenced infrequent reviewers' posting intentions. These findings suggest that there is potential for platform managers to adapt social feedback cues in online rating environments to reduce social risk perceptions and thereby increase posting intentions, especially among infrequent posters.

7. General discussion

Consumers agree on the value of online reviews to inform purchase decisions (Babić Rosario et al., 2016; Murphy, 2019). Not surprisingly, firms are eager to solicit the generation of online reviews and to understand factors that promote or deter consumer posting decisions. Previously posted ratings constitute one such factor that may impact posting decisions. Consumers are usually exposed to the opinions of previous reviewers when considering posting themselves. Depending on how a consumer's own opinion relates to previous average ratings, the consumer may find themself in a minority or majority opinion situation. Can this influence whether the consumer decides to post a review or not? In five experimental studies, we find that holding a minority (vs. majority) opinion influences consumers' posting decisions depending on their posting frequency, further supported by evidence from a field study. Specifically, those who review frequently are more intent on posting a review in environments in which their opinion is in the minority (see Table 6).

The first set of studies provides evidence for our proposed effects using field data and controlled experiments. The Pilot Study leverages a rich dataset of online reviews from Yelp and illustrates that frequent and infrequent reviewers differ in their likelihood to post reviews. More importantly, these differences are, at least in part, due to the variation in existing ratings. When existing ratings are more diverse, this increases frequent reviewers' likelihood to post their opinions.

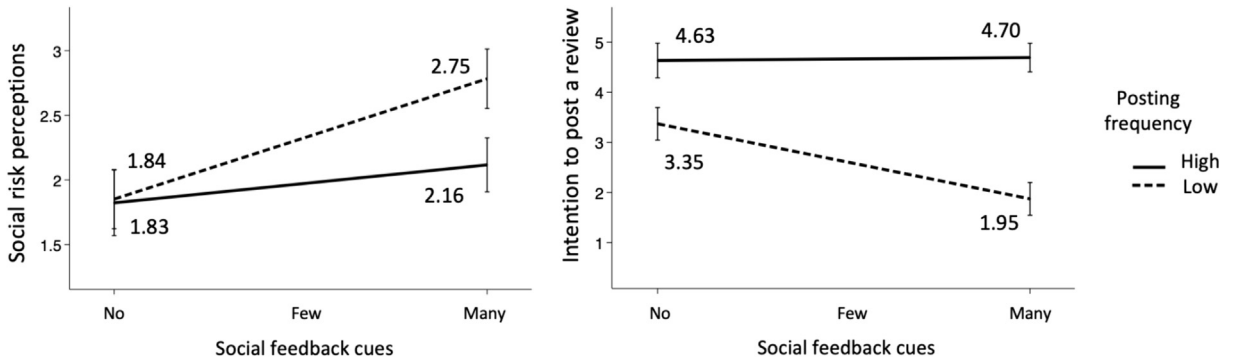

Fig. 3. A greater extent of social feedback cues increases social risk perceptions and decreases the intention to post a review, particularly for infrequent posters (Study 3b). Note: High (low) posting frequency is reported as 1 SD above (below) its mean. Error bars represent CI95.

Table 6
Summary of main results.

	Study 1a	Study 1b	Study 1c	Study 1d	Study 2	Study 3a	Study 3b
Study goal	Test of H1	Test of H1	Test of H1	Test of H1	Test of H1 & H2	Test of managerial levers to encourage review posting	
Sample size	240	383	243	385	327	279	587
Effect size minority opinion × posting frequency → Review posting*	η_p^2 = 0.07	f^2 = 0.15	f^2 = 0.08	f^2 = 0.08	f^2 = 0.06	–	–
Product category	Fiction novel	Head-phones	Short story video	Movie	Restaurant	Electronic product	Last online purchase
Mediation	–	–	–	–	Trade-off social risk – reviewer identity signaling	–	Social risk perceptions
Findings	H1 ✓ supported	H1 ✓ supported	H1 ✓ supported	H1 ✓ supported	H1 ✓ supported H2 ✓ supported	E-mail message: A uniqueness (vs. standard) message increases posting of minority opinions (effect size f^2 = 0.19). The results are independent of posting frequency.	Extent of social feedback cues on review platform: Infrequent posters are deterred from many social feedback cues, while frequent posters are unaffected (effect size f^2 = 0.32). The effect is mediated by infrequent posters' social risk perceptions.

