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The non-contributive bystander: Extending the bystander effect to predict online  
information sharing

A Thesis submitted in partial satisfaction of the  
requirements for the degree Master of Arts  
in Communication

by

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## ABSTRACT

The non-contributive bystander: Extending the bystander effect to predict online information sharing

by

Audrey Nasya Abeyta

The rise of online information pools—or information repositories comprised of individual’s unique contributions—has sparked much research regarding individuals’ motivations to share information in these contexts. However, the effect of non-contributors on individuals’ motivation to share their own information has been understudied, in spite of the prevalence of non-contribution. Using the bystander effect as a theoretical lens, the present study explored the effect of others’ contributive behavior on individuals’ decision to share information on an online review site. In contrast to prior research, this study experimentally manipulated and measured the three psychological mechanisms underlying the bystander effect, allowing for a better understanding of the relationship among these mechanisms in the context of online information pools. A between-subjects 4 (bystander volume; 6, 49, 242, 831) x 2 (anonymity; anonymous, not anonymous) x 2 (contribution appropriateness; 4% contributing, 73% contributing) factorial design was used (N = 243).

Although bystander volume is typically related to greater feelings of diffusion of responsibility, the present study found no significant between bystander volume and diffusion of responsibility; in fact, bystander volume was positively related to contribution amount,

though this relationship was not linear. However, consistent with prior research, diffusion of responsibility was negatively related to contribution amount. Although prior research has found that individuals' behavior is influenced by the observed behavior of others, individuals' contribution amount and length in the current experiment was not affected by the social norms displayed in the information pool. Consistent with past research, individuals' feelings of anonymity were significantly, negatively related to evaluation apprehension, though neither anonymity nor evaluation apprehension was significantly related to contribution amount.

Together, the findings of the present study suggest that the bystander effect and its underlying mechanisms operate differently in the context of an online review site than they do in face-to-face contexts or more traditional mediated contexts, such as email. Possible explanations for these differences and suggestions for future research are presented.

Using the web, individuals can create and share user-generated content, or material created by Internet users that reflects their creative efforts (Ochoa & Duval, 2008). Online information pools, such as Wikipedia, Yelp, and Trip Advisor, are a form of user-generated content, comprised of individuals' contributions, like articles and reviews. These contributions are accessible to a large number of users worldwide (Cheshire & Antin, 2008). While researchers have examined individuals' motivations to contribute their opinions and knowledge to online information pools (e.g., Cheshire & Antin, 2008; Cho, Chen, & Chung, 2010; Ling et al., 2005; Nov, 2007; Rashid et al., 2006; Yang & Lai, 2010), little empirical research has investigated the most prevalent behavior in these information repositories: non-contribution. In many online information pools, non-contributive behavior is quite common.

In fact, prior research has demonstrated that a very small percentage of information pool users provide a large percentage of the content (e.g., Nov, Naaman, & Ye, 2010; Ochoa & Duval, 2008; Voss, 2005). In Wikipedia, less than one percent of the site's 500 million unique visitors have made ten or more edits (Wikimedia Foundation, 2013; "Wikipedia statistics", n.d.). Similarly, in open source software communities, a mere four percent of users provide half of the answers on a user-to-user help site (Lakhani & Von Hippel, 2003). In Gnutella, a peer-to-peer music sharing site, 85 percent of users share no files at all (Hughes, Coulson, & Walkerdine, 2005).

Non-contributive behavior presents a severe challenge to the vitality of online information pools. Without individuals who are motivated to contribute, existing information pools would quickly stagnate and new information pools would never be created. Open-source software projects would quickly become outdated and riddled with bugs. Clearly, non-contributive behavior can have exceedingly detrimental effects on online



information pools, but this behavior is not always apparent to users. In online information pools, individuals cannot observe the majority of users who benefit from the information without contributing (Cheshire & Antin, 2008). If individuals were made aware of others' presence in online information pools, would it impact their decision to contribute? This experiment uses past research and findings rooted in the bystander effect (Latané & Darley, 1970) to predict individuals' contributions to online information pools when the presence of others is made salient.

### **The Bystander Effect**

The bystander effect is a social inhibition phenomenon in which an individual fails to intervene in a critical situation due to the presence of known or assumed bystanders.

Although it was originally used to explain individuals' behavior in emergency situations, the bystander effect is—at its core—a social psychological phenomenon that addresses why individuals behave differently in the presence of others. As a result, it has been successfully used to predict individuals' behavior in non-emergency and mediated contexts. Because of its broader applicability, which has been empirically demonstrated, the bystander effect is a valuable tool with which researchers can examine individuals' contributions to online information pools in the known presence of virtual bystanders. If these virtual bystanders exhibit non-contributive behavior, individuals can choose to mimic this behavior, or they can choose to share information, in spite of the others' non-contribution. However, several steps must occur before an individual decides to contribute to the information pool (Latané & Darley, 1970).

First, the individual must be aware of the need for contribution to the information pool and identify this as an important need. Next, the individual must feel that he or she is

personally responsible to contribute and has the efficacy to do so successfully. Finally, the individual must decide to contribute to the information pool. Extensive testing of the bystander effect in a variety of emergency, non-emergency, and mediated situations has revealed three psychological processes that may prevent an individual from engaging in the necessary behavior for a given situation: diffusion of responsibility, social influence, and evaluation apprehension (Latané & Darley, 1970). Decades of empirical research have identified these processes as factors that inhibit individuals' behavior; however, researchers often assume that these processes work in accordance with one another and, subsequently, do not empirically test for their presence. To better understand the bystander effect, the present study experimentally induces and empirically measures its three underlying processes.

### **Diffusion of responsibility**

Through the diffusion of responsibility, individuals feel less personal responsibility to act when others are present and capable of doing so. Furthermore, any repercussions that result from not acting are distributed among all bystanders present. In some situations, the other bystanders' presence is known but not observed, allowing each individual to assume that another bystander has acted, further reducing personal responsibility. Diffusion of responsibility is similar to the concept of social loafing, or "the reduction in motivation and effort when individuals work collectively compared with when they work individually" (Karau & Williams, 1993, p. 681).

Individuals experience decreased motivation and exert less effort when working in groups, as empirical work has consistently demonstrated (for a full review, see Karau & Williams, 1993). Even when performing alone, but as part of a believed group, individuals engage in social loafing. For example, individuals participating in a rope-pulling task, in

actual or believed groups, were blindfolded and told they were pulling with others, although they were actually pulling alone (Ingham, Levinger, Graves, & Peckham, 1974). In both actual and presumed groups participants exerted less effort. Further support for social loafing was found in a similar experiment in which participants were blindfolded, given headphones, and instructed to clap and shout as loudly as they could (Latané et al., 1979). Again, individuals performing in groups—real or imagined—exerted less effort. This research led to the formulation of the Collective Effort Model (Karau & Williams, 1993), which addresses the motivational factors that predict the amount of effort an individual will exert in collective tasks. According to the model, the number of other potential task performers (i.e., bystanders) present is positively related to social loafing. When individuals are in the real or believed presence of others, diffusion of responsibility occurs, and it is this psychological mechanism that results in social loafing. In the context of online information pools, individuals are expected to feel less personal responsibility to contribute when virtual others are present, causing them to engage in social loafing, which will result in fewer contributions to the information pool. Thus, the following hypotheses are proposed:

**H1:** Bystander volume is positively related to diffusion of responsibility.

**H2:** Diffusion of responsibility is negatively related to contribution amount.

If the presence of others results in diffusion of responsibility and, subsequently, social loafing, large groups are less likely than small groups to accomplish a collective task, as Olson (1965) suggested; however, this may not always be the case. When a group is working to obtain a non-rival good (i.e., a commodity that can be used by and shared with many individuals without losing its value), large groups are more likely to achieve their goal because there is a higher probability that someone in the group is willing to help, which

results in a larger number of total contributions from the group (Marwell & Oliver, 1993). Applying this logic to the context of online information pools, a large group of potential contributors is more likely to provide the resources necessary to create an information repository, in spite of some individuals' proclivity to engage in social loafing. Thus, group size alone perhaps does not sufficiently explain the bystander effect; indeed, two other psychological mechanisms—social influence and evaluation apprehension—also affect individuals' decisions to act or not act.

### **Social influence**

Social influence refers to individuals' tendency to rely on others to make sense of ambiguous situations (Latané & Nida, 1981). Latané and Nida (1981) note that “helping situations” (p. 309) are often ambiguous; as a result, individuals observe the behavior of those around them to determine what is situationally appropriate. However, individuals often misinterpret the behavior of those around them, causing them to come to inaccurate conclusions about others' beliefs. Cialdini (2001) refers to the cues that enable individuals to make decisions in ambiguous situations as social proof. When individuals cannot observe other bystanders' behavior, they assume that action has already been taken or that it would be inappropriate to do so.

In an early study investigating the role of social influence in social inhibition, Latané and Darley (1968) found that individuals were less likely to act in an ambiguous situation if others were present. In their experiment, participants waited—alone or with two nonreactive others—in a room that began to fill with smoke. As anticipated, the majority of individuals who were waiting alone reported the smoke, while the majority of those who were waiting with others did not. The researchers attribute this inaction to the participants' reliance on

social influence. Faced with an ambiguous situation, participants gauged the reactions of others and—based on their inaction—determined that the situation was not an emergency and therefore not worthy of intervention. Furthermore, in follow-up interviews, participants attributed the smoke to a number of non-emergency alternatives. While these participants' behavior could be explained by diffusion of responsibility, Latané and Darley (1968) argue that it does not fit a situation in which an individual's own safety is at stake, as it was in the experiment. In a similar experiment, Clark and Word (1972) found that individuals, in the presence of nonreactive others, were less likely to intervene in an ambiguous situation. Like the participants in Latané and Darley's (1968) experiment, those who did not act provided alternative, non-emergency interpretations of the situation. Although these experiments placed participants in emergency situations, individuals are expected to rely on their observations of others' behavior to form perceptions of what is socially appropriate, even in non-emergency, mediated contexts, like online information pools. Because individuals are subsequently expected to base their behavior on these perceptions, the following hypothesis is proposed:

**H3:** When contribution is perceived to be socially appropriate, individuals will contribute more than when contribution is perceived to be socially inappropriate.

