Effect Of Recruitment Strategies And Mixed-Mode Design On Survey Response: A Between-Subjects Factorial Design

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Abstract:
The researcher explored the impact of email prenotifications, follow-up reminders, and mixed-mode design on survey response rates among four conditions when applying a 2 (prenotification: yes, no) × 2 (follow-up: email, WhatsApp) between-subjects factorial design. Further, the researcher investigated the impact of including the phrase "All I need is 10 more people" during the survey distribution. Results indicated that using both email prenotifications and follow-up reminders simultaneously, as well as multiple follow-up reminders in the form of both email and social media applications, increased the response rate. Further, using the phrase "All I need is 10 more people" during the second-follow reminder both increased the response rate and motivated the university to support the researcher.

Keywords: survey response rate, follow-up reminders, mixed-mode design, factorial design, WhatsApp-based survey.

Introduction

Because low response rates can affect survey quality, social scientists and researchers are increasingly becoming concerned that there is a decreased willingness within populations to respond to surveys (Hellevik, 2016). Declining response rates is not a new concern (Singer, 2006), but it is a significant one that survey research must pay more attention to (Hox & De Leeuw, 1994). Shih and Fan (2009) asserted that many researchers have been investigating methods that can be used to increase response rates. The aim of these efforts is to increase the number of respondents and minimize the probability of biased results (National Research Council, 2013; Shih & Fan, 2009). Further, Andrews et al. (2003), Sheehan (2001), and Keusch (2012) recommended using diverse kinds of recruitment techniques to increase respondents' readiness to reply to online surveys.

Koopman et al. (2013) reported that follow-up reminders may increase response rates. A meta-analysis by Nakash et al. (2006) also demonstrated the importance of follow-up reminders to increase response rates. Shih and Fan (2009) found that follow-up contact increased response rates. Moreover, contacting prospective respondents in advance had a positive effect on response rates (Beebe et al., 2010; Lynn, 2016; Ritter & Sue, 2007). Kaplowitz et al. (2004) found that an online survey can increase the response rate if email prenotifications complement it and recommended further studies on the effectiveness of email prenotifications. However, Hart et al. (2009) claimed that most studies investigating the effectiveness of sending prenotification letters to prospective respondents have only been conducted with paper questionnaires, limiting researchers' ability to generalize the results to email surveys.

Response rates also increase when using prenotification combined with other factors, such as follow-up contact and short surveys (Sheehan, 2001). Beebe et al. (2010) found that response rates to email surveys were declining and argued that the use of prenotifications and the survey length can affect the response rate. Based on previous studies, Dykema et al. (2011) found that using both prenotifications and incentives increased survey response rates. Cook et al. (2000) conducted meta-analyses of 49 studies with 68 surveys, to examine the factors that affect response rate. They found that follow-up notices and prenotifications are factors that are most likely to increase the response rate.

Over the past decade, social media has been used in contemporary societies as a dynamic instrument of communication (Alsanie, 2015). Google applications have become more efficient when combined with other survey modes (Gordon et al., 2006). WhatsApp is one of the numerous mobile instant messaging services (MIM) available in the market in addition to Line, Hike, Nimbuzz, WeChat, iMessage, Viber, Skype, Facebook Messenger, and Telegram (Ansari & Tripathi, 2017). WhatsApp has been one of the most preferred cross-platform messaging mobile applications (Cetinkaya, 2017; Kaliyadan et al., 2016). In Saudi Arabia, the widest tool used daily for connecting individuals and friends is WhatsApp (Alsanie, 2015). WhatsApp became the first and most well-known application with 30.67 million users or 87.40% of the Saudi population (Global Media Insight, 2022). According to the statistics for the third quarter of 2017, compared to other selected countries, Saudi Arabia had the highest proportion of active users of WhatsApp at 73% of the population (Statista, 2017). The reasons for the decrease in response rates are unclear, but it is beneficial to examine solutions related to the data collection methods (O'Connell, 2010). Thus, the current study will use WhatsApp as an alternative survey communication mode.

