Diffusion of Responsibility on Social Networking Sites

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Abstract

Social networking sites regularly feature requests for assistance, although the massive number of users represents corresponding scope for diffusion of responsibility; and unlike most physical scenarios, the request for help is often made several days before assistance is offered. The present research used a specially-prepared imitation social networking site (SNS) with embedded requests for assistance, and manipulations of the number of virtual bystanders and time since the request was posted to test whether explanations of helping in physical settings apply to SNS contexts. Results showed that offers of assistance were explained less well by social impact theory, which states that propensity to offer help will decrease in proportion to the number of bystanders who can assist, than by the social influence model, which states that diffusion of responsibility effects will cease to become significantly stronger beyond a certain critical number of bystanders; and that assistance is offered more readily for recent requests than those made two days earlier.

Social networking sites (SNS) continue to grow in popularity (Donath & Boyd, 2004; Madden & Zickuhr, 2011). Facebook (a popular SNS), for example, has approximately 800 million users who spend over 9.7 billion minutes on the site daily (Wilson, Gosling, & Graham, 2012). These sites therefore offer an interesting opportunity for examining social behavior, especially as they are increasingly used to share information and request assistance (Burke, Kraut, & Marlow, 2011; Tess, 2013), sometimes involving missing persons or other similar significant issues (Lowe, 2012) that are analogous to the methodologies employed in the founding research on prosocial behavior. However, SNSs perhaps represent a special case for research on prosocial behavior for two reasons. First, there is a massive number of potential bystanders (i.e., all global internet users) who may potentially learn of the request for help, and so it is interesting to determine whether models of diffusion of responsibility based on research in the physical world apply to online helping. Second, SNSs often involve message boards and other means that allow two people to interact without simultaneously using the site: this means that, unlike arguably most of the research on helping behavior in the physical world, a request for help on a SNS is often made some time before 'bystanders' offer or decline to assist. Specifically, the present research tests whether diffusion of responsibility in helping behavior on an imitation SNS conforms to the predictions of social impact theory or the social influence model, and whether findings concerning the impact of a time delay on helping in the physical world generalize to SNS-based helping.

Prosocial behavior includes altruism and cooperation (Macaulay & Berkowitz, 1970), although the present study concerned helping, which has been defined as actions that benefit or improve the well-being of others (Hetherington & Parke, 1986). Since Latané and Darley's (1970) original demonstration that the physical presence of other people (bystanders) inhibits prosocial behavior, researchers have examined the effect in a variety of contexts (reviewed by Fisher, Krueger, & Greitemeyer et al., 2011), and have identified the diffusion of responsibility as a mediator of this effect (see review by Latané & Nida, 1981). It has further been established that for the diffusion of responsibility to take place there does not need to be any real social interaction (Latane & Nida, 1981): rather, there simply needs to be bystanders present (be they virtual, physical, or perceived) when a a need for help is apparent (Fisher et al., 2011). A classic example of diffusion of responsibility operating in a context void of social interaction is provided by Hurley and Allen (1979). That work involved researchers and a car with a flat tire on the side of high volume traffic area (highway) or a low volume traffic area (country road). The researchers

found that significantly more people stopped to provide assistance on the country road than on the highway, demonstrating that there does not need to be any social interaction whatsoever between bystanders to the stimulate diffusion of responsibility phenomenon.

Research to date indicates that the diffusion of responsibility operates in the virtual world of the Internet (Fisher et al., 2011). For example, Markey (2000) found a positive correlation between the number of virtual bystanders in a chat room and the amount of time it took to receive a response to a request for information. Similarly, Barron and Yechiam (2002) sent university students a request for help via email, and participants were contacted either individually or with four others in the addressee line. The results were indicative of a virtual diffusion of responsibility, as there were significantly more responses to the email request for help addressed to a single person in comparison with the quintuple condition, and this occurred without any social interaction taking place More recently, Kozlov and Johansen (2010) examined prosocial behaviour in the context of a simple video-game-based virtual environment where participants were instructed to enter a virtual labyrinth and locate the exit. The number of virtual bystanders inside the various rooms of the virtual labyrinth was manipulated, and in some cases the virtual bystanders asked for help. Results were indicative of a virtual diffusion of responsibility as significantly more helping occurred when there were few bystanders in the rooms compared to when there were many. It is therefore surprising that no work on pro-social behavior has been carried out in arguably the most 'social' virtual environment, namely SNSs, and interesting to consider whether and how diffusion of responsibility will operate in this context where there is the potential for a massive number of bystanders. The present research aimed to address this gap in the literature.