### **Evaluation Apprehension**

Individuals who witness an emergency in the presence of others experience evaluation apprehension, or anxiety that they will be judged when acting publicly. Because of this evaluation apprehension, individuals behave in a way that they believe will maximize others' evaluations of them. Depending on others' expectations of and ability to evaluate the individual's behavior, evaluation apprehension can inhibit or facilitate helping (Schwartz &

Gottlieb, 1980). In other words, individuals are likely to conform to situational norms when they are identifiable to others, but this conformity is reduced if they perceive themselves to be anonymous.

When witnessing an emergency situation, individuals tend to assume that intervention is appropriate and expected, unless presented with social cues to the contrary. Through two experiments, Schwartz and Gottlieb (1980) found that anonymous individuals (i.e., their presence was not known to others) who witnessed an emergency situation in the believed presence of others were slower to offer help than identifiable individuals (i.e., their presence was known to others). Because participants could not observe the other witnesses' reactions, Schwartz and Gottlieb (1980) assert that they were likely to view intervention in the emergency as socially appropriate. Due to this presumed expectation to help, identifiable individuals intervened more quickly than those who were anonymous, which, the authors argue, is a result of their desire to adhere to social norms and maximize others' evaluation of them. Similarly, individuals are expected to view contribution to information pools as appropriate, unless the behavior of others signifies that it is not. In accordance with the findings of Schwartz and Gottlieb (1980), individuals' feelings of identifiability are expected to affect their feelings of evaluation apprehension; thus, the following hypothesis is proposed:

**H4:** Identifiable individuals will experience higher evaluation apprehension than anonymous individuals.

Furthermore, because individuals' feelings of evaluation apprehension affect their desire to conform to situational norms, an interaction effect can be expected such that:

**H5:** When contribution is perceived to be (a) socially appropriate, identifiable individuals will contribute more than anonymous individuals, but when contribution is perceived to be (b) socially inappropriate, anonymous individuals will contribute more than identifiable individuals.

In addition to affecting contribution amount, individuals' feelings of evaluation apprehension are expected to affect contribution convergence, or the degree to which an individual's contributions are similar in length from those seen in the information pool. Thus, the following hypothesis is proposed:

**H6:** The (a) contributions of identifiable individuals will be similar in length to those seen in the information pool, while the (b) contributions of anonymous individuals will differ in length to those seen in the information pool.

### **The Bystander Effect in Emergency and Non-emergency Situations**

Together, the three mechanisms underlying the bystander effect have been shown to inhibit individuals' intervention in three distinct types of emergency situations, identified by Latané and Nida (1981). In the first type of emergency, all bystanders present are in danger, as when smoke fills a room (Latané & Darley, 1968; Ross & Braband, 1973). In the second and most commonly studied emergency context, a victim is in danger. In this type of situation, participants have, for example, witnessed a victim suffer a seizure (Darley & Latané, 1968), a painful fall (Latané & Rodin, 1969), or an asthma attack (Harris & Robinson, 1973). In the third type of emergency, participants witness an individual engage in a "villain act" (Latané & Nida, 1981, p. 311), such as stealing cash from the experimenter (Latané & Elman, 1970), stealing a case of beer (Latané & Darley, 1970), or stealing books from a university campus (Howard & Crano, 1974). In all cases, participants who believed

that other bystanders were present were less likely to intervene and, when they did intervene, were slower to do so than those who were alone.

Furthermore, prior research has found a negative relationship between bystander volume and participants' likelihood to intervene as well as their response latencies. However, the context in which the emergency occurs is important, as Fischer et al. (2011) note. In dangerous emergencies (i.e., emergencies in which the perpetrator is present and there are physical costs of intervention), there is a smaller bystander effect than in non-dangerous emergencies, because the cost of non-intervention is greater and other bystanders can provide physical support. While some of these studies convincingly isolate one of the bystander effect's underlying mechanisms, many assume that the three processes operate in conjunction with each other and do not test them individually.

Although the bystander effect originally addressed social inhibition in emergency situations, it has been consistently supported in non-emergency contexts as well (for a full review, see Latané & Nida, 1981). For instance, individuals in the presence of others are less likely to answer the door (Levy et al., 1972), clean up a mess (Latané & Dabbs, 1975), change a flat tire (Hurley & Allen, 1974), report a broken tape recording (Misavage & Richardson, 1974), or take a coupon (Petty, Williams, Harkins, & Latané, 1977). In fact, a meta-analysis by Fischer et al. (2011) revealed that non-emergency situations produce larger effect sizes for the bystander effect than emergency situations.

### **The Bystander Effect in Online Environments**

In spite of the differences between face-to-face and mediated communication, the psychological processes underlying the bystander effect are highly relevant in online environments. To investigate the bystander effect online, researchers have requested help



from chat room participants and email recipients. In a correlational study (Markey, 2000), a confederate entered 400 chat rooms and posed a simple, technical question to either all individuals present or to one specific individual. Answers were received more quickly when the confederate directed the question at a specific individual and, consistent with the bystander effect, answers were received less quickly when the question was posed to larger groups. Thus, the following hypothesis is proposed:

**H7:** Bystander volume is positively related to contribution speed.

The presence of others has also been found to have detrimental effects on the quality of individuals' responses. In a study similar to Markey (2000), a confederate sent a nonemergency, information-seeking email to either one or five recipients (Barron & Yechiam, 2002). The researchers found that responses in the single-recipient condition were lengthier and more helpful than those received in the quintuple-recipient condition. Likewise, Voelpel et al. (2008) found a negative relationship between bystander volume and response quality, with small and medium-sized groups more likely to provide high quality responses than large or very large groups. Based on these findings, the following hypothesis is proposed:

**H8:** Bystander volume is negatively related to contribution quality.

While prior research has consistently found that the presence of others negatively affects contribution speed and quality, its effect on contribution amount is more complex. In email interactions, bystander volume has been found to negatively impact contribution amount, though the relationship is not always linear. For example, Barron and Yechiam (2002) sent an information-seeking email to one or five recipients and found, in accordance with the bystander effect, that the proportion of responses in the single-recipient condition

was significantly larger than in the quintuple-recipient condition. Issuing a similar request for help, Blair, Thompson, and Wuensch (2005) experimentally examined the bystander effect in email interactions and obtained similar results. Unlike Barron and Yechiam (2002), the number of recipients in the email header varied from no other recipients, to 1 other recipient, 14 other recipients, or 49 other recipients. Participants who received an email addressed only to them or to them and 1 other person responded significantly more than those who received an email addressed to 15 or 50 individuals. As predicted, participants' responsiveness was reduced by the presence of bystanders, though the effect was not linear, as there was no significant difference between the 1- and 2-person conditions or the 15- and 50-person conditions.

Researchers have also tested this relationship in email discussion groups, or Listservs (Yechiam & Barron, 2003). Researchers sent Listserv subscribers a request to participate in a survey, either through the discussion group server or through an email sent to each member individually. In the previously mentioned studies (Barron & Yechiam, 2002; Blair et al., 2005), participants were able to determine the exact number of message recipients from the email header; however, when participants receive a request through the discussion group server, they are unable to determine the exact number of recipients, though they may have an estimate of the number of members in the group. As predicted, individuals who received an individual email participated more than those who received an email addressed to the entire group.

Voelpel et al. (2008) examined this relationship in an online environment more consistent with that of online information pools by posting an easily answered, technical question in more than three hundred public discussion groups, ranging in size from seven

members to more than 10,000 members. Like Blair et al. (2005), the researchers did not find a negative linear relationship between group size and proportion of responses. To examine this relationship further, the researchers divided the groups by size into four categories: small (0-99 members), medium (100-250 members), large (251-500), and very large (501-10,253). When comparing the proportion of responses in small- and medium-sized groups, the researchers found—in accordance with the bystander effect—a negative correlation between group size and proportion of responses. However, this trend did not continue for large and very large groups, which had higher proportions of responses than medium and large groups, respectively. Overall, small groups had the highest proportion of responses.

In accordance with Marwell and Oliver's (1993) argument, larger groups are more likely to have individuals in the group who are willing to help, which would result in a greater *number* of contributions than would be provided by a smaller group. However, Voelpel et al. (2008) found that large and very large groups produced a higher *proportion* of responses than medium and large groups, respectively, which renders Marwell and Oliver's (1993) argument less applicable. To explain the reverse of the bystander effect observed in large and very large groups' proportion of responses, Voelpel et al. (2008) surmise that individuals in larger groups perceive themselves to be more anonymous, which results in decreased evaluation apprehension. Because of this, the researchers suggest that the costs associated with helping (e.g., judgment from other group members and the resulting decrease in status) are lower in larger groups, which results in a greater amount of contributions.

While this explanation is plausible, it is also highly speculative and cannot be substantiated by Voelpel et al.'s (1998) field experiment, in which a number of other factors—such as the nature of the naturally occurring groups—may be at play. While their

study, as well as those conducted by Barron and Yechiam (2002), Blair et al. (2005), and Yechiam and Barron (2003), demonstrates the applicability of the bystander effect to online contexts, it is only able to quantitatively account for the impact of diffusion of responsibility on individuals' likelihood of helping. Although this is useful, it precludes Voelpel et al. (2008) from definitively determining the cause of their surprising findings. In order for the cause of their results to be better understood, the variables invoked in their explanation—bystander volume and evaluation apprehension—should be isolated and accounted for, as the present study does. If Voelpel et al.'s (2008) intuition is correct, individuals in large groups should feel more anonymous than individuals in smaller groups, resulting in decreased evaluation apprehension and, subsequently, increased contribution. Based on this logic, the following research question is posed:

**RQ1:** In large groups, will individuals (a) feel more anonymous, (b) experience less evaluation apprehension, and (c) contribute more than individuals in smaller groups?

Although the bystander effect has been supported by decades of empirical research, its three underlying mechanisms are still not fully understood. Previous research examining the bystander effect has focused primarily on diffusion of responsibility (e.g., Barron & Yechiam, 2002; Blair et al., 2005; Darley & Latané, 1968; Markey, 2000; Yechiam & Barron, 2003), while either ignoring the role of social influence and evaluation apprehension or assuming that these two mechanisms are simultaneously occurring. Furthermore, while prior research has consistently shown that diffusion of responsibility inhibits helping, Voelpel et al. (2008) surmise that social influence and evaluation apprehension sometimes suppress its impact, though the effects of these two processes are more variable and largely context-specific (e.g., evaluation apprehension will affect helping positively or negatively,

depending on situational norms). In contrast to previous research, the present study does not simply assume that all three mechanisms are at work but, instead, experimentally manipulates bystander volume, contribution appropriateness, and identifiability in order to gain a clearer understanding of the relationship between the underlying mechanisms of the bystander effect and information contribution in an online setting.