Overall, some researchers believe that an acceptable response rate is unachievable in most surveys and that the future of survey research is in jeopardy (Hellevik, 2016). Therefore, the present research is designed to explore the impact of various factors and of WhatsApp-based survey methods on survey response rates in Saudi Arabia. It is imperative to better understand the relationship among prenotifications, follow-up reminders, mixed-mode design, and response rates. The research investigates whether these factors predict high survey response rates in Saudi Arabia. Thus, the main research questions are as follows:

1. Does using email prenotifications affect the response rate in Saudi universities?
2. Does using email or WhatsApp follow-up reminders affect the response rate in Saudi universities?
3. Does using email prenotifications and follow-up notices simultaneously affect the response rate in Saudi universities?
4. Does using the phrase "All I need is 10 more people" in the follow-up affect survey response?

Literature Review

Researchers have been investigating factors that may increase survey response rate, claiming that response bias may cause external validity issues. A lower response rate implies that a smaller proportion of the target population participated in the survey, which is a risk researchers have to face (Lindén-Boström & Persson, 2012). Lower response rates make it difficult to generalize results to the population (Sivo et al., 2006) and may lead to poor results as well (Hellevik, 2016; Sivo et al., 2006). However, the likelihood of nonresponse bias might be minimized by obtaining high response rates (Groves & Peytcheva, 2008).

Researchers have been attempting to face the primary challenge of the decline in web-based survey response rates (Fan & Yan, 2010; Hart et al., 2009). One reason for the

decline is the lack of studies examining viable techniques that may increase the rates (Crawford et al., 2001). Therefore, it is necessary to explore how to reach the accessible survey population and solicit its participation in the survey (Sheehan, 2001), as well as examine other factors regarding questionnaires and participants (Steinbrecher et al., 2014). For example, offering incentives effectively in web surveys depends on the target population's characteristics, regardless of the quantity and nature of the incentives (Stern et al., 2017). The mixed-mode design is one of the alternative designs that may mitigate the response rate issue, because it tends to be the best design for accessing a vast amount of the target population (Couper, 2000). Stern et al. (2017) emphasized the importance of choosing an appropriate survey mode to match the study population.

Crawford et al. (2001) claimed that email prenotifications may play a larger role than survey content information in terms of attracting the target population to participate in the survey. The results showed that sending only email prenotifications was associated with partially lower response rates than sending email prenotifications with an incentive (Jacob & Jacob, 2012). Because of the large number of emails containing diverse contents people receive daily from different senders, many people prefer to adopt technical solutions such as spam filters (Keusch, 2012). Nevertheless, participation in surveys would be more likely to increase when using email prenotifications. Results have shown that precontacting prospective respondents increased the overall response rate (Dykema et al., 2011; Koopman et al. 2013; Lynn, 2016).

Sending a prenotification message that includes the survey layout would reduce the breakoff rate, which in turn would affect the response rate (Keusch, 2012). Hart et al. (2009) concluded that precontacting participants by telephone or email increased the response rate (although the difference was small), and the overall response rate was very high compared to that of past studies.

Many studies have been investigating several methods to increase the response rate. The impacts of pre- and postcontact have been explored in many such studies, but no study has addressed the effect of using prenotifications and follow-up simultaneously (Hammink et al., 2010). Results have demonstrated that follow-up reminders were the most significant predictor of response rates, OR = 3.71 (95% CI: 2.30, 5.9), p < .00001 (Crawford et al., 2001), but this applied only to shorter surveys (Nakash et al., 2006). Although the response rate was not increased in the group that received both prenotifications and a follow-up as compared with the group that received only a follow-up, the researchers suggested adding a second follow-up to the group that received both prenotifications and a follow-up (Crawford et al., 2001; Koopman et al., 2013). Although sending a second and third email reminder did not statistically significantly raise the response rate for offline surveys but did raise it for internet surveys (Westlake et al., 2001).

One study's results demonstrated that there was a positive relationship between follow-up reminders and response rate, but this relationship was only statistically significant for the group not receiving an advanced letter, F (1, 19.889) = 84.40, p < .05 (Kaplowitz et al., 2004). The results of another study showed no correlation between using both prenotifications and follow-up and response rate. However, considering other factors, such as the study population, is crucial when interpreting such results (Hammink et al., 2010). Furthermore, Sheehan (2001) highlighted the importance of taking advantage of contemporary resources that might be helpful for achieving research objectives and suggested that further studies investigate not only email surveys but also other survey modes and complementary techniques.

