

Breakoff and Unit Nonresponse Across Web Surveys

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Sample members start web surveys but fail to complete them at relatively high rates compared to other modes. Existing theories and empirical findings on unit nonresponse may or may not apply to breakoff. This study contrasts breakoff and unit nonresponse in web surveys through response behavior for the same individuals across different surveys. Nonrespondents to one survey were considerably more likely to be nonrespondents to subsequent surveys, but such *consistency* in response behavior was substantially lower for breakoffs. There is a degree of transitioning between response behaviors, however, such as nonrespondents in one survey being more likely to be breakoffs than respondents in a subsequent survey, indicative of unmeasured common causes. Limited support for the common cause hypothesis is also found in demographic covariates, yet to a very limited degree; race and gender were associated with both breakoff and nonresponse, and some associations (e.g., year in school) were in the opposite direction. Subjects invited to multiple surveys in a short period of time were more likely than others to be nonrespondents, but were not more likely to break off.

Key words: Response behavior; unit nonresponse; breakoff; nonresponse consistency.

1. Introduction

There is lack of research examining the degree of *consistency* of nonresponse in surveys – the likelihood that a nonrespondent in a survey will be a nonrespondent to another, unrelated, survey request. Rather, research has focused on persistent nonresponse behavior within a survey conditional on a survey protocol, asserting the existence of “hard-core nonrespondents” (e.g., Sirken et al. 1960; Rubin 1977; Drew and Fuller 1980; Tanur 1983; Lahaut et al. 2003; Biemer and Link 2007). If there is consistency, researchers should be wary of the possibility of persistent bias in survey estimates, to the extent that such likely nonrespondents are systematically different on a survey’s key measures. Unfortunately, consistency in nonresponse is difficult to evaluate directly as it requires the ability to link individuals’ response behavior across unrelated survey requests. In a small-scale mail survey of women in New Zealand, one study found that most of those who refused to complete a survey were also nonrespondents to a subsequent survey, while most of the

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respondents in the first survey were also respondents in the second survey (Brennan and Hoek 1992). Attempts have been made to measure consistency indirectly, through respondents' reports of prior survey participation (Stinchcombe et al. 1981), yet this captures reports only from respondents, and even then, with likely reporting error. Consistency in nonresponse could be examined if sample members could be linked across multiple surveys.

Responding to a survey is more than a binary choice. A respondent may not start the survey, resulting in unit nonresponse, but he/she can also start the survey but fail to complete it, resulting in survey breakoff. This behavior, breakoff, is particularly pronounced in web surveys where the social interaction with an interviewer is absent and could be captured (unlike in some other self-administered modes such as mail), with median breakoff rates reported to be as high as 16–34% in meta-analyses (Musch and Reips 2000; Lozar-Manfreda and Vehovar 2002). Despite the possibility of high rates of breakoff, the threat to survey estimates from breakoff remains largely unknown. Some researchers have used terms to refer to breakoff that relate it to a consistent behavior, such as “lurkers” (Bosnjak and Tuten 2001) – a subset of the population that tend to start the survey, see some of the content, but not complete it. This would pose another significant risk to bias in survey estimates to the extent that those who break off are different on survey variables from those who complete the survey, much like the threat from unit nonresponse – introducing the potential for breakoff bias. Although breakoff can be studied in web surveys, findings are likely to apply to other self-administered modes where the behavior may just not be recorded as breakoff.

Survey practitioners and those using survey results may hope that survey breakoff is not predetermined and is related to factors that are largely under researcher control. While some theories on causes of unit nonresponse imply consistency in behavior, such as social isolation and altruism (Goyder 1987; Groves et al. 1992), they may not apply to breakoff. Individuals who break off in a survey have already started demonstrating some willingness to participate (although some still may start without any intention of completing the survey). Breakoff may be influenced to a greater degree by the content of the survey, such as type and formatting of the questions and use of progress indicators (e.g., MacElroy 2000; Crawford et al. 2001; Frick et al. 2001; Hogg and Miller 2003; Conrad et al. 2010; Peytchev 2009), and if so, consistency may be found only to the extent that different surveys contain the same features that cause some individuals to stop their participation.