### **Method**

The hypotheses and research question were tested by a three-phase experiment in which participants viewed and interacted with a fictitious restaurant review website and responded to a series of questions after exposure to the site. Participants were randomly assigned to one of sixteen conditions and were able to contribute information to the site.

### **Experimental Design**

To test the proposed hypotheses and research question, a between-subjects 4 (bystander volume; 6, 49, 242, 831) x 2 (anonymity; anonymous, not anonymous) x 2 (contribution appropriateness; 4% contributing, 73% contributing) factorial design was used. In traditional bystander effect research in non-mediated contexts, participants are in the presence of no or only a few other bystanders. In an online context, however, it is very unlikely that an individual is one of the sole viewers of a website at any given time; thus the lowest level of bystander volume in the present study was 6 other bystanders—a number that is presumably low enough for participants to feel personal responsibility, but high enough to be realistic for the context. The bystander volume in the remaining conditions was based on previous research by Blair et al. (2005), who found that diffusion of responsibility occurred when 49 others were present, and Voelpel et al. (2008), who found a greater proportion of responses in groups exceeding 250 members. The percentage used to indicate low

contribution appropriateness (4%) is based on findings by Lakhani and Von Hippel (2003), while the percentage used to indicate high contribution appropriateness (73%) was chosen because it is low enough to be believable but high enough to be unambiguous. To enhance the believability of the site, the number of reviews displayed on the website in each condition was determined by the supposed bystander volume and contribution appropriateness (i.e., participants in a condition with high bystander volume and high contribution appropriateness will see more reviews than participants in a condition with low bystander volume and low contribution appropriateness).

### **Procedure**

**Pilot Study.** A pilot study was conducted in advance of the main study to identify problems with the experiment's manipulations or procedure. Participants who participated in the pilot study were told that they would be assessing the quality of reviews on an existing restaurant review website dedicated to Isla Vista restaurants. Participants were told that they could submit their own reviews to the site but were not required to. Before beginning the study, informed consent was obtained.

In the first phase of the study, participants were randomly assigned to one of the 16 conditions. They were then directed to individual computer rooms in a research laboratory, where the stimulus site was loaded. After participants were done exploring the site and submitting their own reviews, if they chose to do so, they proceeded to the second phase of the study, in which they completed a posttest questionnaire comprised of manipulation checks, dependent measures, and demographic items. At the end of the questionnaire, participants were asked whether they believed the review site existed; if they indicated that it did not exist, they were asked to explain why. In the third and final phase of the study,

participants assessed the quality of five reviews that were on the site. After completing this phase of the study, participants were debriefed and thanked for their participation.

Based on the results of the pilot study and participants' feedback, several changes were made to enhance the believability of the study's cover story. The majority of participants cited the study location—the research laboratory—as an obstacle to believability because they had been there previously for other research studies. In hopes of preventing participants from being primed to the experimental nature of the study, the main study was conducted in a newly completed research laboratory, with which students had not yet had experience. Rather than having participants complete the study in individual rooms, they were seated together in a large computer room with individual computer stations; this arrangement may have felt less artificial to students.

Additionally, several changes were made to the cover story that was presented to participants. Participants were told that the website was not yet available to the public and currently undergoing beta testing. The researcher and undergraduate research assistants told participants that they were interns, working with the review website to conduct market testing sessions for the site; the researcher and research assistants were careful to not use the word “study” when interacting with participants. To further increase the believability, t-shirts with the website's logo were made and worn by the researcher and research assistants when in the lab.

**Main study.** Upon arriving at the research laboratory, participants were informed that they would be participating in a market testing session for a restaurant review website dedicated to Isla Vista restaurants. They were also told that the website was not yet available to the public and asked to interact with the site, ostensibly to check for glitches that would

affect future users' experiences on the site. Participants were told that they could contribute their own restaurant reviews to the site but were not required to. Before beginning the study, informed consent was obtained.

In the first phase of the study, participants were randomly assigned to one of the 16 conditions. They were then directed to individual computer stations, where the stimulus site was loaded. After participants were done exploring the site and submitting their own reviews, if they chose to do so, they proceeded to the second phase of the study, in which they completed a posttest questionnaire comprised of manipulation checks, dependent measures, and demographic items. In the third and final phase of the study, participants assessed the quality of five reviews that other participants had contributed to the site. After completing this phase of the study, participants were debriefed and thanked for their participation.

### **Participants**

Participants ( $N = 243$ ) were recruited from Communication courses at the University of California, Santa Barbara and received a nominal amount of course credit for participating in the study. Because some participants were told that their contributions to the site were not anonymous and linked to their Facebook profiles, participants were required to have a Facebook account in order to take part in the study. To be included in the analysis, participants had to meet two criteria: they had to indicate a belief in the authenticity of the website, and their estimate of the number of bystanders on the site had to be within two standard deviations of the mean estimate for each bystander level. The first criterion is necessary because participants' behavior will not be affected by the manipulations if they do not believe the website exists. Similarly, the second criterion is necessary because it excludes participants who did not pay adequate attention to the manipulation, making it inappropriate



to attribute their behavior to the manipulation. Based on these criteria, 91 individuals were excluded, leaving a final sample size of 153 ( $N = 153$ ). Demographic information is provided only for participants included in the final analysis.

The final sample consisted of 28.8% males ( $n = 44$ ) and 71.2% ( $n = 109$ ) females. The majority of participants were in their first (36.6%,  $n = 56$ ) or third year of college (29.4%,  $n = 45$ ). Approximately one third of students were in their second (22.9%,  $n = 35$ ) or fourth year of college (11.1%,  $n = 17$ ). The majority of participants (52.3%,  $n = 80$ ) resided in Isla Vista, with the remainder living in on-campus residence halls (33.3%,  $n = 51$ ), off-campus, university-owned apartments (10.5%,  $n = 16$ ), and the greater Goleta and Santa Barbara areas (3.9%,  $n = 6$ ). The vast majority of participants frequently dine at Isla Vista restaurants: 35.9% ( $n = 55$ ) eat in Isla Vista two to three times per week, 30.7% ( $n = 47$ ) eat in Isla Vista once a week, and 24.2% ( $n = 37$ ) eat in Isla Vista two to three times per month.

## **Manipulations**

**Bystander volume.** To manipulate perceived bystander volume, which is purported to affect diffusion of responsibility, the website featured a colorful sidebar that displayed the number of users (6, 49, 242, or 831) viewing the site at the same time as the participants.

**Contribution appropriateness.** To manipulate perceived contribution appropriateness, which mimics social influence, participants were exposed to information indicating that either a low (4%) or high (73%) percentage of users had, over time, contributed to the site. This information was presented immediately below bystander volume on the website's sidebar. To view the website's design, see Figure 1 in Appendix A.

**Anonymity.** To manipulate perceived anonymity, which is proposed to affect evaluation apprehension, participants were randomly assigned to either an anonymous or

identifiable condition. In conditions where participants were anonymous (i.e., their identity was unknown to bystanders), they were told that any contribution they made to the website was anonymous and could not be linked to them in any way. To enhance participants' feelings of anonymity, existing website reviews were accompanied only by the fictional users' anonymous screen names in this condition. To see how the website appeared to anonymous participants, see Figure 2 in Appendix A. Conversely, in conditions where participants were not anonymous (i.e., their identity was known to bystanders), participants were told that any contributions they made to the website could be linked to their identity. More specifically, they were informed that their Facebook profile picture, along with their first name and last initial, would be displayed next to any reviews they submitted. Before entering the site, participants saw an on-screen dialog box which prompted them to log into their Facebook profile. This dialog box was modeled after the dialog boxes that Facebook users commonly see when connecting to an online service (e.g., Yelp, Pinterest, Vimeo, etc.). Participants were assured that the site would never post to Facebook on their behalf. To augment participants' feelings of identifiability, existing website reviews were accompanied by the fictional users' first names and last initials. To see the dialog box and how the website appeared to identifiable participants, see Figures 3 and 4 in Appendix A.

## **Measures**

Prior to data collection, undergraduate research assistants pre-tested all measures to ensure they were free of grammatical and typographical errors and would be easily

understood by participants. Following the pilot test, reliability analyses were conducted and measures were refined for clarity and to ensure better face validity.

**Manipulation checks.** Manipulation checks were performed to ensure that participants attended to both the presence and volume of virtual bystanders and responded appropriately to the contribution appropriateness and anonymity manipulations. To see all manipulation check items, see Appendix B.

**Bystander volume.** Two items assessed participants' perception and recall of bystander volume. Through a Likert-type item ("How many other people were viewing this site *at the same time* you were?"), participants indicated the approximate amount of bystanders present on the site, with answer choices ranging from (1) *very few (less than 10)* to (4) *a very large amount (approximately 850)*. Through an open-ended item, participants were also asked to provide the approximate number of other people viewing the site at the same time they were.

**Contribution appropriateness.** Four Likert-type items assessed participants' perceptions of contribution appropriateness (e.g., "To what extent is it expected/normal/typical for users of this website to write reviews?"), with answer choices ranging from (1) *not at all* expected/normal/typical to (7) *very* expected/normal/typical. Higher scores indicated perceptions of high contribution appropriateness. Two items were drawn from Terry and Hogg (1996) and two were original items. The scale had good inter-item reliability (Cronbach's  $\alpha = .72$ ,  $M = 18.68$ ,  $SD = 3.92$ ).

**Anonymity.** Five Likert-type items assessed participants' feelings of anonymity (e.g., "While viewing the site, I felt anonymous."), with answer choices ranging from (1) *strongly disagree* to (7) *strongly agree*. One item was reverse-coded so that lower scores indicated

greater feelings of anonymity. Three items were adapted from Nadler, Goldberg, and Jaffe (1982) and two are original items. The scale had excellent inter-item reliability (Cronbach's  $\alpha = .90$ ,  $M = 15.33$ ,  $SD = 7.51$ ).

**Dependent measures.** To answer the proposed hypotheses and research question, diffusion of responsibility, evaluation apprehension, contribution amount, contribution quality, contribution convergence, and contribution speed were measured.

***Diffusion of responsibility.*** Two Likert-type items assessed participants' feelings of diffusion of responsibility (e.g., "All users of this website are equally accountable for submitting reviews."), with answer choices ranging from (1) *strongly disagree* to (7) *strongly agree*, and higher scores indicating greater feelings of diffusion of responsibility. The items were adapted from an original measure by Pinsonneault and Heppel (1998); to see both items, refer to Appendix C. The scale had good inter-item reliability (Cronbach's  $\alpha = .72$ ,  $M = 9.59$ ,  $SD = 2.26$ ).