In addition to the contexts in which the previous work on pro-social behavior in virtual environments has been conducted, a common limitation to the work was the inability to assess the patterns in which responsibility diffuses. This is due to the use of dichotomous independent variables or correlational designs, despite the fact that there appear to be two possible theoretical explanations for diffusion of responsibility which each lead to differing predictions concerning this. Social impact theory (SIT, Latané, 1981) proposes that social influence is a function of the strength, immediacy, and number of bystanders present (Latané, 1981), so that the inclusion of the first influence source (bystander) has the greatest impact on diffusion of responsibility, and the inclusion of each additional bystander thereafter will stimulate further diffusion. Evidence consistent with the SIT was provided by a study where participants of two-, four-, six-, and eight- member

groups were asked to allocate 100 responsibility points among members after completing a group task (Forsyth, Zyzniewski, & Giammanco, 2002). Results were consistent with the SIT, as participants designated more responsibility points to others, and fewer to themselves, in proportion to group size (irrespective of whether their group successfully solved the task). As such, in the current study and according to SIT, it was predicted that participants' inclination to assist would decrease as the perceived number of virtual bystanders on a mock SNS increased (see H2a and H4a), and that this diffusion would occur in proportion to group size (see H2b and H4b).

The social influence model (SIM; Tanford and Penrod, 1984) makes different predictions to the SIT concerning the impact on diffusion of responsibility of the addition of bystanders. Work on the SIM has used computer simulations to predict social influence, and has been found to better predict minority and majority social influence than the SIT (for a review see Tanford & Penrod, 1984). Partial motivation for the development of the SIM was to address recognized shortcomings of the SIT, one of which is the inability to account for data from Asch's classic studies of social influence and conformity. Asch (1951, 1952, 1955,1956) found participants presented with an opposing opinion of one or two confederates rarely conformed to this opposing view, but were significantly more likely to conform when faced with an opposing consensus of three confederates. However, Asch also observed a ceiling effect whereby increasing the number of confederates above four did not result in increased conformity. Accordingly, the SIM proposes that members of dyads behave similarly to individuals, and predicts a ceiling effect to occur whereby increasing the number of bystanders beyond four will not result in increased social influence. Therefore in the context of diffusion of responsibility, the SIM suggests that members of dyads will experience less diffusion of responsibility than implied by the SIT, and that diffusion of responsibility should not increase further as group size increases beyond four members, whereas the SIT implies no such ceiling effect.

Evidence aligning with the SIM emerged from a study where researchers sent emails containing an embedded request for help to participants with 0, 1, 14, or 49 others listed in the addressee line (Balir et al., 2005). Contrary to SIT and consistent with SIM, responsiveness in the individual and dyad conditions was almost identical, and there was no significant difference between the 15- and 50-person groups, so that the inclusion of additional bystanders did not stimulate additional diffusion of responsibility which was instead subject to a ceiling effect. The data was then collapsed into a "no or few others" group (individual/dyad) and a "many others" group (15/50), and comparisons were made

between the two. Results were indicative of a significantly higher response rate in the no or few others group compared to the many others group. Thus, although the diffusion of responsibility appeared to occur, this was not in proportion to group size as the SIT proposes and was better explained by the SIM. Therefore, in the current study and according to SIM, it was predicted that individuals and member of dyads would not differ significantly in helping behaviour, and that helping behavior would not differ among participants with four or fourteen bystanders present (see H2c and H4c), but that participants in the small N conditions (individuals and dyads) would be significantly more helpful than those in the large N conditions (four and 14 bystanders; see H2d and H4d).

In summary, it is possible that diffusion of responsibility may differ between online and offline contexts, although to our knowledge, very little research has addressed this. As such, the present research considered whether diffusion of responsibility on an imitation SNS can explain propensity to help, and whether the pattern of any such findings corresponds better with SIT or SIM.

The current study also addressed the effect of time on the diffusion of responsibility. Some evidence suggests that individuals feel less responsible to help when they believe other people have already had time to intervene, such that there is a negative relationship between the passage of time since the request for assistance and people's propensity to help (e.g., Cacioppo, Losch, & Petty, 1986; Suedfeld, Bochner, & Wnek, 1972).