It would also be desirable if any consistency in both breakoff and nonresponse behaviors could be explained by respondent characteristics. Since demographic characteristics are commonly used in nonresponse adjustments, bias in survey estimates resulting from those who are consistently breakoffs or nonrespondents can be effectively reduced.

Breakoff and nonresponse may have a lot in common, including a general predisposition. Certainly, it is only breakoff in web surveys that can be affected by the content and design of the survey other than what is described prior to the survey – in which case common nonresponse adjustments that do not differentiate between breakoff and unit nonresponse would be inappropriate. If breakoff and nonresponse share causes and correlates, sample members who have broken off in an earlier survey should have

increased likelihood to be nonrespondents in a subsequent survey, and vice versa. Conversely, if breakoff and nonresponse have more unique causes, then nonrespondents should be no more likely to break off than other sample members. Similarly, commonality between breakoff and nonresponse should result in similar relationships between the two response behaviors and individuals' characteristics.

A possible common cause of breakoff and nonresponse is survey burden. There is some indication of burden being a common cause of breakoff and nonresponse; when a survey is introduced as shorter, more sample persons start the survey (lower nonresponse) but more break off during the survey (Crawford et al. 2001). The survey research industry has been increasingly concerned with overburdening web survey respondents with many survey requests, or "over-surveying," resulting in higher unit nonresponse rates (Interactive Marketing Research Organization 2006), and particularly for student populations (Stanford University 2009; University of Ottawa 2009). There are psychological principles that would explain this phenomenon; for example, under the *scarcity principle* (Cialdini 1993) respondents invited to many surveys may not feel that the survey is a unique opportunity worth their time and effort, hence respond at lower rates to subsequent survey requests. Respondents could also simply become overburdened by multiple surveys. This fear has been neither supported nor refuted by empirical evidence. It is difficult to anticipate the effect of previous survey participation on breakoff; it may not affect breakoff as such respondents have already started the survey regardless of their past survey-taking history, or it may increase the likelihood of breakoff as they can be less tolerant of the burden imposed by surveys. If breakoff should be found to be affected by prior surveys, additional considerations in the design of surveys and possibly respondent debriefings would be needed.

In sum, there are three sets of research questions that this study aims to address.

- (1) Is there consistency of response behaviors across surveys?
 - a. Are breakoffs in a survey more likely to be breakoffs in another survey; and
 - b. Are nonrespondents in a survey more likely to be nonrespondents in another survey?
- (2) Is there an underlying commonality between breakoff and nonresponse?
 - a. Are breakoffs more likely to be nonrespondents than to be respondents in another survey;
 - b. Are nonrespondents more likely to be breakoffs than to be respondents in another survey; and
 - c. Are nonresponse and breakoff propensities associated with respondent characteristics in a similar pattern?
- (3) Does inviting sample members to multiple surveys increase the likelihood in subsequent surveys for:
 - a. Breakoff; and
 - b. Nonresponse?

Ideally, data on individuals in the general population would be available for multiple survey requests, survey characteristics, their own demographic characteristics, and their response behavior. Unfortunately, no such data exist. However, such data could be obtained for subpopulations – data from surveys conducted with members in the same

organization or institution could be linked through the sampling frame, which can contain information on all individuals.

2. Data and Methods

Response outcomes to five large web surveys conducted at a U.S. university between 2001 and 2005 were compiled, and linked using the university-assigned unique names which students use for e-mail and university business. In March 2001 the Student Life Survey – college version (SLS 2001) – was conducted at a large Midwestern research university, inviting a sample of 7,000 registered undergraduate students. Half of the students were assigned to a mail survey and the other half to a paging web survey (the survey is presented in multiple pages, with little or no scrolling required). The invitations to the survey came from the principal investigators on the project, sent from the data collection company whose logo also appeared on the survey. Students were promised a coupon for \$10 to a book store upon completion. The main topics covered in the survey were alcohol consumption and tobacco and other drug use. The study was repeated in late March 2003 (SLS 2003) by the same group of researchers and data collection firm, with much of the same questions and design (Appendix, Figure 1). This time, the sampling frame included the entire university undergraduate population. The incentive was entry in a sweepstakes drawing, with a chance to win cash prizes totaling \$3,000. The survey was repeated once again in 2005 (SLS 2005), on a sample of 7,000 students. In this survey all selected respondents were mailed a prenotification/invitation and prepaid \$2 incentive and upon completion they had the opportunity to be entered in a sweepstakes drawing for a variety of prizes.

