Attachment D ● Supporting evidence on study to assess strategies to improve response rates

Objective

Given declining national trends in survey response rates (National Research Council 2013), the National Science Foundation (NSF) is interested in rigorously testing the effect of alternative follow-up strategies with nonrespondents to increase survey response rates and minimize response rate bias in online surveys. This study will examine whether harder-to-reach participants are more likely to respond to surveys if they receive a personalized follow-up email from their principal investigator (PI) or are contacted via social media.

Overall Approach

This study will examine the relative effectiveness of two higher-cost survey follow-up methods for NSF participants who do not initially respond to the survey. These harder-to-reach participants will be randomly assigned to one of three conditions:

1. Receiving a follow-up email automatically generated by the NSF Education and Training Application (ETAP) system participants had used to apply to the program (the low-cost control condition)
2. Receiving the automatic follow-up email (described above), plus a follow-up email from the principal investigator of the award participants had been involved in (the first higher-cost treatment condition)
3. Receiving the automatic follow-up email (described above), plus a follow-up message from NSF ETAP program staff via social media (the second higher-cost treatment condition)

The study will include all ETAP Sites (that is, NSF awards pilot-testing the ETAP system) and leverage one of the participants surveys administered through the systems (see Timing section for additional information). Those who do not initially respond to the survey will be randomized to receive additional follow-up. We expect about 30 percent of participants to not initially respond to the survey.[4]

Treatment and Control Conditions

The survey will be web based, since university students are more likely to respond to web surveys than paper surveys (Shih & Fan, 2008), and all participants will receive prenotifications via SMS (if have consented to receive messages when applying to the program) or via email (if they have not consented SMS), and survey invitations via email. Prior research has shown that undergraduate and graduate students are significantly more likely to respond to a survey if they are prenotified about the survey and are substantially more likely to respond if they are prenotified via SMS rather than via email. Students are also more likely to respond if they receive the survey invitation link via email rather than SMS (Bosnjak, Neubarth, Couper, & Kaczmirek, 2008). Because these methods have

---

[4] This is based on an analysis of the pilot test of the exit survey previously tested with a sample of 2019 participants who used the REU data system—the predecessor of the ETAP system—to apply to the NSF's Research Experiences for Undergraduates (REU) program, which found that 28% of participants did not respond to the survey (Mathematica 2020).

been shown to be effective in similar populations and are relatively low cost, we will apply these methods in all three conditions (see Table 1 for a summary of the control and treatment conditions).

Table 1. Control and treatment conditions

Component	Control: Email from ETAP System	Treatment 1: Email from ETAP + Email from PI	Treatment 2: Email from ETAP + Email through social media
Prenotification via SMS or email	√	√	√
Survey invitation via SMS and email	√	√	√
Survey administered via web	√	√	√
Follow-up reminder for nonrespondents via			
Email from NSF ETAP system (automatic system-generated weekly reminders sent to nonrespondents until survey closes)[a]	√	√	√
Email from principal investigator[a]		√	
Email through social media			√

[a] Draft emails are included at the end of this document.

Other research has shown that survey participants are more likely to respond if they receive a follow-up communication, but there is little research on the impacts of different follow-up communication strategies (Neal, Neal & Piteo, 2020; Robbins et al., 2018). The study will test the impact of two higher-cost follow-up strategies relative to a low-cost follow-up strategy. The two higher-cost strategies include: 1) encouraging PIs to send follow-up emails to their students and 2) contacting students through social media (provided as part of their application to the program) to remind them to complete the survey. The low-cost follow-up strategy consists on automatic system emailing to remind nonrespondents to complete the survey. Some studies have shown a large impact of receiving a phone call, but on different samples than are being tested in this study (like hard-to-reach school principals) (Neal, Neal & Piteo, 2020). Last, because participants and PIs involved in the study are current or past beneficiaries of NSF funding, they will not receive monetary incentives to complete the survey or participate in the study for any condition.

Analysis and Minimum Detectable Effects

We will conduct two types of analyses. First, the **implementation analysis** will measure the proportion of PIs that sent reminders to students (of those that were encouraged to send reminders) by requesting that PIs copy them on any emails they send to their students to measure implementation. We will also document the proportion of nonrespondents who could be reached through a social media account.[5] Second, the **impact analysis** will measure the impact of *being assigned* to each of the three conditions. The study will compare the two higher-cost treatment conditions to the control condition, and if sample sizes allow, we will also compare each of the

---

[5] In a prior survey effort, NSF recently reached students who participated in international research experiences funded by the REU and IRES awards made in 2013 (Speroni 2020; 2021). In this survey administration, we found that 60 percent of nonrespondents had a LinkedIn account.

conditions to one another. The study will also estimate the impact of *receiving* a follow-up reminder from a PI (i.e. a treatment-on-treated analysis).

With two treatment conditions to be tested jointly, the study will need at least 1,575 harder-to-reach participants to be able to detect differences of at least 8 percentage points between each of the treatment arms (Table 2). For the study to have 1,575 harder-to-reach participants, it would need to include about 315 Sites. This assumes that 50% of participants will be harder-to-reach (i.e. not respond initially to the survey) and that there will be 10 participants per Site. If we test one treatment condition at a time (leveraging the multiple years this survey will be implemented), we will need fewer participants (1,050 harder-to-reach participants) to be able to detect differences between treatment and control of similar magnitude (at least 8 percentage points). More participants would be needed to detect impacts that are smaller.

Table 2. Minimum number of hard-to-reach participants needed to detect an effect of 8 percentage points or greater

	Minimum detectable effect of:	
	8 percentage points	12 percentage points
Two treatment conditions		
Treatments vs. control	1,575	675
One treatment condition		
Treatment vs. control	1,050	450

Note: Hard-to-reach participants are those who do not initially respond to the survey. For these power calculations, we assume that the average response rate among nonrespondents is 40% and the proportion of individual-level variance in response rates explained by covariates (i.e., R-squared) is 0.13. Both statistics are from the exit survey pilot (tested with a sample of 2019 participants who used ETAP system to apply to the program).