***Evaluation apprehension.*** Six Likert-type items assessed evaluation apprehension (e.g., "When I was writing a review on this site, I was concerned about what other people thought of me."), with answer choices ranging from (1) *strongly disagree* to (7) *strongly agree*, and higher scores indicating greater feelings of evaluation apprehension. Four items were adapted from an original measure by Pinsonneault and Heppel (1998) and two items were drawn from Bordia et al. (2006) and adapted from an original measure by Rechten and Dizinno (1997). Because these items only apply to participants who contributed information to the website, hypothetical versions of the questions (e.g., "If I were to write a review, I would be concerned about what other people thought of me.") were presented to participants who chose not to contribute information. During data analysis, each item and its equivalent

hypothetical statement were summed to create the final scale for all participants. The scale had excellent inter-item reliability (Cronbach's  $\alpha = .93$ ,  $M = 17.28$ ,  $SD = 8.32$ ). To see all items, refer to Appendix D.

***Contribution amount.*** To assess contribution amount, the number of reviews that participants in each condition submitted to the site were tallied. For each participant, the average number of words across reviews was also counted.

***Contribution quality.*** For each review submitted by participants, contribution quality was assessed with a scale composed of five Likert-type items (e.g., "How [helpful] was this review?"), with answer choices ranging from (1) *extremely [unhelpful]* to (7) *extremely [helpful]*. One item was reverse-coded. The quality of each review was assessed by participants; no participants rated their own contributions to the site. To see all items, refer to Appendix E.

***Contribution convergence.*** To assess contribution convergence, two independent measures were used. First, convergence in regards to contribution length was measured by calculating the difference between the average number of words in participants' reviews and the average number of words in the reviews displayed on the site for each condition.

***Contribution speed.*** To assess the speed with which participants contributed to the site, the time it took them to contribute each review was divided by the number of words in

the review, resulting in an average contribution speed. Lower numbers indicate a faster contribution speed.

**Covariates.** Because they may affect participants' behavior, relevant covariates were measured. To see all covariate measures, see Appendix F.

**Contribution behavior.** Because individuals who more frequently share information online are more likely to contribute reviews to the site, independent of the experimental manipulations, participants were asked to report the frequency with which they share different kinds of information online. Contribution behavior was assessed by five Likert-type items (e.g., "How often do you post reviews for restaurants or other businesses on online review sites, like Yelp or TripAdvisor?"), with answer choices ranging from (1) *never* to (5) *very often*. The scale had good inter-item reliability (Cronbach's  $\alpha = .79$ ,  $M = 10.09$ ,  $SD = 3.41$ ). Participants rarely engage in online information sharing ( $M = 2.03$ ,  $SD = .71$ ).

**Social media self-efficacy.** Participants who have higher social media self-efficacy (SMSE), or the perceived ability to obtain desired outcomes in the social media environment (Hocevar, Flanagin, & Metzger, 2014), may be more likely to contribute information to the site. SMSE is composed of several dimensions. Specifically, two dimensions of SMSE—social media production and social media consumption—are especially likely to affect participants' contribution behavior. Social media production was measured by eight Likert-type items (e.g., "How often do you create or update your own blog?"), with answer choices ranging from (1) *never* to (5) *very often*. This scale had good inter-item reliability (Cronbach's  $\alpha = .78$ ,  $M = 14.81$ ,  $SD = 5.35$ ). Participants rarely engaged in social media production ( $M = 1.85$ ,  $SD = .67$ ). Social media consumption was assessed by five Likert-type items (e.g., "How often do you look up answers on social question and answer sites (like

Yahoo! Answers or WikiAnswers)?”), with answer choices ranging from (1) *never* to (5) *very often*. This scale had good inter-item reliability (Cronbach’s  $\alpha = .79$ ,  $M = 18.99$ ,  $SD = 3.72$ ). Participants often engaged in social media production ( $M = 3.80$ ,  $SD = .74$ ). For both of these dimensions, higher numbers indicate greater production or consumption, respectively.

**Reciprocity.** Because participants may be motivated by feelings of reciprocity to share information on the site, three Likert-type items (e.g., “Because reviews written by other people will help me, it’s only fair that I should write reviews to help other people.”) were used to assess reciprocity; answer choices ranged from (1) *strongly disagree* to (7) *strongly agree*, where higher numbers indicate greater feelings of reciprocity. These items were adapted from Wasko and Faraj (2005) and Kankanhalli et al. (2005). The scale had acceptable inter-item reliability (Cronbach’s  $\alpha = .69$ ,  $M = 13.19$ ,  $SD = 3.08$ ). Generally, participants agreed that individuals who share information online should receive it in return ( $M = 4.39$ ,  $SD = 1.03$ ).

**Costs.** Participants may be discouraged from submitting reviews to the site because of the perceived costs of contribution. Perceived contribution costs were measured by four Likert-type items (“Writing reviews about businesses or products is time-consuming.”), with answer choices ranging from (1) *strongly disagree* to (7) *strongly agree*, where higher numbers indicate greater perceived costs. The scale had acceptable inter-item reliability (Cronbach’s  $\alpha = .69$ ,  $M = 14.93$ ,  $SD = 4.02$ ). On average, participants did not perceive online information sharing to be costly ( $M = 3.74$ ,  $SD = 1.00$ ).

**Privacy concerns.** Because privacy concerns could discourage participants from contributing information to the site (particularly those asked to log in with their Facebook

accounts), three Likert-type items (e.g., “Are you concerned that you are asked for too much personal information when you register with websites?”) assessed participants’ concerns about their privacy online. Answer choices ranged from (1) *not at all* to (5) *very much*, with higher numbers indicating greater privacy concerns. These items were drawn and adapted from Buchanan, Paine, Joinson, and Reips (2007). The scale had good inter-item reliability (Cronbach’s  $\alpha = .82$ ,  $M = 14.87$ ,  $SD = 3.52$ ). On average, participants did not perceive online information sharing to be costly ( $M = 3.74$ ,  $SD = 1.00$ ).

***Self-reported conformist attitudes.*** Because individuals higher in trait conformity may be more susceptible to the contribution appropriateness manipulation, self-reported conformist attitudes were assessed by six Likert-type items (e.g., “People are constantly prying into matters that should remain unquestioned.”), with answer choices ranging from (1) *strongly disagree* to (6) *strongly agree*; higher numbers indicate greater trait conformity. These items were drawn from Murray and Schaller (2011). The scale had acceptable inter-item reliability (Cronbach’s  $\alpha = .71$ ,  $M = 19.62$ ,  $SD = 4.75$ ). Participants were fairly low in trait conformity ( $M = 3.28$ ,  $SD = .78$ ).

## **Results**

Prior to analysis, all dependent variables were screened to ensure that they were normally distributed. Both evaluation apprehension and contribution amount were significantly, positively skewed; as a result, each variable was log transformed, which resulted in normality.

### **Manipulation Checks**

**Bystander volume.** A one-way ANOVA was conducted to examine the effect of bystander level on participants’ perceptions of bystander volume. The omnibus test was



significant,  $F(3, 148) = 39.85, p < .001$ , indicating a difference in perceptions of bystander volume across levels. Post hoc comparisons using the Tukey HSD test indicated significant differences between the first ( $M = 1.31, SD = .47$ ) and second ( $M = 1.97, SD = .19$ ) levels ( $p < .01$ ), between the first ( $M = 1.31, SD = .47$ ) and third ( $M = 2.77, SD = .61$ ) levels ( $p < .001$ ), between the first ( $M = 1.31, SD = .47$ ) and fourth ( $M = 3.10, SD = 1.36$ ) levels ( $p < .001$ ), between the second ( $M = 1.97, SD = .19$ ) and third ( $M = 2.77, SD = .61$ ) levels ( $p < .001$ ), between the second ( $M = 1.97, SD = .19$ ) and fourth ( $M = 3.10, SD = 1.36$ ) levels ( $p < .001$ ), but not between the third ( $M = 2.77, SD = .61$ ) and fourth ( $M = 3.10, SD = 1.36$ ) levels ( $p = .29$ ).

For each bystander level, participants also provided a numerical estimate of the number of bystanders present on the site. Table 1 presents the mean estimation and standard deviation for each level. For each level of bystander volume, participants' mean estimation and the standard deviation of their estimation was computed. Participants' mean estimation was then compared to the bystander volume displayed on the site. If the displayed bystander volume was within one standard deviation of participants' mean estimation, the manipulation was considered successful. Using the standard deviation of participants' estimation allows for increased variance at higher levels of displayed bystander volume. Based on this criteria, participants' mean estimation for each level was acceptable. Coupled with the results of the perceptual measure of bystander volume, the manipulation was considered successful.

**Contribution appropriateness.** An independent-samples  $t$ -test was used to compare perceived contribution appropriateness in low and high appropriateness conditions. There was a significant difference in the scores for low appropriateness ( $M = 4.38, SD = 1.04$ ) and

high appropriateness ( $M = 4.89$ ,  $SD = .86$ ) conditions,  $t(151) = -3.34$ ,  $p = .001$ . Thus, the manipulation was successful.

**Anonymity.** An independent-samples  $t$ -test was used to compare perceived anonymity in anonymous and identifiable conditions. There was a significant difference in the scores for anonymous ( $M = 2.15$ ,  $SD = 1.07$ ) and identifiable ( $M = 3.83$ ,  $SD = 1.37$ ) conditions,  $t(151) = -8.31$ ,  $p < .001$ . Thus, the manipulation was successful.

### **Hypotheses and Research Question**

To test the first hypothesis, which predicted a positive relationship between bystander volume and diffusion of responsibility, a one-way ANOVA was used. There was no significant relationship between bystander volume and diffusion of responsibility,  $F(3, 149) = 1.84$ ,  $p = .14$ ; thus H1 was not supported.

The second hypothesis predicted a negative relationship between diffusion of responsibility and contribution amount. Because contribution behavior, social media self-efficacy, reciprocity, costs, privacy, and conformity may affect participants' contributions to the site, a multiple regression was run. The model accounted for 16% of the variance in contribution amount,  $R^2 = .16$ ,  $F(8, 120) = 2.84$ ,  $p < .01$ . Only conformity,  $\beta = .22$ ,  $t(8) = 2.47$ ,  $p < .05$ , and diffusion of responsibility,  $\beta = -.25$ ,  $t(8) = -2.83$ ,  $p = .01$ , were significant predictors of contribution amount. Trait conformity positively predicted individuals' contribution amount, while diffusion of responsibility negatively predicted contribution amount; thus H2 is supported.

