

Improving web survey efficiency: the impact of an extra reminder and reminder content on web survey response

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ABSTRACT

With the growing possibilities for conducting web surveys, researchers increasingly use such surveys to recruit student samples for research purposes in a wide array of social science disciplines. Simultaneously, higher education students are recurrently asked to complete course and teacher evaluations online and to participate in small-scale research projects of fellow students, potentially leading to survey fatigue among student populations across the globe. One of the most frequently reported effects of over-surveying is a decrease in overall response rates. This situation has significant impacts on the generalizability and external validity of findings based on web surveys. The collection of reliable data is, nevertheless, crucial for researchers as well as educational practitioners and administrators, and strategies should be developed for achieving acceptable response rates. This paper reports on a methodological experiment ($N = 15,651$) conducted at the University of Antwerp, Belgium, in which possible strategies to improve survey response are explored. I specifically focus on the impact of an extra reminder as well as specific reminder contents on response rates. The results reveal that extra reminders are effective for increasing response rates, but not for diversifying the sample.

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Introduction

Today, scholarly researchers and educational practitioners increasingly use web surveys for scientific research and for assessing a wide range of university-related issues, such as students' satisfaction with courses and teachers. The advantages of web surveys have been extensively documented in the academic literature.¹ They tend to reduce the cost of questionnaire distribution and administration and eliminate the influence of an interviewer (Callegaro et al., 2015; Couper, 2000; Tourangeau, Couper, & Conrad, 2004), while respondents are able to control how and when they complete the survey (Callegaro et al., 2015; Christian, Parsons, & Dillman, 2009) and no educational time is lost by the completion of questionnaires or evaluations during lectures. In addition, web surveys offer the advantages of obtaining large samples in a relatively easy way (Couper, 2000; Malhotra, 2008) as well as increased response accuracy because respondents enter their own information directly (Durrant & Dorius, 2007). However, there are also several pitfalls. The key challenges addressed in the scholarly

literature are errors of non-observation or issues of representation (Couper & Miller, 2008) and data quality (Malhotra, 2008; Sánchez-Fernández, Muñoz-Leiva, Montoro-Ríos, & Ibáñez-Zapata, 2010). Errors of non-observation generally comprise coverage and nonresponse (Couper, Kapteyn, Schonlau, & Winter, 2007; Vehovar & Lozar Manfreda, 2008). Nevertheless, as several scholars indicate (Couper, 2000; Couper et al., 2007; Smyth & Pearson, 2011), for a specialized population such as students in higher education, web surveys might be the ideal instrument with few coverage and sampling problems, as complete Internet and email coverage (by providing all students an official university email address) of the population under study is generally possible (Callegaro et al., 2015, p. 25).

Although web surveys are often considered an ideal instrument for students' assessments and evaluations, response rates have been steadily decreasing over the last decade (Adams & Umbach, 2012; Avery, Bryant, Mathios, Kang, & Bell, 2006; Nair & Adams, 2009). Part of students' nonresponse can be explained by the fact that students do not always use or consult their official university email address, may have dropped out, experience technical issues, or the invitation email can be considered SPAM. Nevertheless, there is another significant factor leading to decreasing response rates: students in higher education are among the most surveyed population groups in society (Sax, Gilmartin, & Bryant, 2003), which enhances a feeling of survey fatigue and a lack of engagement in the survey process. As a result, there is a need to develop strategies for addressing such student survey fatigue. The aim of this article is twofold. First, I report an experiment I conducted to investigate possible strategies to convince non-respondents to nonetheless complete a web questionnaire. Furthermore, I compare the profile of 'initial refusals' (students who responded positively to an extra reminder and completed the survey) with those of early respondents. Second, I aim to stimulate the debate on response rates and motivate other researchers to add experiments to their web surveys, in order to further develop reliable strategies for addressing student survey fatigue and ensure acceptable response rates.

Background

Survey non-response

Today, even a response rate below 10% is not uncommon for web surveys (Conrad, Couper, Tourangeau, & Peytchev, 2010; Fricker, 2008; Heerwagh, Vanhove, Loosveldt, & Matthijs, 2004; Muñoz-Leiva, Sánchez-Fernández, Montoro-Ríos, & Ibáñez-Zapata, 2010; Porter, 2004; Smyth & Pearson, 2011). Several meta-analyses reveal, for example, that web surveys generally get a 6 to 15% lower response rate compared to other survey modes (Fan & Yan, 2010; Smyth & Pearson, 2011; Vehovar & Lozar Manfreda, 2008), and nowadays many studies conducted among students report response rates below 20% (e.g. Lauber, Ajdacic-Gross, Fritschi, Stulz, & Rössler, 2005; Lee, 2010; Sax et al., 2003). Although it has been suggested that student surveys with a 10% or lower response rate can eventually be considered trustworthy if the researcher checks the response quality (Nair, Adams, & Mertova, 2008), researchers and practitioners should be aware of the pitfalls of (very) low response rates, especially considering the fact that web surveys increasingly inform the planning of undergraduate and post-graduate education (Porter, 2004).

