

Anger in Consumer Reviews: Unhelpful but Persuasive?

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Abstract: A common assumption in prior research and practice is that more helpful online reviews will exert a greater impact on consumer attitudes and purchase decisions. We suggest that this assumption may not hold for reviews expressing anger. Building on Emotions as Social Information (EASI) theory, we propose that although expressions of anger in a negative review tend to *decrease* reader perceptions of review helpfulness, the same expressions tend to *increase* the negative influence of the review on reader attitudes and decisions. Results from a series of laboratory experiments provide support for our claims. Our findings challenge the widely accepted assumption that more “helpful” reviews are ultimately more persuasive, and they extend current understanding of the interpersonal effects of emotion in online communication. Our findings also suggest implications for review platforms, retailers, marketers, and manufacturers faced with the task of managing consumer reviews.

Keywords: anger, online reviews, review helpfulness, consumer attitudes, online word-of-mouth, discrete emotions, emotions as social information

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INTRODUCTION

Consumers increasingly rely on online word-of-mouth (WOM) to acquire information, reduce uncertainty, and make better decisions. Online reviews exert a substantial impact on product sales that is driven (in part) by their ability to inform and persuade prospective customers (Dellarocas 2003; Floyd et al. 2014; Rosario et al. 2016). An ongoing stream of research has identified characteristics of “helpful” reviews (e.g., Forman et al. 2008; Mudambi and Schuff 2010; Yin et al. 2016). Helpfulness captures the diagnostic value of a review for decision making, and it is typically assessed by asking readers to “rate” or “vote” the review as helpful or unhelpful. Understanding the ingredients of a “helpful” review enables review platforms to identify and promote diagnostic content, to develop guidelines encouraging such content, and ultimately to increase user satisfaction.

At a fundamental level, persuasion involves changes to mental states that are precursors to behavior (O’Keefe 2002). For the purposes of this paper, we adopt a widely-held definition of persuasion, originally offered by Petty and Cacioppo (1986): “attitude change resulting from exposure to a communication.” Thus, a given piece of information can be deemed more persuasive if it results in greater attitude change. A common assumption in prior research and practice is that reviews perceived as more helpful by consumers will also be more persuasive—having a greater impact on their product attitudes and subsequent purchase decisions. However, we argue that this assumption is often invalid. In particular, we consider the ramifications of anger, an emotion that is often experienced during consumption and often expressed in consumer reviews.

The influence of user affect and emotions is an essential topic in information systems (IS) research (Zhang 2013). For example, scholars have augmented the technology acceptance model by including emotion-laden variables (Venkatesh 2000; Zhang and Li 2005) and explored the diverse roles of emotions in website design and online trust formation (Deng and Poole 2010; Hwang and Kim 2007). Consistent with evidence that extreme emotion is a powerful driver of consumer word-of-mouth (Hennig-Thurau et al. 2004; Ladhari 2007), a growing body of work has begun to explore the role of emotional expression in online reviews (Jensen et al. 2013; Malik and Hussain 2017; Yin et al. 2014, 2017). A robust finding of such work is that over and above the objective content of a review, expressed emotions influence how readers make sense of that content to determine its usefulness for their product decisions.

In contrast to prior research examining “emotional review content” in general (e.g., Jensen et al. 2013) or comparing various emotions (e.g., Yin et al. 2014), our research focuses on the specific emotion of anger. Despite being the most commonly expressed emotion in negative reviews (Wetzer et al. 2007), anger has received little prior scholarly attention in this field, and its consequences merit deeper understanding. We address the following question: Holding constant the objective content of a negative review, how do overt expressions of anger affect its perceived helpfulness and its persuasiveness?

Building on the theory of Emotions As Social Information (EASI) (van Kleef 2009, 2010), we propose that expressions of anger can influence readers through two distinct pathways, with contrasting implications. We argue that expressed anger influences perceptions of review helpfulness primarily through *inferential processes* by which readers form impressions of the reviewer. Angry reviews often contain objectively useful information about product or service deficiencies, failures, etc. Holding constant such objective information, however, we argue that

expressions of anger tend to diminish the perceived helpfulness of a review, because readers interpret reviewer anger as a sign of inadequate reasoning and irrationality. Initial evidence for this proposal was obtained by Yin et al. (2014), who compared “angry” reviews with “anxious” reviews. We complement that evidence by rigorously investigating anger and by exploring downstream consequences including attitude and choice.

If negative reviews exhibiting anger are perceived to be less helpful, then intuition suggests that the adverse impact of those reviews on reader attitudes and decisions will be reduced. We propose that this intuition is overly simplistic, due to the presence of a second pathway involving *affective reactions*.¹ Overt expressions of anger in a review tend to be vivid, memorable, and highly negative in their connotations. In addition, expressions of anger are directed toward a specific target (typically, a product or retailer). Thus, readers of an angry review may form an immediate, negative impression of the target that subsequently worsens attitudes and intentions. The two different pathways have opposing implications, and we propose that the second pathway is typically more powerful than the first. Even if angry reviews are perceived as *less* helpful, they can nonetheless be *more* persuasive.

To test our proposals, we present six experimental studies in which participants read and evaluated reviews with the same objective content but varying expressions of anger. Taken together, our framework and investigations make two primary contributions to the understanding of emotions in online reviews. First, we challenge the commonly held assumption that more helpful reviews are inherently more persuasive, and we provide robust experimental evidence to the contrary. Second, we provide a detailed investigation of a specific emotion, anger, which is both prevalent and consequential in online reviews but has been insufficiently examined. These

¹ We do not preclude the possibility that inferential processes also play a role in the impact of expressed anger on consumer attitudes. We explore this possibility in Study 3.

contributions open exciting opportunities for future research and suggest practical guidance for review platforms, which we elaborate upon in the general discussion.

THEORETICAL DEVELOPMENT AND HYPOTHESES

Anger as Social Information

Psychologists classify anger within a subset of discrete, “basic” emotions that is reliably recognized across different situations and cultures (Ekman 1992). Anger is commonly defined as a strong and hostile response to a perceived provocation, hurt, or threat (Novaco 1986; Videbeck 2013). Individuals become angry when they perceive that an undesirable, personally relevant event is obstructing their goals, and that the event was caused by another party rather than by themselves or the circumstances (Lazarus 1991). After becoming angry, individuals are motivated to actively oppose or harm the causal party (Frijda 1987). Anger is associated with negative outcomes such as aggression and conflict, but it can also serve adaptive and functional purposes (e.g., inhibiting immoral behavior; Gibson et al. 2009; Hess 2014).

Scholars have long recognized that emotions play an important signaling role in communication. Above and beyond the verbal content of a message, emotional expressions provide useful information regarding the disposition and intentions of the sender and features of the underlying situation (Hareli and Hess 2010; van Kleef 2010), which in turn influence observer judgments and decisions. A small body of research in other fields has documented the ramifications of observing an angry individual for reactions and behavior toward that individual. (Knutson 1996; Montepare and Dobish 2003). In negotiation contexts, for example, angry opponents are perceived to be strong and powerful, hard to undermine, and unlikely to settle, all of which influence subsequent interactions (Sinaceur and Tiedens 2006; van Kleef et al. 2004).

Our research addresses the following common situation: A consumer who is engaged in a shopping task consults online customer reviews to acquire more information about the products and retailers being considered. During the process, (s)he encounters a review written by an unknown reviewer. The review is negative in valence and contains clear, overt expressions of anger toward the product or retailer. This context forms the basis for all of our experimental studies; we address boundary conditions and contextual moderators in the discussion.

Our fundamental assertion is that anger influences reader attitudes toward the target of the review through two distinct mechanisms: an indirect mechanism based on cognitive inferences regarding the helpfulness of the review, and a direct mechanism based on affective reactions to the review. Our assertion of two parallel mechanisms is consistent with EASI theory, a holistic framework of affect and persuasion in social settings that has gained increasing attention (see van Kleef 2017 for a review). EASI theory is especially appropriate to our setting for three reasons. First, it was developed to explain the *interpersonal* effects of expressed emotions on *observers*, in contrast to well-known frameworks that focus on the *intrapersonal* effects of emotions on *experiencers* ("affect-as-information" - Clore et al. 2001; "affect infusion" - Forgas 1995; etc.). Hence, it is suited to a context where readers use review-embedded emotions as "social information" about the source and situation. Second, the theory has been applied to the study of discrete emotions, including anger (for a review, see van Kleef et al. 2012). Third, it has been tested and validated in numerous persuasion contexts including negotiation, leadership, and customer service (e.g., Adam and Shirako 2013; Cheshin et al. 2018; Wang et al. 2018).