* Cohen's f^2 effect size calculations for studies S1b, S1c, S2 are based on the increase of R^2 of model with minority opinion perception, posting frequency, their interaction and control variables on review posting compared to a model with control variables only, Study 1c is based on Nagelkerke's R^2. Study 1a is based on an analysis of variance, thus reports Cohen's η_p^2, S3a is based on the increase of Nagelkerke's R^2 of model with the email message factor, posting frequency and control variables on review posting compared to a model with control variables only, S3b is based on the increase of R^2 of model with the social feedback cues factor, posting frequency, their interaction and control variables on intention to post compared to a model with control variables only.

In Study 1a, we manipulate perceptions of being a frequent vs. infrequent poster and show that perceptions of being a frequent poster increase preferences for posting a minority opinion. Study 1b measures respondents' posting intentions regarding headphones. Results again show that holding a minority (vs. majority) opinion impacts posting decisions depending on reviewers' posting frequency. Specifically, compared to infrequent reviewers, those who review frequently are significantly more intent on posting a review in environments in which their opinion is in the minority. Study 1c replicates this effect with respondents all experiencing the same product by watching an animated video and then indicating their posting intentions. Study 1d provides a further replication of this effect by examining actual posting behavior of movie reviews on Amazon Prime.

Study 2 examines the proposed underlying mechanism for our effects. A minority opinion setting constitutes a trade-off: Posting in this setting may be perceived as socially risky, but it may at the same time be perceived as an attractive opportunity for identity signaling. Results show that compared to infrequent posters, frequent posters focused more on the oppor-

tunity to signal their reviewer identity and less on the social risk side of the trade-off when considering posting a minority opinion review. These perceptions subsequently influenced posting intentions. Study 2 also rules out the motivation to signal product expertise and the perceptions of previous reviewers' product expertise as alternative mechanisms.

Studies 3a and 3b focus on managerially relevant variables – review solicitation through company e-mails with a specific framing (Study 3a) and the number of available social feedback cues on online review platforms (Study 3b). Results of Study 3a show that e-mail invitations with a "uniqueness" (vs. standard) message increase the posting of both, infrequent and frequent posters. In Study 3b we find that social risk perceptions can be countered by the number of available social feedback cues on a review platform. Infrequent posters became more intent to post a minority rating the fewer social feedback cues were available.

Our findings generalize over a variety of products and services: We study reviews about fiction novels (Study 1a), headphones (Study 1b), animated film clips and movies (Studies 1c and 1d), restaurants (Pilot study and Study 2), electronic products (Study 3a) and recalled product purchases (Study 3b). Our results hold when manipulating perceptions of posting frequency (Study 1a), when using reported posting frequency in terms of the actual number of previous posts (Studies 1b, 1c, 2, 3a), and when using a subjective measure of perceived posting frequency (Studies 1d, 3b).

Theoretical implications. Whereas prior research has shown that previously posted reviews can lead reviewers to adjust the nature of their posts, we examine the posting decision itself. We thereby extend the literature on social influence effects in online review environments.

Second, we find that posting decisions in minority (vs. majority) opinion situations vary depending on the posting frequency of the focal reviewer. In contrast to infrequent posters, we find that frequent posters are more intent to post in minority (vs. majority) situations. Our findings therefore indicate that frequent and infrequent review posters have systematically different perceptions of what makes an online review environment attractive for posting. We thereby add to previous research based on large-scale modeling that has already pointed to differences between types of reviewers (Moe and Schweidel, 2012; Sunder et al., 2019).