In the academic literature, it has been repeatedly suggested that non-response is not random and differences between respondents and non-respondents can seriously bias results (Groves, 1989; Heerwagh, Abts, & Loosveldt, 2007). Decreasing response rates increase the likelihood of a difference in opinion and attitude between non-respondents and respondents (Adams & Umbach, 2012; Groves & Peytcheva, 2008). Bias resulting from low response rates can, in its turn, affect the usefulness of the collected data, as well as the reliability and external validity of a study (Adams & Umbach, 2012; Spitzmüller, Glenn, Barr, Rogelberg, & Daniel, 2006; Webber, Lynch, & Oluku, 2013). This is not to say that non-response always significantly undermines findings (Avery et al., 2006; Groves, 2006; Groves et al., 2006; Sax et al., 2003). When only a low correlation of the causes of non-participation with survey variables such as the topic or needed time to complete the survey exists, results appear to still have their validity (Groves & Peytcheva, 2008). However, there is only little research available on how



to cope with low response rates of surveys in higher education institutions (Adams & Umbach, 2012). In sum, with decreasing response rates on the one hand, but wide-spread use of web surveys guiding academic management decisions and informing (social science) scientific research on the other hand, it is important to develop practical strategies for ensuring acceptable response rates.

Student survey fatigue

In recent years, students are literally 'bombed' with invitations to complete web surveys and evaluations. Such invitations are not merely limited to the area of higher education; students also regularly encounter them in their daily lives in the form of, for example, rating online services, entering online prize polls or invitations to evaluate websites. At institutions for higher education, moreover, students are regularly asked to complete web surveys and online evaluations. At the University of Antwerp, for example, between March and May 2012, students from the Faculty of Social and Political Sciences received 57 invitations from fellow students to participate in web surveys in the framework of their bachelor or master theses, two web survey invitations from researchers from the university for scientific purposes, and five invitations to evaluate attended courses online. This adds up to a total of 63 invitations over a 92-day period, an average of one invitation every day and a half, logically enhancing student survey fatigue and low response rates.

In the higher education literature, it has been shown that respondents are generally characterized by high performance and achievement (Adams & Umbach, 2012; Avery et al., 2006; Porter & Umbach, 2006; Porter & Whitcomb, 2005). Research among college students also revealed that response rates differ according to personality (Porter & Whitcomb, 2005; Sax et al., 2003), gender (Avery et al., 2006; Porter & Whitcomb, 2005; Sax et al., 2003) and ethnicity (Avery et al., 2006; Porter & Umbach, 2006), with female students and ethnic majority students being more likely to respond. The more general methodological literature on off- and online surveys has, moreover, consistently shown that the response rate is closely related to the topic (Groves, Presser, & Dipko, 2004; Porter, Whitcomb, & Weitzer, 2004) and how long it takes to complete the survey (Fan & Yan, 2010). The longer the stated length, for example, the fewer respondents engage in the survey (Galesic & Bosnjak, 2009). Thirteen minutes or less seems to be the ideal length for obtaining a high response rate (Fan & Yan, 2010:133). Nevertheless, such short questionnaires are not always possible for the topics investigated, especially where scientific surveys are concerned. Thus, in cases where surveys are relatively long, a lower response rate is generally the result.

Although students' response might differ because of different attitudes, opinions or practical barriers to participation, not all students can be classified clearly as respondents and non-respondents (Webber et al., 2013). Spitzmüller et al. (2006), for example, analysed a student sample and differentiated between passive and active non-respondents, the latter explicitly stating they were not willing to complete an organizational survey. They discovered that only 14% formed part of the active non-respondent group. The passive non-respondents and respondents, moreover, appeared not to differ in their perceptions of relevant organizational processes.

This study

The presented methodological experiment is grafted on the literature showing that response rates increase alongside the number of reminders (e.g. Fan & Yan, 2010; Sheehan, 2001), with, however, a maximum of three or four messages (Muñoz-Leiva et al., 2010). I started from the idea that the specific content of a reminder might have an influence on response rates as well. As such, I considered the influence of subtle, indirect and non-conscious processes of social influence on 'conformity', referring to 'the act of changing one's behaviour to match the responses of others' (Cialdini & Goldstein, 2004, p. 606). After all, those students who did not complete the survey had to be convinced to reconsider potential participation. My first starting point was the idea that providing exact information on the number of students that already answered the survey could produce 'social pressure' and increase the

response rate. Nevertheless, the opposite direction can also be true. When mentioning the exact numbers of participating students, respondents might perceive that there are already enough respondents, and their participation is not required. This would be in line with the scientific literature suggesting that perceptions of scarcity can increase response rates, as this makes respondents feel special. Examples of scarcity perceptions are mentioning the deadline of the survey as well as stating that the respondents form part of a small select group (Porter & Whitcomb, 2003).