Researchers have been exploring numerous approaches to combat the response rate issue. The factors influencing the response rate may be associated with the modern patterns of people's lives in terms of communication technology (Kempf & Remington, 2007). Hill

et al. (2014) questioned whether the next wave in survey research would occur under the dominance of social media. Dusek et al. (2015) took advantage of social media by disseminating their web-based questionnaire through LinkedIn. Additionally, Global Media Insight, an online analytics company, offers its services to help researchers who use social media applications to more effectively contact people in Saudi Arabia or abroad (Global Media Insight, 2022). The use of social media in Saudi Arabia has extended quickly to play a major role in many areas of people's lives (Global Media Insight, 2022). For example, 30 million people use WhatsApp in Saudi Arabia, and it is reported to be the most popular mobile application in the region (Global Media Insight, 2022). Cetinkaya (2017) emphasized the importance of the role social media plays in both education and people's lives, concluding that using WhatsApp in education offers advantages regarding technology, learning, and academia.

Dusek et al. (2015) suggested that researchers access social media platforms to recruit hard-to-reach populations, and they used social media to sample these populations by adopting a snowball approach. Furthermore, because the decline in response rates has been an issue in quantitative research for several decades, there is a need to research modern, scientific data collection methods.

Because of the development of mobile technologies and expanded access to the internet, survey research is expanding drastically, emphasizing the active advantages researchers can obtain when using mobile applications (Hill et al., 2014). Therefore, to enhance survey administration, researchers should consider developing the relevant technologies and scientific methodologies (Kempf & Remington, 2007).

Methodology

Study Design and Sampling Procedures

The researcher explored the impact of email prenotifications, follow-up reminders, and mixed-mode design on survey response rates in Saudi Arabia. The researcher used logistic regression to examine whether response rates (a dichotomous variable) would be significantly different among the four conditions when applying a 2 (pre-notification: Yes, No) $\times$ 2 (Follow-up: E-mail, WhatsApp) between-subjects factorial design. Table 1 illustrates the 2×2 factorial design based on the levels of the independent variables. The study's target population was all faculty members at four Saudi universities who worked as assistant professors, associate professors, or professors during the 2018–2019 academic year. The total population of the research was 5,951. The study population included both male and female participants and Saudi and non-Saudi faculty members. Four universities were selected such that the ranking of each university and its regional location with respect to other universities were well-distributed to enhance generalizability.

Because of the nature of WhatsApp's messaging platform, random sampling was considered impractical in this study, which was fundamentally concerned with investigating factors increasing the response rate in Saudi Arabia. Rather, the nonprobability sampling method of purposive (or selective) sampling was used because of the nature of the research design to maintain the variability of the sample. Additionally, the researcher used snowball sampling for the conditions using the WhatsApp mode of communication. This technique may be appropriate for conducting follow-up interventions using WhatsApp.

The sample was split into four groups according to the survey distribution mode and pre-post contact situation, as Table 2 illustrates. Each group received the questionnaire either by email or WhatsApp. Group 1 received four contacts, a prenotification email, an email survey, a follow-up reminder email, and a second follow-up reminder. Group 2 received three contacts, an email survey, a follow-up

reminder email, and a second follow-up reminder. Group 3 received three contacts, a prenotification email, an email survey, and a follow-up message on WhatsApp. Group 4 received two contacts, an email survey, and a follow-up message on WhatsApp. The prenotification email was sent to the assigned group three days before the survey delivery, and both the follow-up email and WhatsApp message were sent three days after the survey delivery. Dillman (2007) stated that three days, at maximum, before delivering the survey is the recommended time for precontacting prospective respondents (as cited in Hart et al., 2009, p. 21). Koundinya et al. (2016) claimed that follow-up contact occurring over a limited period is likely to raise the response rate.

By using logistic regression, generalized linear model, crosstab, and ANOVA, the researcher answered the following main research questions:

1) Does using email prenotifications affect the response rate in Saudi universities?
2) Does using email or WhatsApp follow-up reminders affect the response rate in Saudi universities?
3) Does using email prenotifications and follow-up notices simultaneously affect the response rate in Saudi universities?
4) Does using the phrase "All I need is 10 more people" in the second follow-up affect survey response?