According to EASI theory, emotions displayed by actors can influence observers through both a pathway involving *inferential processes* and a pathway involving *affective reactions* (van Kleef 2009). The *inferential processes* pathway captures the idea that seeing an actor express

emotions provides observers with useful information about how the actor regards the situation (Shaver et al. 1987; Siemer 2008). When observing an actor expressing intense sadness, for example, observers may infer that the actor faces irrevocable loss and insufficient coping ability, which may in turn lead observers to offer help (Clark et al. 1996). In contrast, the *affective reactions* pathway captures the notion that merely observing an actor expressing emotion can lead observers to experience emotion themselves, through relatively automatic processes such as emotional contagion or impression formation, which in turn influence their own attitude and behavior (Knutson 1996; Parkinson and Simons 2009). In negotiation settings, for example, expressions of anger by one party often lead other parties to form negative affective impressions that undermine cooperation or increase retaliatory behavior (van Beest et al. 2008). The core principles of EASI theory serve as a theoretical foundation for the arguments developed below.

Anger and Review Helpfulness

Our first hypothesis concerns the extent to which readers will perceive an online review as helpful. In keeping with prior literature (Yin et al. 2014), we define perceived review helpfulness as the extent to which consumers believe that a review facilitates their decision process. By this definition, perceived helpfulness is conceptually similar to “information diagnosticity” in online retail environments (see Mudambi and Schuff 2010). A common theme is that diagnostic information is helpful for understanding or evaluating the available options (e.g., Jiang and Benbasat 2004; Kempf and Smith 1998; Pavlou and Fygenson 2006). To avoid confusion, we use the term “review helpfulness” henceforth.

Most prior investigations of antecedents to review helpfulness have focused on objective characteristics such as numeric “star” rating, text length, or presence of one-sided vs. two-sided

arguments (e.g., Forman et al. 2008; Mudambi and Schuff 2010; Schindler and Bickart 2012). However, other antecedents involve subjective characteristics (Moore 2015; van Laer et al. 2019). In particular, recent evidence suggests that both the type and magnitude of emotions expressed in a review can affect perceived helpfulness, as a result of reader inferences regarding the reviewer (Craciun et al. 2020; Yin et al. 2014, 2017).

Integrating these ideas with EASI theory, we argue that expressed anger influences perceived review helpfulness primarily through an inferential process, in which readers make inferences about the reviewer that also influence their judgment of the review. To interpret the emotional expressions of actors, observers rely on their own mental representations of emotion concepts (Russell 1991; Siemer 2008). Those representations include prototypical emotion “scripts”—sequences of beliefs, feelings, facial expressions, and actions associated with an emotion (Fehr and Russell 1984; Frijda 1993). For anger, elements of a prototypical emotional script may include: “narrowing of attention,” “loud voice, yelling, screaming,” and “verbally attacking the cause” (Frijda et al. 1989; Shaver et al. 1987). Observers perceive angry actors to be less careful, to communicate less coherently, and to have difficulty focusing outside the current situation (Shaver et al. 1987). Observers may also perceive angry actors as lacking self-control and unable to regulate their feelings, which in turn compromise reasoning abilities (Baumeister 1997; Baumeister and Scher 1988). Applied to our context, these lay beliefs suggest that review readers interpret overt expressions of anger as a signal of irrationality. It is important to emphasize that our arguments do not require angry reviewers to behave less rationally, only that readers assume this to be the case.

Inferences regarding reviewer rationality should naturally influence the perceived value of a review. When assessing cognitive performance, observers tend to reward evidence of rational

thinking, and across a wide variety of domains, observers expect judgments guided by logic and objective reasoning to be more accurate (Bond et al. 2008; Hsee et al. 2003; Pham 2007).

Holding constant the objective content of a review, therefore, expressions of anger will lead readers to evaluate that content as less helpful. Stated formally:

Hypothesis 1: The expression of anger in a negative review diminishes perceptions of review helpfulness.

Anger and Attitudes

If angry reviews are perceived by readers to be less helpful, then it is logical to expect that they will also be less persuasive. This logic is both intuitively appealing and consistent with findings in other contexts; for example, more diagnostic website information has greater influence on customer beliefs and attitudes (e.g., Jiang and Benbasat 2007a, b). Given our simplifying assumption that the angry review is negatively valenced, any attitude change resulting from exposure to the review will tend to be negative as well.² Hence, intuition suggests that overt expressions of anger will lead to attitudes that are less negative (more positive) than they would have been without those expressions.

However, we suggest that this intuition is incomplete. Consistent with EASI theory, we propose that expressions of anger influence reader attitudes not only through the indirect, inferential process described above, but also through a direct, affective process that produces unfavorable impressions of the target. Such unfavorable impressions might arise for various reasons, but two reasons are especially noteworthy. First, angry review content is especially

² In theory, a negatively valenced review could actually improve attitudes toward the target, if those attitudes were sufficiently negative to begin with. However, we believe such cases to be rare, and they do not apply to the studies presented later (see Study 2 pretest)

likely to be noticed, encoded and remembered. Compared to similar but non-emotional stimuli, emotional stimuli receive enhanced attention, elaboration, and consolidation of memory traces (Hamann 2001; Reisberg and Heuer 1992). The combination of negative valence and high arousal associated with anger makes it especially memorable (Kensinger and Corkin 2003). Given that memory-based evaluations are disproportionately affected by information that is easy to recall (Menon and Raghurir 2003; Schwarz et al. 1991), angry review content should have a substantial impact on reader attitudes.

Second, expressed anger may induce unfavorable impressions through a process of *evaluative conditioning* (for reviews, see De Houwer et al. 2001; Hofmann et al. 2010). In its simplest form, evaluative conditioning refers to attitude change that results when a target stimulus is paired with other, strongly valenced stimuli (the “conditioning stimuli”). In almost all cases, the attitude change is convergent: attitude toward the target becomes more negative (positive) when the conditioning stimuli are negative (positive). Importantly, evaluative conditioning can result from the mere co-occurrence of stimuli, without any direct elaboration. One prominent explanation is that co-occurrence leads stimuli to be stored together in a “holistic” memory representation (Gawronski and Bodenhausen 2006; Jones et al. 2010). Among characteristics known to facilitate evaluative conditioning, many apply to our review setting: the conditioning stimuli are evocative (anger is a powerful and easily recognized emotion; Fox et al. 2000), the stimuli and target occur in close temporal proximity (reviews are typically located alongside the target product or retailer being reviewed), and consumers perceive the stimuli and target to be inherently related (reviews contain information and opinions about the product or retailer). If the conditioning process is successful, then readers will automatically associate the target of the review with its angry content.

Once negative, anger-based impressions are formed, they are likely to exert strong effects on reader attitudes. Evaluative associations can be retrieved effortlessly, and they influence subsequent evaluations even when they are acknowledged to be invalid (Cunningham et al. 2004; Fazio and Olson 2003; Gawronski and Bodenhausen 2006). Even if readers have discounted angry content as “unhelpful,” therefore, the unfavorable impressions created by that content will come to mind easily and worsen attitudes. Stated formally:

Hypothesis 2: The expression of anger in a negative review enhances the adverse impact of the review on attitudes toward the target.

To investigate our hypotheses, we conducted six experiments. All of the experiments utilized realistic online retailer reviews that contained identical informational content but varied in the expression of anger. The first two experiments documented the basic phenomenon in an evaluation setting (Study 1) and a choice setting (Study 2). The four subsequent experiments explored underlying mechanisms and investigated alternative explanations for our findings.

STUDY 1

The first study utilized a repeated-measures design in which participants read and evaluated a series of retailer reviews. Each of the reviews described a different retailer, and the expression of anger in each review was manipulated across three levels. Participants evaluated the helpfulness of each review and reported their attitudes toward each retailer.

Stimulus Materials

The cover story and stimulus materials were adapted from Yin et al. (2014). Treatment reviews were developed in three steps. First, we collected actual retailer reviews from the *electronics* category at Yahoo! Shopping. Second, we edited those reviews by removing emotional words, so that they conveyed a negative opinion of the store with minimal emotional content. The three resulting reviews represented the *control* conditions in the study. An example control review is the following: “I purchased a camera on Feb 27th for two-day delivery, and on March 23 I am still waiting for it. Plus they billed me for it on the 27th.” Table 1 presents the treatment reviews for all conditions.

Third, we formed reviews in the *low-anger* and *high-anger* conditions by manipulating the text at the beginning and end of the control reviews. For the *low-anger* condition, we appended the sentence “I am a little bit angry” to the beginning of each review. For the *high-anger* condition, we appended the sentence “I feel so mad!” to the beginning and the sentence “Let me tell you: I’m very angry!” to the end of each review. The end result was three sets of three reviews, each set containing a *control*, *low-anger*, and *high-anger* version. (Table 1).