Third, we highlight differences between frequent and infrequent posters in how minority opinion posts are perceived as the underlying mechanism that drives this effect. Combining the literature on identity signaling and the theoretical perspective of the spiral of silence, we argue that posting from a minority opinion setting entails a trade-off between the possibility of identity signaling and social risk. Our findings show that the same review environment is perceived differently regarding this trade-off, depending on one's posting frequency. Specifically, frequent posters focus more on the identity-signaling opportunity, while infrequent posters perceive higher levels of social risk in a minority opinion setting. We therefore provide a deeper understanding of the psychological mechanisms that underlie differences in posting decisions.

Stakeholder implications. Understanding posting decisions is important for a variety of stakeholders: Consumers, who wish to base their purchase decisions on an informative set of opinions and consumers, who post; firms, who wish to gain a holistic picture of how consumers evaluate their products and services; and platform providers, whose business model depends on rich information exchange.

Our results can inform consumers who use reviews for decision-making by raising awareness of potential biases in the review environment. Even though many consumers hold reviews in high regard, such insights may help them to keep a healthy critical perspective during the information search phase. Similarly, our results may inform consumers who have the opportunity to post a review and encourage them to critically question their urge of posting (or not posting) a review in light of previous ratings.

Our results can also provide insights for firms and online review platform providers. Encouraging posting among consumers like Taylor and Zara, who were mentioned in the introduction as examples of individuals facing minority opinion settings, is crucial for an effective opinion exchange. Minority opinion reviews can, for instance, inform firms and platform providers about unexpected changes in the quality of a product or service. Motivating infrequent posters to voice their opinion is particularly important due to the distorted distribution of review posters on many platforms.

Our findings indicate two important managerial levers to address these issues. We find that the wording of review solicitation messages increases minority posting decisions, particularly when they highlight the value of unique and diverse perspectives on review platforms. Second, we find that the extent to which social feedback cues on a review platform enable social responses to reviews is consequential for minority review posting. Particularly infrequent posters perceived a review environment as less socially risky when it does not allow for any social feedback which in turn increased their posting intention. These managerial levers can help encourage consumers like Taylor and Zara to engage in review posting behavior.

To illustrate the monetary consequences of these effects, and using product sales as a central managerial metric, we suggest two calculations based on findings from Study 3a and 3b. While it's important to approach extrapolation from experimental results with caution, these calculations might provide interesting guidance to managers.

First, consider the impact of using a "uniqueness" message instead of a standard message. Imagine 1,000,000 customers, accounting for $5,000,000 in sales, and a baseline rate of 4 % of customers who write a review without any solicitation effort (Burtch et al. 2018, field experiment). Now, assume that all customers receive a standard solicitation message. Based on previous research, a standard solicitation message typically has a 7 % acceptance rate (Burtch et al., 2018, field experiment). This results in 70,000 posted reviews which means an 75 % increase in review volume. Next, drawing on data from Study 3a, where compared to a standard message the "uniqueness" message showed a positive effect on posting behavior ($\beta = 0.20$, $SE = .06$), we estimate an additional 14,000 reviews, bringing the total to 84,000 reviews.

Next, we draw on *meta*-analytic estimates of the effect of eWoM volume on product sales (You et al. 2015), which found a generalized eWoM volume elasticity of 0.236, to estimate the financial impact. The increase of reviews that is solicited from a standard message compared to no message could lead to an additional $885,000 in sales.[3] Further, the additional 20 % of reviews caused by a "uniqueness" message could result in 4.72 % of additional sales or $277,932. After accounting for a one-time management cost of $2,000 to adapt the email message, the net gain would be $275,932. Even with a more conservative estimate of a 10 % (vs. 20 %) increase in review posts due to a "uniqueness" message, the total monetary gain would still be $136,966.