Further research in this area is needed in order to clarify the effect of time on the inclination to assist, as previous researchers have not recorded the time in which participants received, accessed, and responded to virtual pleas for assistance (Blair et al., 2005). Specifically, it has been proposed that researchers embed electronic messages with a request for help, and determine whether a lapse in time between the request being sent and subsequently being read influences a person's willingness to respond to that request. Such effects may be particularly relevant in the context of SNSs since, although some SNS interactions occur in real time, a significant number involve a time delay between a message being posted (e.g., a Facebook status update) and that message being read by those in a position to offer assistance. Therefore, the present research manipulated the time at which a request for help was posted on a mock SNS to determine any effect of this on participants' propensity to help, and it was predicted that participants' inclination to help would be significantly greater for current requests than for those supposedly posted in the past (see H1 and H3).

In the present research, participants recruited via convenience sampling were led to believe they were evaluating the design of a "newly developed" SNS created by university students, and that the only other people on the site were other participants in the current study. The mock SNS contained two direct embedded requests for help. These requests resembled those used in previous research by asking participants how willing they would be to donate their time or money as a means for measuring prosocial behavior (e.g., Manucia, Baumann, & Cialdinni, 1984). The first asked participants how willing they would be to participate in a supposed second phase of the current study, and the second asked participants how willing they would be to donate money to a children's charity.

The number of other people supposedly online was manipulated (0, 1, 4, or 14) as was the posting time for the two requests for help ("posted today" versus "posted two days ago"). The research employed a fully randomized 4 (number of others online) x 2 (posting time) between subjects design in order to assess the impact on inclination to help of varying numbers of virtual bystanders and the time of the request being posted. The rationale for manipulating the number of bystanders was to assess whether the pattern of findings would correspond better with SIT or SIM, and the rationale behind manipulating time was to address limitations of the Blair et al. (2005) research.

Some research has identified an altruistic personality trait (Rushton, Chrisjohn, & Fekken, 1981), which is associated with a greater propensity to offer assistance in online contexts (Lee & Lee, 2010): individual participants' scores on this altruistic trait were therefore included as a covariate in the present design. The research tested the following hypotheses;

H1. For all four bystander conditions, willingness to participate in future research will be significantly greater for requests that were sent 'today' than for requests that were sent 'two days ago'.

H2a. For both time conditions, willingness to participate will decrease as the number of virtual bystanders increases.

H2b. According to SIT, the bystander main effect predicted in H2a will reflect a proportional decrease in willingness to participate as the perceived number of virtual bystanders increases.

H2c. According to SIM, the bystander main effect predicted in H2a will reflect no significant difference between the zero and one bystander conditions, or between the four and 14 bystander conditions.

H2d. According to SIM, the bystander main effect predicted in H2a will reflect a significantly greater willingness to participate in the zero and one bystander conditions compared to the four and 14 bystander conditions.

H3. For all four bystander conditions, willingness to donate to charity will be significantly greater for requests that were sent 'today' than for requests that were sent 'two days ago'.

H4a. For both time conditions, willingness to donate will decrease as the perceived number of virtual bystanders increases.

H4b. According to SIT, the bystander main effect predicted in H4a will reflect a proportional decrease in willingness to donate as the perceived number of virtual bystanders increases.

H4c. According to SIM, the bystander main effect predicted in H4a will reflect no significant difference between the zero and one bystander conditions, or between the four and 14 bystander conditions.

 H4d. According to SIM, the bystander main effect predicted in H4a will reflect a significantly greater willingness to donate in the zero and one bystander conditions compared to the four and 14 bystander conditions.

Method

Participants

A recent meta-analytic review of bystander intervention found a small to medium effect (Fisher et al., 2011). A-priori power analysis, calculated using the G*Power program (Faul, Erdfelder, Lang, & Buchner, 2007), determined that approximately 489 (α = .05, power = .8, f = .15) participants were required for detecting a small to moderate bystander x time interaction in the present research.

Participants, required to be over the age of 18 and a current SNS user, were recruited via convenience snowball sampling through SNSs, by placing recruitment flyers in letterboxes around the Perth metro area, and by flyers on university campus noticeboards. Although 532 responses were downloaded from Qualtrics, 73 participants did not complete the debriefing page, thereby withdrawing consent, and these cases were removed. The final sample (N=459) consisted of 160 men and 299 women. Thirty-seven (8.1%) were aged 18-21-years, 69 (15%) were aged 22-25 years, 145 (31.6%) were aged

26-29 years, 96 (20.9%) were aged 30-33, 24 (5.2%) were aged 34-37, 29 (6.3%) were aged 38-41, and 59 (12.9%) were aged 41 or over.

Materials

A summary of the materials, design and procedure is shown in Figure 1.