In early February 2003 a Living-Learning Program (LLP 2003) survey of undergraduate students living in residence halls at the same large Midwestern research university was launched as part of a program aiming to involve students in learning outside of the classroom. The survey used sweepstakes drawing for a Palm Pilot and a \$300 bookstore voucher as incentives. The invitation, as in the other surveys, was signed by the Principal Investigator and sent exclusively by e-mail. This survey had an almost identical design to that of the Student Life Surveys apart from two distinguishing features (Appendix, Figure 2). The logo was not that of the data collection firm (although many of the design features were identical as the same firm did the SLS 2001 and SLS 2003), but the university seal was used. The other difference was that the survey used grids – most of the questions were presented in tables of about five questions each, where the items were in the rows and the response options in the columns. The explicit topic of the survey was life on campus and residence halls, and there were a few questions on topics that were covered in the Student Life Surveys, such as alcohol use. The survey was repeated a year later (LLP 2004) using the same design – invitation, signature, incentive, and questionnaire layout.

The five surveys differed in their design and samples. To account for survey characteristics and sample differences, multivariate models were estimated controlling for the effect of each survey on breakoff and on nonresponse. The effects of unique characteristics – the announced survey length, topic, incentives, and type of incentives – were estimated; but due to possible other differences in the designs, they are not reported

here. For more detail on those results, see Peytchev (2007). The data were reorganized so that each record represented the response outcome for a particular respondent to a particular survey. The response behavior outcome was coded as a trichotomy: nonrespondent (did not start the web survey), breakoff (started the survey but did not reach the end), and complete survey (submitted the page with the last question). There were 41,981 records, of which 20,417, 14,408, 5,808, and 1,348 were for respondents who were invited to one, two, three or four surveys, respectively.

Some characteristics for all sampled individuals in all surveys were made available from the registrar's office at the university. These included gender, school standing (Freshman, Sophomore, Junior, or Senior), race/ethnicity (White, Black, Hispanic, Asian, or Other), and age (not used due to limited variability and collinearity with school standing).

To examine the notion of consistency of breakoff and nonresponse across surveys, as well as transitioning from one particular behavior to another, a variable was created for the response behavior in the previous survey. Since approximately half of the records in this person-survey data set were from students who were invited to only one survey, this variable held previous response outcome for 12,087 cases (survey requests) from 9,477 students. Due to the students graduating and because only half of the students selected for SLS 2001 were invited to the web survey, the number of students invited to SLS 2001 and to either LLP 2003, LLP 2004, or SLS 2005 web survey was relatively small; these pairs were excluded from these data in order to provide stable estimates. As SLS 2003 was a census of students, the overlap between students invited to SLS 2001 and SLS 2003 was sufficient.

Multinomial logistic regression of breakoff and nonresponse relative to complete respondent as dependent variable was estimated. The model was estimated once with response behavior in the previous survey, controlling for the main effects of each survey, and again, adding sample member characteristics. Estimation accounted for nonindependence of observations (clustering within sampled persons).

To address the question whether over-surveying (multiple survey requests to the same individuals) may have been a cause of breakoff and nonresponse, these were response behaviors across two of the surveys that were conducted in consecutive months – the 2003 SL and LLP surveys.

3. Results

The overall response rates were very different in the three SLS studies, varying between 43.4% and 64.8% (treating all breakoffs as incompletes), as shown in the first column of Table 1. This variation was consistent with the attributes of the designs, as respondents in the 2001 SLS were guaranteed an incentive upon completion of the survey, in the 2003 SLS they were offered a chance to win a prize upon completion, and in 2005 all respondents were sent a prepaid incentive in addition to being entered in a lottery. Respondents in 2003 were informed that the survey would take about 30 minutes to complete, while in 2005 the announced survey length was 20 minutes.