My second starting point was the idea that response rates would also increase when providing students with exact information on the median time needed to complete the survey, enabling them to assess more adequately when to complete the survey. This idea builds further on research carried out by Peytchev (2009), which showed the importance of providing respondents with an adequate estimation of the time they will need to complete the survey. In practice, this often leads to time-ranges such as 'between 15 and 25 min'. In order to provide the respondents with the most accurate information as possible, I decided to send them the median time other students needed to complete the questionnaire. This means that I referred to real-time indicators of other students, which might stimulate their participation.

In sum, in this paper I investigate possible strategies for motivating 'initial refusers' to still participate in the survey.

Materials and methods

Data

In this paper, I report an experimental test conducted with a web survey administered to the full population of 15,651 higher education students of the University of Antwerp, Belgium, between October and December 2013. The survey was available in two languages (Dutch and English). The main aim of the questionnaire was to explore students' attitudes and opinions about internationalization initiatives at the university in order to offer adequate 'internationalization at home' activities and initiatives in their curriculum. This specific topic might have an influence on the response rate: those who tend to participate in such activities can be expected to be more likely to answer the questionnaire. To control for this possible source of bias, I include 'topic interest' (indicating a student's degree of interest in international activities in an educational context) as a control variable in the analysis. Nevertheless, it should be noted that I was particularly interested in the opinions of those who are not eager to participate in such activities, in order to develop specific internationalization activities for these students, tailoring them to their needs as well. As a result, the topic was expected to be of interest to all students. Standard ethical procedures were followed, and students were able to withdraw their participation at any point during the survey process.

The survey was tested with the most popular internet browsers (Internet Explorer, Mozilla Firefox, Opera, Google Chrome and Safari) to ensure that all respondents received the survey in a similar and useable format. Students received two reminders, which is the most commonly used number of reminders in student web surveys, if specified (see, e.g. Fan & Yan, 2010; Kayongo & Helm, 2010; Porter & Whitcomb, 2003; Said, Kypri, & Bowman, 2013). They received these reminders within the subsequent week. Whereas this timing might seem relatively quick, the academic literature suggests that sending reminders two days instead of five days after the invitation is more effective for increasing response rates (Crawford, Couper, & Lamias, 2001). Students who already completed the questionnaire did not receive these reminders. All students received an individual link to the questionnaire. This means that they accessed the questionnaire directly, without having to provide a username and password, as this has a positive effect on the response rate (Porter, 2004). The individual links also ensured that the questionnaire could not be completed several times. The response rate after these two reminders was 24.96%.



Experimental design

I sent an extra reminder to non-respondents between 9 and 28 days after the final (second) reminder.² I divided non-respondents randomly into four groups. Each group received a reminder with a different content. The first group ($n = 2946$) received the standard reminder email which they also received during the normal survey process. The second group ($n = 2927$) received the standard reminder email with exact information on the median time other students needed to complete the questionnaire (when completing the survey this was 16 min, 31 s). The third group ($n = 2940$) received the standard reminder with exact information on the number of students that had already completed the questionnaire. The last group ($n = 2913$) received the standard information with the median completion time as well as number of students that had already completed the questionnaire. As all groups were randomly selected, the bias related to specific disciplines and students lecture schedules is minimized.

Analytic strategy

For my analysis of the evolution of response rates, descriptive statistics are used. In order to investigate differences between initial refusers (those who completed the questionnaire after sending the extra reminder) and those who completed the survey during the standard survey process, ‘time of response analysis’ (Porter & Whitcomb, 2005) was applied. Statistical significance is estimated by Chi-squared tests, and a Bonferroni correction is applied for controlling the Type I error rate.

Variables included in the analysis

I included several demographic variables in the analysis for comparing different response waves, as well as a measure of topic salience. Descriptive statistics on these variables can be consulted in Table 1.

Gender is measured by a dichotomous variable (0 = *male*, 1 = *female*). Including gender in the analysis is important, as previous research showed a tendency of female students being more likely to participate in surveys (e.g. Avery et al., 2006). Female students are indeed overrepresented in the final sample as at the University of Antwerp, where 53.82% of the total student population was female in the 2013–2014 academic year.

Age can also be expected to play a role, as older students might be less used to the completion of web surveys. Furthermore, they may also have a different level of interest in the survey topic. This continuous variable is measured in years, and recoded into four categories, namely 15–18 years old, 19–22 years old, 23–26 years old, and older than 27 years.

As the survey targeted students, educational level and/or income were not available as measures of their socio-economic background. As a result, I use parental education as a proxy for such background.

Table 1. Descriptive statistics of the background characteristics of respondents.

Variable	Mean	Standard deviation	Minimum	Maximum	n
Age	21.65	4.59	15	61	4322
Topic salience	3.20	.70	1	5	3923
Variable	Categories	Percentage	Minimum	Maximum	n
Gender	Male	38.2	0	1	1651
	Female	61.8			2671
Education mother	Low	34.4	1	3	1460
	Medium	43.8			1858
	High	21.8			926
Education father	Low	35.3	1	3	1477
	Medium	31.9			1335
	High	32.8			1372
Nationality	Belgian	87.2	1	3	3767
	EU	10.1			437
	Non-EU	2.7			118

The parental educational level is measured by an ordinal level variable ranging from 1 (primary education or less) to 9 (doctoral or equivalent level). I recoded this variable into three categories, based on the 2011 International Standard Classification of Education), namely a low (ISCED level 0–4), medium (ISCED level 5–6) and highly (ISCED level 7–8) educated group.