- Figure 1 about here -

Five PowerPoint slides resembling SNS pages were created using Microsoft PowerPoint, and are referred to as 'the SNS pages' throughout the manuscript. In order to access the study participants had to visit a university's website. After reading the online information page and providing consent, they were automatically re-directed to a Qualtrics website where the SNS pages were displayed online, full-screen, in a manner intended to indicate that they were real web pages, and participants were able to scroll up and down while viewing these pages. Of the five SNS pages, three were distractor pages, and two were embedded with the experimental materials. All five SNS pages incorporated the experimental manipulations.

Demand characteristics were addressed via distractor measures and distractor SNS pages which were selected and designed specifically to align with, and enhance, the credibility of the cover story (provided electronically which stated that, "*We are interested in how different people will evaluate our design for a new social networking website, and also some behaviours associated with the use of this website*"). Data collected from the distractor measures were discarded and were not included in any analyses. The first was a 20-item self-report Resourcefulness and Playfulness Questionnaire (RPQ) which required participants to provide a rating on a Likert scale from 1 (*does not at all describe me*) to 7 (*completely describes me*). An example item from this questionnaire is "*Give up easily*" (Jackson, Paunonen, & Tremblay, 2000). Second, a four-item, self-report, SNS Page Quality Scale (SNPQS) was created and presented to participants at the bottom of each SNS page (see Figure 2) to align with this cover story. An example item is "*On a scale of 1 (very poor) to 5 (excellent) rate the quality of this page in regards to attractiveness*". Finally, at the bottom of each distractor SNS page was a further distractor question. These questions followed the format of the dependent measures, but were otherwise irrelevant. As an example, participants rated *"How willing would you be to attend this event?"* on a

Likert-type item from 1 (*not at all willing*) to 7 (*very willing*) after viewing the birthday event SNS page.

The first page of interest was the SNS newsfeed page, which was embedded with a direct request for help. Participants were asked if they would be willing to participate in a future phase of the current study via a SNS "wall post" (see Figure 2). The first dependent measure (willingness to participate) appeared at the bottom of this page, following the SNPQS. Participants gave a rating in response to the question "*How willing would you be to participate in this study?*" on a scale from 1 (*not at all willing*) to 7 (*very willing*). This item was created because a standardized willingness to help measure does not appear to exist, and direct requests for help have commonly been used to measure helping behavior in previous studies (e.g., Manucia et al., 1984; North, Tarrant, & Hargreaves, 2004).

- Figure 2 about here -

The number of virtual bystanders was manipulated, so that the page read 'Online (0)', 'Online (1)', 'Online (4)' or 'Online (14)'. The time the direct request for help was supposedly posted was also manipulated, so that the page read 'Posted 2 days ago' or 'Posted today'. The text in Figure 2 shown inside blue boxes is taken from the tutorial material used to align with the cover story and familiarize participants with the elements of the "newly developed" SNS.

The subsequent SNS page of interest, incorporating the second dependent measure (willingness to donate), was a children's charity SNS homepage. Participants responded to the question "*How willing would you be to donate money to this organization?*" on a scale from 1 (*not at all willing*) to 7 (*very willing*). Again, this mirrored measures used by previous research (e.g., Hirschberger, Ein-Dor, & Almakias, 2008).

The altruistic trait was assessed using the Self-Report Altruistic Scale (SRAS; Rushton et al.,1981), consisting of 20 items requiring ratings on a 5-point Likert scale ranging from 1 (*never*) to 5 (*very often*). The items concerned a variety of altruistic acts, such as, "*I have donated blood*". This scale was chosen as previous research has shown it to have good reliability (α=.89, Lee & Lee, 2010), and the internal consistency of the SRAS in the present study is acceptable (α = .89).

Research Design

The research employed a fully-randomized 2 (time: today, two days ago) x 4 (number of virtual bystanders: 0, 1, 4, 14) between-subjects design. The first dependent variable was willingness to participate in another study, and the second dependent variable was willingness to donate to a charity.

Procedure

Ethics approval was granted from the Human Research Ethics Committee at the authors' host university, and data was collected over approximately 10 weeks. Participants were required to read an information sheet and provide consent online before being directed to the imitation SNS hosted by Qualtrics. As shown in Figure 1, participants provided demographic information and completed the RPQS (distractor measure) prior to viewing the "entering social networking site" notification (see Figure 3), which informed the participants how many other participants were supposedly also on the mock SNS at that time.