Table 1: Review Stimuli Used in Study 1

#	Control	Low-Anger	High-Anger
1	I purchased a camera on Feb 27th for two-day delivery, and on March 23 I am still waiting for it. Plus they billed me for it on the 27th.	I am a little bit angry. I purchased a camera on Feb 27th for two-day delivery, and on March 23 I am still waiting for it. Plus they billed me for it on the 27th.	I feel so mad! I purchased a camera on Feb 27th for two-day delivery, and on March 23 I am still waiting for it. Plus they billed me for it on the 27th. Let me tell you: I’m very angry!
2	Ordered a laptop battery (12 cell) and RAM. I received a 6 cell battery and the incorrect RAM. I returned the products to this merchant three weeks ago (and they were	I am a little bit angry. Ordered a laptop battery (12 cell) and RAM. I received a 6 cell battery and the incorrect RAM. I returned the products to this merchant three weeks	I feel so mad! Ordered a laptop battery (12 cell) and RAM. I received a 6 cell battery and the incorrect RAM. I returned the products to this merchant three weeks ago (and they

	received), but still have not received my refund.	ago (and they were received), but still have not received my refund.	were received), but still have not received my refund. Let me tell you: I'm very angry!
3	I placed an order on Dec. 14th using standard shipping because it said if I ordered by the 19th it would be delivered before Christmas. I just received an E-mail saying they shipped it today (Dec. 23rd) and the estimated arrival date is Dec. 30th.	I am a little bit angry. I placed an order on Dec. 14th using standard shipping because it said if I ordered by the 19th it would be delivered before Christmas. I just received an E-mail saying they shipped it today (Dec. 23rd) and the estimated arrival date is Dec. 30th.	I feel so mad! I placed an order on Dec. 14th using standard shipping because it said if I ordered by the 19th it would be delivered before Christmas. I just received an E-mail saying they shipped it today (Dec. 23rd) and the estimated arrival date is Dec. 30th. Let me tell you: I'm very angry!

Procedure

Eighty undergraduate students (42 female) from an introductory IS course at a southern U.S. university participated in exchange for course credit. The experimental procedure is summarized in Appendix A. In the cover story, participants were introduced to a fictitious third-party review site, "OnlineStoreReviews.com." They were told that the researchers were working with the site to "improve its data mining algorithms," and that doing so required us to gather opinions of potential consumers about text reviews on the site. Participants were told that they would be evaluating six different text reviews, each one describing a different retailer.

Participants then read and evaluated each review, one at a time. The three treatment reviews were presented in positions 2, 4, and 6 of the sequence. The treatment reviews were randomly chosen from the three sets in Table 1 and counterbalanced in order, subject to the constraint that treatment reviews for each participant included one review from each set and one review from each condition. This approach ensured that each version (*control*, *low-anger*, *high-anger*) of the same review set would appear a similar number of times across participants, and

thus any results would not be due to differences in specific review content. The filler reviews were presented in positions 1, 3, and 5, were constant across participants, and described positive experiences with the retailers (see Appendix A).

After reading each review, participants reported their perceptions of review helpfulness and their attitudes toward the retailer described in the review. Perceived helpfulness was measured on a nine-point, semantic differential scale, using three items from Yin et al. (2014) (e.g., “not at all helpful / very helpful”). Attitude toward the store was measured on a nine-point, semantic differential scale, using three items adapted from Yang et al. (2011) (e.g., “bad / good”). As a manipulation check, participants also rated the extent to which different emotions (including anger) were expressed in the review (1 = “extremely low amount,” 9 = “extremely high amount”). At the conclusion, participants completed an attention check adapted from Goodman et al. (2013), in which they viewed a seemingly obvious, multiple-choice question (“What was this study about?”), but were instructed to select an incorrect response (“Other”).

Results

Eight participants who failed the attention check were excluded from the analyses ($N = 72$). Examination of the manipulation check revealed that perceived anger followed the expected pattern: means and standard errors were 6.02 [.28] vs. 6.92 [.19] vs. 8.82 [.06] for *control* vs. *low-anger* vs. *high-anger*, respectively (all $ps < .01$). Cronbach’s alphas for the review helpfulness and retailer attitude measures exceeded .90, indicating satisfactory reliability. Items for each measure were averaged to form an overall score.

Table 2 presents observed means for perceived review helpfulness and attitude toward the retailer, for this study and all subsequent studies. To explore the effect of expressed anger on helpfulness, we conducted a repeated-measure ANCOVA with anger as a within-subject factor

and review order as a categorical covariate ($F(5, 66) = 1.15; p = .34$). Results revealed that helpfulness differed significantly across the three conditions ($F(1, 66) = 5.85, p = .02, \eta_p^2 = .08$). Planned pairwise comparisons revealed that the *high-anger* review was perceived as significantly less helpful than both the *control* review ($M = 6.08$ vs. $6.75, SE_{diff} = .28, t(71) = -2.42, p = .02$), and the *low-anger* review ($M = 6.85, SE_{diff} = .22, t(71) = -3.57, p = .001$). Therefore, H1 was supported and was driven by diminished helpfulness for the *high-anger* review. The difference in perceived helpfulness between *control* and *low-anger* conditions was not significant ($p = .7$).

Table 2: Perceived Review Helpfulness and Attitude Toward the Retailer (Studies 1-5)

	Review Helpfulness			Attitude		
	Control	Low Anger	High Anger	Control	Low Anger	High Anger
Study 1	6.75 (.22)	6.85 (.18)	6.08 (.21)	2.23 (.12)	2.15 (.16)	1.83 (.13)
Study 2	6.87 (.15)		6.40 (.20)	6.54 (.17)		6.08 (.18)
Study 3	7.05 (.14)		6.19 (.17)	2.60 (.14)		2.14 (.11)
Study 4A						
Emotion Non-salient	7.44 (.20)		7.39 (.21)			
Emotion Salient	7.93 (.20)		7.82 (.22)			
Study 4B						
Emotion Non-salient				2.48 (.23)		1.99 (.22)
Emotion Salient				2.76 (.24)		2.20 (.23)
Study 5						
Low Load	7.52 (.13)		6.95 (.17)	2.97 (.18)		2.44 (.16)
High Load	7.33 (.22)		7.26 (.28)	2.59 (.30)		1.90 (.26)

Note: standard errors of the mean in parentheses.

To explore the effect of expressed anger on attitude toward the retailer, we conducted a repeated-measures ANCOVA with attitude as the dependent variable, anger as a within-subject

factor, and review order as a covariate ($F(5, 66) = 1.57; p = .18$). Results revealed a significant difference in attitude across the three anger conditions ($F(1, 66) = 10.02, p = .002, \eta_p^2 = .13$). Planned pairwise comparisons revealed that attitude was more negative for the *high-anger* review than the *control* review ($M = 1.83$ vs. $2.23, SE_{diff} = .13, t(71) = -3.17, p = .002$) or the *low-anger* review ($M = 2.15, SE_{diff} = .19, t(71) = -1.69, p = .095$). Therefore, H2 was supported, and driven by more negative attitudes toward the retailer with the *high-anger* review. The difference in attitude between *control* and *low-anger* conditions was not significant ($p = .7$).

The results thus far indicate that negative reviews expressing high anger were perceived as less helpful by participants, but nonetheless resulted in more negative attitudes toward the retailer. We next investigated the direct effect of expressed anger on attitude after accounting for any indirect effect through perceived helpfulness. To do so, we conducted mediation analyses using the MEMORE macro (Montoya and Hayes 2017), which represents a bootstrapping approach to conventional methods for testing mediation in within-subject designs (Judd et al. 2001). The first analysis compared the *high-anger* and *control* conditions, using 10,000 bootstrapped samples. Results revealed that the indirect effect of anger on attitude through review helpfulness was positive and marginally significant ($a*b$ path coefficient = $.09, SE = .09, 95\% CI = [-.01, .32]$). After controlling for review helpfulness, the direct effect of anger on attitude became more negative, and remained significant ($\beta = -.50$ from $-.42, SE = .13, t(69) = -3.90, p < .001$). A similar analysis comparing *high-anger* and *low-anger* conditions yielded similar results ($a*b$ path coefficient = $.17, SE = .09, 95\% CI = [.04, .38]$).

Discussion

By directly manipulating the level of anger expressed in retailer reviews, Study 1 provided initial evidence for our two hypotheses. Despite containing identical objective content, negative reviews expressing high levels of anger were perceived to be less helpful than those expressing low levels of anger (or no anger). Nonetheless, high-anger reviews led readers to form more negative attitudes toward the retailer, suggesting that they were ultimately more persuasive.