Given the fact that ethnic majority students are more likely to respond to survey invitations (e.g. Porter & Umbach, 2006), I included a variable on students' national background. This variable is based on their current nationality as shown on their passport, not their country of birth. I distinguished three groups, namely (1) Belgian citizens; (2) EU-nationals; and (3) non-EU nationals.

Lastly, response rates prove to be related to the topic (e.g. Porter, 2004). Therefore, I included a control variable measuring topic salience. This variable is based on the question 'In which of the following international activities would you participate during your degree?' Students could rate 12 activities on a Likert scale from 1 'Extremely unlikely' to 5 'Extremely likely'. I calculated the mean score on these 12 items with a restrictive sumscale (missing values were not allowed).

Results

Response rate evolution

As Figure 1(a) shows, the first response wave – after sending the invitation – yielded a response rate of 6.2%, the first reminder an additional response of 10.3% and the final reminder 8.6%. The extra reminder to the initial refusers convinced 955 students to complete the questionnaire, raising the total response rate with 6.1%. As a result, the total survey response rate after the extra reminder was 31.2% ($n = 4880$). This last 6.1% increase will be explored further, as I differentiated between four different reminder contents (see Figure 1(b)). 8.62% of students that received a standard reminder completed the questionnaire. Of those who received the median time to complete the questionnaire, only 7.14% replied. The most effective content seems to be the reminder mentioning the number of respondents, as 9.04% of the students who received such a reminder completed the questionnaire. Finally, a 7.76% response rate was observed among students who received both indications (time and number of respondents). Nevertheless, we do not know whether these numbers are statistically significant. Therefore, I ran a binary logistic regression with questionnaire response as the outcome variable (0 = did not respond, 1 = responded), and reminder content as a predictor variable. The standard reminder is used as the reference category. Interestingly, no statistical significant relationship could be detected for the reminder mentioning the number of respondents and the reminder indicating the number of respondents and median completion time. However, the reminder indicating the median time to complete the questionnaire shows to be the least likely compared to the other reminders to motivate 'initial refusers' to complete the web questionnaire (OR = .811 (SE = .097), $p < .05$).

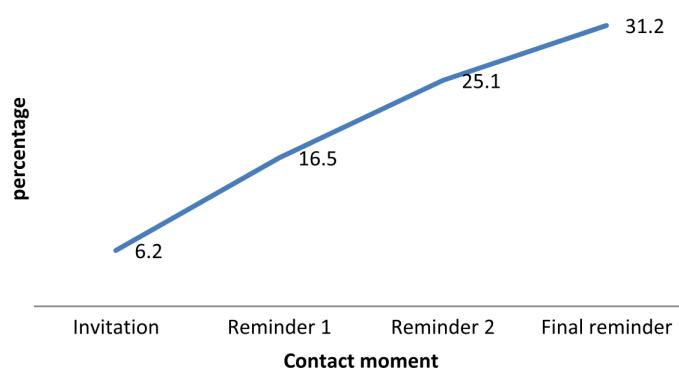


Figure 1a. Evolution of the overall response rate.

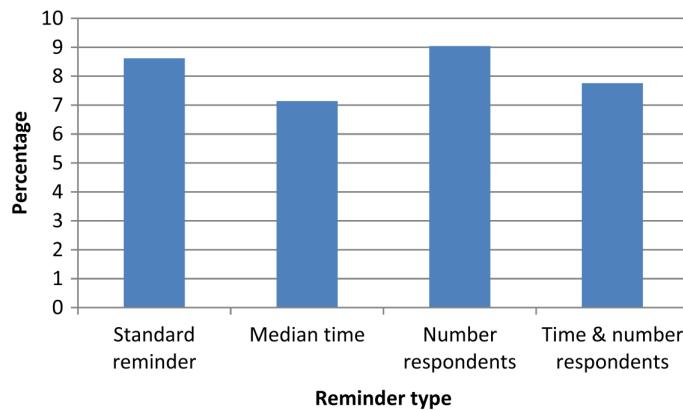


Figure 1b. Response rate final reminder, according to reminder content.

Furthermore, these numbers do not indicate how the total response rate would change if I had opted exclusively for one of these reminders. Using the separate response rates for each group as the reference point, I calculate the number of students that would ideally answer the questionnaire if they all received the same invitation. From this number, I then calculate hypothetical response rates for each group. This analysis reveals that the final response rate would reach 31.54% with a standard reminder, 30.43% with a time indication, 31.85 when indicating the number of respondents, and 30.77% when the last two indications are combined. In sum, these numbers suggest that it is the extra reminder rather than the content that increases the total survey response rate.