Higher response rates corresponded to higher completion rates. This is consistent with a common mechanism, that respondents who are less motivated to start a particular survey can also be less motivated to continue once they have started – thus surveys that attract

Table 1. Response, Breakoff, Nonresponse, Completion Rates, Type of Incentive, and Informed and Median Time to Complete the Survey for Each of the Five Surveys

Survey	Complete	Breakoff	Non-respondent	Total	Completion rate	Guaranteed incentive	Prepaid incentive	Informed time in minutes	Median time in minutes for completes ^a
	1 1/(1 + 2 + 3)	2 2/(1 + 2 + 3)	3 3/(1 + 2 + 3)	<i>n</i> 1 + 2 + 3	1/(1 + 2)				
Student life 2001 ^b	61.6%	2.7%	35.7%	3,500 100%	95.8%	Yes	No	Un-disclosed	Not recorded
Living learning program 2003	28.7%	10.1%	61.2%	5,040 100%	74.1%	No	No	15–20	32
Student life 2003	43.4%	4.3%	52.4%	21,294 100%	91.0%	No	No	30	23
Living learning program 2004	19.0%	6.9%	74.1%	5,228 100%	73.4%	No	No	20	28
Student life 2005	64.8%	1.8%	33.4%	6,919 100%	97.4%	Yes	Yes	20	15

^a The mean time was approximately 1.5 minutes longer than the median time for each of the four surveys.

^b Half of the sample cases in this survey were excluded (3,500), as they were assigned to receive a mail survey.

fewer respondents are also more likely to lose them. It is likely that initial response to a survey request is affected by the announced survey length, and that the completion rate is affected by the actual length of the survey. In addition, an interaction between the two, that respondents who are informed of a shorter survey length are more likely to begin the survey but break off at higher rates, is consistent with Crawford et al. (2001). Overall, the same response rate is observed as if longer survey length was announced and fewer respondents started the survey. Unfortunately, this comparison confounds the effect of the initial motivation with the effect of the difference between the announced and actual time to complete the survey. The SL surveys achieved lower nonresponse rates (36%, 52%, and 33%, Table 1) than the LLP surveys (61% and 74%). The SL surveys also had a shorter actual length (23 and 15 minutes) than announced (30 and 20 minutes), while the LLP surveys took longer to complete (32 and 28 minutes) than announced (15–20 and 20 minutes). Considering that there are multiple differences across the surveys that could not be disentangled by only five surveys, we shift focus away from survey characteristics but account for differences between the surveys in the multivariate analysis.

3.1. Consistency of Response Behavior Across Surveys

Response behavior in pairs of consecutive surveys showed that unit nonrespondents in one survey were much more likely to be unit nonrespondents in another survey than to be complete respondents or breakoffs, as presented in Table 2. Three out of five (60.8%) of the nonrespondents in a prior survey were also nonrespondents in the next survey to which they were invited. This consistency is not a function of differential marginal distributions (nonresponse rates to prior and subsequent surveys); more than three out of five (63.1%) among completes in the prior survey also completed the next survey to which they were invited. This consistency is undoubtedly a function of the similarities across the surveys,

Table 2. Current Survey Response Outcomes by Previous Survey Outcomes in the Seven Pairs of Surveys with Substantial Overlap in Sample Members

Previous survey disposition	Current survey disposition			Total
	Complete	Breakoff	Nonrespondent	
Complete				4,603
Percent of complete	63.1%	4.4%	32.5%	100.0%
Percent of total	24.0%	1.7%	12.4%	38.1%
Breakoff				861
Percent of breakoff	49.1%	6.5%	44.4%	100.0%
Percent of total	3.5%	0.5%	3.2%	7.1%
Nonrespondent				6,623
Percent of nonrespondent	36.0%	3.2%	60.8%	100.0%
Percent of total	19.7%	1.8%	33.3%	54.8%
Total				12,087
Percent of total	47.2%	3.9%	48.9%	100.0%

Significant at $\alpha = .001$, χ^2 test with 4 d.f.

such as three of the surveys being on one topic and the other two surveys on another topic; one would expect somewhat lower consistency if the surveys were more different in their designs.

Breakoffs did not exhibit this degree of consistency across surveys. Only 6.5% of those who broke off in a survey, also broke off in the next survey they were invited to, although at a slightly higher rate than prior completes (4.4%). These consistencies of behavior are underestimated due to combining studies with very different breakoff and nonresponse rates and different study characteristics. This was evident when examining behavior across pairs of surveys separately (results not presented), but it is best addressed through multivariate analysis that attempts to account for these differences.