The straightforward design of study 1 contained notable limitations. Attitudes were requested after a single review, diminishing realism and creating the potential for floor effects (average attitude was below 3.0 on the 9-point scale). Because review helpfulness was assessed immediately prior to attitude, answers to the former may have influenced the latter, creating measurement artifacts. For example, participants may have “anchored” their responses to the attitude questions on their responses to the preceding helpfulness questions (Feldman and Lynch 1988). To address these issues in the next experiment, we created a choice between competing retailers, based on multiple reviews of each. In addition, we reversed the order of the attitude and helpfulness measures.

STUDY 2

Participants in our second study were asked to choose between two different retailers, based on three customer reviews of each. This design enhanced experimental realism and also allowed us to manipulate expressed anger within-subjects.³ After choosing, participants reported their attitudes toward each retailer and evaluated the helpfulness of the reviews.

Stimulus Materials

³ We dropped the low-anger condition in this study, given that finding of Study 1 suggested that “low-anger” words and phrases did not sufficiently portray the high arousal and extreme valence characterizing anger.

Review stimuli were adapted from the prior study and are presented in Table 3. To create the reviews in the *control* (no anger) conditions, we utilized two control reviews from Study 1. To create the reviews in the *high-anger* condition, we appended three short phrases: a) “I feel so mad!!!” (at the beginning), b) “I’m very angry!!!” (at the end), and c) “It is very irritating that ...” (in the middle), as well as an additional exclamation mark. These changes were intended to strengthen the impact of the manipulation.

Table 3: Review Stimuli Used in Study 2

#	Control	High Anger
1	Ordered a laptop battery (12 cell) and RAM. I received a 6 cell battery and the incorrect RAM. I returned the products to this merchant three weeks ago (and they were received), but still have not received my refund.	I feel so mad!!! Ordered a laptop battery (12 cell) and RAM. I received a 6 cell battery and the incorrect RAM. I returned the products three weeks ago (and they were received), but it is very irritating that I still have not received a refund! I'm very angry!!!
2	I placed an order on Dec. 14th using standard shipping because it said if I ordered by the 19th it would be delivered before Christmas. I just received an E-mail saying they shipped it today (Dec. 23rd) and the estimated arrival date is Dec. 30th.	I feel so mad!!! I placed an order on Dec. 14th using standard shipping, because they said orders made by the 19th would arrive before Christmas. It is very irritating that I received an E-mail saying the order only shipped today (Dec. 23rd), and the estimated arrival date is not until Dec. 30th! I'm very angry!!!

Procedure

The experimental procedure is summarized in Appendix B. Sixty-four undergraduate students (38 female) from an IS course at a southern U.S. university participated in exchange for course credit. In the cover story, participants were asked to imagine that they were shopping online for a digital camera. They were told that they had decided on a specific model, identified

multiple retailers offering the model, and narrowed the choice to two retailers (“Store A” and “Store B”). Before making a decision, they had decided to consult reviews from prior customers.

Participants then read and evaluated reviews for each of the two retailers, presented on two separate screens. The top of each screen displayed an “average rating,” which was fixed at four stars (out of five) for both retailers. Each screen displayed a set of three reviews, described as the “most recent reviews” available for that retailer. The first two of these were filler reviews, which were positive in tone and constant across conditions (see Appendix B). The third review in each set was the treatment review (either *control* or *high-anger*, depending on the treatment condition). To minimize potential order effects, we randomized the sequence of the two review sets and the sequence of the anger treatment.

After reading all three reviews for a retailer, participants were asked first to report their attitudes toward that retailer and then to rate the helpfulness of the set of three reviews (as a whole). The attitude and helpfulness measures were similar to those in Study 1. After participants finished evaluating both retailers, they were asked to choose the retailer from whom they would make their purchase, using an eight-point scale (1 = “definitely choose store A,” 8 = “definitely choose Store B”). Finally, they completed an anger manipulation check for the treatment review and an attention check, identical to those in Study 1.

Results

Six participants who failed the attention check were excluded from the analyses ($N = 58$). Examination of the manipulation check revealed that anger was perceived as substantially greater in the *high-anger* review than the *control* review ($M = 8.50$ vs. 5.27 , $SE_{diff} = .30$, $t(57) = 10.74$, p

< .001). Means for perceived helpfulness and attitude toward the retailer are presented in Table 2. As in Study 1, we first examined the impact of expressed anger on helpfulness perceptions. To do so, we conducted a repeated-measure ANCOVA with anger as a within-subject factor and review order as a categorical covariate ($F(3, 54) = .48, p = .70$). Consistent with findings of the prior study, results revealed that the set of reviews in the *high-anger* condition was perceived as significantly less helpful than the set of reviews in the *control* condition ($M = 6.40$ vs. $6.87, SE_{diff} = .16, t(57) = -2.99, p = .004, \eta_p^2 = .14$).

We next explored the impact of expressed anger on the choice between the two retailers. The mean response to the 8-pt. choice measure was 3.86 ($SD = 2.16$), indicating that participants tended to prefer the retailer described in the *control* condition. Results of a one-sample t-test revealed this mean to be significantly below the scale midpoint ($t(57) = -2.25, p = .03$). To form a binary measure, responses were recoded so that values of four or less indicated preference for the retailer described in the *control* condition, and values of five or more indicated preference for the retailer described in the *high-anger* condition. Thirty-seven participants (63.8%) chose the store described in the *control* condition, while only 21 participants (36.2%) chose the store described in the *high-anger* condition. Results of a chi-square test revealed this difference to be significant ($X^2 = 4.41, p = .04$).

Finally, we examined the impact of expressed anger on attitude toward the retailer. To do so, we conducted a repeated-measures ANCOVA with attitude as the dependent variable, anger as a within-subject factor, and review order as a covariate ($F(3, 54) = 2.23, p = .10$). Consistent with findings of the prior study, results revealed that attitude toward the retailer was significantly

more negative in the *high-anger* condition than in the *control* condition ($M = 6.08$ vs. 6.54 , $SE_{diff} = .22$, $t(57) = -2.06$, $p = .04$, $\eta_p^2 = .07$).⁴

Discussion

Study 2 replicated and extended the findings of our initial study, using a more realistic design in which participants read multiple reviews with the goal of making a choice. Findings provided evidence that the contrasting effects of expressed anger extend to downstream reader decisions: although participants perceived the angry reviews to be less helpful, they nonetheless tended to reject the retailer described by those reviews. The negative influence of anger on choice is consistent with the negative influence of anger on attitudes revealed in study 1. The results are especially noteworthy given the use of a relatively subtle manipulation, in which only one of three reviews for each retailer varied across the anger conditions.

According to the logic underlying our second hypothesis, expressed anger reduces reader attitudes toward the review target due to unfavorable impressions—the *affective* route of EASI theory (van Kleef 2010). However, the results thus far allow for alternative explanations. One such explanation concerns attributions of responsibility for the events described by the angry review. In our context, angry reviewers tend to attribute their unsatisfactory experiences to the retailer, rather than other possible causes (unrealistic expectations, bad luck, bad mood, etc.). If readers make the same attribution, then they may deem the negative review to be the result of

⁴ Given that the first two reviews in each set were positive, we interpret these results to indicate that attitudes declined after reading the treatment reviews and that the decline was greater in the *high-anger* condition. However, it is possible that participants had a very unfavorable attitude toward the retailers before reading the treatment reviews. We conducted a short pretest, in which 58 undergraduates were randomly assigned to one of the two review sets. Participants read only the first two (positive) reviews from the set and then reported their attitudes. Results revealed that attitudes did not depend on which review set was assigned ($p = .89$). Consistent with our interpretation, attitudes were very positive ($M = 8.37$, $SD = 0.96$) and were much more positive than attitudes in the main experiment ($M_s = 6.08$ and 6.54 in the *high-anger* and *control* conditions).

retailer wrongdoing, in which case their attitudes toward the retailer will logically worsen. Another plausible explanation concerns “emotional contagion”: simply observing an actor’s emotional state can lead observers to experience the same state themselves (Hess and Blairy 2001; Neumann and Strack 2000). Thus, readers of an angry review may experience anger themselves, and use that anger as an input to form their attitudes (“feelings as information”; Schwarz and Clore 1983). We designed our next studies to investigate these explanations.

STUDY 3

In Study 3, we explored possible inference and attribution mechanisms by which expressed anger in a review might influence reader evaluations and attitudes. In addition, we separated measurement of the two dependent variables to preclude any anchoring effect (see discussion preceding Study 2), and we utilized a more precise measure of perceived review helpfulness.

Procedure

161 undergraduate students (85 female) from an IS course at a southern U.S. university participated in exchange for course credit. The experimental procedure is summarized in Appendix C. The cover story and procedure were similar to that of study 1, with important exceptions discussed here. Participants were asked to read and evaluate four different reviews, and they were told that each review described a different retailer. The four reviews included two treatment reviews and two fillers. The treatment reviews were identical to the *control* (no anger) and *high-anger* reviews in Study 2, and they were presented in positions 2 and 4 of the sequence (counterbalanced). The filler reviews were positive, adapted from the earlier studies, and presented in positions 1 and 3 (held constant).

