



Brief Report

The impact of phone calls on follow-up rates in an online depression prevention study

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ABSTRACT

Background: Automated Internet intervention studies have generally had large dropout rates for follow-up assessments. Live phone follow-ups have been often used to increase follow-up completion rates.

Objective: To compare, via a randomized study, whether receiving phone calls improves follow-up rates beyond email reminders and financial incentives in a depression prevention study.

Method: A sample of 95 participants (63 English-speakers and 32 Spanish-speakers) was recruited online to participate in a “Healthy Mood” study. Consented participants were randomized to either a Call or a No Call condition. All participants were sent up to three email reminders in one week at 1, 3, and 6 months after consent, and all participants received monetary incentives to complete the surveys. Those in the Call condition received up to ten follow-up phone calls if they did not complete the surveys in response to email reminders.

Results: The follow-up rates for Call vs. No Call conditions at 1, 3, and 6 months, respectively, were as follows: English speakers, 58.6% vs. 52.9%, 62.1% vs. 52.9%, and 68.9% vs. 47.1%; Spanish speakers, 50.0% vs. 35.7%, 33.3% vs. 21.4%, and 33.3% vs. 7.1%. The number of participants who completed follow-up assessments only after being called at 1-, 3- and 6 months was 2 (14.3%), 0 (0%), and 3 (25.0%) for English speakers, and 2 (18.9%), 0 (0%), and 1 (7.7%) for Spanish speakers. The number of phone calls made to achieve one completed follow-up was 58.8 in the English sample and 57.7 and Spanish-speaking sample.

Conclusions: Adding phone call contacts to email reminders and monetary incentives did increase follow-up rates. However, the rate of response to follow-up was low and the number of phone calls required to achieve one completed follow-up raises concerns about the utility of adding phone calls. We also discuss difficulties with using financial incentives and their implications.

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1. Introduction

Attrition from follow-up is a significant concern in most intervention research. For Internet interventions, it is one of the most pervasive and troubling issues. Significant follow-up attrition can compromise the interpretation of findings from a clinical trial, either by obfuscating the outcomes, or by making the conclusions about outcomes too optimistic or too dismal (depending on who drops out). Either way, attrition presents a problem for both science and for the patient populations clinical trials aim to help. Attempts to counteract follow-up attrition often take two forms, sometimes employed jointly: financial incentives, wherein participants are paid for completing follow-ups, and social nudges (e.g., calling participants, or sending them letters). However, Internet

interventions may face specific challenges that could make such strategies less effective, as described below.

Utilizing financial incentives to increase retention in Internet interventions itself represents a challenge. As the requisites to enter Internet studies tend to be low, and payments are often anonymous, participation strictly for financial gain becomes a threat to the study validity. Opportunities for “gaming the system” or downright exploitations by deceitful individuals are omnipresent. Internet interventions must contend with “professional research participants”, individuals who enter the study multiple times, or even automated “bots” (Prince et al., 2012).

Maintaining ecological validity presents several other challenges. Many Internet interventions are meant to be used as widely as possible. Such scalability can best be reached with unsupported interventions, that is, interventions that are fully automated and do not rely on any human contact. Utilizing methods of attrition reduction that cannot be sustained after the official study is completed may reduce the ecological validity of the study. Aside from the challenge of ensuring honest participation, financial incentives that are sufficiently attractive to

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participants are probably not realistic for use with large populations (such as worldwide samples, see Muñoz et al., 2015). Similarly, utilizing assessment methods that require human contact (e.g. phone calls) may create additional social pressures that would be unavailable outside of the research context and may likewise be too expensive to use in the context of widespread dissemination. Nonetheless, because human contact (and financial incentives) increases follow-up rates, these methods are often implemented within a research context. Indeed, in our earlier work phone contact has resulted in respectable follow-up rates (Muñoz et al., 2009). An important element that increases follow-up rates appears to be human contact during the recruitment process. For example, in three trials of Internet-based cognitive-behavioral therapy which instituted phone diagnostic interviews at the beginning of the trial, follow-up rates were between 74% and 84% (Dear et al., 2015), 97% (Andersson et al., 2012), and even 100% by Hedman et al. (2011), which is remarkable even for face-to-face interventions. Though such procedures appear to increase adherence, they may be practical only for studies that involve relatively small samples (e.g., perhaps up to several hundred participants) and for interventions that do not intend to be scaled to larger populations.