Differences between respondents and initial refusors

Finally, I investigated whether significant differences can be detected between early respondents, late respondents and initial refusors. Such analysis is helpful for unravelling whether the administrative effort and time cost of an extra reminder pays off in terms of diversifying the final sample. Table 2 gives an overview of differences in demographic characteristics and topic salience between initial refusors and students participating in the normal survey cycle. The results show a significant difference in terms of gender: male students are more likely to answer the extra reminder than the initial invitation. As a robustness check, I investigated whether these gender differences are still significant when adjusting the gender imbalance of the sample to represent the gender balance of the overall student population at the University of Antwerp. The findings still hold in this analysis: 59.5 percent of the respondents of the initial wave were female students, compared to 52.1 percent among those who answered after the third reminder ($\chi^2 (1) = 9.34, p < .01$).³ Furthermore, parental education differs between early respondents and initial refusors. The mothers of early respondents show to be less educated compared to those who answer the extra reminder. Nevertheless, it should be noted that such statistically significant differences are not observed when comparing late respondents (those who completed the questionnaire after two reminders) with initial refusors. The only difference between the latter is the nationality of respondents, with students with an EU-background being more likely to complete the questionnaire. No statistically significant differences could be detected, however, concerning respondents' gender, age, fathers' educational background and students' interest in internationalization initiatives.⁴

Discussion and conclusion

Using a web survey administered to 15,651 university students, I investigated the impact of a late reminder on web survey response. With this methodological experiment, I aimed to investigate whether (1) initial refusors can still be convinced to participate in student surveys, which is relevant in times of increasing survey fatigue, and (2) whether there are differences in the profile of respondents when

Table 2. Comparison of characteristics of respondents and initial refusals, percentages.

	Early respondents (wave 1) vs. initial refusals (wave 4)		Late respondents (wave 3) vs. initial refusals (wave 4)		
	Wave 1 (n=970)	Wave 4 (n=955)	χ ²	Wave 3 (n=1348)	Wave 4 (n=955)
					χ ²
Gender			8.94**		.00
Female	67.2	60.2		60.3	60.2
Male	32.8	39.8		39.7	39.8
Age (years)			4.05		9.22
15–18	16.3	13.1		16.4	13.1
19–22	57.4	57.9		59.5	57.9
23–26	18.6	20.9		16.5	20.9
≥27	7.7	8.1		7.5	8.1
Education mother			7.89*		2.71
Low	37.7	31.2		34.7	31.2
Medium	41.0	46.0		43.2	46.0
High	21.2	22.9		22.2	22.9
Education father			.12		2.27
Low	35.5	36.4		34.6	36.4
Medium	32.9	32.6		31.1	32.6
High	31.6	31.1		34.3	31.1
Nationality			1.54		8.25*
Belgian	84.5	85.6		89.3	85.6
EU	12.3	12.3		8.4	12.3
Non-EU	3.2	2.2		2.3	2.2
Topic salience	Mean (SE) 3.22 (.66)	Mean (SE) 3.20 (.72)	t .75	Mean (SE) 3.21 (.69)	Mean (SE) 3.20 (.72)
					t .36

Notes: Statistical significance is measured by Chi-Square statistics.

* $p < .025$ (Bonferroni correction for multiple comparisons); ** $p < .001$.

comparing early and late response waves. Considering the first point, I showed that extra reminders are indeed helpful for raising response rates among populations that are over-surveyed. Nevertheless, the analysis also revealed that there is no statistically significant advantage of altering the content of standard reminders. The findings indicated that mentioning the number of people that already completed the questionnaire or mentioning this number in combination with the median time other respondents needed to complete the questionnaire does not result in a statistically significant larger number of responses. In contrast, the analysis showed that respondents are even less likely to respond to an extra reminder when they receive information on the median time other respondents needed to complete the questionnaire. Together, these findings indicate that when opting for an extra reminder, the best strategy to follow is to use the same reminder throughout the survey process.

Considering the second point, I observed that male students are more likely to participate in later waves of a survey, which is in line with the existing literature (e.g. Avery et al., 2006). Considering socio-economic background, the results are less conclusive: whereas differences regarding the educational level of respondents' mother were detected, no similar differences could be traced for respondents' father. This finding might reflect the substantive influence of mother's educational status on their offspring's demand for higher education (e.g. Albert, 2000) as well as on their educational attainment (e.g. Korupp, Ganzeboom, & Van Der Lippe, 2002). As mothers' educational status is related to the trajectories of their sons and daughters throughout higher education, it is plausible this is also related to student's survey response behaviour. Finally, I also observed differences considering the ethnic background of students, with students with an EU background being more likely to participate in later waves of the survey.