Table 1. 2×2 Factorial Design for survey modes and group conditions

		Follow-up reminders	
		E-mail	WhatsApp
	Yes	Group 1	Group 3
Pre-notification	No	Group 2	Group 4

Table 2. Research Design for all survey modes and group conditions

Group	Prenotification	Survey	1st follow-up	2nd Follow-up
1	Email	Email	Email	Email
2	-------	Email	Email	All I need 10
3	Email	Email	WhatsApp	-------
4	-------	Email	WhatsApp	-------

Data Collection Procedures

The researcher contacted the scientific deanship at each university selected to participate in the study. Emails sent to the deans mentioned the purpose of the study and asked them to send the surveys to prospective participants. Additionally, the researcher minimized the impact of other factors on the response rate, such as question characteristics, by controlling them using the same surveys and survey modes across all groups. As discussed earlier, the

sample of the study was divided into four groups and four phases.

In the first phase, email prenotifications were sent to groups 1 and 3 to participate in the study. After three days, the second phase started, which involved distributing the surveys via email to all four groups. In the third phase, follow-up reminders were sent to all four groups after 3 days. Follow-up interventions were sent via email to groups 1 and 2. The other two groups, 3 and 4, received follow-up messages via WhatsApp. In

the fourth phase, groups 1 and 2 received their second follow-up messages.

Data Analysis

To answer the research question of whether the variation in experimental design affects response rates in Saudi Arabia, the researcher used logistic regression to examine the relationship between the independent variables (prenotification invitation and follow-up survey mode) and the binary dependent variable: whether recipients responded to the survey (0 = no and 1 = yes). The null hypothesis that there were no interaction effects between the independent variables and that the β coefficients were equal was also examined using the likelihood ratio test (and the Wald test). Using data entered previously into SPSS version 22.0, the researcher first tested whether the assumptions of logistic regression were met. A significance level of .05 was used, and chi-square statistics were adopted to determine whether each main effect was significant as well as to examine the interaction effects.

Results

Binary logistic regression analysis was conducted to examine the relationship between the levels of predictor variables and the dependent variable of whether members of each group responded to the survey. The dependent variable was dichotomous and was coded as 0 for "no response" and 1 for a response. The predictor variables were email prenotifications and follow-up reminders. The two levels of the prenotification email variables were initially coded as 2 when participants did not receive prenotifications and 1 when they did receive prenotifications. However, to make the results more interpretable, email variables were recoded such that the No prenotifications group was the reference group. Accordingly, the two levels of the follow-up reminder variable were originally coded as 1 for email and 2 for WhatsApp but were recoded as 0 for email and 1 for WhatsApp. While acknowledging the potential for model misspecification, the first two research questions examined the bivariate logistic regression for prenotifications and follow-up separately. Research question 3 provided the results for the completely specified model, including the interaction between prenotifications and follow-up.

Question 1. Does using email prenotifications affect the response rate in Saudi universities?

Binary logistic regression was conducted separately to examine whether email prenotifications and follow-up reminders significantly predicted survey response rate. In the model that included only email prenotifications, this variable significantly predicted survey response rate, $\chi^2(1, N = 5951) = 5.270$, $p = .022$. The odds ratio was examined to understand the association between the predictor and outcome variables. The odds of the group that received email prenotifications responding to surveys were 1.504 times greater than the odds of the group that did not receive email prenotifications responding to surveys, $\chi^2(1, N = 5951) = 5.319$, $p = .021$, OR = 1.504 (Table 3). In other words, the results showed that the group that received email prenotifications was more likely to respond than the group that did not receive email prenotifications.

Table 3. Summary of Logistic Regression Analysis for Predicting Survey Responding Group

Variable	B	OR	X^{2C}
Block 1			5.270*
PreEmail	0.408	1.504	5.319*
Constant	-4.380	0.013	249.542*

* p < .05

Reference group: e-mail prenotification = No

Question 2. Does using email or WhatsApp follow-up reminders affect the response rate in Saudi universities?

The group received an email or WhatsApp follow-up reminder was entered as a single variable in the model. According to the omnibus test, the type of follow-up reminder given significantly predicted response rate, $\chi^2(1, N = 5951) = 62.533, p < .001$. The odds of responding were 4.17 higher for those who received follow-up emails compared to those who received follow-up reminders through WhatsApp, $\chi^2(1, N = 5951) = 57.600, p < .001$, OR = 4.17. In other words, people in the email follow-up group were more likely to respond than people in the WhatsApp follow-up group. Table 4 summarizes the binary logistic regression coefficients, Wald statistics, and odds ratio for this model.