Reviewers of an earlier version of this article pointed out that there are also differences between intervention completers and study completers. Ecological validity in the context of open access to Internet interventions (versus the context of randomized controlled studies) suggests that completion rates are likely to be similar to that of Massive Open Online Courses (MOOCs). The median certification rate (a proxy for “completion” for our purposes) for courses provided by Harvard and MIT in a four year period has been reported to be 7.7% (308,000 individuals) among 4 million participants, and 30% (149,400 individuals) among 498 thousand participants who stated that they intended to earn a certificate (Chuang and Ho, 2016). Note that although the percentages are small, the actual numbers are impressive. It would have taken decades to provide the courses to that many people using traditional in-person methods. The field of Internet interventions may need to begin valuing *actual number* of individuals who complete Massive Open Online Interventions (Muñoz et al., 2006; Muñoz et al., 2015), rather than focusing primarily on the *percentage* of those who complete them. To evaluate the effectiveness of the interventions, however, does require increasing the number of study completers, that is, those who provide follow-up data. Given that many participants are unlikely to do so at official follow-up assessment periods, it is important to obtain measures of clinical outcome at every visit to the intervention sites, so that we can at least report the last score provided by the participant.

Because participants in online interventions enter the study through the Internet, they may expect most of the contact to be online, or prefer to keep anonymity, so they may be more reluctant to provide a correct phone number or to pick up the phone and speak to the study personnel at follow-up.

The purpose of this report is to describe our efforts to increase follow-up rates in a clinical trial of an internet-based depression prevention intervention, conducted in Spanish and English. The goal of the project was to determine, in a randomized study, whether adding live phone calls to financial incentives and email reminders would increase completion of follow-up data at 1, 3, and 6 months. We present our follow-up rates, and discuss the difficulties we faced in the conduct of this investigation.

2. Methods

2.1. Participants and recruitment

Spanish- and English-speaking adult (18 years of age and older) residents of the United States, who reported fluency in Spanish or English, consistent access to the Internet, and screened positive for high-risk for major depression (without meeting criteria) based on their self-

reported symptoms on the PHQ-9 were eligible. Participants were recruited online via Google Ads that invited individuals to join an online “Healthy Mood” study to help them manage their mood. The advertisements initially included payment information, however, an overwhelming number of early visitors were “bots” (automated study entries likely meant to obtain the participant fees by entering the study repeatedly). We paused recruitment, identified and removed the bots, and restarted recruitment with the modified advertisements, which no longer mentioned monetary incentives. Participants were informed of monetary incentives as part of the consent form. Thus, ($n = 23$) English-speaking participants were recruited with the original ads, which mentioned incentives, and the rest of the English-speaking participants ($n = 40$) were recruited via ads that did not mention incentives. The Spanish-speaking sample was unaffected, as recruitment to the Spanish language version of the study commenced just after English-speaking recruitment was restarted.

Participants were screened for eligibility, and those eligible read and electronically signed the informed consent before entering the study. Participants gave their phone number, completed baseline questionnaires, and received access to the Healthy Mood site, which contained mood management lessons based on cognitive-behavioral therapy.

All participants also received monetary incentives in the form of online gift certificates to a popular online megastore. Participants received US\$10 for completing each of the three follow-up assessments (1, 3, and 6 months after consenting), and a US\$20 bonus if all three follow-ups were completed. Thus, a participant could earn up to US\$50. At each follow-up point, all participants received up to three emails in one week, inviting them to complete follow-up by following an embedded link.

Participants were randomized to two conditions.

1. Call: Those randomized to the Call condition were phoned (up to ten attempts were made to reach them) and asked to complete the surveys by phone if they did not fill out the survey online.
2. No Call. Those randomized to the No Call condition received no phone calls.

All participants were informed, via the consent form, that they may receive phone calls if they did not complete follow-up surveys online. Thus the participants were blind to condition.