Perceived review helpfulness and attitude toward the retailer were assessed in two separate blocks, and the order of the two blocks was randomly assigned. Participants in the *helpfulness-first* condition evaluated the helpfulness of all four reviews (one at a time), then saw the same reviews again and reported their attitudes toward each store. Participants in the *attitude-first* condition reported their attitude toward each store based on its review (one at a time), then saw the same reviews again and evaluated the helpfulness of each review.

Perceived review helpfulness was assessed by three 9-pt items: “Assume that you were a potential customer, deciding whether to purchase from this store. How would you describe the review?” (“informative,” “helpful,” “useful”). To investigate our proposed explanation and alternatives, we added new measures including the following: perceived reviewer rationality and effort, perceived review subjectivity, and attributions of retailer agency and responsibility.⁵ Appendix C details all measurement items. As an additional attention check, participants were shown two sets of four reviews, and asked to identify the review from each set that had been presented earlier.

Results

Forty-six participants failed at least one attention check. Analyses reported below exclude only eight participants who answered the memory questions incorrectly ($N = 153$), but results are qualitatively similar if all 46 participants are excluded. Anger was perceived as substantially

⁵ Presentation of the potential mediators after the dependent measures may raise concerns about post-hoc rationalization by participants. Given that the dependent and mediator measures were presented in separate blocks, however, such rationalization would have required that subjects remember their helpfulness ratings (or attitudes) for every review. In addition, the review content was repeated alongside the mediator questions, and the questions did not mention helpfulness or attitudes.

greater for the *high-anger* review than the *control* review ($M = 8.46$ vs. 5.18 , $SE_{diff} = .20$, $t(152) = 16.44$, $p < .001$), indicating that the anger manipulation was successful.

Table 2 depicts mean ratings of perceived review helpfulness and attitude toward the retailer by condition. To examine the impact of expressed anger on helpfulness, we conducted a repeated-measures ANCOVA, with anger as a within-subject factor and the two order variables (order of reviews and order of dependent measure blocks) as categorical covariates ($F(1, 150) = .001$ and $.15$, $p = .98$ and $.70$). Results are summarized in Table 4. Supporting hypothesis 1 and replicating the results of studies 1-2, reviews in the *high-anger* condition were perceived as significantly less helpful than reviews in the *control* condition ($M = 6.19$ vs. 7.05 , $SE_{diff} = .17$, $t(152) = -4.97$, $p < .001$, $\eta_p^2 = .14$).

Table 4: Results from Repeated-Measure ANCOVA in Study 3

	SS	df	MS	F	p
Review Helpfulness					
Within subjects					
Anger	56.370	1	56.370	24.627	<.001
Anger × Review Order	8.703	1	8.703	3.802	.053
Anger × Block Order	.616	1	.616	.269	.605
Error	343.338	150	2.289		
Between subjects					
Review Order	.005	1	.005	.001	.976
Block Order	.802	1	.802	.150	.699
Error	801.707	150	5.345		
Attitude					
Within subjects					
Anger	16.683	1	16.683	9.031	.003
Anger × Review Order	15.578	1	15.578	8.434	.004
Anger × Block Order	2.151	1	2.151	1.164	.282
Error	277.081	150	1.847		
Between subjects					
Review Order	3.114	1	.3.114	1.809	.298
Block Order	49.207	1	49.207	17.209	<.001
Error	428.900	150	2.859		

To examine the impact of expressed anger on persuasion, we conducted a repeated-measure ANCOVA, with attitude as the dependent variable and the same predictors as above. Results are summarized in Table 4. The effect of the review order covariate was not significant ($F(1, 150) = 1.09, p = .30$); the effect of the question block order covariate was significant ($F(1, 150) = 17.21, p < .001$) but did not interact with the effect of anger ($F(1, 150) = 1.16, p = .28$) (see Table 4). Supporting hypotheses 2 and replicating the results of studies 1-2, attitudes toward the retailer were significantly more negative in the *high-anger* condition than the *control* condition ($M = 2.14$ vs. $2.60, SE_{diff} = .16, t(152) = -3.01, p = .003, \eta_p^2 = .06$).

Next, we examined the direct effect of anger on attitude after controlling for its indirect effect through perceived review helpfulness. To do so, we applied the MEMORE macro with 10,000 bootstrap samples. The indirect effect of anger on attitude through helpfulness was positive but only suggestive (a*b path coefficient = $.08, SE = .07, 95\% CI = [-.04 .23]$). After controlling for helpfulness, the direct effect of anger on attitude became more negative and remained significant ($\beta = -.56$ from $-.48, SE = .17, t(150) = -3.26, p = .001$). Additional mediation tests (described in Appendix D) revealed that the negative effects of expressed anger on helpfulness could be explained by perceived reviewer rationality, whereas the negative effects of expressed anger on attitudes could not be explained by attributions of agency or responsibility.

Discussion

Our third study replicated the main results of studies 1-2 using a more precise measure of perceived review helpfulness and a design that separated the dependent measures. Given the consistent results across three studies using different orders of measurement, we deem it unlikely that the observed effects are a result of response anchoring. Consistent with the inference-based

portion of our account, findings suggested that the detrimental impact of anger on perceived review helpfulness can be explained by diminished perceptions of reviewer rationality.

Consistent with the impression-based portion of our account, the detrimental impact of anger on attitudes toward the retailer was not explained by perceptions of agency or responsibility.

In three additional experiments described below, we probed deeper into the process underlying the contrasting effects of expressed anger on perceived review helpfulness and attitudes toward the retailer. All three experiments utilized a “moderation-of-process” design, in which proposed process variables are manipulated directly (Spencer et al. 2005). This approach contrasts with the “measurement-of-mediation” design utilized in Study 3, in which proposed process variables are measured and mediation is inferred using statistical analyses. Though measurement-of-mediation designs are common in IS research, they have well-known limitations (Bullock et al. 2010; Stone-Romero and Rosopa 2008). Use of an alternative approach allays such concerns.

STUDIES 4A and 4B

One plausible alternative explanation for our findings involves the phenomenon of “emotional contagion,” by which simply observing another person’s emotional state can lead observers to experience the same state themselves (Hess and Blair 2001; Neumann and Strack 2000). Anger is considered especially contagious, both because it easily captures attention and because it serves an important adaptive function (Kelly et al. 2016; Koster et al. 2004). Applied to our context, a contagion account suggests that readers of an angry review “feel” the expressed anger themselves, to at least some extent. That feeling of anger might then serve as an input to subsequent judgments of the review or the target (Schwarz and Clore 1983).

To the extent that our findings are explained by emotional contagion, the influence of contagion-based feelings of anger on judgment should be reduced if the source of that anger is made salient (Pham 1998). To explore this possibility, we designed two experiments that focused separately on perceived review helpfulness (Study 4A) and attitude toward the retailer (Study 4B). Participants in both experiments were recruited from Amazon Mechanical Turk (N = 124 and 140, respectively). The cover story and review stimuli were identical to those in Study 3. To manipulate the salience of review-embedded emotion, we varied the placement of the emotion manipulation check (“In your opinion, what amount of each emotion is present in the review?”). In the *emotion-salient* condition, the check occurred immediately before the dependent measure. In the *emotion-nonsalient* condition, the check occurred at the end of the study.

Means for the dependent measures are presented in Table 2. Analyses using ANCOVA revealed no evidence of an anger*salience interaction on perceived review helpfulness in Study 4A ($F(1, 121) = .05, p = .82$) and no evidence of an anger*salience interaction on attitude toward the retailer in Study 4B ($F(1, 137) = .10, p = .76$). Surprisingly, the main effect of anger on review helpfulness in Study 4A was not significant ($M = 7.69$ vs. $7.60, SE_{diff} = .14, p = .6$). The main effect of anger on attitude in Study 4B was negative and significant ($M = 2.62$ vs. $2.10, SE_{diff} = .12, p < .001$). Together, these results suggest that emotional contagion is unlikely to explain the effects of review-embedded anger observed in our studies.

STUDY 5

We next explored a theoretical moderator implied directly by our EASI-based account. If the effects of expressed anger on perceived review helpfulness are driven by inferential processes and the effects on attitude are driven by affective reactions, then cognitive constraints

should impact the former more than the latter (van Kleef 2010). To test this proposition, we varied the cognitive resources available to participants as they read and evaluated the reviews.

