Received: 23 January 2021 | Revised: 16 June 2021 | Accepted: 12 August 2021

DOI: 10.1002/mpr.1891

ORIGINAL ARTICLE

WILEY

Does the management of personal integrity information lead to differing participation rates and response patterns in mental health surveys with young adults? A three-armed methodological experiment

Claes Andersson[1,2] | Marcus Bendtsen[3] | Petra Lindfors[4] | Olof Molander[5] | Philip Lindner[5] | Naira Topooco[6] | Karin Engström[7] | Anne H. Berman[2,5]

[1]Department of Criminology, Malmö University, Malmö, Sweden

[2]Department of Psychology, Uppsala University, Uppsala, Sweden

[3]Department of Health, Medicine and Caring Sciences, Linköping University, Linköping, Sweden

[4]Department of Psychology, Stockholm University, Stockholm, Sweden

[5]Centre for Psychiatry Research, Department of Clinical Neuroscience, Karolinska Institutet, & Stockholm Health Care Services, Stockholm, Sweden

[6]Department of Behavioural Sciences and Learning, Linköping University, Linköping, Sweden

[7]Department of Global Public Health, Karolinska Institutet, Stockholm, Sweden

Correspondence
Claes Andersson, Department of Criminology, Malmö University, 206 05 Malmö, Sweden.
Email: claes.andersson@mau.se

Funding information
Vetenskapsrådet, Grant/Award Number: 2019-01127

Abstract

Objectives: This study evaluates whether initiation rates, completion rates, response patterns and prevalence of psychiatric conditions differ by level of personal integrity information given to prospective participants in an online mental health self-report survey.

Methods: A three-arm, parallel-group, single-blind experiment was conducted among students from two Swedish universities. Consenting participants following e-mail invitation answered the World Health Organization (WHO) World Mental Health-International College Student (WMH-ICS) mental health self-report survey, screening for eight psychiatric conditions. Random allocation meant consenting to respond (1) anonymously; (2) confidentially, or (3) confidentially, where the respondent also gave consent for collection of register data.

Results: No evidence was found for overall between-group differences with respect to (1) pressing a hyperlink to the survey in the invitation email; and (2) abandoning the questionnaire before completion. However, participation consent and self-reported depression were in the direction of higher levels for the anonymous group compared to the two confidential groups.

Conclusions: Consent to participate is marginally affected by different levels of personal integrity information. Current standard participant information procedures may not engage participants to read the information thoroughly, and online self-report mental health surveys may reduce stigma and thus be less subject to social desirability bias.

KEYWORDS
anonymous, confidential, mental health, online survey, personal integrity, register data

1 | INTRODUCTION

Research on mental health, including epidemiological and intervention studies, typically involves collection and management of sensitive personal data. This may be done either anonymously, where researchers do not know the identity of the respondents, or confidentially, where respondents are given information that no traceable record of their responses will be disclosed. Self-report questionnaires are a common method for data collection in epidemiological studies, and may in some cases be the only feasible way to measure certain phenomena. In collecting self-reported data, perceived invasion of personal integrity, or privacy, may affect validity of data in terms of biased responses and completion rates. Such bias may be due to social desirability, meaning that people convey a particular impression of themselves to others to minimize their own discomfort (Krumpal, 2013), or that participants alter their responses in what they believe to be the direction of the researchers' hypotheses, sometimes known as demand characteristics (Orne, 1962). While anonymity offers participants the opportunity to provide information without revealing their personal identity, and by doing so hypothetically reducing the risk of social desirability bias, confidential data are required for any study that requires record linkage, longitudinal follow-ups, and for allocation to interventions with longitudinal follow-ups (D'Orazio, 2015).