In sum, depending on the aim and scope of the survey, researchers can assess whether the effort of sending repeated reminders is worthwhile for reaching relevant respondents. If the aim is merely to obtain greater sample sizes, the results strongly suggest that repeated reminders are highly effective. All reminders significantly contributed to a response rate that is quite acceptable for current standards



on web survey response rates among students. If the aim is, however, to diversify the collected sample, the results of the study are less conclusive. In addition, researchers should carefully consider whether gaining higher response rates also pays off in the long term. After all, sending extra reminders to an already over-surveyed group might lead to even more survey fatigue and lower engagement in future surveys. It should be mentioned, for example, that already when sending the standard reminders, five students asked not to be bothered again. Sending an extra reminder resulted in one similar request.

Some limitations of the study should be acknowledged. First, this experiment was limited to a specific group of respondents, namely students, and only one institution for higher education in a particular country, limiting the generalizability of the results. The response rate of this survey can, on the one hand, be highly dependent upon the characteristics of the institution and its students (Porter & Umbach, 2006), or, on the other hand, indicate that the implication strategy was successful, which is something to be confirmed or falsified by future web surveys at other institutions for higher education, in Belgium as well as elsewhere, as well as with other groups of respondents. Second, it would have been interesting to cross-test the analysis with the same student cohort through other surveys. Unfortunately, this was not possible due to organizational and practical reasons. Future studies could address this weakness, cross-checking methodological experiments across different surveys with similar student samples. Such approach would be insightful for supporting or falsifying the presented results.

Finally, I acknowledge that the presented findings do not reveal a promising venue for coping with student survey fatigue. Nevertheless, the analysis is useful for two purposes. First, it confirms previous insights on the relationship between the number of reminders and survey response, adding fresh empirical evidence to the scientific canon. As such, the presented results strengthen findings presented by other authors. Second, the analysis indicates that the financial and time-wise effort required for diversifying the specific reminder contents discussed in this paper does not yield significant benefits in terms of increase in response rates. Therefore, the findings also have their practical value for researchers, as it sheds light on strategies that can be avoided.

To conclude, if we aim to base scientific knowledge as well as educational interventions on online student evaluations and student web surveys, maximizing efforts and developing tangible strategies to achieve acceptable response rates is of crucial importance. Using extra reminders to convince non-respondents to participate shows to have potential in this regard. Nevertheless, increasing response rates goes hand-in-hand with combatting student survey fatigue, which is the more important issue at stake. A logical strategy would be to decrease the number of invitations students receive over the course of an academic year. As a result, higher education institutions themselves play a crucial role in this regard. After all, institutions are probably able to control the number of invitations students receive from within their own institution. Therefore, it can be suggested to carefully evaluate each individual request to approach the full student population through a web survey (e.g. by undergraduate and graduate students who increasingly use web surveys for their bachelor or master theses). Furthermore, invitations can also be spread over the total student population to lower the burden for each student. Institutions can, for example, construct random pools of students and send each invitation to a different student pool. Consequently, the total number of invitations a student receives will be lowered as well. The development and evaluation of such approaches might offer promising ways forward to effectively combat survey fatigue and secure acceptable response rates.

Notes

1. For an overview of differences between ‘web surveys’, ‘online surveys’ and ‘internet surveys’, see Callegaro, Lozar Manfreda, and Vehovar (2015, pp. 12–13).
2. This time range was chosen as I expected differences in response rates depending on the time interval between the final and the extra reminder. However, no significant differences could be observed over time.
3. A similar robustness check could not be performed for the other variables, as no information was available on the educational background, nationality, age and topic salience of the total student population.
4. A robustness check adjusting the gender balance of the sample to the overall student population at the University of City was also performed here. Again, the results were similar to the ones without weights ($\chi^2(1) = .00, p > .05$).

Disclosure statement

No potential conflict of interest was reported by the author.

Notes on contributor

Christof Van Mol is a senior researcher at the Netherlands Interdisciplinary Demographic Institute (the Hague, the Netherlands) and an associated researcher at the Centre for Migration and Intercultural Studies (CeMIS, University of Antwerp, Belgium). He is interested in the empirical application of qualitative and quantitative methodologies as well as the development of novel methodologies. His empirical work largely focused on intra-European mobility, and has been published in journals such as European Union Politics, Global Networks, and Population, Space and Place.