The simple cross-tabulation of response behaviors shows that in these surveys, nonrespondents tended to be nonrespondents to other survey requests, while breakoffs were just as likely to be completes and nonrespondents as they were likely to be breakoffs. That is, there is a degree of *consistency* in nonresponse but not in breakoff. Testing this in a multivariate model allows controlling for differences between surveys and differences between respondents, as well as for the marginal probabilities (i.e., the different response rates in the five surveys).

A model was fit to data on respondents invited to more than one survey, yielding 12,087 observations from 9,477 individuals. A key predictor was the response behavior in the prior survey to which the individual was invited. Table 3, Model 1, presents the odds ratios controlling for survey characteristics. Nonrespondents in the previous survey were approximately four and a half times more likely (4.454) to be nonrespondents in the following survey, than completes in the prior survey. Breakoffs in the previous survey were also more likely to be breakoffs again in the current survey, but at much lower odds – about two and a half times more likely (2.418).

We also added individual characteristics known on all sample members from the school's registrar, to examine the degree to which the consistency in response behaviors across surveys can be explained by respondent characteristics. Results are presented in Model 2 (Table 3). A very small part of the consistency in breakoff was explained, slightly reducing the odds to 2.248. For consistency in unit nonresponse, the odds actually increased slightly to 4.574, meaning that the individual characteristics explained part of the inconsistency in behavior. At least for surveys of college populations, we conclude that these respondent characteristics are insufficient to reduce potential bias in estimates due to consistent breakoff and nonresponse behaviors.

The degree of consistency in nonresponse behavior across surveys implies that some sample persons are far more likely to be nonrespondents to various surveys. The lower consistency in breakoff behavior means that while some people are more likely to be breakoffs, this behavior is affected by other factors to a greater extent.

3.2. Commonality Between Breakoff and Nonresponse

Undoubtedly, there are survey features within the survey instrument that could not affect nonresponse but have been found to affect breakoff (Peytchev 2009). Of interest, however, is whether there is any commonality between breakoff and unit nonresponse. We examined this question through transitioning between breakoff and nonresponse

Table 3. Multinomial Regression of Breakoff and Nonresponse Outcomes Relative to Complete Respondent in LLP 2003, SLS 2003, LLP 2004, SLS 2005 on Respondent Characteristics, Survey Characteristics, and Response Outcome in the Previous Survey (12,087 observations from 9,477 individuals selected for at least two surveys)

Predictor	Model 1				Model 2			
	Breakoff		Nonresponse		Breakoff		Nonresponse	
	Odds ratio	<i>p</i> -value	Odds ratio	<i>p</i> -value	Odds ratio	<i>p</i> -value	Odds ratio	<i>p</i> -value
Previous survey outcome								
Complete	1.000	–	1.000	–	1.000	–	1.000	–
Breakoff	2.418	< .001	2.153	< .001	2.248	< .001	2.285	< .001
Nonrespondent	1.908	< .001	4.454	< .001	1.773	< .001	4.574	< .001
Gender								
Female					1.000	–	1.000	–
Male					1.315	0.006	1.542	< .001
Race								
White					1.000	–	1.000	–
Black					1.469	0.014	1.884	< .001
Hispanic					1.005	0.982	1.346	< .001
Asian					1.205	0.205	1.299	< .001
Other					1.194	0.272	1.158	0.050
Year in school								
Freshman					1.000	–	1.000	–
Sophomore					0.783	0.075	0.845	0.008
Junior					0.758	0.080	1.031	0.667
Senior					0.539	0.001	1.284	0.001

Coefficients for survey characteristics are omitted; models control for main effects of each survey.

Model 1: Likelihood Ratio $\chi^2(10 \text{ d.f.}) = 2,234, p < .001$, Pseudo $R^2 = .169$.

Model 2: Controlling for survey (main effects of each survey) and respondent characteristics (sex, race/ethnicity, and year in school): Likelihood Ratio $\chi^2(26 \text{ d.f.}) = 2,516, p < .001$, Pseudo $R^2 = .188$.

across surveys and through the relationship between respondent characteristics and each response behavior.

3.2.1. Transitioning Between Response Behaviors

As seen in Table 2, those who broke off in one survey were not more likely to be nonrespondents in the next survey than to be respondents. This is consistent with the hypothesis that nonrespondents and breakoffs tend not to be a single set of people who share a higher propensity to not respond and to break off. However, this finding could be affected by survey characteristics, a hypothesis which was tested in the multivariate model presented in Table 3.