Next, we illustrate the effects of varying the extent of a review platform's social feedback cues on review posting, based on findings from Study 3b. Assuming the same number of customers, baseline sales, and 4 % baseline rate of customers who write reviews, we estimate significant changes when social feedback cues are adjusted. Reducing social feedback cues from many to a few (see Study 3b) increases review posts from 40,000 to 70,000 posts for infrequent posters (β = 0.75, SE = .13, $p < 0.001$), with no substantial increase for frequent posters (β = 0.03, SE = .12, p = 0.81). Further reducing cues from a few to none (β = 0.75, SE = .13, $p < 0.001$) results in an estimated additional increase from 70,000 reviews to 100,000 reviews by infrequent posters. Applying the eWoM elasticity, reducing social feedback cues from many to few can increase sales by $885,000, and eliminating social feedback cues altogether could boost sales by $1,770,000. With an estimated one-time cost of $10,000 to adjust social feedback features on the review platform, the potential net gain could be up to $1,760,000. Even with a more conservative estimate of a 25 % (vs. 75 %) increase in reviews, the gain would be $580,000.

Our proposed managerial levers require only one-time managerial changes but promise significant financial benefits. While the extrapolation from experimental results should be approached cautiously, our calculations suggest that these managerial levers pave the way for attractive cumulative monetary gains over time.

Limitations and avenues for future research. We note several possible limitations of our research that provide exciting opportunities for further research on this topic. First, our research is situated in the context of online rating platforms. Thus, the generalizability of our findings is bound to this specific empirical context, yet, it may have broader relevance for research on opinion sharing in other online formats, such as social media platforms. Online communication is highly dynamic, and perceptions of minority and majority opinions shift and thereby shape future opinions. Given the increasing polarization of opinions on a wide range of topics it is paramount to gain a better understanding of the dynamics that shape the generation of public opinion (Mitchell et al., 2020).

Second, the combination of experimental studies and field data allows us to provide evidence for the underlying trade-off mechanism between identity signaling and social risk perceptions and to demonstrate the ecological validity of our theory. Based on this account, we investigate the wording of e-mail solicitations and social feedback cues as potential levers for firms and opinion-sharing platforms to motivate users to post their opinions. Yet, these are only two possible ways to facilitate opinion sharing. Future research could extend our findings and study other factors to identify interventions that can improve the representativeness of online experiences. For example, gamification has been suggested as a fruitful avenue to increase customer engagement (Yang et al., 2017). The implementation of gamified elements can motivate users to overcome inertia and become active contributors (Harwood and Garry, 2015). Offering badges for the first review written and similar rewarding events could nudge users towards overcoming their tendency to only share their opinions in certain settings. In addition, providing consumers with opportunities to selectively share their opinions with members of their social network might help achieve this goal. Consumers may feel safer as the environment becomes more communal and they may feel more confident to voice their opinions, even if they do not conform to others' opinions. A sense of familiarity with other users may contribute to increased confidence in one's opinion and motivate increased contribution (Hilmert et al., 2006).

Finally, our research focuses on average ratings of previously posted reviews and their impact on the posting decision of a focal consumer in our project. While our interview data supported the notion that the average rating is a prominent cue to assess whether one's own opinion belongs to the minority or majority, future research could examine other information cues on review platforms. This could include questions such as whether consumers treat the number of existing reviews as a proxy for the number of potential readers of a review and whether this moderates their willingness to post a minority opinion dependent on their review posting frequency. Studies could also explore the role of the recency of individual reviews, potentially in terms of a temporal discounting effect, or the influence of the presentation format of ratings (Lembregts, Schepers, and de Keyser, 2023). Similarly, future studies could drill down into the text level of reviews and examine, for example, how consumers respond to different review texts given their own opinion and their posting frequency. This would allow differentiating between individual review texts that share the same valence in terms of star ratings but focus on different content aspects in the text. Overall, such research would help to further illuminate differences between frequent and infrequent posters.

CRediT authorship contribution statement

Jana Möller-Herm: Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Conceptualization.
Sabrina A. Gottschalk: Writing - review & editing, Writing - original draft, Methodology, Formal analysis, Conceptualization.
Alexander Mafael: Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Conceptualization.