References

- Adams, M. J. D., & Umbach, P. D. (2012). Nonresponse and online student evaluations of teaching: Understanding the influence of salience, fatigue, and academic environments. *Research in Higher Education*, 53, 576–591. doi: <http://dx.doi.org/10.1007/s11162-011-9240-5>
- Albert, C. (2000). Higher education demand in Spain: The influence of labour market signals and family background. *Higher Education*, 40, 147–162. doi: <http://dx.doi.org/10.1023/A:1004070925581>
- Avery, R. J., Bryant, W. K., Mathios, A., Kang, H., & Bell, D. (2006). Electronic course evaluations: Does an online delivery system influence student evaluations? *The Journal of Economic Education*, 37, 21–37. doi: <http://dx.doi.org/10.3200/JECE.37.1.21-37>
- Callegaro, Mario, Lozar Manfreda, Katja, & Vehovar, Vasja (2015). *Web survey methodology*. London: Sage.
- Christian, L. M., Parsons, N. L., & Dillman, D. A. (2009). Designing scalar questions for web surveys. *Sociological Methods & Research*, 37, 393–425. doi: <http://dx.doi.org/10.1177/0049124108330004>
- Cialdini, R. B., & Goldstein, N. J. (2004). Social influence: Compliance and conformity. *Annual Review of Psychology*, 55, 591–621. doi: <http://dx.doi.org/10.1146/annurev.psych.55.090902.142015>
- Conrad, F. G., Couper, M. P., Tourangeau, R., & Peytchev, A. (2010). The impact of progress indicators on task completion. *Interacting with Computers*, 22, 417–427. doi: <http://dx.doi.org/10.1016/j.intcom.2010.03.001>
- Couper, M. P. (2000). Web surveys. *Public Opinion Quarterly*, 64, 464–494. doi: <http://dx.doi.org/10.1086/318641>.
- Couper, M. P., Kapteyn, A., Schonlau, M., & Winter, J. (2007). Noncoverage and nonresponse in an internet survey. *Social Science Research*, 36, 131–148. doi: <http://dx.doi.org/10.1016/j.ssresearch.2005.10.002>.
- Couper, M. P., & Miller, P. V. (2008). Web survey methods: Introduction. *Public Opinion Quarterly*, 72, 831–835. doi: <http://dx.doi.org/10.1093/poq/nfn066>
- Crawford, S. D., Couper, M. P., & Lamias, M. J. (2001). Web surveys: Perceptions of burden. *Social Science Computer Review*, 19, 146–162. doi: <http://dx.doi.org/10.1177/089443930101900202>
- Durrant, M. B., & Dorius, C. R. (2007). Study abroad survey instruments: A comparison of survey types and experiences. *Journal of Studies in International Education*, 11, 33–53. doi: <http://dx.doi.org/10.1177/1028315306286929>
- Fan, W., & Yan, Z. (2010). Factors affecting response rates of the web survey: A systematic review. *Computers in Human Behavior*, 26, 132–139. doi: <http://dx.doi.org/10.1016/j.chb.2009.10.015>
- Fricker, R. D. (2008). Sampling methods for web and e-mail surveys. In N. Fielding, R. M. Lee, & G. Blank (Eds.), *The Sage handbook of online research methods* (pp. 195–216). Los Angeles, CA: Sage.
- Galesic, M., & Bosnjak, M. (2009). Effects of questionnaire length on participation and indicators of response quality in a web survey. *Public Opinion Quarterly*, 73, 349–360. doi: <http://dx.doi.org/10.1093/poq/nfp031>
- Groves, R. M. (1989). *Survey errors and survey costs*. New York, NY: Wiley.
- Groves, R. M. (2006). Nonresponse rates and nonresponse bias in household surveys. *Public Opinion Quarterly*, 70, 646–675. doi: <http://dx.doi.org/10.1093/poq/nfl033>
- Groves, R. M., Couper, M. P., Presser, S., Singer, E., Tourangeau, R., Acosta, G. P., & Nelson, L. (2006). Experiments in producing nonresponse bias. *Public Opinion Quarterly*, 70, 720–736. doi: <http://dx.doi.org/10.1093/poq/nfl036>
- Groves, R. M., & Peytcheva, E. (2008). The impact of nonresponse rates on nonresponse bias: A meta-analysis. *Public Opinion Quarterly*, 72, 167–189. doi: <http://dx.doi.org/10.1093/poq/nfn011>
- Groves, R. M., Presser, S., & Dipko, S. (2004). The role of topic interest in survey participation decisions. *Public Opinion Quarterly*, 68, 2–31. doi: <http://dx.doi.org/10.1093/poq/nfh002>
- Heerwagh, D., Abts, K., & Loosveldt, G. (2007). Minimizing survey refusal and noncontact rates: Do our efforts pay off? *Survey Research Methods*, 1, 3–10.
- Heerwagh, D., Vanhove, T., Loosveldt, G., & Matthijs, K. (2004). *Effects of personalization on web survey response rates and data quality*. Paper presented at the 6th International conference on social science methodology, Amsterdam.
- Kayongo, J., & Helm, C. (2010). Graduate students and the library: A survey of research practices and library use at the University of Notre Dame. *Reference & User Services Quarterly*, 49, 341–349.



