



Using different Facebook advertisements to recruit men for an online mental health study: Engagement and selection bias



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ABSTRACT

A growing number of researchers are using Facebook to recruit for a range of online health, medical, and psychosocial studies. There is limited research on the representativeness of participants recruited from Facebook, and the content is rarely mentioned in the methods, despite some suggestion that the advertisement content affects recruitment success. This study explores the impact of different Facebook advertisement content for the same study on recruitment rate, engagement, and participant characteristics. Five Facebook advertisement sets (“resilience”, “happiness”, “strength”, “mental fitness”, and “mental health”) were used to recruit male participants to an online mental health study which allowed them to find out about their mental health and wellbeing through completing six measures. The Facebook advertisements recruited 372 men to the study over a one month period. The cost per participant from the advertisement sets ranged from \$0.55 to \$3.85 Australian dollars. The “strength” advertisements resulted in the highest recruitment rate, but participants from this group were least engaged in the study website. The “strength” and “happiness” advertisements recruited more younger men. Participants recruited from the “mental health” advertisements had worse outcomes on the clinical measures of distress, wellbeing, strength, and stress. This study confirmed that different Facebook advertisement content leads to different recruitment rates and engagement with a study. Different advertisement also leads to selection bias in terms of demographic and mental health characteristics. Researchers should carefully consider the content of social media advertisements to be in accordance with their target population and consider reporting this to enable better assessment of generalisability.

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1. Introduction

Researchers are increasingly turning to the Internet and social media to recruit participants for health, medical, and psychosocial research. Social media networks such as Facebook can instantaneously reach a wide audience or target a specific population with round-the-clock access, providing significant advantages over traditional recruitment methods (Andrews, 2012). In particular, the widespread popularity and targeted advertising capabilities of Facebook make it an important tool for recruiting participants. Facebook has been used to recruit hard to reach groups, such as those in stigmatized communities (Martinez et al., 2014) or minority ethnic groups (Baltar and Brunet, 2012), but also people from the general population (Batterham et al., 2016). Indeed, a recent systematic review reported over 100 studies have used Facebook to recruit participants for health, medical or mental health research, all within the last 8 years (Thornton et al., 2016).

There are two main avenues to recruit participants via Facebook. Researchers can directly promote the study's Facebook page or website through paid text and image-based advertisements displayed on the news feed or side panel. Paid advertisements can be customized towards the interests, demographics, and location of the target population. Facebook also provides a source for snowball recruitment as users can recruit others in their social network into the studies. Most studies have utilized Facebook's paid advertising feature to attract people clicking to the study website (Thornton et al., 2016). Facebook recruitment was found to be cost-effective and rapid, with researchers paying on average USD \$17 per completer (range \$1.36–\$110) for a range of topics, populations, study designs and settings (Thornton et al., 2016). It is likely that more future studies will make use of Facebook as the main source of recruitment.

However, there is limited research on the representativeness of participants recruited from Facebook, and studies that examine this tend to look at demographic factors as proxies of generalizability. For instance, Thornton et al. (2016) reported only 16 out of 110 studies tested the representativeness of their Facebook recruited sample. Their systematic review found that only 36% of studies were representative of the

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population of interest, although 86% of studies reported similar representativeness to those recruited through traditional methods. Facebook recruits tend to have higher education, but no systematic gender or age differences (Thornton et al., 2016). Further, it has been found that various online recruitment methods attract people from different demographics who engage differently in the same study (Antoun et al., 2016). For example, online recruitment strategies that target people who are not actively looking to participate in research tend to attract more diverse participants, but they were less willing to provide personal information compared to those who were actively looking to participate in research online. Yet many internet and mobile health studies recruiting participants online do not report participant engagement, which is an important metric to determine the generalizability of the study results (Lane et al., 2015).

Specifically, few studies have examined the representativeness of participants recruited from Facebook or social media among studies for mental health problems. Lindner et al. (2015) found that participants seeking internet-administered cognitive behavioural therapy for depression differed in demographic and clinical characteristics depending on the source of recruitment. Another study found that participants recruited from Facebook to an online mental health survey tended to be younger compared to respondents to postal surveys (Batterham, 2014). Further, the study found that there was an over-representation of people with mental health problems recruited from Facebook compared to those recruited via traditional methods, and they were more likely to complete the surveys than those without mental health problems.