Based on our experience with smoking cessation Internet trials (Muñoz et al., 2006, 2009), we estimated a 65% completion rate with phone call follow-ups vs. a 40% completion rate for monetary incentives without phone call follow-ups (a slight improvement over email reminders alone). For a two-sided 0.05 level test of differences in proportion followed-up, with 40% completion in the financial incentive alone group and 65% in the financial incentive + phone call condition (relative response of 1.625), we estimated needing 70 subjects in each arm or 140 total subjects to achieve 80% power. We set as our target 150 subjects (75 in each group) to determine the impact of phone calls in addition to incentives in follow-up completion.

3. Results

3.1. Sample

The total sample consisted of 95 participants, of whom 63 were English speakers and 32 were Spanish speakers. The Spanish-speaking participants were 35.5 ($SD = 10.90$) years old, on average, and 25 (78.1%) of the sample were women. The English-speaking participants were 36.4 ($SD = 10.38$) years old, on average, and 25 (39.7%) of the sample were women.

As described below, in the English sample, initial recruitment advertised the study as a paid study, and marked differences in recruitment rates were observed between the periods when the study was advertised as a paid study, and when payments were no longer mentioned. Thus, in the Call condition, when the study was advertised as a paid study, 14 participants in the Call condition and 9 in the No Call condition

consented in a period of just two days. When payments were no longer mentioned in the advertisement, the recruitment rate dropped precipitously, and it took five months to recruit 15 more participants in the Call condition and 25 in the No Call Condition. The entire Spanish sample of 32 participants was recruited with no mention of monetary incentives, thus no such effect was noted, and the sample was recruited in seven months. The slow rate of recruitment sans references to financial incentives necessitated discontinuing recruitment prior to meeting our recruitment goals.

3.1.1. Completion rates

Completion rates, after receiving up to three email reminders in one week, were higher for the Call condition than for the No Call condition at every follow-up period (see Table 1). Numerically, in all but one case (English, 6 month follow-up), a greater proportion of participants in the Call condition completed the follow-up on their own with no phone call reminders compared with the No Call condition, which makes it difficult to attribute the higher completion rates to the telephone calls. The follow-up rates for Call vs. No Call conditions at 1, 3, and 6 months, respectively, were as follows. For English speakers, 58.6% vs. 52.9% (Fisher's exact test, $p > 0.5$), 62.1% vs. 52.9% ($p > 0.5$), and 68.9% vs. 47.1% ($p = 0.12$). For Spanish speakers, 50.0% vs. 35.7% ($p = 0.49$), 33.3% vs. 21.4% ($p > 0.5$), and 33.3% vs. 7.1% ($p = 0.11$). The number of participants who completed follow-up assessments only after being called at 1-, 3- and 6 months was 2/24 (14.3%), 0/9 (0%), and 3/12 (25.0%) for English speakers, and 2/11 (18.2%), 0/12 (0%), and 1/13 (7.7%) for Spanish speakers.

We also calculated study-wide completion rates for the Call and No Call conditions, by dividing the total number of completed follow-up assessments by the maximum number of possible assessments (the total number of participants multiplied by 3 possible follow-ups; see Total row in Table 1). In a Poisson regression analysis that adjusted for language, we tested whether the call condition increased overall response. The call condition did not increase responses overall (odds ratio = 1.34, CI = (0.95, 1.88), $p = 0.9$) while Spanish speaking participants were half as likely to respond than English speakers (odds ratio = 0.54, CI = 0.38, 0.75), $p = 0.003$). Among English speakers, the Call condition yielded 63.2% follow-up rate, whereas No Call condition yielded 51.0% ($p = 0.11$ by comparing total responses to non-responses in a 2×2 table). Among Spanish speakers, the study-wide rates for Call

and No Call conditions were 38.9% and 21.4% ($p = 0.08$). In the Call condition, for English-speaking participants, only 5 (5.75%) out of 87 possible follow-ups were completed either by phone or after a phone conversation; for Spanish-speaking participants only 3 (5.56%) out of 54 possible follow-ups were completed either by phone or after a phone conversation. Given the number of phone call attempts that were made, the investment of resources spent to obtain data via the phone was substantial. To obtain one follow-up assessment, 58.8 calls were needed for English speakers, and 57.7 calls were needed for Spanish speakers.