-Figure 3 about here-

After clicking on the link at the bottom of the notification, participants were randomly allocated to one of eight online conditions by Qualtrics. Participants viewed the profile page (distractor), birthday event page (distractor), newsfeed page (first dependent measure), inbox page (distractor), children's charity homepage (second dependent measure), and finally completed the SRAS. At the bottom of each SNS page was the SNPQS and an additional question. The additional question on the SNS newsfeed page was the first dependent measure (willingness to participate), and the additional question on the children's charity homepage was the second dependent measure (willingness to donate).

Results

Altruism

The original planned analysis was to test H1 and H2a by conducting a 2 x 4 between-subjects analysis of covariance (ANCOVA) with willingness to participate as the

dependent variable, and altruism as the covariate. The same analysis was planned for H3 and H4a, but with willingness to donate as the dependent variable.

To determine if altruism was a confounding covariate, a time x bystander analysis of variance (ANOVA) was conducted, with altruism as the dependent variable. The results revealed non-significant main effects for bystander, $F(3, 430) = 1.88$, $p = .133$, and time, $F(1,430) = .16$, $p = .690$, and the interaction was not significant, $F(3, 430) = .62$, $p = .603$. These results indicate that altruism did not have the potential to confound the results of this study (Rutherford, 2001). In light of this, a 2 x 4 between-subjects ANOVA was instead adopted for testing hypotheses H1, H2a, H3, and H4a.

Descriptive Statistics

The mean, standard deviation, and confidence intervals of the willingness to participate and the willingness to donate are presented in Tables 1 and 2 respectively.

- Tables 1 and 2 about here -

Hypothesis Testing

Hypothesis 1 proposed greater willingness to participate in the today condition than in the two days ago condition across all bystander groups. A factorial between-groups ANOVA revealed a non-significant effect for time, $F(1, 451) = 2.00$, $p = .158$, and a significant interaction, indicating that the effect of number of virtual bystanders on the willingness to participate depends on the time of request, $F(3, 451) = 3.10$, $p = .027$, with a small effect size, $\eta_p^2 = .20$. Thus, these findings do not support H1. The nature of the interaction effect is illustrated in Figure 4. Figure 4 illustrates that willingness to participate decreased as the number of virtual bystanders increased in the 2 days ago condition only.

- Figure 4 about here -

Hypothesis 2a suggested willingness to participate would decrease as the number of virtual bystanders increased for both time conditions. However, the significant interaction indicates that this trend occurred in one time condition only. Simple effect analyses confirmed that willingness to participate did not significantly differ among bystander groups in the today condition, $F(3,222) = .68$, $p = .565$, but that willingness to participate significantly decreased as the number of bystanders increased in the two days ago condition, $F(3,229) = 4.50$, $p = .004$. These results provide partial support for H2a.

As a consequence of the simple effect analyses, H2b and H2c were tested by conducting simple planned comparisons across the two days ago condition only. The prediction of H2b was that willingness to participate would decrease in proportion to the number of virtual bystanders, whereas the prediction in H2c was that willingness to participate would not significantly differ between the zero and one bystander conditions, or between the four and 14 bystander conditions. A simple planned comparisons test revealed that willingness to participate in the small N conditions (zero and one bystander) did not significantly differ, $t(229) = .66$, $p = .508$, nor did the responses in the large N conditions (four and 14 bystander), $t(229) = .49$, $p = .623$. Thus, these results do not support H2b, but provide support for H2c in the two days ago condition.

The prediction of H2d was that willingness to participate would be significantly greater in the zero and one bystander conditions (small N conditions) compared to the four and 14 bystander conditions (large N conditions). To test this hypothesis a simple planned comparison was conducted, collapsing data in the small N conditions and comparing it to the collapsed data of the large N conditions. The results support H2c in the two days ago condition, as participants in the small N conditions were significantly more willing to participate than were participants in the large N conditions, $t(229) = 3.62$, $p < .001$.

A factorial between-groups ANOVA was performed to investigate the impact of IV1 and IV2 on the willingness to donate (H3 and H4). The interaction between the variables was non-significant, $F(3, 451) = 1.92$, $p = .126$, $\eta_p^2 = .013$. Additionally, there was no significant main effect of time, $F(1,451) = .31$, $p = .575$, $\eta_p^2 = .001$, or of number of virtual bystanders, $F(3, 451) = 1.03$, $p = .378$, $\eta_p^2 = .007$. These results indicate that neither IV, nor any combination of the IVs, significantly affected participants' willingness to donate. Thus, the predictions made in H3 and H4 are not supported by these results.

Discussion

Hypothesis 1 proposed that, for all bystander conditions, willingness to participate in another study would be significantly greater for requests posted in the present (today) than for requests posted in the past (two days ago). However, results revealed a non-significant effect of time so that H1 is not supported by these results.