[3] Percentage change in sales = eWoM elasticity * percentage change in eWoM = 0.236 * 0.75 = 0.177 (Chen et al. 2012).

Data availability

Data will be made available on request.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ijresmar.2024.08.005.

References

Abadie, A., Athey, S., Imbens, G. W., & Wooldridge, J. M. (2017). When should you adjust standard errors for clustering? *The Quarterly Journal of Economics, 138*(1), 1–35.
Akpinar, E., Verlegh, P. W., & Smidts, A. (2018). Sharing product harm information: The effects of self-construal and self-relevance. *International Journal of Research in Marketing, 35*(2), 319–335.
Amazon Services (2021). No more commenting on customer reviews! Accessed online, April 16th, 2021 from https://sellercentral.amazon.com/forums/t/no-more-commenting-on-customer-reviews/751365.
Arndt, A. D., Ford, J. B., Babin, B. J., & Luong, V. (2022). Collecting samples from online services: How to use screeners to improve data quality. *International Journal of Research in Marketing, 39*(1), 117–133.
Asch, S. E. (1956). Studies of independence and conformity: I. A minority of one against a unanimous majority. *Psychological Monographs: General and Applied, 70*(9), 1.
Askalidis, G., Kim, S. J., & Malthouse, E. C. (2017). Understanding and overcoming biases in online review systems. *Decision Support Systems, 97*, 23–30.
Askay, D. A. (2015). Silence in the crowd: The spiral of silence contributing to the positive bias of opinions in an online review system. *New Media & Society, 17*(11), 1811–1829.
Babić Rosario, A., Sotgiu, F., De Valck, K., & Bijmolt, T. H. (2016). The effect of electronic word of mouth on sales: A meta-analytic review of platform, product, and metric factors. *Journal of Marketing Research, 53*(3), 297–318.
Belk, R. W. (1988). Possessions and the extended self. *Journal of Consumer Research, 15*(2), 139–168.
Bell, S. J., & Luddington, J. A. (2006). Coping with customer complaints. *Journal of Service Research, 8*(3), 221–233.
Bellezza, S., Gino, F., & Keinan, A. (2014). The red sneakers effect: Inferring status and competence from signals of nonconformity. *Journal of Consumer Research, 41*(1), 35–54.
Berger, J., & Heath, C. (2007). Where consumers diverge from others: Identity signaling and product domains. *Journal of Consumer Research, 34*(2), 121–134.
Berger, J., & Heath, C. (2008). Who drives divergence? Identity signaling, outgroup dissimilarity, and the abandonment of cultural tastes. *Journal of Personality and Social Psychology, 95*(3), 593.
Blumenthal, M. (2020). Survey: How willing are consumers to write reviews? Accessed online, August 14th, 2022 from https://gatherup.com/blog/survey-how-willing-are-consumers-willing-to-write-reviews/.
Burtch, G., Hong, Y., Bapna, R., & Griskevicius, V. (2018). Stimulating online reviews by combining financial incentives and social norms. *Management Science, 64*(5), 2065–2082.
Cameron, A.C., & Trivedi, P.K. (2013). *Regression Analysis of Count Data*. 2nd edition, Cambridge University Press.
Chen, Y., Liu, F., Ho, L. M., & Lin, T. M. (2012). Development of Word-of-Mouth Elasticity Measures for Tourism Product Categories. *Psychology, 3*(09), 722.
Chen, Z., & Lurie, N. H. (2013). Temporal contiguity and negativity bias in the impact of online word of mouth. *Journal of Marketing Research, 50*(4), 463–476.
Chevalier, J. A., Dover, Y., & Mayzlin, D. (2018). Channels of impact: User reviews when quality is dynamic and managers respond. *Marketing Science, 37*(5), 688–709.