It has been hypothesized that anonymously collected surveys should generate higher rates of accessing the consent materials and higher reporting of items with potential social desirability bias (Nederhof, 1985). However, previous findings on whether different levels of personal integrity invasion affect response and completion rates, or data validity are inconclusive, and few studies cover the range of different conditions that mental health research encompasses. Across different research areas, several studies have shown that anonymous questionnaires result in higher quality data (Beatty et al., 2014; Beebe et al., 2006; Chase et al., 2013; Durant et al., 2002; Futrell et al., 1978; Malvin & Moskowitz, 1983; Murdoch et al., 2014; Olson et al., 2004; Richman et al., 1999; Rolnick et al., 1989; Singer et al., 1993; Stander et al., 2002; Werch, 1990; Zagumny et al., 1996), while other studies have shown that quality is not affected by a confidential approach (Albaum, 1987; Bjarnason & Adalbjarnardottir, 2000; Campbell & Waters, 1990; Esposito et al., 1984; Fear et al., 2012; Kundig et al., 2011; McKee, 1992; O'Malley et al., 2000; Ong & Weiss, 2000; van de Looij-Jansen et al., 2006). Few of these studies have investigated online surveys. In addition, research is limited on whether quality of data is affected by requesting consent to collect register data in addition to a confidential survey, although a review has shown that research participants are generally positive about participating in register studies (Da Silva et al., 2012).

1.1 | Study aim

The aim of the present study was to evaluate whether initiation rates, consent rates, completion rates, and response patterns differed, depending on whether an online mental health self-report questionnaire, screening for eight psychiatric conditions, was distributed (1) anonymously; (2) confidentially, or (3) as a confidential survey where the respondents gave their consent for the collection of register data.

2 | METHODS

2.1 | Design and setting

A three-arm, parallel-group, single-blind randomized controlled trial was used to address the study aims. The study was conducted among students from two Swedish universities: a large university in the capital area from which educational programs were strategically selected; and a middle size university situated in a metropolitan area in the southern part of the country, where all registered students were included. The data collection took place as an initial pilot study for Swedish participation in the World Health Organization (WHO) World Mental Health-International College Student (WMH-ICS) initiative. This is a global initiative designed to generate epidemiological data on mental health issues and treatment needs in university students by using a validated web-based survey providing estimates of a wide range of mental disorders (Cuijpers et al., 2019).

2.2 | Ethics and procedure

In accordance with the Swedish Act concerning the Ethical Review of Research Involving Humans (2003:460), all procedures and information, including sending invitation emails to participants and informed consent materials, were vetted by the Swedish Ethical Review Authority (Ref. No. 2020-01465, approved May 12, 2020). The informed consent materials followed a pre-specified format supplied by the Swedish Ethical Review Authority. Participants' email addresses were obtained via a national student register containing student level information on course registrations and results. Included students were randomized by a 1:1:1 ratio, resulting in three groups: an anonymous arm informing participants that survey responses were anonymous (Group 1); a confidential arm informing them that survey responses were linked to personal information via a so-called pseudonymization code (Group 2); and a confidential register arm, informing participants that survey responses were linked to personal information and register data on study activity and results (Group 3).

Students were sent one email and up to two reminders. Each invitation email provided a brief text about this research project on students' mental health and a hyperlink to a webpage with the informed consent materials. As shown in Figure 1, both the invitation email and study information included group specific information concerning the handling of personal integrity based on randomization. For students assigned to any of the three groups, participation did not differ in any way other than the content of this