To test the third hypothesis, which predicted that individuals would contribute more reviews to the site when contribution was perceived to be socially appropriate than when it was perceived to be socially inappropriate, a one-way ANCOVA was used. Self-reported

conformist attitudes was included as a covariate because individuals higher in trait conformity are more likely to be influenced by the contribution appropriateness manipulation, and because this variable was significantly related to reviews ( $r = .18, p < .05$ ). Controlling for conformist attitudes, contribution appropriateness did not significantly affect contribution amount,  $F(1, 126) = 2.11, p = .15$ . Thus, H3 was not supported.

The fourth hypothesis predicted that identifiable individuals would experience higher evaluation apprehension than anonymous individuals. There was a significant difference in feelings of evaluation apprehension for anonymous ( $M = .34, SD = .21$ ) and identifiable ( $M = .46, SD = .21$ ) individuals,  $t(151) = -3.55, p = .001$ . Thus, H4 was supported.

The fifth hypothesis predicted an interaction between contribution appropriateness and anonymity, such that when contribution is perceived to be (a) socially appropriate, identifiable individuals will contribute more than anonymous individuals, but when contribution is perceived to be (b) socially inappropriate, anonymous individuals will contribute more than identifiable individuals. Controlling for conformist attitudes, a two-way ANCOVA found no significant interaction effect between contribution appropriateness and anonymity on contribution amount,  $F(1, 125) = 1.40, p = .24$ . Although the  $F$  test was not significant, the pattern of results (see Figure 1) is consistent with the predicted interaction effect.

The sixth hypothesis predicted that the contributions of identifiable individuals would be similar in length to those seen in the information pool, while the contributions of anonymous individuals would differ in length from those seen in the information pool. To determine whether the average length of participants' contributions differed from the average length of contributions displayed on the site, the average length of contributions displayed on

the site and the average length and standard deviation of contributions contributed by participants was calculated for each condition (see Table 2). If participants' average contribution length differed from the average contribution length of displayed reviews by more than one standard deviation, participants' contribution length was considered divergent. Participants' average contribution length diverged in three out of eight anonymous conditions and three out of eight identifiable conditions. It does not appear that anonymous individuals are more likely to diverge in contribution length than identifiable individuals; thus, H6 was not supported.

The seventh hypothesis predicted a positive relationship between bystander volume and contribution speed. A one-way ANOVA found a significant effect of bystander volume on contribution speed,  $F(3, 95) = 7.22, p < .001$ . Although bystander volume significantly affected contribution speed, the relationship between these two variables was negative; in other words, participants responded more quickly in conditions where more bystanders were believed to be present. Post hoc comparisons using the Tukey HSD test found significant differences in contribution speed between the second ( $M = 4.12$  seconds,  $SD = 3.30$  seconds) and third ( $M = 2.06$  seconds,  $SD = 1.16$  seconds) levels ( $p < .001$ ) of bystander volume. No other pairwise comparisons were significant ( $p > .05$ ).

The eighth hypothesis predicted a negative relationship between bystander volume and contribution quality. A one-way ANOVA found no significant effect of bystander volume on contribution quality,  $F(3, 95) = .81, p = .49$ ; however, there were unequal sample sizes within each cell and the assumption of homogeneity of variances was violated,  $F(3, 95) = 3.63, p < .05$ , so the results of this ANOVA should be interpreted with caution.

In response to Voelpel et al.'s (2008) finding, the research question examined the effect of bystander volume on participants' feeling of anonymity and evaluation apprehension, as well as their contribution amount. Voelpel et al.'s (2008) interpretation of the reverse of the bystander effect found in the presence of a large number of bystanders suggests that these variables are linearly related; in other words, bystander volume affects individuals' feelings of anonymity, which affects their feelings of evaluation apprehension, ultimately affecting their contribution amount (see Figure 2). To investigate this research question, a path analysis was performed with Amos 17.0, testing the relationship modeled in Figure 2. Participants' feelings of anonymity significantly predicted their feelings of evaluation apprehension,  $\beta = .07, p < .001$ , and bystander volume significant predicted contribution amount,  $\beta = .07, p < .01$ , but no other paths were significant. Thus, the overall model suggested by Voelpel et al.'s (2008) findings was not supported.

To further investigate the relationship between bystander volume and contribution amount, a one-way ANOVA was used. The ANOVA revealed a significant effect of bystander volume on contribution amount,  $F(3, 195) = 7.22, p < .001$ . Post hoc comparisons using the Tukey HSD test indicated significant differences among several pairwise comparisons. The mean number of reviews contributed by participants in the first level of bystander volume ( $M = .40$ ) was significantly different than the mean number of reviews contributed by participants in the third ( $M = .64, p < .001$ ) and fourth ( $M = .56, p < .05$ ) levels of bystander volume. There was also a significant difference ( $p < .05$ ) in the mean number of reviews contributed by participants in the second level of bystander volume ( $M = .46$ ) and participants in the third level of bystander volume ( $M = .64$ ).

## **Discussion**

Individuals' motivation to engage in online information sharing has been widely studied, but scholars have devoted little attention to the effect of non-contributors on individuals' motivation to share information, in spite of the prevalence of non-contributive behavior. Using the bystander effect as a theoretical lens, the present study sought to explore the effect of others' contributive behavior on individuals' decision to share information in an online information pool. Additionally, this study aimed to clarify the relationship between the presence of bystanders and the bystander effect's three underlying mechanisms. In contrast to prior research, which often assumes that these psychological mechanisms occur when individuals are in the presence of others, the present study experimentally manipulated and measured these mechanisms, providing a novel understanding of their relationship to one another in the context of online information pools.

Bystander effect research has primarily focused on individuals' feelings of diffused responsibility when in the presence of others. Consistently, prior research has found a negative relationship between bystander volume and individuals' likelihood to intervene in a situation. When in the presence of others, individuals experience diffused personal responsibility and often fail to intervene in a situation necessitating help or action. This relationship has been attributed to individuals' feelings of diffusion of responsibility, which are positively related to bystander volume. In the present study, however, individuals' feelings of diffusion of responsibility were not significantly impacted by bystander volume, suggesting that bystander volume does not impact individuals' feelings of diffusion of responsibility.

This null finding suggests that diffusion of responsibility may not occur in online information pools as it does in face-to-face contexts or more traditional mediated contexts in

which the bystander effect has been tested. One potential reason for this is that the presence of bystanders may feel less tangible in this context. In non-mediated situations, the presence of others is often either observed, heard, or reasonably assumed. Similarly, in email interactions, others' names and email addresses are often revealed in the message header. In online information pools, however, the presence of others is not easily observed, and individuals, generally, would not assume that they are the sole viewers of a website at any given time. Even though participants in the present study were provided with information about the number of others simultaneously viewing the site, the presence of bystanders in this context may feel less tangible than when one can observe the physical presence of others or see their names in the address line of an email. If an individual does not truly feel that he or she is in the presence of others who are capable of intervening, diffusion of responsibility will not occur.

Second, the nature of the online information pool may affect individuals' feelings of diffusion of responsibility. When an individual is confronted with a face-to-face situation requiring help or an email soliciting advice from the recipient and several others, a response is required almost immediately; if help is not provided at the time of the request, it will likely not be given. In contrast, the opportunity to contribute to an information pool is not fleeting. If an individual chooses not to contribute upon his or her first visit to the site, he or she has almost unlimited future opportunities to share his or her information; additionally, if the individual chooses not to contribute, future visitors to the site will have the opportunity to share their own information. As a result, the current number of bystanders on the site may not affect an individual's feelings of diffusion of responsibility as much as the knowledge that countless others will visit the site in the future does. If one assumes that others are likely to

share information in the future, one's feelings of personal responsibility are greatly reduced, regardless of how many others are currently viewing the site.

Although bystander volume does not affect diffusion of responsibility as predicted, the relationship between diffusion of responsibility and contribution amount is consistent with the predictions of the bystander effect. As expected, individuals who feel less personal responsibility to contribute to the information pool submit fewer reviews. Because individuals' feelings of diffused responsibility negatively impact their contribution amount, it is important to understand what causes decreased feelings of personal responsibility.

Although it seems plausible that individuals experience diffusion of responsibility when in the presence of non-contributors, there was no significant difference in contribution amount between individuals who believed a low number of users had contributed to the site versus a high number of users,  $t(127) = -1.62, p = .11$ . Additionally, individuals' feelings of diffusion of responsibility were not significantly affected by the percentage of users who have contributed to the site,  $t(151) = .40, p = .69$ . It is possible that some individuals have a tendency to feel less personal responsibility to act in any given situation; in other words, some individuals may be more inclined to help than others.

In contrast to the relationship between diffusion of responsibility and contribution amount, the relationship between bystander volume and contribution amount does not align with prior research on the bystander effect. Although past research has found a negative relationship between bystander volume and individuals' likelihood to act, the present study found the opposite: individuals contribute more reviews—and at a greater speed—in the believed presence of more virtual others. However, the relationship between bystander volume and contribution amount was not strictly linear. In contrast to Blair et al.'s (2005)



study, there was no significant difference in contribution between participants who believed they were in the presence of 6 or 49 others. This finding can be explained by the context of the study: Blair et al.'s (2005) study was conducted through email interaction, which is qualitatively different from a more public online setting, like an information pool. In the context of an information pool, it seems that individuals do not distinguish between moderately small numbers of bystanders. Similarly, there was no significant difference in the average number of reviews contributed by individuals in the presence of 242 or 831 others, suggesting that individuals do not distinguish between larger numbers of bystanders. Instead, individuals seem to distinguish between smaller (6, 49) and larger (242, 831) numbers of bystanders; in larger groups, individuals contribute significantly more than in smaller groups.

Based on this finding, it appears that individuals may not pay attention to subtle differences in bystander volume in the context of an online information pool. In contrast to group size in face-to-face settings or email interactions, it seems that the number of bystanders that is considered small or large may be drastically different on a website than it is face-to-face, in email, or on a message board. This finding suggests that individuals expect a much larger audience in a publically available information pool than they do in other contexts in which the bystander effect has been tested. Given the popularity of sites like Yelp, which attracted 107.5 million unique visitors in the past month ("Yelp Network", 2015), this is not surprising.