Hypothesis 2a proposed that a virtual diffusion of responsibility would occur, so that willingness to participate would decrease as the number of virtual bystanders increased across both time conditions. Although the results are indicative of a virtual diffusion of responsibility, this occurred only when participants read the request that was supposedly posted two days ago. In other words, these results indicate that the virtual diffusion of responsibility does not affect helping in the case of a current request for help on a mock SNS but does affect helping when a request is perceived to be dated. Although these results are inconsistent with previous findings indicative of a diffusion of responsibility occurring when there is a current request for help in a face to face settings (Fisher et al., 2011), it may well be that the diffusion of responsibility operates differently in the virtual world. Nonetheless, these same results are partially consistent with online studies demonstrating that the diffusion of responsibility operates in the virtual world (Barron & Yechiam, 2002; Blair et al., 2005; Markey, 2000), and thus partially support H2a. This apparent temporal element to the impact of diffusion of responsibility on helping warrants further investigation in a SNS context.

H2b was derived from SIT, proposing that, for both time conditions, willingness to participate would decrease in proportion to the number of virtual bystanders. The predictions of H2c and H2d in contrast were derived from SIM, proposing that, for both time conditions, willingness to participate would not differ between participants in the zero and one bystander conditions (small N conditions), or between participants in the four and 14 bystander conditions (large N conditions), but that participants in the small N conditions would be significantly more helpful than those in the large N conditions. The results do not provide support for H2b, H2c, or H2d in the today condition, as these participants responded similarly regardless of the number of virtual bystanders present. However, the results from the two days ago condition revealed no significant difference between responses from participants in the small N conditions, nor between responses in the large N conditions. These findings do not align with the SIT, and therefore do not support H2b, but do support H2c and the predictions of SIM. Moreover, by collapsing the data from the zero

and one bystanders conditions (small N conditions), as well as collapsing the data from the four and 14 bystander conditions (large N conditions), it was found that the participants from the small N conditions were significantly more willing to participate than those in the large N conditions in support of H2d and the SIM. As such, the present findings are consistent with those obtained from the Blair et al. (2005) study in suggesting that, in the context of the virtual world, SIM is a better description of the pattern of diffusion of responsibility than is SIT.

The current results are inconsistent with face-to-face research demonstrating that the diffusion of responsibility aligns with the SIT (Forsyth et al., 2002) but do correspond with previous virtual world research demonstrating that the diffusion of responsibility aligns with the SIM in online contexts (Blair et al., 2005). The apparent discrepancy between the patterns of responsibility diffusion online and offline could be a result of social interaction differing between the two contexts (Subrahmanyam, Reich, Waechter, & Espinoza, 2008), and further research is needed to better specify the nature of these differences.

Contrary to predictions, a virtual diffusion of responsibility did not occur when participants were asked to donate money to a charity. Participants responded similarly to this request regardless of the number of virtual bystanders present or the amount of time that had elapsed since the request was made. Therefore, these results do not support H3 or H4, and are inconsistent with the findings concerning H2a, H2c, and H2d. One possible explanation is that these inconsistent findings are a result of the order of appearance of the dependent variables. Liu and Aaker (2008) found that participants who were first asked about their intention to volunteer time subsequently donated more money to charity than those who were not first asked about volunteering their time. Thus, the first request in the current study could have potentially influenced participants' decisions regarding the second request to donate money. The ordering of the requests in the current study therefore presents a possible confound, and should be addressed in future studies.

There are limitations to this study. Firstly, the desired sample size was not reached, increasing the risk of a type two error (Tabachnick & Fidell, 2007); and convenience sampling resulted in an over-representation of female participants, further limiting the generalizability of findings. Second, using a real SNS site rather than a replica would have had the advantage of requiring less effort to be devoted to the establishment of a cover story. Third, and perhaps most interestingly, although great effort was made to create an imitation SNS closely resembling a real exemplar, future researchers might attempt to use

a real SNS site as this would also allow investigation of the impact of social *interaction* on participant behavior. That is, although the mere perception of bystander presence can stimulate diffusion of responsibility, as evidenced by previous research (e.g., Blair et al., 2005) and further corroborated by the current findings, it would be interesting to observe how the supposed response of others to an initial behavior by the participant could itself mediate a given participant's subsequent behavior. Thus, using a real SNS would allow for an array of interesting hypotheses to be investigated that cannot be addressed by the use of a replica site.