Chevalier, J. A., & Mayzlin, D. (2006). The effect of word of mouth on sales: Online Book Reviews. *Journal of Marketing Research, 43*(3), 345–354.
Cialdini, R. B., & Goldstein, N. J. (2004). Social influence: Compliance and conformity. *Annual Review of Psychology, 55*, 591–621.
Das, G., Spence, M. T., & Agarwal, J. (2021). Social selling cues: The dynamics of posting numbers viewed and bought on customers' purchase intentions. *International Journal of Research in Marketing, 38*(4), 994–1016.
Eisingerich, A. B., Chun, H. H., Liu, Y., Jia, H. M., & Bell, S. J. (2015). Why recommend a brand face-to-face but not on Facebook? How word-of-mouth on online social sites differs from traditional word-of-mouth. *Journal of Consumer Psychology, 25*(1), 120–128.
Eklund, L., von Essen, E., Jonsson, F., & Johansson, M. (2022). Beyond a dichotomous understanding of online anonymity: Bridging the macro and micro level. *Sociological Research Online, 27*(2), 486–503.
Escalas, J. E., & Bettman, J. R. (2005). Self-construal, reference groups, and brand meaning. *Journal of Consumer Research, 32*(3), 378–389.
Gearhart, S., & Zhang, W. (2015). "Was it something I said?", "No, it was something you posted!" A study of the spiral of silence theory in social media contexts. *Cyberpsychology, Behavior, and Social Networking, 18*(4), 208–213.
Gearhart, S., & Zhang, W. (2018). Same spiral, different day? Testing the spiral of silence across issue types. *Communication Research, 45*(1), 34–54.
Goldberg, D. M., & Abrahams, A. S. (2022). Sourcing product innovation intelligence from online reviews. *Decision Support Systems, 157*, 1–12.
Grewal, L., Stephen, A. T., & Coleman, N. V. (2019). When posting about products on social media backfires: The negative effects of consumer identity signaling on product interest. *Journal of Marketing Research, 56*(2), 197–210.
GWI (2019). Brand discovery. Accessed online, April 22th, 2023 from https://www.gwi.com/hubfs/Downloads/Brand_Discovery-2019.pdf.
Harwood, T., & Garry, T. (2015). An investigation into gamification as a customer engagement experience environment. *Journal of Services Marketing, 29*(6/7), 533–546.
Hayes, A. F. (2022). Introduction to mediation, moderation, and conditional process analysis: A regression-based approach (3rd ed.). The Guilford Press.
Hennig-Thurau, T., Gwinner, K. P., Walsh, G., & Gremler, D. D. (2004). Electronic word-of-mouth via consumer-opinion platforms: What motivates consumers to articulate themselves on the internet? *Journal of Interactive Marketing, 18*(1), 38–52.
Hilmert, C. J., Kulik, J. A., & Christenfeld, N. J. (2006). Positive and negative opinion modeling: The influence of another's similarity and dissimilarity. *Journal of Personality and Social Psychology, 90*(3), 440.
Hite, D. M., Voelker, T., & Robertson, A. (2014). Measuring perceived anonymity: The development of a context independent instrument. *Journal of Methods and Measurement in the Social Sciences, 5*(1), 22–39.
Hollander, E. P. (1958). Conformity, status, and idiosyncrasy credit. *Psychological Review, 65*(2), 117–127.
Hu, Y., & Li, X. (2011). Context-dependent product evaluations: An empirical analysis of internet book reviews. *Journal of Interactive Marketing, 25*(3), 123–133.
Jensen Schau, H., & Gilly, M. C. (2003). We are what we post? Self-presentation in personal web space. *Journal of Consumer Research, 30*(3), 385–404.