Unexpectedly, however, individuals contribute more reviews when in the presence of a larger number of bystanders. Although this finding conflicts with prior research, it is likely due to the insignificant relationship between bystander volume and diffusion of

responsibility. Past research has attributed the negative relationship between bystander volume and likelihood to intervene to individuals' increased feelings of diffusion of responsibility in larger groups; however, if this relationship does not hold in the context of online information pools, there is no reason to expect a negative relationship between bystander volume and contribution amount. One possible explanation for individuals' increased contribution amount when in the presence of larger groups is the effect of audience size. Individuals are more motivated to engage in information sharing when they believe their contribution is seen by larger audiences, as found by Burke, Marlow, and Lento (2009), who found a significant, positive relationship between audience size in social networking sites and information sharing. In the presence of a larger number of bystanders, individuals may be motivated by audience size, believing that their contribution will be beneficial to a greater number of people.

It is also possible that participants were motivated by a shared group identity, unintentionally created by the localized nature of the online review site. Participants may have felt that their contributions to the site were helping their peers, with whom they share a common identity. If this is true, participants may have been particularly motivated to contribute when they believed a larger number of their peers were also viewing the site and receiving their aid. Flanagin, Hocevar, and Samahito (2014) found that individuals experienced increased motivation to contribute to an online review site when a group identity was salient; this motivation then led to increased contribution.

Another aspect of the bystander effect that does not seem to occur in large online contexts is the effect of social influence on individuals' behavior. In online information pools, individuals appear to be less influenced by the social norms displayed by others on the

site. Although the bystander effect proposes that individuals look to others' behavior to determine what is appropriate in a given situation, no evidence was found for this in the present study. In fact, individuals' contribution amount and average contribution length were not significantly affected by the percentage of supposed users who had contributed to the site or by the length of reviews displayed on the site. Participants' apparent inattention to social cues may be due to the nature of the site and the intervention required. In many bystander effect studies, individuals' are presented with an ambiguous and potentially embarrassing or dangerous situation; due to the nature of these situations, individuals may be more likely to attend to social norms when determining an appropriate reaction. In contrast, in online information pools—especially those intended to help other consumers, restaurant-goers, or travelers—there is little reputational risk to providing help in the form of a review. Furthermore, participants may have had pre-existing notions about the appropriateness of contributing to an online review site; given the popularity of these sites, it is likely that individuals feel it is appropriate to contribute their own reviews, regardless of the normative information provided on the site.

Although many findings of traditional bystander effect research are not relevant to online information pools, anonymity is negatively related to evaluation apprehension, as predicted. Anonymous individuals feel less anxiety about others' perceptions of their behavior than identifiable individuals. In contrast to Voelpel et al.'s (2008) supposition that larger group sizes positively impact feelings of anonymity, the present study found no relationship between group size and feelings of anonymity. However, contribution amount does not significantly differ between anonymous and identifiable individuals,  $t(127) = .25, p$

= .80. Furthermore, neither feelings of anonymity,  $\beta = .10$ ,  $t(2) = .98$ ,  $p = .33$ , nor evaluation apprehension,  $\beta = -.08$ ,  $t(2) = -.77$ ,  $p = .44$ , significantly predict contribution amount.

In spite of its strong research tradition, the present study suggests that many findings of the bystander effect do not apply to online information pools. The current study's inducement and measurement of the bystander effect's underlying mechanisms demonstrates how this social inhibition phenomenon operates in a large online context; additionally, the results of the study illuminate the impact of non-contribute behavior on individuals' decision to engage in online information sharing. The findings of the current study have implications for future researchers who are exploring the bystander effect in online environments or interested more generally in the factors—both psychological and structural—that affect individuals' information sharing behavior.

To summarize, the present study has shown that individuals' feelings of personal responsibility are not affected by the number of virtual bystanders present, though these feelings of responsibility do affect their contribution amount. Furthermore, individuals contribute more reviews when in the presence of a larger group. While anonymous individuals experience less evaluation apprehension than identifiable individuals, this reduced social anxiety does not affect their contribution amount; similarly, individuals do not conform to the social norms displayed in the information pool. Perhaps most importantly, as it is directly related to the continued vitality of online information pools, individuals' information sharing is not impacted by visible evidence of non-contributive behavior.

To gain a better understanding of these findings, future research is needed. The relationship between bystander volume and diffusion of responsibility, in particular, warrants additional investigation, as diffusion of responsibility negatively impacts individuals'

contributions to online information pools. Gaining a better understanding of the antecedents of diffusion of responsibility is of paramount importance for researchers and site designers who wish to understand and spur contribution to these vital information resources.

Specifically, further research is needed to understand why group size does not affect diffusion of responsibility in this context. As previously mentioned, individuals' knowledge that other users will view the site in the future may lead to diffusion of responsibility, independent of the number of users on the site. In future studies, individuals should be asked about their belief that future users will visit and contribute to the information pool, reducing their personal responsibility to do so. Varying levels of bystander volume and their effect on diffusion of responsibility should also be explored. Finally, while it is encouraging that the presence of non-contributors does not negatively impact individuals' decision to share information, future research should examine other consequences of non-contributive behavior, such as a decline in commitment to the information pool or a decreased willingness over time to share information.

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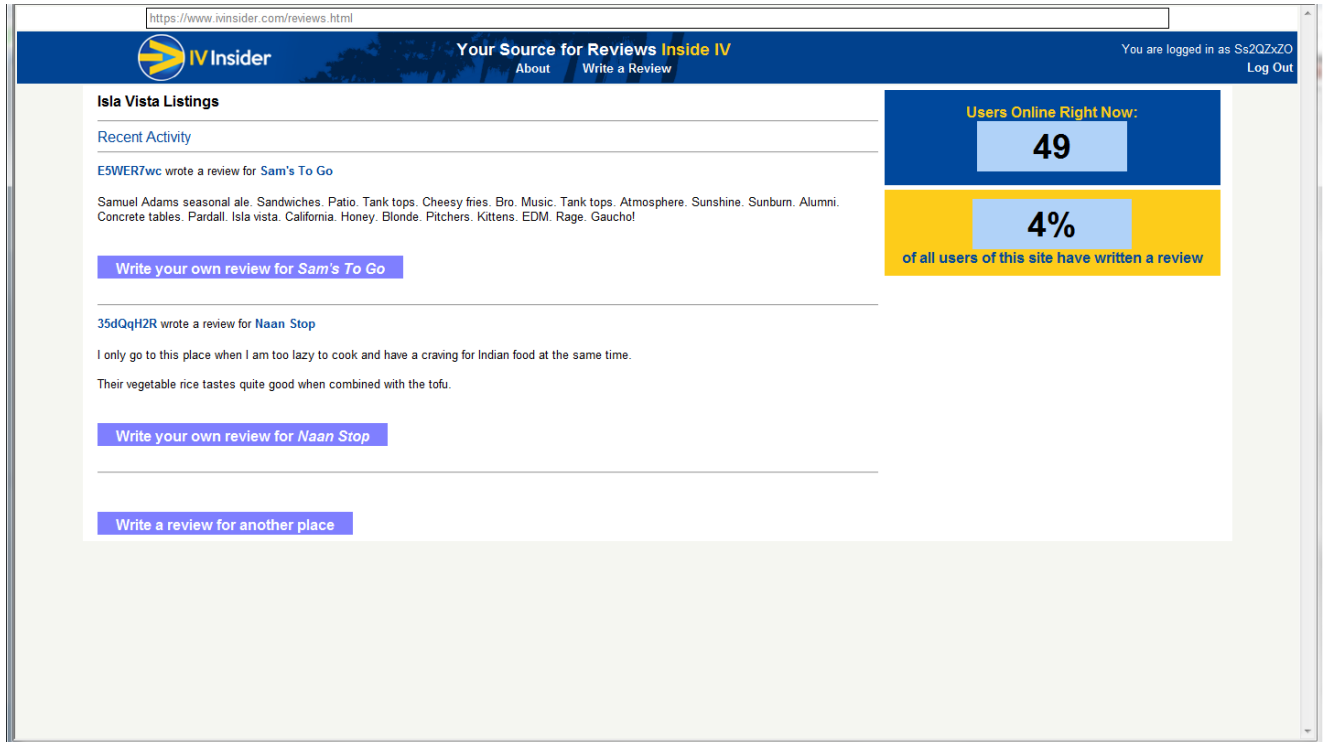
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## Appendix A

Figure 1. Screenshot of the stimulus website, displaying the number of bystanders and contribution appropriateness in the sidebar.