Contrary to expectations, there was some evidence for transitioning between response behaviors when accounting for differences between surveys. Nonrespondents were about twice as likely to be breakoffs in the next survey (1.908), and so were breakoffs to become nonrespondents (2.153) than to be respondents. The surprising transitioning between nonresponse and breakoff suggests that some individuals are indeed more likely to break off and to not respond, linking the two behaviors to some degree as a predisposition.

3.2.2. Respondent Characteristics

Apart from transitioning across surveys, any commonality between breakoff and unit nonresponse can be evidenced through similarity of the relationships between sample member characteristics and breakoff and nonresponse. Model 2 in Table 3 shows that fewer sample persons' characteristics were associated with breakoff than with nonresponse, and that when they were significant for both response behaviors, the associations were substantially larger for nonresponse or in the opposite direction. Contrary to prior findings in mail surveys (Goyder 1982) but in line with findings from interviewer-administered surveys (see Gray et al. 1996), men had higher odds of being nonrespondents than women. The result found by Goyder, however, is based mostly on comparison of response rates to surveys of special populations that happen to be either male or female. Of greater interest is the difference between the odds of being a nonrespondent versus breakoff; the odds ratio of males to break off (1.315) was significantly lower than for males to be nonrespondents (1.542), $p < .001$. Race and ethnicity were significant, and the parameter estimates again tended to be larger for nonresponse. Senior students had significantly lower odds of breaking off (0.539) and higher odds of being nonrespondents (1.284). Thus, we find that breakoff and nonresponse are differentially affected by characteristics of the sample persons, providing additional evidence for the different causes of the two response behaviors.

3.3. *Effect of Previous Survey Invitations on Breakoff and on Nonresponse*

Researchers have been concerned about over-surveying target populations, potentially causing higher nonresponse rates and especially so in university student populations where e-mail addresses can often be obtained for all students (e.g., Stanford University 2009; University of Ottawa 2009), and even methods to avoid it have been proposed (e.g., Graves 2007). Finding such an effect would carry implications for sampling (optimizing samples for multiple surveys), data collection procedures (e.g., number of

Table 4. Response Outcomes in the Student Life (SL) 2003 Survey by Invitation to LLP 2003 One Month Earlier, among Those Eligible for Both Studies

		SL Survey 2003 (April), among eligible for both studies			
		Complete	Breakoff	Nonrespondent	Total
Invited to the LLP Survey 2003 (March), among those eligible for both studies	Not invited	267 57.1%	20 4.3%	181 38.7%	468 100%
	Invited	589 50.0%	64 5.4%	526 44.6%	1,179 100%

Significant at $\alpha = .05$, χ^2 test.

reminders), survey design (including measures for predispositions and prior survey experience), and post-survey adjustments that may incorporate measures for the number of surveys respondents have been exposed to, when any of these are feasible. Of particular importance here is the potential for this to be a mechanism producing both nonresponse and breakoff, an effect that would be expected if it stems from overburdening respondents.

Since the five surveys had different eligibility criteria and had large time lapses between them (except for two of them), and since other surveys were conducted from this population that are not included in this analysis, simply examining the impact of the number of surveys to which an individual is invited is insufficient. Such confounds could not be fully addressed by a multivariate model, but can be examined through comparison within a specific subset of students – a smaller but identical set of respondents (with equal probability of being invited to the next survey as those not invited), who can be compared across two independent and temporally adjacent survey requests.

The two LLP surveys were used to identify a larger pool of students who were eligible to be selected but only part of them were invited to the LLP 2003. About a month after LLP 2003, students were invited to the SLS 2003 survey (census). Among those in SLS 2003 who were eligible for the LLP surveys, those who were invited (and sent reminders) to participate in the LLP 2003 survey the previous month failed to respond at significantly higher rates than those who were not invited to the LLP 2003 (44.6% vs. 38.7%, respectively, Table 4). However, the breakoff rates (conditional on starting) were not significantly different ($p = .161$) among those invited and those not invited to the LLP 2003 earlier. Note that the term “breakoff rates” is not used for the percent of the whole sample who abandoned the survey, but the percent of those who started, i.e., 100% completion rate. This is based both on a theoretical argument that breakoff is conditional on initial response (vs. a class of people who are breakoffs and start the survey without an intention to finish it), and on limitations of many web surveys where the nonrespondents could not be identified. Despite the relatively small number of breakoffs, this evidence supports that earlier survey requests affect nonresponse, but do not affect breakoff.