There was a substantial difference in the English sample in the rate of follow-up completion between those who were recruited by ads mentioning monetary incentives, and those recruited by ads with no reference to monetary incentives. Across all the three follow-up time points, a total of 33 out of 42 (78.6%) follow-up assessments were completed online without any phone call reminder by the group recruited via "paid study" ads, and only 12 out of 45 (26.6%) follow-up assessments were completed by those recruited via ads that did not mention financial incentives.

Out of all the participants randomized to the Call condition, 12.8% (6/47) (English-speaking $n = 29$ and Spanish-speaking $n = 18$) did not provide a correct phone number. Of those we were able to reach on the phone, only 3 participants in the English-speaking sample and 3 in the Spanish-speaking sample completed the follow-up assessment via phone.

4. Discussion

This pilot study raises questions about the practice of using phone follow-ups or financial incentives to increase completion rates. Even though the Call condition yielded slightly higher completion rates at every follow-up period, our findings did not reach significance. While our sample size was smaller than we intended and therefore could have contributed to these null findings, several other factors lead us to question whether these completion rates were actually due to the calls. First, phone call reminders yielded a very modest increase in rates of completion. Secondly, the fact that no one in the Call condition knew their status would make it impossible to attribute higher completion rates without a phone call to the potential extra attention they would receive if they did not respond. In this report, we described the difficulties we faced in the conduct of this investigation. A review of these difficulties may be beneficial for Internet intervention researchers.

Table 1
Percentage completion of follow-up assessments by condition.

| Participants total $N = 95$ | | English $n = 63$ | | | | Spanish $n = 32$ | | | |
|-----------------------------|--|-------------------|-------|----------------------|-------|-------------------|-------|----------------------|-------|
| Language | | Call ($n = 29$) | | No call ($n = 34$) | | Call ($n = 18$) | | No call ($n = 14$) | |
| | | n | % | n | % | n | % | n | % |
| 1 m | Completed on their own | 15 | 51.72 | 18 | 52.94 | 7 | 38.89 | 5 | 35.71 |
| | Completed with live help (message or on phone) | 2 | 6.89 | – | – | 2 | 11.11 | – | – |
| | Completed total | 17 | 58.61 | 18 | 52.94 | 9 | 50.00 | 5 | 35.71 |
| | Not even started | 12 | 41.37 | 16 | 47.06 | 9 | 50.00 | 9 | 64.28 |
| | Total calls | 116 | | | | 64 | | | |
| 3 m | Completed on their own | 18 | 62.07 | 18 | 52.94 | 6 | 33.33 | 3 | 21.43 |
| | Completed with live help (message or on phone) | 0 | 0 | – | – | 0 | – | – | – |
| | Completed total | 18 | 62.07 | 18 | 52.94 | 6 | 33.33 | 3 | 21.43 |
| | Not even started | 11 | 37.93 | 16 | 47.06 | 12 | 66.67 | 11 | 78.57 |
| | Total calls | 80 | | | | 78 | | | |
| 6 m | Completed on their own | 17 | 58.62 | 16 | 47.06 | 5 | 27.78 | 1 | 7.14 |
| | Completed with live help (message or on phone) | 3 | 10.34 | – | – | 1 | 5.55 | – | – |
| | Completed total | 20 | 68.96 | 16 | 47.06 | 6 | 33.33 | 1 | 7.14 |
| | Not even started | 9 | 31.03 | 18 | 52.94 | 6 ^a | 33.33 | 13 | 92.86 |
| | Total calls | 98 | | | | 31 | | | |
| Totals | Completed on their own | 50 | | 52 | | 18 | | 9 | |
| | Completed with live help (message or on phone) | 5 | | – | | 3 | | – | |
| | Not even started | 32 | | 50 | | 27 | | 33 | |
| | Total phone calls | 294 | | | | 173 | | | |
| | Phone calls per completer | 58.8 | | | | 57.7 | | | |

^a An additional six participants had missing data.