From a theoretical perspective, this study adds to existing literature by being the first to examine the diffusion of responsibility in a SNS context, showing that the phenomenon also operates in this context. The current study also appears to be the first to document a temporal effect on the virtual diffusion of responsibility, suggesting that this phenomenon occurs in the context of a SNS only when there has been a lapse in time between a request being made and subsequently being read. This is noteworthy as previous virtual world studies did not assess or manipulate the time delay between a virtual request for help being made, subsequently being read and responded to by the participant (Blair et al., 2005). It appears this study is the first to address this limitation of multiple virtual world studies (Markey, 2000; Barron & Yechaim, 2002; Blair et al., 2005) by being the first to successfully manipulate this temporal aspect online, resulting in a significant interaction. This study also investigated two social influence theories, and presented findings partially consistent with those of previous research suggesting that the virtual diffusion of responsibility aligns more closely with the SIM than the SIT.

From a practical standpoint, the current findings offer guidance for people using SNSs as a means for requesting assistance. Results suggest that addressing requests to individuals or dyads (perhaps via private messaging) is a more effective way of eliciting a desired behavior than posting requests where many people can view them. Additionally, the results imply that hiding the time of posting a request could be beneficial.

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Table 1. Descriptive Statistics for Willingness to Participate

Bystander	Time	N	Mean	SD	95% Confidence Interval	
					Lower Bound	Upper Bound
0	2 days	53	4.59	1.81	4.10	5.07
	Today	58	4.05	1.93	3.59	4.52
1	2 days	60	4.37	1.62	3.91	4.82
	Today	49	4.45	1.75	3.94	4.95
4	2 days	62	3.73	1.65	3.28	4.18
	Today	58	4.48	1.76	4.02	4.95
14	2 days	58	3.57	1.90	3.11	4.03
	Today	61	4.22	1.95	3.76	4.67

Note. SD = Standard Deviation; N = Total number of participants in that condition.

Table 2. Descriptive Statistics for Willingness to Donate

Bystander	Time	N	Mean	SD	95% Confidence Interval	
					Lower Bound	Upper Bound
0	2 days	53	4.04	1.84	3.57	4.50
	Today	58	3.45	1.78	3.01	3.90
1	2 days	60	3.84	1.84	3.40	4.28
	Today	49	3.49	1.80	3.00	3.98
4	2 days	62	3.40	1.45	2.97	3.83
	Today	58	3.61	1.62	3.16	4.06
14	2 days	58	3.20	1.84	2.75	3.64
	Today	61	3.56	1.65	3.12	3.99

Note. SD = Standard Deviation; N = Total number of participants in that condition.
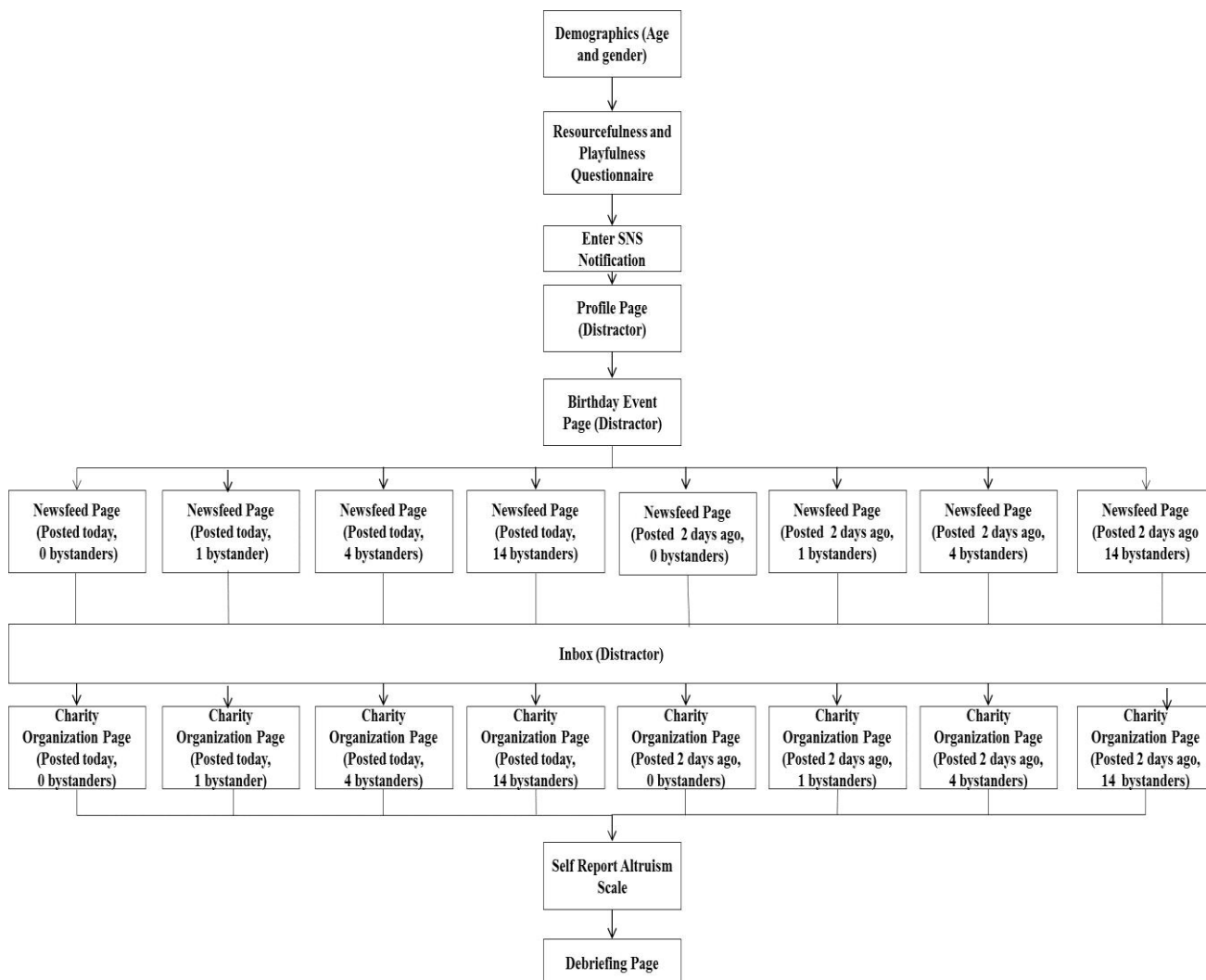
Figure 1. Flow chart of methodology.