Table 4. Summary of Logistic Regression Analysis for Predicting Survey Responding Group

Variable	B	OR	X^{2C}
Block 1			62.533*
Follow-up	1.428	4.170	57.600*
Intercept	-4.509	.011	864.542*

* p < .05
Reference group: Follow-up = WhatsApp.

Question 3. Does using email prenotifications and follow-up notices simultaneously affect the response rate in Saudi universities?

Whereas Q1 and Q2 intended to examine the bivariate relationship between each prenotification/follow-up and response separately, Q3 aimed to test the complete model. Prenotification (no = 1), follow-up (WhatsApp = 1), and the two-way interaction between these variables were entered simultaneously into a standard logistic regression model predicting the survey response rate in Saudi universities. According to the omnibus tests, the null hypothesis that the slopes of the predictor variables were equal was met (H_0: $\beta_{pre} = \beta_{follow-up} = 0$); thus, prenotification and follow-up variables were jointly related to response rate, $\chi^2(1, N = 5951) = 115.146, p < .001$. In the presence of follow-up as a predictor variable, email prenotifications were significantly related to survey response, $\chi^2(1, N = 5951) = 35.999, p < .001$. That is, the odds of the people who received prenotifications responding were 3.75 times higher than the odds of those who did not receive prenotifications responding, OR = 3.75 (the inverse of .267), p < .001. Additionally, after controlling for email prenotifications, the type of follow-up reminder was found to be significantly related to survey response, $\chi^2(1, N = 5951) = 106.073, p < .001$. The odds of groups that received email follow-ups responding to surveys were 15.38 times greater than the odds of groups that received WhatsApp follow-ups responding to surveys, OR = 15.38 (the inverse of .065), p < .001.

Moreover, the interaction between prenotification emails and follow-up notices was statistically significant, $\chi^2(1, N = 5951) = 50.532, p < .001$. Thus, it is critical to interpret the results of the main effects cautiously. Among groups that received prenotification emails, the odds of responding after receiving email follow-ups were 15.38 (the inverse of .065) times greater than the odds of responding after receiving WhatsApp follow-ups, as follows: for WhatsApp follow-up, if prenotification = 0 (Yes) $\Rightarrow$ (.065) $\times$ (14.737)^0 = .065. That is, among groups that received email follow-ups, receiving email prenotifications increased the response rate

compared to not receiving them. Among groups that received WhatsApp follow-ups, those that received email prenotifications were less likely to respond than those that did not receive them, considering the small sample size of the

WhatsApp group. Table 5 shows the main results of the interaction between prenotification and type of follow-up, and Figure 1 shows the interaction between prenotification and follow-up type.
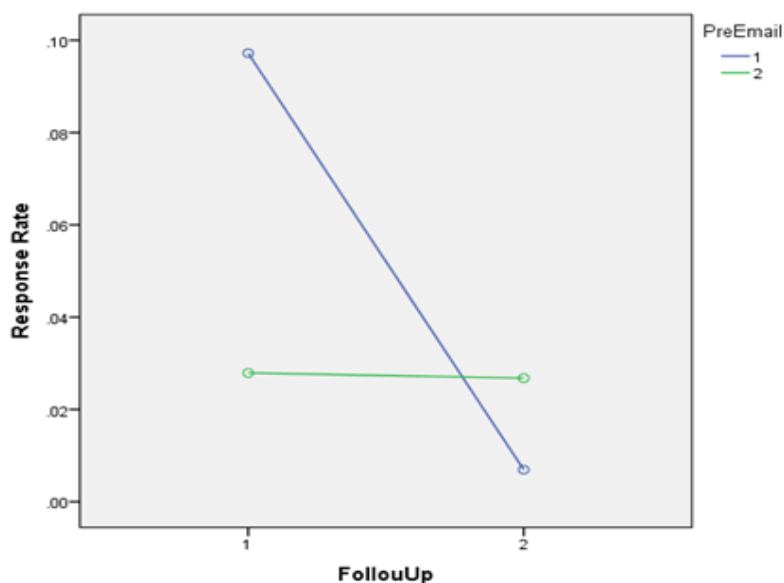

Figure 1: The interaction between prenotification and follow-up type.