# Appendix A

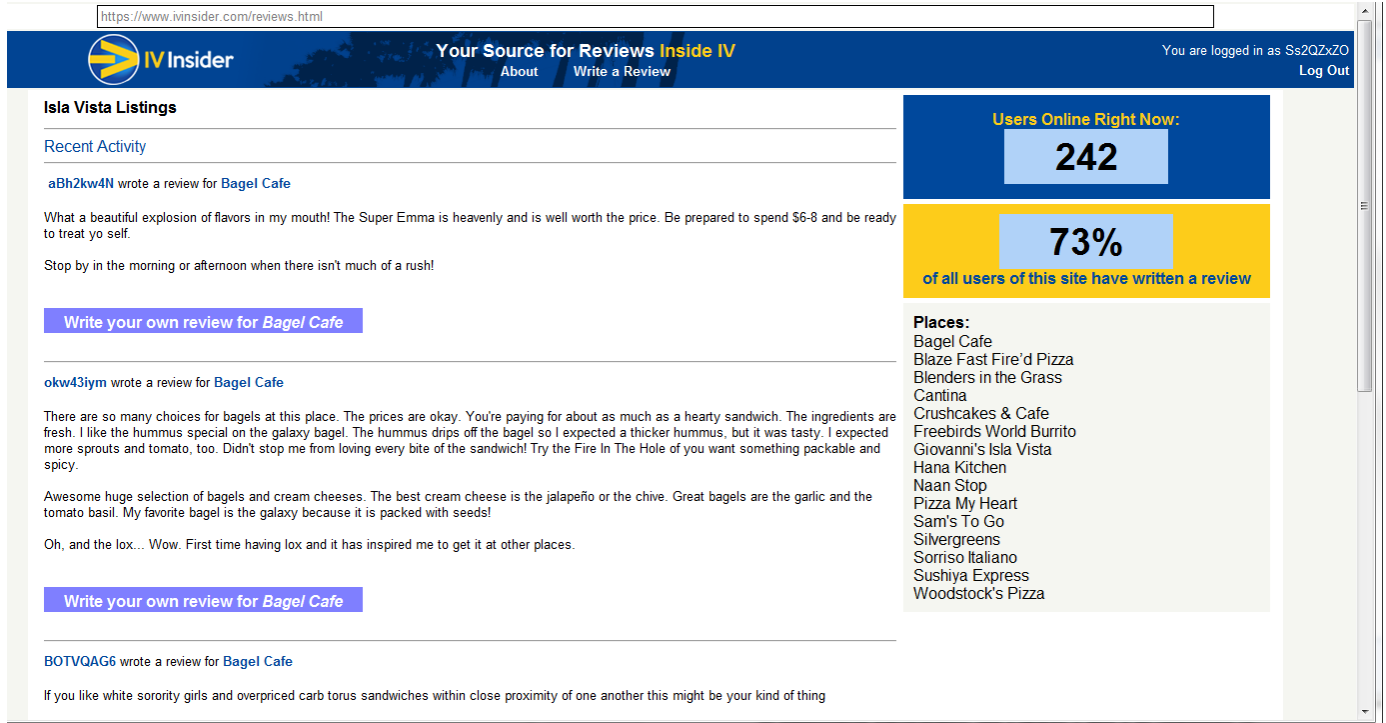
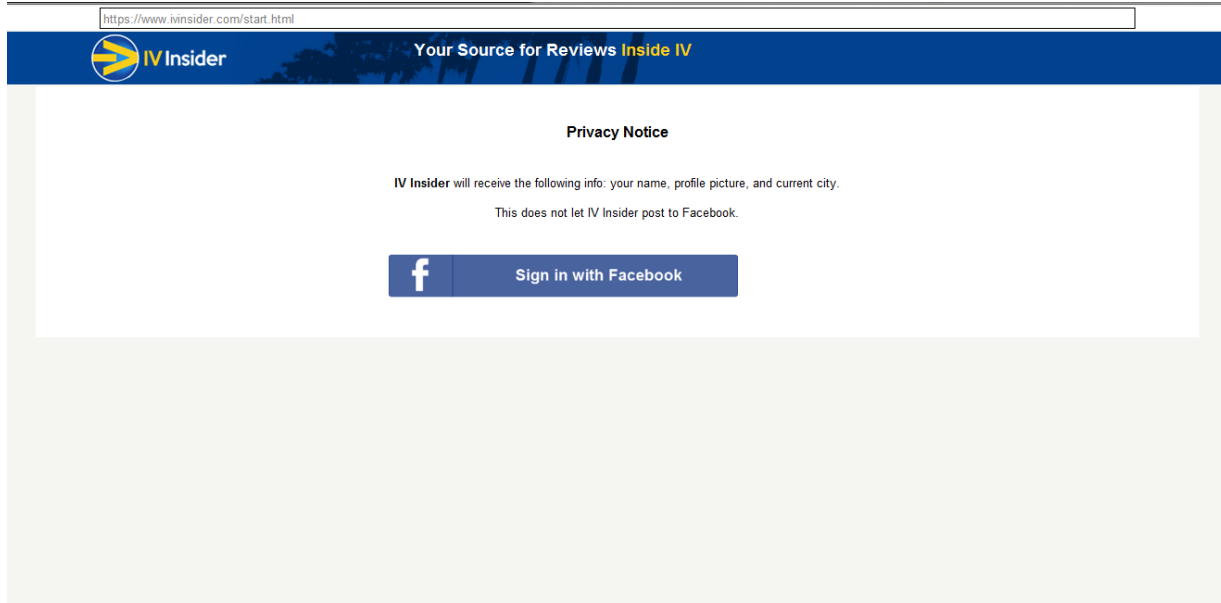


Figure 2. Screenshot of the stimulus website, displaying the participant's anonymous username (upper right corner) and other users' anonymous usernames.

## Appendix A



*Figure 3.* A screenshot of the Facebook log-in prompt for identifiable participants.

# Appendix A

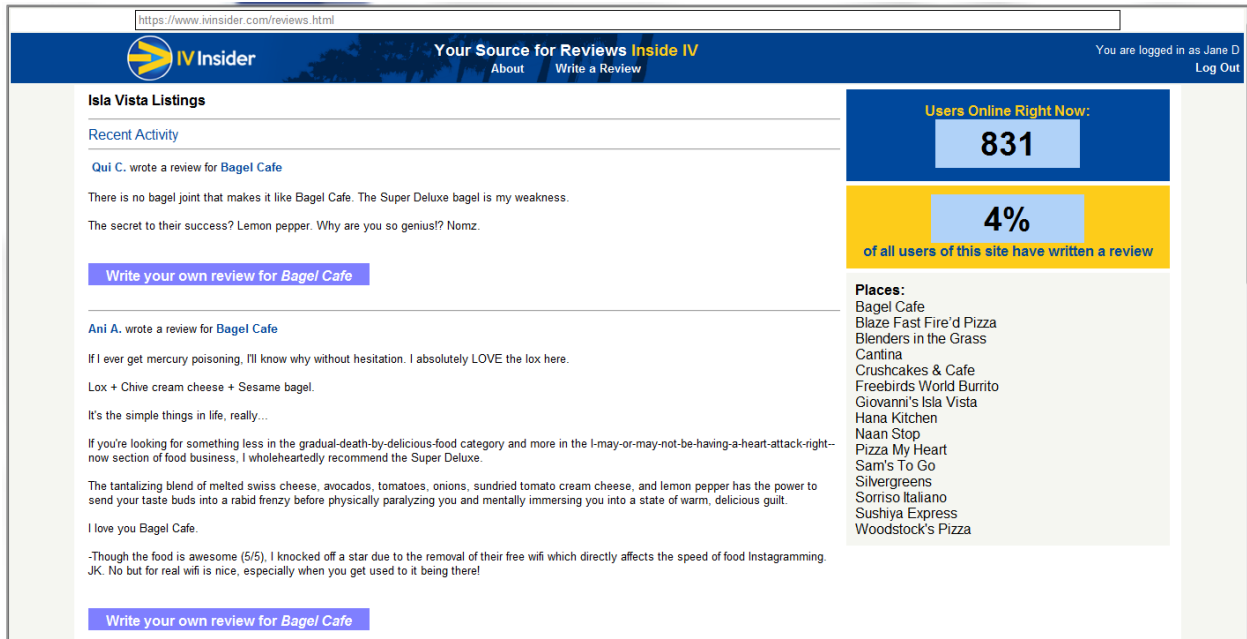


Figure 4. A screenshot of the stimulus website, showing a participant's first name and last initial (upper right corner) and other users' first names and last initials.

## Appendix B

### Manipulation Check Items

#### Bystander volume

1. Approximately how many other users were viewing the site?

Very few (less than 10)

A moderate amount (approximately 50)

A large amount (approximately 250)

A very large amount (approximately 850)

2. Please provide the approximate number of other users who were viewing the site? [open-ended]

#### Anonymity

Please indicate your agreement with the following statements.

1. While viewing the site, I felt anonymous.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7

2. Other users viewing the site will know exactly who I am.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7

3. While viewing the site, I felt that I could be identified by others.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7



4. If other users were to see my review, they would know that I had written it.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7

5. While viewing the site, I felt that I could identify other users.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7

### Social appropriateness

Thinking about the *other users of this website*, please answer the following questions.

1. To what extent is it *expected* that users of this website write reviews?

Not at all expected						Very expected
1	2	3	4	5	6	7

2. To what extent is it *normal* for users of this website to write reviews?

Not at all normal						Very normal
1	2	3	4	5	6	7

3. To what extent is it *typical* for users of this website to write reviews?

Not at all typical						Very typical
1	2	3	4	5	6	7

4. How many of the website's users would think that writing reviews is expected?

None	Very few	Some	About half	Quite a bit	Very many	All
1	2	3	4	5	6	7

## Appendix C

### Diffusion of Responsibility Items

Consider the following statements about your experience with IV Insider and indicate how much you agree with each.

1. All current site users were equally accountable for submitting reviews.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7

2. No particular user is more responsible for submitting reviews than another particular user.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7

3. I am not personally responsible for submitting reviews.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7

4. All users of this website are equally accountable for submitting reviews.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7

5. It was impossible to make me more responsible than other users for submitting reviews.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7

## Appendix D

### Evaluation Apprehension Items

Consider the following statements about your experience with IV Insider and indicate how much you agree with each.

1. I was concerned about the way I presented myself.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7

2. I was worried that my review would make me look bad.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7

3. When I was writing my review, I was worried about making a good impression.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7

4. When I was writing a review on this site, I was concerned about what other people thought of me.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7

5. I felt uncomfortable writing a review on this website because my contribution may be critiqued.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7

6. I would worry about being negatively evaluated if writing a review on this website.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7

## Appendix E

### Contribution Quality Items

Thinking of the review you just read, please indicate your agreement with the following statements.

1. How helpful was this review?

Extremely unhelpful	Unhelpful	Somewhat unhelpful	Neither unhelpful nor helpful	Somewhat helpful	Helpful	Extremely helpful
1	2	3	4	5	6	7

2. How complete was this review?

Extremely incomplete	Incomplete	Somewhat incomplete	Neither incomplete nor complete	Somewhat complete	Complete	Extremely complete
1	2	3	4	5	6	7

3. How useful was this review?

Extremely useless	Useless	Somewhat useless	Neither useless nor useful	Somewhat useful	Useful	Extremely useful
1	2	3	4	5	6	7

4. How trustworthy was this review?

Extremely untrustworthy	Untrustworthy	Somewhat untrustworthy	Neither untrustworthy nor trustworthy	Somewhat trustworthy	Trustworthy	Extremely trustworthy
1	2	3	4	5	6	7

5. How biased was this review?

Extremely biased	Biased	Somewhat biased	Neither biased nor unbiased	Somewhat unbiased	Unbiased	Extremely biased
1	2	3	4	5	6	7



Appendix F

Covariate Items

**Contribution Behavior**

How often do you engage in the following behaviors:

1. Post reviews for restaurants or other businesses on online review sites, like Yelp or TripAdvisor?	I don't know what this (9)	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Very often (5)
2. Post reviews for products on e-commerce sites, like Amazon or eBay?	I don't know what this (9)	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Very often (5)
3. Post reviews online, without knowing who, specifically, might find them	I don't know what this (9)	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Very often (5)
4. Post reviews online, for use by people you are already acquainted with?	I don't know what this (9)	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Very often (5)
5. Share information on online social networking sites, like Facebook or Twitter?	I don't know what this (9)	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Very often (5)