Figure 2. Example of imitation SNS newsfeed page, distractor questions, and primary dependent measure (willingness to participate).

Figure 3. Entering SNS notification.

By clicking on the arrows below you will enter the social networking site. You will only view and evaluate five of the newly developed pages for this site. Please take the time to read all of the information on each page, including the tutorials, before answering any of the questions provided. There is one other participant on the social networking site at this time.
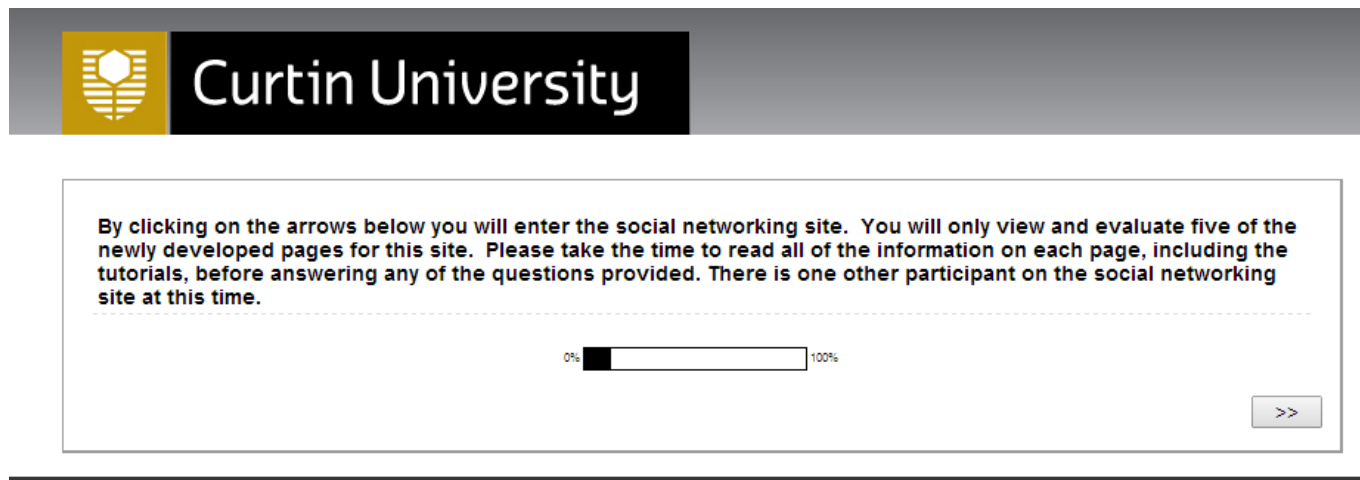
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Figure 4. The effects of the number of virtual bystanders and time.