Table 5. Summary of Standard Logistic Regression Analysis for Predicting responding Group.

Variable	B	OR	X^{2C}
Block 1			115.146*
PreEmail= no	-1.322	.267	35.999*
WhatsApp Follow-Up	-2.730	.065	106.073*
Follow-Up by PreEmail	2.690	14.737	50.532*
Constant	-2.229	.108	201.817*

* p < .05

Question 4. Does using the phrase "All I need is 10 more people" in the second follow-up impact survey response?

To answer this question, a binary logistic regression was conducted to predict survey response from the group that received this phrase. The group that received the phrase "All I need is 10 more people" in its second follow-up was divided into three subgroups: groups that responded to the initial survey,

groups that responded to the first follow-up reminder, and groups that responded to the second follow-up reminder. Entering these groups in the model revealed whether including this phrase in the second follow-up was significantly related to survey response rate, $\chi^2(2, N = 4623) = 9.226$, p =.010.

The findings showed that the phrase "All I need is 10 more people" increased the likelihood of response when it was included in

the second follow-up reminder, compared to the initial survey and first follow-up reminder. The odds of someone responding after receiving this phrase during the second follow-up were 2.70 times greater than the odds of someone responding after receiving the initial survey, $\chi^2(1, N = 4623) = 6.369$, $p = .012$, OR = 2.70 (the inverse of .371). Additionally, the odds of people who received the phrase during the second follow-up responding were 2.42 times greater than the odds of people who received the phrase during the first follow-up responding, $\chi^2(1, N = 4623) = 5.474$, $p = .019$, OR = 2.42 (the inverse of .413). Table 6 displays the binary logistic regression

coefficients, Wald statistics, and odds ratio for this group. Figure 2 depicts the increased response rates when moving from the initial survey to the first follow-up to the second follow-up. The significant omnibus test was followed by all pairwise comparisons to examine the effect of the second follow-up using the Holm-Bonferroni method for controlling family-wise Type I error at .05. The mean differences between initial vs 1st follow-up were not significant, $p = .851$; those between initial vs 2nd follow-up were significant, $p = .005$; and those between 1st follow-up vs 2nd follow-up were also significant, $p = .009$.
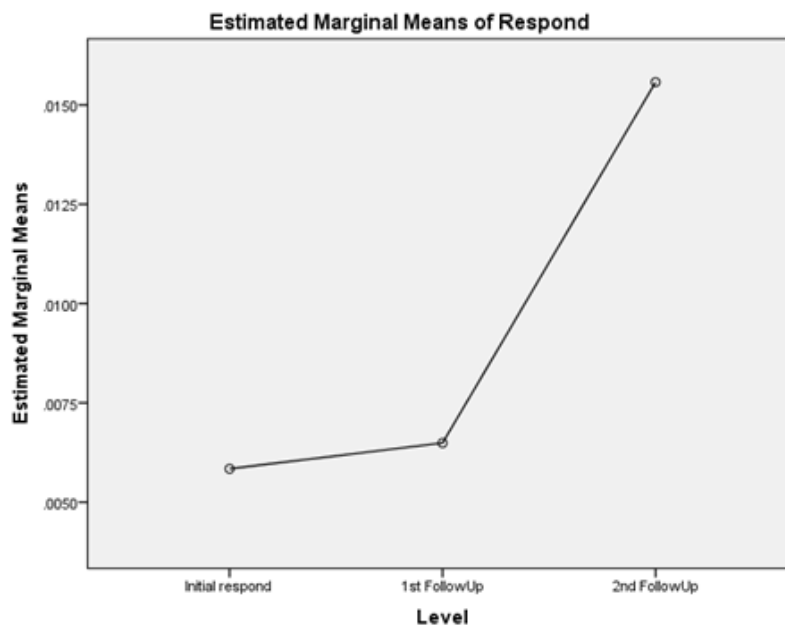

Figure 2: Group Levels*Response rate

The cross-tabulation (Table 7) revealed that the second follow-up group reported the highest response rate against the other two groups, chi-square = 9.906, Cramer's V = .046, $p = .007$.