**Social Media Self-Efficacy (Production)**

How often do you do each of the following:

1. Create or update your own blog	I don't know what this (9)	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Very often (5)
2. Provide comments to someone else's blog	I don't know what this (9)	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Very often (5)
3. Read messages on microblogs (like "tweets" on Twitter or posts on Tumblr)	I don't know what this (9)	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Very often (5)
4. Write or post messages on	I don't	Never	Rarely	Sometimes	Often	Very

microblogs (like “tweets” on Twitter or posts on Tumblr)	know what this (9)	(1)	(2)	(3)	(4)	often (5)
5. Write or change some information on a Wikipedia page	I don’t know what this (9)	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Very often (5)
6. Provide answers to social question and answer sites (like Yahoo! Answers or	I don’t know what this (9)	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Very often (5)
7. Share links using social bookmarking sites (such as Digg, Reddit, Delicious, etc.)	I don’t know what this (9)	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Very often (5)
8. Provide information to wikis, other than Wikipedia (such as WikiHow, WikiAnswers,	I don’t know what this (9)	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Very often (5)

**Social Media Self-Efficacy (Consumption)**

1. Read ratings, written reviews, or testimonials on a website (for example, “star” ratings,	I don’t know what this (9)	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Very often (5)
2. Read information on a Wikipedia page	I don’t know what this (9)	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Very often (5)
3. Obtain information from wikis, other than Wikipedia (such as WikiHow,	I don’t know what this (9)	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Very often (5)
4. Watch videos on video sharing sites (such as YouTube and Google Video)	I don’t know what this (9)	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Very often (5)
5. Look up answers on social question and answer sites (like Yahoo! Answers or	I don’t know what this (9)	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Very often (5)

**Reciprocity**

1. Because reviews written by other people will help me, it's only fair that I should write reviews to help other people.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7

2. If I share information online, I believe that I will get information in return from others.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7

3. If I share information online, I expect that somebody will provide information I need.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7

**Costs**

1. Writing reviews about businesses or products is time-consuming.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7

2. Writing reviews about businesses or products is a waste of my time.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7

3. It is difficult to write reviews about businesses or products.

Strongly disagree	Disagree	Somewhat disagree	Neither agree	Somewhat agree	Agree	Strongly agree
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			disagree			
1	2	3	4	5	6	7

4. It takes a lot of effort to write reviews about businesses or products.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7

### Privacy Concerns

1. In general, how concerned are you about your privacy while you are using the Internet?

Completely unconcerned	Unconcerned	Somewhat unconcerned	Neither unconcerned nor concerned	Somewhat concerned	Concerned	Strongly concerned
1	2	3	4	5	6	7

2. Are you concerned that you are asked for too much personal information when you register with websites?

Completely unconcerned	Unconcerned	Somewhat unconcerned	Neither unconcerned nor concerned	Somewhat concerned	Concerned	Strongly concerned
1	2	3	4	5	6	7

3. Are you concerned about people you do not know obtaining personal information about you from your online activities?

Completely unconcerned	Unconcerned	Somewhat unconcerned	Neither unconcerned nor concerned	Somewhat concerned	Concerned	Strongly concerned
1	2	3	4	5	6	7

### Self-reported Conformist Attitudes

1. Obedience and respect for authority are the most important virtues children should learn.

Strongly disagree	Mostly disagree	Somewhat disagree	Somewhat agree	Mostly agree	Strongly agree
1	2	3	4	5	6

2. People are constantly prying into matters that should remain unquestioned.

Strongly disagree	Mostly disagree	Somewhat disagree	Somewhat agree	Mostly agree	Strongly agree
1	2	3	4	5	6

3. Too many new ideas in one country can cause its values to erode.

Strongly disagree	Mostly disagree	Somewhat disagree	Somewhat agree	Mostly agree	Strongly agree
1	2	3	4	5	6

4. Constantly breaking social norms often has harmful, unintended consequences.

Strongly disagree	Mostly disagree	Somewhat disagree	Somewhat agree	Mostly agree	Strongly agree
1	2	3	4	5	6

5. The most important part of any game is a well-defined set of rules.

Strongly disagree	Mostly disagree	Somewhat disagree	Somewhat agree	Mostly agree	Strongly agree
1	2	3	4	5	6

6. Imposing tough laws and punishments, even to minor crimes, is an effective way to preserve the fiber of a society.

Strongly disagree	Mostly disagree	Somewhat disagree	Somewhat agree	Mostly agree	Strongly agree
1	2	3	4	5	6

Table 1

*Mean estimation of bystander volume in each level*

Bystander level							
<u>Level 1 (6</u>		<u>Level 2 (49</u>		<u>Level 3 (242</u>		<u>Level 4 (831</u>	
<u>bystanders)</u>		<u>bystanders)</u>		<u>bystanders)</u>		<u>bystanders)</u>	
<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>
36	17.44 (20.02)	29	46.52 (7.89)	54	222.76 (93.13)	34	551.62 (388.23)

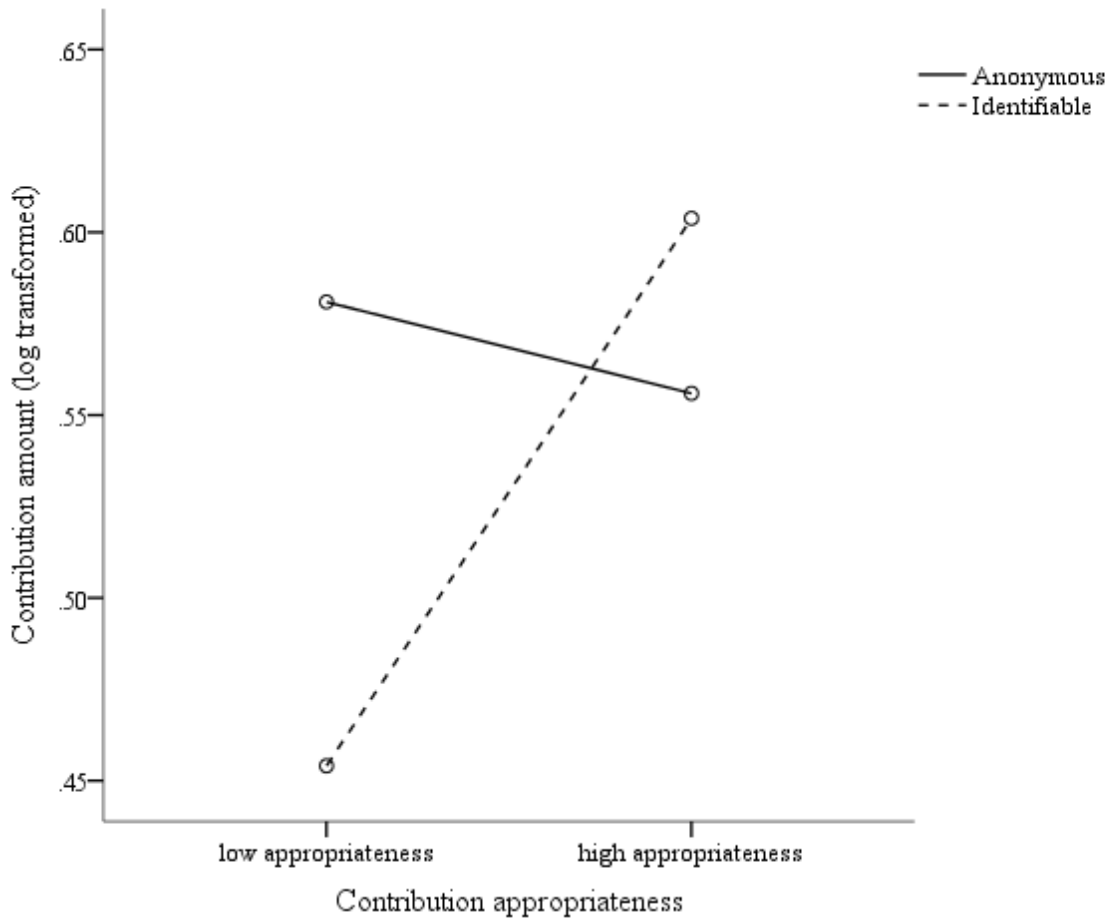


Figure 1. Effect of anonymity and contribution appropriateness on contribution amount,  $F(1, 125) = 1.40, p = .24$ .

Table 2

*Average Contribution Length of Reviews Displayed on Side and Submitted by Participants*

Condition	Average Contribution Length, Site, <i>M</i> ( <i>SD</i> )	Average Contribution Length, Participants, <i>M</i> ( <i>SD</i> )
Anonymous, low contribution appropriateness, 6 bystanders	79.26 (NA)	28.47 (16.77)*
Anonymous, low contribution appropriateness, 49 bystanders	68.5 (NA)	41.20 (24.39)*
Anonymous, low contribution appropriateness, 242 bystanders	86.10 (NA)	67.35 (24.26)
Anonymous, low contribution appropriateness, 831 bystanders	91.54 (NA)	104.47 (41.04)
Anonymous, high contribution appropriateness, 6 bystanders	79.26 (NA)	57.88 (26.58)
Anonymous, high contribution appropriateness, 49 bystanders	84.86 (NA)	60.59 (34.57)
Anonymous, high contribution appropriateness, 242 bystanders	79.81 (NA)	44.00 (24.96)*
Anonymous, high contribution appropriateness, 831 bystanders	84.58 (NA)	60.00 (27.50)
Identifiable, low contribution appropriateness, 6 bystanders	79.26 (NA)	56.53 (32.14)



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Identifiable, low contribution appropriateness, 49 bystanders	68.5 (NA)	68.24 (26.83)
Identifiable, low contribution appropriateness, 242 bystanders	86.10 (NA)	68.24 (26.83)
Identifiable, low contribution appropriateness, 831 bystanders	91.54 (NA)	50.82 (19.45)*
Identifiable, high contribution appropriateness, 6 bystanders	79.26 (NA)	46.47 (32.21)*
Identifiable, high contribution appropriateness, 49 bystanders	84.86 (NA)	46.47 (32.21)*
Identifiable, high contribution appropriateness, 242 bystanders	79.81 (NA)	72.71 (40.15)
Identifiable, high contribution appropriateness, 831 bystanders	84.58 (NA)	58.12 (26.27)

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*Note.* Values marked with an asterisk are not within one standard deviation of the average contribution length displayed on the site and are considered different.

Figure 2



*Figure 2.* The relationship between bystander volume and contribution amount proposed by Voelpel et al. (2008).