Jha, A. K., & Shah, S. (2019). Social influence on future review sentiments: An appraisal-theoretic view. *Journal of Management Information Systems, 36*(2), 610–638.
Jiménez, F. R., & Mendoza, N. A. (2013). Too popular to ignore: The influence of online reviews on purchase intentions of search and experience products. *Journal of Interactive Marketing, 27*(3), 226–235.
Karaman, H. (2021). Online review solicitations reduce extremity bias in online review distributions and increase their representativeness. *Management Science, 67*(7), 4420–4445.
Kim, S. J., Maslowska, E., & Tamaddoni, A. (2019). The paradox of (dis)trust in sponsorship disclosure: The characteristics and effects of sponsored online consumer reviews. *Decision Support Systems, 116*, 114–124.
Krishna, A. (2016). A clearer spotlight on spotlight: Understanding, conducting and reporting. *Journal of Consumer Psychology, 26*(3), 315–324.
Lee, Y. J., Hosanagar, K., & Tan, Y. (2015). Do I follow my friends or the crowd? Information cascades in online movie ratings. *Management Science, 61*(9), 2241–2258.
Lei, Z., Yin, D., Mitra, S., & Zhang, H. (2022). Swayed by the reviews: Disentangling the effects of average ratings and individual reviews in online word-of-mouth. *Production and Operations Management, 31*(6), 2393–2411.
Liu, Y., Rui, J. R., & Cui, X. (2017). Are people willing to share their political opinions on Facebook? Exploring roles of self-presentational concern in spiral of silence. *Computers in Human Behavior, 76*, 294–302.
Lembregts, C., Schepers, J., & De Keyser, A. (2023). Is it as bad as it looks? Judgments of quantitative scores depend on their presentation format. *Journal of Marketing Research, online first.*.
Ma, X., Khansa, L., Deng, Y., & Kim, S. S. (2013). Impact of prior reviews on the subsequent review process in reputation systems. *Journal of Management Information Systems, 30*(3), 279–310.
Mandel, N. (2003). Shifting selves and decision making: The effects of self-construal priming on consumer risk-taking. *Journal of Consumer Research, 30*(1), 30–40.
Maslach, C., Santee, R. T., & Wade, C. (1987). Individuation, gender role, and dissent: Personality mediators of situational forces. *Journal of Personality and Social Psychology, 53*(6), 1088.
Mathwick, C., & Mosteller, J. (2017). Online reviewer engagement: A typology based on reviewer motivations. *Journal of Service Research, 20*(2), 204–218.
Matthes, J., Rios Morrison, K., & Schemer, C. (2010). A spiral of silence for some: Attitude certainty and the expression of political minority opinions. *Communication Research, 37*(6), 774–800.
Matthes, J., Kroll, J., & von Sikorski, C. (2018). The "spiral of silence" revisited: A meta-analysis on the relationship between perceptions of opinion support and political opinion expression. *Communication Research, 45*(1), 3–33.
Mitchell, A., Jurkowitz, M., Oliphant, J.B., & Shearer, E. (2020). Americans who mainly get their news on social media are less engaged, less knowledgeable. *Pew Research Center Report*, July 2020. Accessed online August 4th, 2020, at https://tinyurl.com/4m5bf5a4https://www.journalism.org/2020/07/30/americans-who-mainly-get-their-news-on-social-media-are-less-engaged-less-knowledgeable/.
Moe, W. W., & Schweidel, D. A. (2012). Online product opinions: Incidence, evaluation, and evolution. *Marketing Science, 31*(3), 372–386.
Moe, W. W., & Trusov, M. (2011). The value of social dynamics in online product ratings forums. *Journal of Marketing Research, 48*(3), 444–456.
Moscovici, S. (1991). Silent majorities and loud minorities. *Annals of the International Communication Association, 14*(1), 298–308.
Motyka, S., Grewal, D., Aguirre, E., Mahr, D., De Ruyter, K., & Wetzels, M. (2018). The emotional review–reward effect: How do reviews increase impulsivity? *Journal of the Academy of Marketing Science, 46*(6), 1032–1051.
Murphy, R. (2019). Local consumer review survey. Accessed online, August 3rd, 2020 from https://www.brightlocal.com/research/local-consumer-review-survey/.