Most of the respondents (55.8%) were in the second follow-up group, whereas 20.9% and 23.3% of the respondents were in the initial survey and first follow-up groups, respectively.

Table 6. Summary of Logistic Regression Analysis for Predicting Responding Group

Variable	B	OR	X^{2C}
Block 1			9.226*
Initial Respond	-.991	.371	6.369*
1st Follow-up	-.885	.413	5.474*
Constant	-4.146	.016	406.204*

* p < .05
Reference group: 2nd Follow-up, "all I need is 10 more people"

Table 7. Level * Respond Crosstabulation

			Respond		Total
			0	1	
Level	Initial respond	Count	1532	9	1541
		% within Level	99.4%	0.6%	100.0%
		% within Respond	33.4%	20.9%	33.3%
		% of Total	33.1%	0.2%	33.3%
	1st Follow-Up	Count	1531	10	1541
		% within Level	99.4%	0.6%	100.0%
		% within Respond	33.4%	23.3%	33.3%
		% of Total	33.1%	0.2%	33.3%
	2nd Follow-Up	Count	1517	24	1541
		% within Level	98.4%	1.6%	100.0%
		% within Respond	33.1%	55.8%	33.3%
		% of Total	32.8%	0.5%	33.3%
Total		Count	4580	43	4623
		% within Level	99.1%	0.9%	100.0%
		% within Respond	100.0%	100.0%	100.0%
		% of Total	99.1%	0.9%	100.0%

Discussion

The researcher conducted a binary logistic regression analysis to explore the relationship between the presence or absence of email prenotifications and the follow-up notification delivery method and whether or not participants responded to the survey. This study used mixed-mode design, which included the use of both email and WhatsApp during the follow-up reminders.

The results showed that the group that received an email follow-up was more likely to respond than the group that received a WhatsApp follow-up reminder. Because of the lack of resources for using WhatsApp as a survey method, future studies should investigate why email follow-up reminders lead to a higher response rate than WhatsApp

follow-up reminders. One important aspect of this study that might provide a hint about the difference between email and WhatsApp reminders is that the sample receiving WhatsApp follow-up reminders was much smaller than the sample receiving email follow-up reminders. More discussion about this issue is conducted below in the limitations section.

Although the impacts of pre- and post-contact in increasing survey response rate have been investigated in numerous studies, none of them have investigated the effects of using prenotifications and follow-up reminders simultaneously (Hammink et al., 2010). Furthermore, Koopman et al. (2013) concluded that sending prenotification messages alone did not increase the response rate. This conclusion was taken into consideration in the current

study. The next section will discuss the results for the question investigating the impact of simultaneously using email prenotifications and follow-up notices on the response rate.

The results showed that the interaction between email prenotifications and follow-up notices was significantly related to survey response rate; therefore, the main effects of the analysis should be interpreted cautiously (Kleinbaum et al., 2010). These interaction results revealed that, among groups that received email prenotifications, people who received email follow-ups were more likely to respond than those who received WhatsApp follow-ups. Among groups that received email prenotifications, receiving email follow-ups (versus WhatsApp follow-ups) positively increased the odds of survey response, OR = 15.385 (the inverse of .065), p < .001. These findings resulted from the following formula: for WhatsApp follow-up, if prenotification = 0 (Yes) $\Rightarrow (.065) \times (14.737)^0 = .065$. The findings can be interpreted in two ways. First, among those who received email follow-ups, receiving email prenotifications increased the response rate compared to not receiving them. This interpretation is partially consistent with the results of the Kaplowitz et al. (2004), who found that follow-up reminders were positively related to response rate and that a significant relationship between follow-up reminders and response rate existed only for those who did not receive a prenotification. Second, among those who received WhatsApp follow-ups, those who received email prenotifications were less likely to respond than those who did not receive them. This may be due to the small sample size of the WhatsApp group and other factors discussed below in the implications and limitations sections.

Additionally, the interaction between prenotification and follow-up levels could not be represented visually using logistic regression because of the 2×2 factorial design, so the researcher assembled a profile plot to provide an additional insight into the significant interaction prenotification and follow-up levels. The graph showed that there was a significant interaction between prenotification and follow-up levels (Figure 1). Thus, the present study showed that taking advantage of each statistical method can improve the understanding of the results, and future researchers should avoid limiting themselves to the use of only one analysis procedure.