Participants were recruited from Amazon Mechanical Turk ($N = 190$). The cover story and review stimuli were similar to those in Study 3. To vary cognitive resources, we utilized a “digit span” manipulation (adapted from van Dillen et al. 2013) with three levels: *no-load*, *low-load*, and *high-load*. Before reading each review, participants in the *low-load* condition viewed a one-digit number for five seconds. They were told to memorize and continue rehearsing the number as they read and evaluated the review. Afterwards, they were asked to recall the number and informed whether their recollection was correct. Participants in the *high-load* condition viewed a seven-digit number and received similar instructions. Participants in the *no-load* condition did not view any number or receive additional instructions. After reading each review, participants completed attitude and helpfulness measures on separate screens (counterbalanced).

Preliminary analysis revealed that the *no-load* and *low-load* conditions did not differ with regard to either dependent variable in either of the anger conditions (all $ps > .3$). Therefore, the two conditions were combined into a single *low-load* condition. Means for both dependent variables are depicted in Table 2. Analysis of perceived review helpfulness via ANCOVA revealed a marginal anger*load interaction effect ($F(1, 186) = 3.28, p = .072$). Pairwise comparisons revealed that anger significantly reduced helpfulness at low levels of cognitive load ($M = 7.52$ vs. $6.95, SE_{diff} = .14, p < .001$) but not at high levels of cognitive load ($M = 7.33$ vs. $7.26, SE_{diff} = .24, p = .8$). In contrast, analysis of attitude toward the retailer revealed no evidence of an anger*load interaction ($F(1, 186) = .26, p = .61$), but did reveal a significant main effect of anger ($M = 2.78$ vs. $2.17, SE_{diff} = .15, p < .001$). Taken together, these results support our claim

that anger influences review readers through both a deliberative, inferential process that reduces perceived helpfulness and an affective, impression-based process that worsens attitudes.

GENERAL DISCUSSION

Modern consumers receive a vast number of messages from a vast number of senders (retailers, platforms, other consumers, etc.) and must choose which messages to rely on based on the signals available (Moore and Lafreniere 2020). In the context of online reviews, signals include sender-specific and message-specific factors ranging from reviewer similarity, expertise, and disclosure to review structure, valence, and linguistic style (Cao et al. 2011; Ghose et al. 2012; He and Bond 2013; Moore 2015; Mudambi and Schuff 2010; Packard et al. 2016; Pan and Zhang 2011; Schindler and Bickart 2012; Zhao et al. 2013). A common assumption is that readers incorporate these factors in a deliberate manner, so that they are most likely to be persuaded by the reviews they deem most “helpful.” Our research challenges this assumption by highlighting the effects of anger. We propose that on the one hand, reviews expressing high levels of anger are perceived by consumers to be less helpful, but on the other hand, the same angry reviews are often *more* persuasive, producing more negative attitudes and intentions. We obtained convergent evidence for these contrasting effects across multiple experiments that varied in format and context. Supporting our theoretical model, the final experiments suggested that the direct, negative effect of anger on attitude is less deliberate than its indirect effect on review helpfulness, while ruling out competing explanations.

Implications and Future Research

Although an abundance of research has examined the impact of review characteristics on perceived review helpfulness (e.g., Forman et al. 2008; Mudambi and Schuff 2010; Yin et al. 2016), less is known about their impact on actual consumer attitudes and choices. Presumably, this deficiency reflects a tendency of the online review literature to conceptualize consumer utilization of reviews as a thoughtful process (Evans 2008). Our findings suggest that although consumers encountering anger in a review do make reasoned, logical inferences about helpfulness and its implications (e.g., “Is this reviewer being rational?”), they also form immediate, unfavorable impressions that negatively impact their attitudes. Therefore, our findings imply that caution is warranted when applying prior research on review helpfulness to predict downstream consequences, and they suggest other cases in which “helpful” reviews may not be persuasive (or vice versa). In particular, it is likely that other common review emotions (happiness, surprise, etc.) play nuanced roles in reader inference and attitude formation.

Our focus complements a growing stream of research on the *interpersonal* (as opposed to *intrapersonal*) effects of emotion, by which observing another’s emotion can exert powerful effects on the thoughts, attitudes, and behaviors of observers. Such interpersonal effects are especially relevant in online communication, where a single item containing emotional content may be encountered by thousands of observers over an extended period of time. By examining interpersonal effects of anger through the lens of EASI theory (van Kleef 2009, 2010) we extend the theory to a markedly new environment. In contrast to prior applications of EASI that involve verbal interactions between familiar parties in offline settings (e.g., Adam and Shirako 2013; Cheshin et al. 2018; Wang et al. 2018), we demonstrate the main principles of the theory in an online setting involving one-way, written communication between an anonymous reviewer and

review readers. Building on these ideas, we encourage others to apply the EASI framework to other communication channels, emotions, and downstream effects.

Our findings bear meaningful implications for the design of online review platforms. Most platforms allow readers to identify reviews that are especially helpful (“like,” “thumbs-up,” etc.), and the resulting helpfulness “votes” often form a basis for sorting reviews. A platform may have numerous motivations for utilizing helpfulness-based sorting, but one motivation is presumably the assumption that “helpful” reviews are more persuasive in shaping customer decisions. If so, then our findings suggest that sorting based solely on helpfulness votes may be less effective than intended. Identification of the most persuasive reviews requires consideration of other factors, one of which is the presence of emotional cues.

Our findings suggest means by which review platforms might improve writing guidelines for reviewers. The notion that “too much anger” can reduce the perceived value of a review is reflected in the guidelines provided by certain review platforms: e.g., guidelines at TripAdvisor (2019) explicitly discourage reviewers from “ranting.” Given that participants in our studies consistently perceived angry reviews as “irrational” and “unhelpful,” this advice appears sound. Based on our overall pattern of findings, a more nuanced implication is that platforms should encourage dissatisfied reviewers to “take your time,” “provide your reasoning,” etc. Such guidelines may be more practical than asking reviewers to avoid expressing anger, while also producing reviews that readers perceive to be more “rational” and “helpful.”

The persuasive impact of anger in our studies suggests that manufacturers, marketers, and retailers should take any WOM expressing anger seriously, even if it is seemingly “trivial.” For example, it is increasingly common for manufacturers or retailers to respond to negative user reviews on the platforms to which they were posted. Based on our framework, this approach may

be especially effective if it: 1) highlights to readers the “irrational, unhelpful” aspects of the angry review, and 2) emphasizes unambiguously positive attributes of the product or service, to counteract the negative impressions elicited by anger.

Certain limitations of our research merit further investigation. Reader inferences of reviewer “irrationality” may be invoked not only by expressed anger, but also by substantive, non-emotional content of the reviews. For example, readers may view ambiguous reasoning, weak argumentation, or poor grammar as indicators of compromised reasoning ability. In these circumstances, anger (or other expressed emotion) is likely to have less influence on helpfulness perceptions. Our stimuli did not address such limiting factors, and they merit exploration.

The second mechanism in our framework proposes that expressed anger leads review readers to form relatively automatic, impression-based reactions that form the basis for later attitudes. Our experiments ruled out various alternatives and provided indirect support by use of a cognitive constraint manipulation (studies 3-5). However, the opportunity exists to investigate the proposed mechanism more rigorously. For example, application of “implicit” measurement techniques (Fazio and Olson 2003; Greenwald et al. 1998) could enable precise measurement of any spontaneous impressions that form after exposure to emotional content.

All of our studies were conducted in the context of retailer reviews. We expect our main findings to replicate in the context of product reviews, but additional factors would require consideration. For example, the target of “anger” in a product review is often not the product itself, but another party (retailer, delivery service, etc.). In such cases, the arguments underlying our second hypothesis suggest a nuanced prediction. Evaluative conditioning is strongest when the target and conditioning stimulus are obviously connected, but can occur even in the absence of any connection (Hofmann et al. 2010). Therefore, the impact of angry review content on

reader attitudes should be reduced—but not eliminated—when that content concerns parties other than the product. Future research could investigate this prediction and other implications of our framework in a product review setting.

CONCLUSION

Challenging the conventional wisdom that more helpful reviews are inherently more persuasive, we suggest that review helpfulness and persuasiveness need not co-vary in the presence of emotional review content. Our experimental findings provide converging evidence that angry reviews are deemed less helpful by readers but nonetheless exhibit greater impact on their attitudes and choices. We view these findings as an initial step toward unpacking the complex and intriguing relationship between review helpfulness and persuasiveness, while enriching understanding of the powerful role of emotion in online communication.

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APPENDICES

Appendix A: Study 1 – Experiment

Note: all Likert and semantic differential items were measured using 9-point scales, unless specified otherwise.

Thank you for taking part in today's study.

Because online shopping involves uncertainty and risk, there are a number of third-party review sites that provide consumer ratings and reviews of online stores.