Neuwirth, K., Frederick, E., & Mayo, C. (2007). The spiral of silence and fear of isolation. *Journal of Communication, 57*(3), 450–468.
Nguyen, N. (2018). Inside Amazon's fake review economy. Accessed online, August 14th, 2022 from https://www.buzzfeednews.com/article/nicolenguyen/amazon-fake-review-problem.
Noelle-Neumann, E. (1974). The spiral of silence a theory of public opinion. *Journal of Communication, 24*(2), 43–51.
Nokes, T. J., & Ohlsson, S. (2005). Comparing multiple paths to mastery: What is learned? *Cognitive Science, 29*(5), 769–796.
Pu, J., Chen, Y., Qiu, L., & Cheng, H. K. (2020). Does identity disclosure help or hurt user content generation? Social presence, inhibition, and displacement effects. *Information Systems Research, 31*(2), 297–322.
Rindova, V. P., Pollock, T. G., & Hayward, M. L. (2006). Celebrity firms: The social construction of market popularity. *Academy of Management Review, 31*(1), 50–71.
Rios Morrison, K., & Wheeler, S. C. (2010). Nonconformity defines the self: The role of minority opinion status in self-concept clarity. *Personality and Social Psychology Bulletin, 36*(3), 297–308.
Scheufele, D. A., & Moy, P. (2000). Twenty-five years of the spiral of silence: A conceptual review and empirical outlook. *International Journal of Public Opinion Research, 12*(1), 3–28.
Schlosser, A. E. (2005). Posting versus lurking: Communicating in a multiple audience context. *Journal of Consumer Research, 32*(2), 260–265.
Schoenmueller, V., Netzer, O., & Stahl, F. (2020). The polarity of online reviews: Prevalence, Drivers and implications. *Journal of Marketing Research, 57*(5), 853–877.
Sherrick, B., & Hoewe, J. (2018). The effect of explicit online comment moderation on three spiral of silence outcomes. *New Media & Society, 20*(2), 453–474.
Shopify Help Center (2023). Shop product reviews merchant guidelines Accessed online, June 14th, 2023, at https://help.shopify.com/en/manual/online-sales-channels/shop/product-reviews/merchant-guidelines.
Soffer, O., & Gordoni, G. (2018). Opinion expression via user comments on news websites: Analysis through the perspective of the spiral of silence. *Information, Communication & Society, 21*(3), 388–403.
Spiegel research center (2023). How online reviews influence sales? Northwestern Medill School of Journalism, Integrated Marketing Communications report, Accessed online, November 22th, 2023, at https://spiegel.medill.northwestern.edu/how-online-reviews-influence-sales/.
Sridhar, S., & Srinivasan, R. (2012). Social influence effects in online product ratings. *Journal of Marketing, 76*(5), 70–88.
Sunder, S., Kim, K. H., & Yorkston, E. A. (2019). What drives herding behavior in online ratings? The role of rater experience, product portfolio, and diverging opinions. *Journal of Marketing, 83*(6), 93–112.
Thompson, D. V., Hamilton, R. W., & Rust, R. T. (2005). Feature fatigue: When product capabilities become too much of a good thing. *Journal of Marketing Research, 42*(4), 431–442.
Wang, C., Zhang, X., & Hann, I. H. (2018). Socially nudged: A quasi-experimental study of friends' social influence in online product ratings. *Information Systems Research, 29*(3), 641–655.
Woong Yun, G., & Park, S. Y. (2011). Selective posting: Willingness to post a message online. *Journal of Computer-Mediated Communication, 16*(2), 201–227.
Yang, Y., Asaad, Y., & Dwivedi, Y. (2017). Examining the impact of gamification on intention of engagement and brand attitude in the marketing context. *Computers in Human Behavior, 73*, 459–469.
You, Y., Vadakkepatt, G. G., & Joshi, A. M. (2015). A meta-analysis of electronic word-of-mouth elasticity. *Journal of Marketing, 79*(2), 19–39.
Zerback, T., & Fawzi, N. (2017). Can online exemplars trigger a spiral of silence? Examining the effects of exemplar opinions on perceptions of public opinion and speaking out. *New Media & Society, 19*(7), 1034–1051.