Koopman et al. (2013) found that using both prenotifications and follow-up did not raise the survey response rate compared to using only follow-up. Nevertheless, they suggested adding a second follow-up to the group receiving prenotifications. This recommendation was considered in the current study, and the phrase "All I need is 10 more people" was added in one of the two groups receiving a second follow-up reminder. The next section will discuss the results of the question examining whether adding a second follow-up with this phrase affected the survey response.

The group that received the phrase "All I need is 10 more people" in the second follow-up was classified into three subgroups: the initial survey, the first follow-up reminder, and the second follow-up reminder groups. People who received this phrase during the second follow-up were more likely to respond to surveys than those who received the initial survey and those who received the first follow-up. The results of univariate one-way ANOVA showed an increase in response rates when moving from the initial survey to the first follow-up to the second follow-up reminders. Thus, using this phrase may play an emotional role in motivating respondents because there is a relationship between motivations and emotions (Sincero, 2012), and certain emotions have been found to influence decision-making (Lerner et al., 2015).

This study only aimed to examine factors affecting survey response rate. However, it is worthwhile to address the ongoing debate about how to define response rate. For example, whereas some researchers define response rate by taking the entire sample into consideration, others insist on including only those people who actually received the

survey (Fincham, 2008). Thus, the debate continues.

Limitations

A limitation of our study is that the researcher faced a challenge in data collection because universities do not allow researchers to access the email list of their faculty members. Rather, surveys must be sent internally on behalf of the researcher. This makes it difficult to calculate response rate because there is no way to determine how many people actually received the survey. This challenge of reaching the sampling frame may be understood by considering Meyers et al.'s (2017) declaration that university is one of the contexts in which researchers find a hard-to-reach population. This makes it difficult to achieve a desirable sample size. This problem emerged during data collection, when the researcher had to contact one of the deans, who explained the difficulty universities face when asking faculty to respond to their emails. The researcher later received an email from one of the faculty members asserting that he does not respond to surveys, confirming the dean's statement.

Snowballing technique, which Dusek et al. (2015) recommended, was considered a justifiable method to recruit members of this so-called hard-to-reach population. However, there were some challenges associated with sending surveys through WhatsApp. First, because of the impossibility of contacting the sample directly through WhatsApp, the researcher asked several faculty members to volunteer to distribute surveys to their colleagues. Thus, there was no way to know how many members of the target population received the WhatsApp-based survey. Second, it is unlikely that everyone in the sample who received the surveys through emails also received WhatsApp follow-up messages. Therefore, this study used a "worst-case scenario" for attempting to solicit responses from the hard-to-reach population.

Conclusion

The researcher explored the impact of email prenotifications, follow-up reminders, and mixed-mode design on survey response rates in Saudi Arabia. Many studies have investigated factors influencing the survey response. However, no studies have investigated the impact of using contemporary tools such as WhatsApp in mixed-mode design on survey response rate. Further, this study used various statistical methods to investigate whether response rates differed among the four conditions when applying a 2 (prenotification: yes, no) × 2 (follow-up: email, WhatsApp) between-subjects factorial design. The sample was divided into four groups separated by survey distribution mode and pre-post contact situation. The results of this study suggested that researchers should use both email prenotifications and follow-up reminders simultaneously, as well as multiple follow-up reminders in the form of both email and social media applications. Although the results showed that WhatsApp follow-up was less effective than email follow-up, future research should continue to examine factors affecting the use of social media or mobile applications such as WhatsApp, which are quick and productive methods of communication (Ansari & Tripathi, 2017; Kaliyadan et al., 2016). Future research should also examine the use of these applications in tandem with other significant factors, such as the study population's characteristics (Hammink et al., 2010).

Further, this study investigated the impact of including the phrase "All I need is 10 more people" during survey distribution, and the results revealed that using this phrase during the second-follow reminder both increased the response rate and motivated the university to support the researcher. These results have strong implications for the use of this messaging strategy to improve survey distribution methodology, especially for researchers who study hard-to-reach populations wherein low response rates are expected. Thus, researchers may consider the

impact of using such phrases on the inclination of populations to respond to surveys. However, such use needs further investigation in future research. This investigation might be conducted using an interdisciplinary approach involving the education and psychology fields.

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