One of these sites, OnlineStoreReviews.Com provides the ability for customers to write a detailed text review about an online store they have recently dealt with. Reviewers are asked to evaluate the store based on their own purchasing experience.

Continued on the next screen.

We have been working with OnlineStoreReviews.com to help them improve their data mining algorithms. In order to achieve this goal, potential consumers' opinions about real text reviews are needed.

Continued on the next screen.

In this task, we would like your help in evaluating an assortment of text reviews collected from real review websites. Specifically, you will be asked to evaluate various characteristics of the reviews and reviewers.

NOTE: You will be reading and evaluating the text reviews one at a time. Each review is describing a DIFFERENT online store. Please make sure to read the entire text review carefully before making a judgment.

This task starts on the next screen. In total, you will see 6 text reviews.

Store A

Review: <Review 1>

Perceived Review Helpfulness: (Yin et al. 2014)

Using the scales below, how would you describe the above consumer review?

- not at all helpful / very helpful
- not at all useful / very useful
- not at all informative / very informative

Attitude Toward the Store: (Yang et al. 2011)

Based on the review, what is your overall opinion of this store?

- bad / good
- negative / positive
- unfavorable / favorable

Filler reviews used:

#1: I liked their web site - lots of items with a decent description of each. Received exactly what I ordered in a timely manner - no need to contact customer service.

#3: Very happy they sent a follow-up before shipping, to confirm that I actually bought it, and verify my address. Will definitely shop here again.

#5: Great customer service. One item was back-ordered. I was notified immediately about the back-order and when shipment was scheduled. They worked with me on getting the products I needed, when and where I needed them. Excellent transaction, and highly recommended.

Store A - Continued

Review: <Review 1>

Perceived anger: (Richins 1997)

Below is a list of emotions. In your opinion, what amount of each emotion is present in the review? <extremely low amount / extremely high amount>

- Sad
- Happy
- Angry
- Anxious
- Surprised

Repeat for the other stores.

Attention checks: (Goodman et al. 2013)

Please answer the following:

Research in decision making shows that people, when making decisions and answering questions, prefer not to pay attention and minimize their effort as much as possible. Some studies show that over 50% of people don't carefully read questions. If you are reading this question and have read all the other questions, please select the box marked 'other' and type 'Decision Making' in the box below. Do not select "your opinions of online store reviews." Thank you for participating and taking the time to read through the questions carefully!

What was this study about?

A Your opinions of online store reviews

B Your opinions of restaurant reviews

C Political preferences

D Other _____

Appendix B: Study 2 – Experiment

Note: all Likert and semantic differential items were measured using 9-point scales, unless specified otherwise.

Thank you for taking part in today's study.

Imagine that you are shopping online for a digital camera. You have already decided on the specific model that you are interested in, and browsed a number of different online electronics retailers that offer this model.

After considering various factors relevant to your decision (price, shipping, etc.), you have selected two stores. Tentatively, you plan to buy the camera from one of these two stores.

For purposes of the present study, we will refer to these two different stores by letters: A and B.

Continued on the next screen.

Because you have no prior experience with Store A or Store B, you decide to find out what past customers have thought about their experience with the stores. Therefore, you visit a third-party website, OnlineStoreReviews.Com.

OnlineStoreReviews.com provides authentic consumer reviews of online stores. Reviewers are recent customers of the stores. They are given the opportunity to write a detailed text review, based on their own shopping experiences.

Continued on the next screen.

After visiting OnlineStoreReviews.com, you discover that the site contains nearly a hundred reviews for both Store A and Store B. Therefore, you decide to look at their most recent reviews.

On the following screens, you will be shown the most recent text reviews for each store. Then you will be asked about your opinion of the stores. Please make sure you read all of the available information on the page before making your evaluation.

Please click below when you are ready to begin.

Store A
Overall Average Rating: ****

Most Recent Customer Reviews

Review #1: *****

Very happy they sent a follow-up before shipping, to confirm that I actually bought it, and verify my address. I will definitely shop here again.

Review #2: *****

Great customer service. One item was back-ordered. I was notified immediately about the back-order and when shipment was scheduled.

Review #3: *

[I feel so mad!!!] Ordered a laptop battery (12 cell) and RAM. I received a 6 cell battery and the incorrect RAM. I returned the products three weeks ago (and they were received), but [it is very irritating that] I still have not received a refund[./!] [I'm very angry!!!]

You will now be asked some questions about **Store A**:

Attitude Toward the Store: (Yang et al. 2011)

Based on the reviews, what is your **overall opinion** of store A?

- bad / good
- negative / positive
- unfavorable / favorable

Reviews used for Store B are:

#1: I liked their web site - lots of items with a decent description of each. Received exactly what I ordered in a timely manner - no need to contact customer service.

#2: They worked with me on getting the products I needed, when and where I needed them. Excellent transaction, and highly recommended.

#3: [I feel so mad!!!] I placed an order on Dec. 14th using standard shipping, because they said orders made by the 19th would arrive before Christmas. [It is very irritating that] I received an E-mail saying the order only shipped today (Dec. 23rd), and the estimated arrival date is not until Dec. 30th[./!] [I'm very angry!!!]

// Show store profile again

Perceived Helpfulness of the Review Set:

Using the scales below, how would you describe the three reviews for Store A (*as a whole*)?

- not at all helpful / very helpful
- not at all useful / very useful
- not at all informative / very informative

Repeat for the other store.

Next, we would like you to choose between Store A and Store B. Assume that both stores offer the camera you are interested in, at a similar price.

As a reminder, the most recent reviews for each store are below.

// Show profiles side by side

Given a choice between the two stores, which store would you choose? (8-point scale)

- Definitely choose store A / Definitely choose store B

*Next, we will ask you some additional questions about **one** of the reviews that you read from each store.*

Continued on the next screen.

// The two treatment reviews appear next, in the same sequence as they appeared earlier.

You will now be asked some questions about **one** of the reviews that you read from **Store A**. The review is shown below:

Review #3: ...

Perceived anger: (Richins 1997)

Below is a list of emotions. In your opinion, what amount of each emotion is present in the review? <extremely low amount / extremely high amount>

- Sad
- Happy
- Angry
- Anxious
- Surprised

Repeat for the other treatment review.

Attention checks: (Goodman et al. 2013)

Please answer the following:

Research in decision making shows that people, when making decisions and answering questions, prefer not to pay attention and minimize their effort as much as possible. Some studies show that over 50% of people don't carefully read questions. If you are reading this question and have read all the other questions, please select the box marked 'other' and type 'Decision Making' in the box below. Do not select "your opinions of online store reviews." Thank you for participating and taking the time to read through the questions carefully!

What was this study about?

- A Your opinions of online store reviews
- B Your opinions of restaurant reviews
- C Political preferences
- D Other _____

Appendix C: Study 3 – Experiment

Note: all Likert and semantic differential items were measured using 9-point scales, unless specified otherwise.

Thank you for taking part in today's study.

Because online shopping involves uncertainty and risk, there are a number of third-party review sites that provide consumer ratings and reviews of online stores.

One of these sites, OnlineStoreReviews.Com provides the ability for customers to write a detailed text review about an online store they have recently dealt with. Reviewers are asked to evaluate the store based on their own purchasing experience.

Continued on the next screen.

We have been working with OnlineStoreReviews.com to help them improve their data mining algorithms.

In order to achieve this goal, we are collecting opinions from potential consumers about actual text reviews of online stores.

Continued on the next screen.

In this task, we would like your help in evaluating an assortment of text reviews collected from real review websites. Specifically, you will be asked to evaluate various characteristics of the reviews and reviewers.

NOTE: You will be reading and evaluating the text reviews one at a time. Each review is describing a DIFFERENT online store. Please make sure to read the entire text review carefully before making a judgment.

This task starts on the next screen. In total, you will see 4 text reviews.

Store A

Review: <Review 1>

Perceived Review Helpfulness: (Yin et al. 2014)

Assume that you were a potential customer, deciding whether to purchase from this store. How would you describe the review?

- not at all helpful / very helpful
- not at all useful / very useful
- not at all informative / very informative

Filler reviews used:

#1: I liked their web site - lots of items with a decent description of each. Very happy they sent a follow-up before shipping, to confirm that I actually bought it, and verify my address. Received exactly what I ordered in a timely manner - no need to contact customer service. Will definitely shop here again.

#3: Great customer service. One item was back-ordered. I was notified immediately about the back-order and when shipment was scheduled. They worked with me on getting the products I needed, when and where I needed them. Excellent transaction, and highly recommended.

Repeat for the other stores.

// Participants were randomly assigned to evaluate review helpfulness or attitude in the first block.

Thank you.

Next, you will read the same set of reviews, and you will be asked a different question about them.

Continued on the next screen.