4. Discussion and Conclusions

We find a substantial degree of consistency in nonresponse. Certainly, this consistency was likely helped by the similar survey designs across the five studies, in particular

as they were limited to two topics. Although consistency was found also for breakoff, it was substantially smaller in magnitude. This should be welcome news for survey practitioners, as it places breakoff and potential bias due to breakoff more under researcher control or random factors, rather than attributing it to an underlying personal predisposition. Furthermore, some of the consistency in breakoff behavior was explained by individuals' characteristics. Controlling for the characteristics available on the sampling frame, however, increased the consistency in unit nonresponse. From the adjustment perspective, this is not an encouraging finding, meaning that nonresponse adjustments based on these characteristics are unlikely to reduce potential nonresponse bias. The difference between the effect on breakoff and nonresponse consistency suggests that postsurvey adjustments using demographic characteristics need to be constructed separately for breakoff and nonresponse, counter to common current practice. This finding, however, should be tempered by the relatively homogenous population in this study – college students.

We find some evidence for commonality between breakoff and unit nonresponse. Breakoffs were more likely to be nonrespondents in the next survey, compared to being respondents, and nonrespondents were more likely to be breakoffs. However, this transitioning across the two response behaviors was much smaller than the consistency within a behavior, still supporting that breakoff and nonresponse have mostly different causal mechanisms. This was also supported by the fact that only some of the individuals' characteristics had similar relationships with each response behavior – for some they were even in the opposite direction.

The tenuous link between breakoff and nonresponse was also evident through the effect of multiple adjacent survey invitations, as burden from multiple surveys affected nonresponse but not breakoff. Sample members invited to a survey were more likely to be nonrespondents to a survey in the following month, but were not more likely to be breakoffs, compared to an identical set of students who were not invited to the first survey. While the common methods for decreasing both nonresponse and breakoff have an inherent efficiency, it is the differences between the two response behaviors that may bear the greatest importance for survey practitioners. The lower consistency in breakoff behavior and the lower predictive ability of respondent characteristics of this response behavior may be erroneously interpreted as a lack of breakoff bias – that breakoffs are like complete respondents. This could not be tested here and is in need of future research. The exact mechanism producing breakoff needs to be identified, so that resulting bias in survey statistics can be anticipated, reduced, and adjusted. Some key survey features causing breakoff have been identified, such as the cognitive demands of survey questions (Peytchev 2009) and design features such as progress indicators (Conrad et al. 2010), but more research is needed.

This study is a necessary first step in understanding breakoffs as a survey response behavior, an outcome that despite anticipated commonalities is very different from unit nonresponse. However, it needs to be explored in other populations and survey designs, and particular causes need to be identified and studied. The same level of attention that has been devoted to studying the causal mechanisms of nonresponse needs to be given to breakoff.

Appendix

msinteractive

Questions about this survey?
Email us at [E-mail address]
or call toll free 1.866.674.3375

Consent About You **Tobacco & Alcohol** Other Drugs Perceptions Sex & Driving

How many cigarettes have you smoked in the PAST 30 DAYS?

None
 Less than one cigarette per day
 1-5 cigarettes per day
 About 1/2 pack per day
 About 1 pack per day
 About 1 1/2 packs per day
 2 or more packs per day
 Refused

Next Screen Previous Screen

Fig. 1. Student Life Surveys

[University Crest and Name]

Questions about this survey?
Email us at [E-mail address]
or call toll free 1.866.674.3375

Before College **College** Campus Life About You Living and Learning

Your Perceptions Before Enrolling In College

Thinking back to before you started college, what activities did you think were going to be very important to you during college?

(Click one response in each row)

	Not at all important	Somewhat important	Important	Very important
Gaining a broad education and appreciation of ideas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Getting to know your instructors outside of class	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Discussing ideas and intellectual topics with friends and other students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Being active in extra-curricular activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Being a top student academically	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Next Screen Previous Screen

Fig. 2. Living-Learning Program Surveys

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