Timing

Depending on the ETAP pilot recruitment success, we will determine whether to test both treatment conditions jointly leveraging the 2022 exit survey administration or implement one treatment condition in the 2022 and another condition in the 2023 exit survey. We will also consider implementing one treatment condition leveraging the high-stakes employment survey planned for 2023. This survey is expected to have a lower response rate initially (as is tracking students several years after program participation), potentially enabling larger impacts of the strategies tested.

References

Bosnjak, Neubarth, Couper, Bandilla & Kaczmirek (2008). Prenotification in Web-Based Access Panel Surveys: The Influence of Mobile Text Messaging Versus E-Mail on Response Rates and Sample Composition. *Social Science Computer Review* 26(2).

National Research Council. (2013). Nonresponse in Social Science Surveys: A Research Agenda. Roger Tourangeau and Thomas J. Plewes, Editors. Panel on a Research Agenda for the Future of Social Science Data Collection, Committee on National Statistics, Division of Behavioral and Social Sciences and Education. Washington, DC: *The National Academies Press*.

Neal, Neal & Piteo (2020). Call Me Maybe: Using Incentives and Follow-ups to Increase Principals' Survey Response Rates. *Journal of Research on Educational Effectiveness* 13(4).

Mathematica (2020). "Research Experiences for Undergraduates (REU) Data System Pilot Analyses: REU Participant Exit Survey." Findings submitted to NSF. Washington, DC: Mathematica.

Robbins, Grimm, Stetcher & Opfer (2018). A Comparison of Strategies for Recruiting Teachers into Survey Panels. *Sage Open*, 8(3).

Shih & Fan (2008). Comparing Response Rates from Web and Mail Surveys: A Meta-Analysis. *Field Methods 20*(3): 249-271.

Speroni, Cecilia (2020). Evaluation of the National Science Foundation's International Research Experiences for Students (IRES) Program: Findings from a Survey of Former Participants. Washington, DC: Mathematica.

Speroni, Cecilia (2021). National Science Foundation's International Research Experiences for Undergraduates: A Comparative Analysis of the IRES and REU Programs. Washington, DC: Mathematica.

Draft Emails

All conditions: Prenotification SMS
Hi, it's NSF Education and Training Application (ETAP) system. We will be sending you a short survey soon to learn more about your experiences and satisfaction with the program. Please respond! Your survey response will help improve the NSF <program name>. Go to www.nsfetap.org/<news> to learn more about the upcoming survey.

All conditions: Email text for initial email with survey link

Subject line: NSF<program name>
Dear <First name Last name>,
Professor <First name Last name> of <INSTITUTION> identified you as a participant of the <year> National Science Foundation (NSF) <program name>.
We hope you will complete a **short survey** about your experiences and satisfaction with the program.

- **You'll be done quickly.** The survey only takes about 10 minutes to complete.

- Participation is **voluntary, but we need you! Your response is critical** for producing valid estimates that can help improve the NSF <program name>.

- The questions are **not sensitive** and you are **free to skip** any of them.

- Your **answers will be kept confidential and used by NSF or its contractors/grantees for research and evaluation purposes only**.

- **Not sure if you participated in this NSF program?** Click the link to the survey below and answer the first few questions to determine whether you are eligible for this survey.

Please complete the survey by <month day, year>.

Questions? Contact the study team at help@nsfetap.org or 1-800-232-8024.
Thanks in advance!
ETAP system administrator
help@nsfetap.org
1-800-232-8024

<div align="center">

Click here to begin this survey

</div>

All conditions: SMS text for initial email with survey link
Hi <First name>,
Please respond a short survey @ https:// <link> or use the link sent to your email.

NSF ETAP system administrator
help@nsfetap.org
1-800-232-8024

STOP=TextOptOut

All conditions: Email text of Reminders (for nonrespondents)
Use same text at initial email

Treatment 1: Study instructions for PIs
Subject: NSF <program name> – your help contacting participants is needed
Dear Prof. [PI Name Lastname],
As part of the ETAP pilot, NSF is conducting a study to rigorously assess the effectiveness of alternative follow-up strategies with nonrespondents to increase survey response rates and minimize response rate bias in online surveys. One of these strategies is receiving an email from you encouraging them to respond to the survey. We need your help in this study!

We hope you can encourage the participants named below to complete the NSF survey.

Firstname	Lastname	Email1	Email2
Firstname	Lastname	Email1	Email2

As of <date> these participants have not yet responded to the survey. Please, reach out to these and only these participants. NSF had randomly assigned nonrespondents to different strategies, and your adherence to instructions is critical to the integrity of the study!

So that we can track implementation, we ask you that you please copy help@nsfetap.org in your email to participants. At the end of this email we provide some suggested language you can use to contact participants. You may choose to contact participants separately or send one email to everyone on the list.

If you have any questions, please do not hesitate to contact the ETAP help desk or the <COR name> at <email> (NSF contracting office representative).
Thank you for your continued support it this ETAP pilot!

NSF ETAP system administrator

help@nsfetap.org
1-800-232-8024

Draft email template (informal)

Hi <first name>,
Hope all is well!
It has come to my attention that you have not yet responded to the survey NSF recently sent you about your experiences in the <program name>. I would really appreciate if you could take a few minutes to respond to the survey!
You should have received it in an email from noreply@nsfetap.org to your primary email associated with your ETAP account. If you can't find it, please contact the ETAP helpdesk at help@nsfetap.org or 1-800-232-8024.

Thanks!