Store A

Review: <Review 1>

Attitude Toward the Store: (Yang et al. 2011)

Based on the review, what is your overall opinion of this store?

- bad / good
- negative / positive
- unfavorable / favorable

Repeat for the other stores.

Thank you. Next, we have some follow-up questions about some of the reviews you read.

Continued on the next screen.

Store B

Review: <Review 2>

Perceived effort of reviewers: (Huddy et al. 2007) <very little / a great deal>

- In your opinion, how much effort did the reviewer put into writing this review?
- In your opinion, how much thought did the reviewer give to this review?
- In your opinion, how much time did the reviewer spend writing this review?

Perceived rationality of reviewers: (Tormala et al. 2011) <not at all / very much>

- In your opinion, how rational was the reviewer in writing this review?
- In your opinion, to what extent was this review based on logic?
- In your opinion, to what extent was this review based on reason?

Perceived subjectivity: (Uhlmann and Cohen 2005)

Using the scales below, how would you describe this review?

- very objective / very subjective
- very unbiased / very biased
- very impartial / very partial

Store B - Continued

Review: <Review 2>

Attribution of agency to store: (van Doorn et al. 2015) <not at all / very much>

- Do you think this reviewer was dissatisfied because of something Store B did?
- Do you think this reviewer was dissatisfied as a result of the actions of Store B?

Attribution of responsibility: (van Doorn et al. 2015) <not at all / very much>

- Do you think Store B was responsible for what happened?
- Do you think Store B should be blamed for what happened?
- Do you think what happened is Store B's fault?

Store B - Continued

Review: <Review 2>

Perceived anger: (Richins 1997)

Below is a list of emotions. In your opinion, what amount of each emotion is present in the review? <extremely low amount / extremely high amount>

- Sad
- Happy
- Angry
- Anxious
- Surprised

Repeat for Store D.

Memory recall question 1:

Please recall the reviews that you evaluated earlier. Which of the following reviews did you see? (choose one)

- Delivered on time in decent protective packaging. Bought this filter for Canon R700 camcorder. A good fit and appears to be well made. Using as a lens protector and to keep dust and dirt from getting into the lens mechanism. I suspect this will do the job very nicely.

- Rip Offs. Don't buy from this company. They send damaged parts and won't refund. They don't even have a real store, they just broker parts. Buyers Beware RUN!!!

- Great customer service. One item was back-ordered. I was notified immediately about the back-order and when shipment was scheduled. They worked with me on getting the products I needed, when and where I needed them. Excellent transaction, and highly recommended.

- Perfectly Packaged. 100% GENUINE. Outstanding Quality item. BEST PRICE ON THE MARKET. Item arrived in MINT++ CONDITION. Best Customer Service. I would buy again 100 times with no hesitation. WORLD CLASS SELLER!

Memory recall question 2:

Please recall the reviews that you evaluated earlier. Which of the following reviews did you see? (choose one)

- Camera was supposed to be delivered between the 18th and 24th. Arrived on the 14th! So happy. Packaged well and a bonus SD card included. Very happy with this seller and would purchase from again.

- <Review #2 from Store B>

- I received the wrong item. Bought the latest version but received last year's model which is far worse in quality. I would send back and get my money back if I didn't need these for a photoshoot this Friday. I paid more money for an inferior product. I'm very pissed off!!!

- The lens arrived on time and was very well packaged. This transaction gives me confidence in this seller and won't hesitate to purchase from them in the future when the need arises.

Attention checks: (Goodman et al. 2013)

Please answer the following:

Research in decision making shows that people, when making decisions and answering questions, prefer not to pay attention and minimize their effort as much as possible. Some studies show that over 50% of people don't carefully read questions. If you are reading this question and have read all the other questions, please select the box marked 'other' and type 'Decision Making' in the box below. Do not select "your opinions of online store reviews." Thank you for participating and taking the time to read through the questions carefully!

What was this study about?

A Your opinions of online store reviews

B Your opinions of restaurant reviews

C Political preferences

D Other _____

Appendix D: Study 3 – Mediation Tests

To investigate our proposed model and alternative explanations, we added new measures that included the following: perceived reviewer rationality and effort, perceived review subjectivity, and attributions of retailer agency and responsibility. Perceived reviewer rationality was measured on a nine-point scale, using three items adapted from Tormala et al. (2011) (e.g., "In your opinion, how rational was the reviewer in writing this review?"; "not at all / very much"). Perceived reviewer effort was measured using three items adapted from Huddy et al. (2007) (e.g., "In your opinion, how much effort did the reviewer put into writing this review?"; "very little / a great deal"). Perceived review subjectivity was measured on a nine-point, semantic differential scale, using three items adapted from Uhlmann and Cohen (2005) (e.g., "Using the scales below, how would you describe this review?"; "very objective / very subjective"). All three of these variables have been identified as predictors of review helpfulness in prior research (Jensen et al. 2013; Yin et al. 2014, 2017). Attributions of store agency and responsibility were measured using items adapted from van Doorn et al. (2015) (e.g., "Do you think this reviewer was dissatisfied because of something Store B did?" and "Do you think Store B was responsible for what happened?"; "not at all / very much").

We first examined the evidence for perceived rationality, effort, and subjectivity as explanations for the detrimental effect of anger on perceived review helpfulness. Separate ANCOVAs revealed that compared to reviews in the *control* condition, reviews in the *high-anger* condition were perceived to be less rational ($M = 4.51$ vs. 7.07 , $SE_{diff} = .20$, $t(152) = -12.79$, $p < .001$, $\eta_p^2 = .52$), less effortful ($M = 4.61$ vs. 4.97 , $SE_{diff} = .19$, $t(152) = -1.94$, $p = .055$, $\eta_p^2 = .02$) and more subjective ($M = 6.76$ vs. 4.22 , $SE_{diff} = .24$, $t(152) = -10.66$, $p < .001$, $\eta_p^2 = .43$).

To formally test the three variables as potential mediators, we again utilized the MEMORE macro with 10,000 bootstrap samples. We included review helpfulness as the dependent variable and perceptions of reviewer rationality, reviewer effort, and review subjectivity as parallel mediators. Results revealed a large and negative indirect effect of anger through perceived reviewer rationality (a*b path coefficient = $-.65$, $SE = .20$, 95% CI = $[-1.06, -.27]$), a modest and negative indirect effect through perceived reviewer effort (a*b path coefficient = $-.10$, $SE = .07$, 95% CI = $[-.26, .002]$), and no evidence of an indirect effect through perceived subjectivity (a*b path coefficient = $-.10$, $SE = .15$, 95% CI = $[-.41, .20]$). The effect of expressed anger on review helpfulness became insignificant ($\beta = -.02$, $SE = .24$, $t(146) = -.07$, $p = .94$), indicating full mediation.⁶

Finally, we tested alternative explanations by which expressed anger may influence attitude toward the retailer through attributions of agency or responsibility. ANCOVA results for the agency measure revealed that the retailer was attributed more agency in the *high-anger* condition than in the *control* condition ($M = 8.10$ vs. 7.63 , $SE_{diff} = .15$, $t(152) = 3.07$, $p = .003$, $\eta_p^2 = .06$). However, results of a bootstrapped mediation test provided only weak support for agency as a mediator (a*b path coefficient = $-.10$, $SE = .06$, 95% CI = $[-.22, .002]$); after controlling for this indirect effect, the effect of anger on attitude remained negative and

⁶ In a separate, exploratory study, we probed the reported thoughts of participants as they formed judgments of helpfulness (e.g., Weber et al. 2007). Seventy-nine undergraduate participants were asked to read each of the four reviews used in Study 3, and then list “everything that you were thinking as you considered whether the review was helpful or not helpful.” Afterwards, participants were shown each of their listed thoughts and asked to classify them into the following categories: a) review specificity, b) reviewer rationality, c) reviewer effort, d) review trustworthiness, e) none of these. Participants were allowed to check more than one category. Participants generated an average of 3.67 and 3.99 thoughts for the *control* review and the *high-anger* review, respectively. The only significant within-category difference that emerged was for rationality: participants generated more rationality-related thoughts when evaluating the *high-anger* review than the *control* review ($M = 1.56$ vs. 1.06 , $F(1, 78) = 8.64$, $p = .004$). Consistent with the main study, this exploratory finding suggests that inferences about rationality help to explain effects of review-embedded anger on perceived helpfulness.

significant ($\beta = -.38$, $SE = .16$, $t(150) = -2.35$, $p = .02$). ANCOVA results for the responsibility measure revealed that attribution of responsibility did not differ between the *high-anger* and *control* conditions ($M = 7.29$ vs. 7.28 , $SE_{diff} = .16$, $t(152) = .06$, $p = .96$, $\eta_p^2 < .001$).