It is unclear whether different Facebook advertisements also lead to different participant characteristics and engagement. Studies have often used a range of advertisements to promote a study on Facebook, but then grouped participants recruited from different advertisements together in the results (Fenner et al., 2012; Nelson et al., 2014). It has been found that Facebook advertisements with different wording and images can lead to varying recruitment rates (Ramo and Prochaska, 2012). For example, in comparing different images and message types on Facebook, advertisements with the study logo and general information led to more clicks to an online study (Ramo et al., 2014). This presents potential for self-selection bias if people are more likely to engage in the study because the advertisement interests them, and if they have different characteristics to those who do not participate. For instance, Batterham (2014) found that negative terminology (e.g. “mental health problem”) rather than positive terminology (e.g. emotional well-being”) in Facebook advertisements led to higher completion rates in a mental health survey. This suggests that the content of Facebook advertisements may potentially lead to self-selection bias during recruitment and affect the generalizability of study results.

The current study aimed to address these issues by 1) exploring the impact of different Facebook advertisement content for the same study on recruitment rates and engagement, and 2) examining whether the participants recruited from the different advertisements show systematic selection bias in their demographic and clinical characteristics. This study targeted men only because they are often a difficult group to recruit for mental health research using traditional methods (Woodall et al., 2010), but there is encouraging research suggesting Facebook may increase their participation rate (Ellis et al., 2014).

2. Methods

2.1. Participants

Participants were recruited for an online study known as “Mindgauge” that allowed people to measure different aspects of their mental health and wellbeing. Individuals were eligible to participate in this study if they were 18 years or older, were resident in Australia, and had a reasonable understanding of the English language. As a consequence of the funding for this study, the aim was to target people in male-dominated industries.

2.2. Facebook recruitment

In order to test the impact of different Facebook advertisement content, five Facebook advertisement sets with themes focused on “mental fitness”, “resilience”, “happy”, “strength” and “mental health” were approved and launched simultaneously during 1–30 November 2015. Two proposed advertisement sets on “mental health” and “stress” were not approved by Facebook because the “mental health” image was believed to represent an “idealized body image”, while the use of the word “stress” allegedly contravened Facebook advertising policy. Fig. 1 describes the wording used for each of the remaining five advertisement sets and the flow of Facebook recruitment for each set.

Each advertisement set contained advertisements with the same wording together with one of a few images relevant to that particular set (e.g. a “mental fitness” advertisement had an image of a man sitting contently on a grass field; a “strength” advertisement had an image of a man licking an axe) (Supplementary Fig. A). A user experience specialist selected the images that were thought to align with the theme of each advertisement set. In order to reduce the effect of a certain image attracting users rather than the overall content, each advertisement set contained several different images, and some of these images overlapped between advertisement sets. Facebook displayed all the advertisements within each advertisement set until it is clear which particular image is best performing, and that advertisement will then be displayed the most (Facebook, 2017b). All advertisements also provided information that the study was “funded by Movember” to acknowledge the funding organization and to raise interest among the male target population.

All the Facebook advertisement sets were targeted to males aged from 18 to 65+ years (no upper age limit), in Australia, and in the transportation and moving, military, farming, fishing and forestry, protective service, or construction and extraction industries. Each advertisement set was given a lifetime budget of \$100 Australian dollar (AUD) for the one month recruitment period. While the budget only allowed for a certain number of the potential Facebook target audience to be reached, Facebook did not provide information on the mechanisms that determined which advertisement set is shown to whom. However, when advertisement sets from the same advertiser targeted similar audiences, Facebook entered the one with the best performance history and prevented the others from competing to be shown (Facebook, 2017a).

Clicking on the Facebook advertisements directed interested individuals to the study website. Each Facebook advertisement set was tagged with a special code in the link to the study website. This allowed the researchers to cross-reference each participant with the specific Facebook advertisement set they clicked on.

2.3. Study enrolment and participation

On the website landing page, interested individuals were provided with a participant information sheet outlining what was involved in the study. Individuals were counted as participants from the time they gave consent to participate in the study after reading the participant information sheet. Participants then filled out basic demographic details. As shown in Fig. 2a, the website then provided six different measures on symptoms, wellbeing, resilience, strengths, stress, and sleep (as described in the measures section). All six measures were offered to participants on one screen, with the order in which the measures were listed being varied randomly. Participants could choose to complete any of these measures in any order of their liking.

Each measure produced a single numeric score, which was presented to the participant as a simple gauge as shown in Fig. 2b. For the sake of simplicity, all scores were normalized to fall between 0 and 100. The possible scores were subdivided into three ranges—low, medium, and high—which were colour-coded (as red, orange or green) to indicate desirability. For example, a low resilience range was coded red, while a low stress range was coded green. The ranges were generally determined by

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