The first difficulty we faced was at the recruitment phase, when the study was advertised as a paid study. After a suspicious number of participants recruited in the first two days, the recruitment was suspended, the participants were analyzed, and over 120 participants were later identified as “bots” and excluded from the study. At that point, we elected to not disclose the monetary compensation on the advertisements, and only mentioned it when eligible participants reached the consent form. By the end of the study, there was a clear difference in the Call condition in the behavior of the 14 participants who were recruited in those first two days and the remaining 15 participants. Researchers should be aware of bots (Prince et al., 2012) or any other fraudulent “participants”, especially if recruitment pace exceeds what can be reasonably expected. One way of preventing this problem is the use of a “CAPTCHA” system, which can protect websites against bots by generating tests that humans can pass but current computer programs cannot. Researchers should be further aware that studies advertised as paid may inadvertently recruit “professional participants” who are merely interested in obtaining the study fees.

Another difficulty was that the interpretation of the finding that the proportion of follow-ups completed “on their own” was higher for the Call condition than for the No Call condition for all time points except one. It is difficult to attribute the higher completion rates in the Call condition to the phone calls. The number of participants who completed follow-up assessments after being called was small for both languages, because very few participants were reached. Most importantly, the resource utilization to achieve this goal was substantial. It took 294 phone calls to obtain 5 completed follow-ups for English speakers (ratio call/completer = 58.8), and 173 phone calls to obtain 3 completed follow-ups for the Spanish speakers (ratio call/completer = 57.7). Even though the small absolute number of participants who were reached makes it difficult to draw any definitive conclusions about the efficacy of phone follow-up, researchers should nonetheless be aware of the potential effort needed to contact participants over the phone.

We note also that our statistical test based on the total number of counts is somewhat too liberal as they are based on three correlated binary outcomes for each person and therefore not independent. The actual comparisons are therefore slightly less significant than reported here (e.g., larger than $p = 0.08$).

From our experiences in conducting automated online clinical trials, including this one, we recommend the following:

1. Do not use monetary incentives without methods (such as CAPTCHAs) to ensure that participants are unique human beings, rather than “bots”, and without implementing data protection tools to screen for fake or spurious responses (e.g., asking the same question twice in two places, logic checks).
2. Do not assume that the standard methods listed below will work. If one of them does not work, be prepared to use another one or to try new ones as needed. Attrition can be reduced by utilizing several simultaneous automated or easily routinized methods. These include:
 - a. Monetary incentives
 - b. Email reminders with links to return to the site and to complete follow-up assessments
 - c. Text messages that request quick data points (a mood rating, or whether a smoker has smoked any cigarettes in the past seven days) in the form of a return text message.
 - d. Text messages with links to access an online follow-up survey
 - e. Letters on official university letterhead reminding participants to return to the website, or to be on the lookout for emails, texts, or phone calls from the research team to complete important follow-up assessments.
3. Methods that require individualized live interventions, especially live phone calls, are very expensive and may yield relatively little additional data, at least for general populations invited through

open websites. Automated phone calls would reduce cost, but may not be acceptable to participants who dislike “robo-calls.”

4. Data obtained with very expensive retention methods may not reflect outcomes when the website is used without such methods. Therefore, findings from studies with costly retention methods may not be ecologically valid and thus not generalizable when online interventions are freely available to all.

These findings may only apply to interventions that are broadly disseminated across the Internet (Muñoz et al., 2015). It may be possible to increase response rates in longitudinal surveys as well as adherence to an on-line intervention by using personal contact by peers who are trusted and provide invitations to try an on-line intervention, as one would use with social network interventions. Such peer-based strategies have shown promise for hard-to-reach populations such as homeless youth who are at risk for HIV/AIDS (Jaganath et al., 2012; Rice et al., 2010; Young et al., 2013) and may be useful in wide-scale implementation of evidence-based interventions (Valente et al., 2015).

Though our trial and the outcomes it generated fell short of our hopes and expectations, the lessons we have learned offer valuable insight into the ever-changing nature of technology-based intervention. As technology, including the Internet innovates and matures, and as the expectations of individual users of these technologies changes with it, the researchers who develop Internet interventions should adapt to both the changing technology and consumers' tastes and preferences. We hope that our experiences offer guidance for other researchers planning or developing Internet interventions.

Conflict of interest

The authors report no conflict of interest.

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