- Korupp, S. E., Ganzeboom, H. B G., & Van Der Lippe, T. (2002). Do mothers matter? A comparison of models of the influence of mothers' and fathers' educational and occupational status on children's educational attainment. *Quality and Quantity*, 36, 17–42. doi: <http://dx.doi.org/10.1023/A:1014393223522>
- Lauber, C., Ajdacic-Gross, V., Fritsch, N., Stulz, N., & Rössler, W. (2005). Mental health literacy in an educational elite – An online survey among university students. *BMC Public Health*, 5(1), 1–9. doi: <http://dx.doi.org/10.1186/1471-2458-5-44>
- Lee, J. J. (2010). International students' experiences and attitudes at a US host institution: Self-reports and future recommendations. *Journal of Research in International Education*, 9, 66–84. doi: <http://dx.doi.org/10.1177/1475240909356382>
- Malhotra, N. (2008). Completion time and response order effects in web surveys. *Public Opinion Quarterly*, 72, 914–934. doi: <http://dx.doi.org/10.1093/poq/nfn050>
- Muñoz-Leiva, F., Sánchez-Fernández, J., Montoro-Ríos, F., & Ibáñez-Zapata, J. A. (2010). Improving the response rate and quality in web-based surveys through the personalization and frequency of remainder mailings. *Qualitative and Quantitative*, 44, 1037–1052. doi: <http://dx.doi.org/10.1007/s11135-009-9256-5>
- Nair, C. S., & Adams, P. (2009). Survey platform: A factor influencing online survey delivery and response rate. *Quality in Higher Education*, 15, 291–296. doi: <http://dx.doi.org/10.1080/13538320903399091>
- Nair, C. S., Adams, P., & Mertova, P. (2008). Student engagement: The key to improving survey response rates. *Quality in Higher Education*, 14, 225–232. doi: <http://dx.doi.org/10.1080/13538320802507505>
- Peytchev, A. (2009). Survey breakoff. *Public Opinion Quarterly*, 73, 74–97. doi: <http://dx.doi.org/10.1093/poq/nfp014>
- Porter, S. R. (2004). Raising response rates: What works? *New Directions for Institutional Research*, 2004, 5–21. doi: <http://dx.doi.org/10.1002/ir.97>
- Porter, S. R., & Umbach, P. D. (2006). Student survey response rates across institutions: Why do they vary? *Research in Higher Education*, 47, 229–247. doi: <http://dx.doi.org/10.1007/s11162-005-8887-1>
- Porter, S. R., & Whitcomb, M. E. (2003). The impact of contact type on web survey response rates. *Public Opinion Quarterly*, 67, 579–588. doi: <http://dx.doi.org/10.1086/378964>
- Porter, S. R., & Whitcomb, M. E. (2005). Non-response in student surveys: The role of demographics, engagement and personality. *Research in Higher Education*, 46, 127–152. doi: <http://dx.doi.org/10.1007/s11162-004-1597-2>
- Porter, S. R., Whitcomb, M. E., & Weitzer, W. H. (2004). Multiple surveys of students and survey fatigue. *New Directions for Institutional Research*, 2004, 63–73. doi: <http://dx.doi.org/10.1002/ir.101>
- Said, D., Kypri, K., & Bowman, J. (2013). Risk factors for mental disorder among university students in Australia: Findings from a web-based cross-sectional survey. *Social Psychiatry and Psychiatric Epidemiology*, 48, 935–944. doi: <http://dx.doi.org/10.1007/s00127-012-0574-x>
- Sánchez-Fernández, J., Muñoz-Leiva, F., Montoro-Ríos, F. J., & Ibáñez-Zapata, J. Á. (2010). An analysis of the effect of pre-incentives and post-incentives based on draws on response to web surveys. *Quality & Quantity*, 44, 357–373. doi: <http://dx.doi.org/10.1007/s11135-008-9197-4>
- Sax, L. J., Gilmartin, S. K., & Bryant, A. N. (2003). Assessing response rates and nonresponse bias in web and paper surveys. *Research in Higher Education*, 44, 409–432. doi: <http://dx.doi.org/10.1023/A:1024232915870>
- Sheehan, K. B. (2001). E-mail survey response rates: A review. *Journal of Computer-Mediated Communication*, 6(2), doi: <http://dx.doi.org/10.1111/j.1083-6101.2001.tb00117.x>
- Smyth, J. D., & Pearson, J. E. (2011). Internet survey methods: A review of strengths, weaknesses, and innovations. In M. Das, P. Ester, & L. Kaczmarek (Eds.), *Social and behavioral research and the internet. Advances in applied methods and research strategies* (pp. 11–44). New York, NY: Routledge.
- Spitzmüller, C., Glenn, D. M., Barr, C. D., Rogelberg, S. G., & Daniel, P. (2006). "If you treat me right, I reciprocate": Examining the role of exchange in organizational survey response. *Journal of Organizational Behavior*, 27, 19–35. doi: <http://dx.doi.org/10.1002/job.363>
- Tourangeau, R., Couper, M. P., & Conrad, F. (2004). Spacing, position, and order: Interpretive heuristics for visual features of survey questions. *Public Opinion Quarterly*, 68, 368–393. doi: <http://dx.doi.org/10.1093/poq/nfh035>
- Vehovar, V., & Lozar Manfreda, K. (2008). Overview: Online surveys. In N. Fielding, R. M. Lee, & G. Blank (Eds.), *The sage handbook of online research methods* (pp. 177–194). Los Angeles, CA: Sage.
- Webber, M., Lynch, S., & Oluku, J. (2013). Enhancing student engagement in student experience surveys: A mixed methods study. *Educational Research*, 55, 71–86. doi: <http://dx.doi.org/10.1080/00131881.2013.767026>