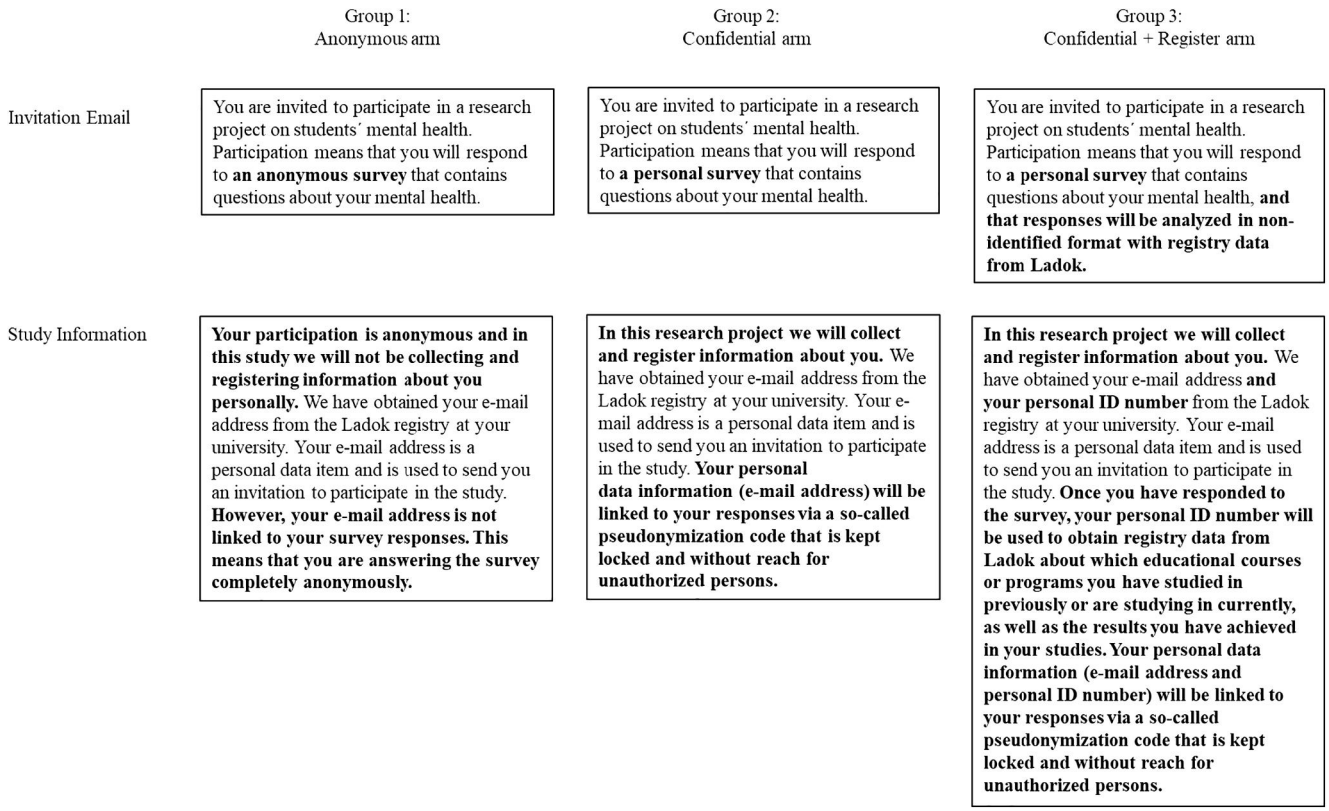

FIGURE 1 Group-specific information provided in invitation email and study information

information. No information was given that participants had been randomized, or that the study was intended to investigate the effects of level of personal integrity invasion on levels of consenting, survey completion, or prevalence of mental health issues among respondents.

2.3 | Survey

The web-based WMH-ICS survey provides estimates of a wide range of mental disorders. Such data concerning individual health is considered sensitive information according to the European Union (EU) General Data Protection Regulation (GDPR). The survey is divided into 11 sections: background, current health, attention and concentration, emotional problems, alcohol and drugs, self-harm, seeking treatment, childhood background, recent experiences, sexuality, and concept of self. The survey screens for the following mental disorders: depression, anxiety, bipolar disorder, panic attacks, post-traumatic stress disorder, self-harm, alcohol use disorder, and drug use (Auerbach et al., 2018).

Definition of positive screens for mental disorders: Depression and anxiety are defined as ever having experienced symptoms of any of these conditions sometime in one's lifetime; bipolar disorder is defined as ever having experienced an episode lasting two days or longer; panic attacks are defined as ever having experienced three or more panic attacks; post-traumatic stress disorder is defined as ever having experienced an episode of trauma-related stress lasting one month or longer; self-harm is defined as ever having experienced suicidal ideation, thoughts on suicide, or deliberate self-harm; alcohol use disorder is defined as problematic alcohol use consisting of at minimum drinking monthly, and having more than 2 standard drinks at each drinking occasion; drug use disorder is defined as ever having taken drugs.

2.4 | Analysis

The analysis plan was registered at the Open Science Framework (OSF; Andersson et al., 2020), before downloading the data from the survey platform but after the data collection had begun; however, purpose, method and outcomes were specified in the ethical application which was approved before data collection was initiated. Figure 2 shows the four basic steps of the analyses. First, we conducted group comparisons of the proportion of respondents who, after receiving the invitation email, pressed a hyperlink to continue to the webpage providing study information. Second, we carried out group comparisons of the proportion of respondents who, after having taken part of the study information, provided informed consent. Third, we conducted group comparisons on the cumulative proportion of consenters who abandoned the questionnaire per question presented. The fourth group comparison concerned proportions of positive screens concerning the following eight

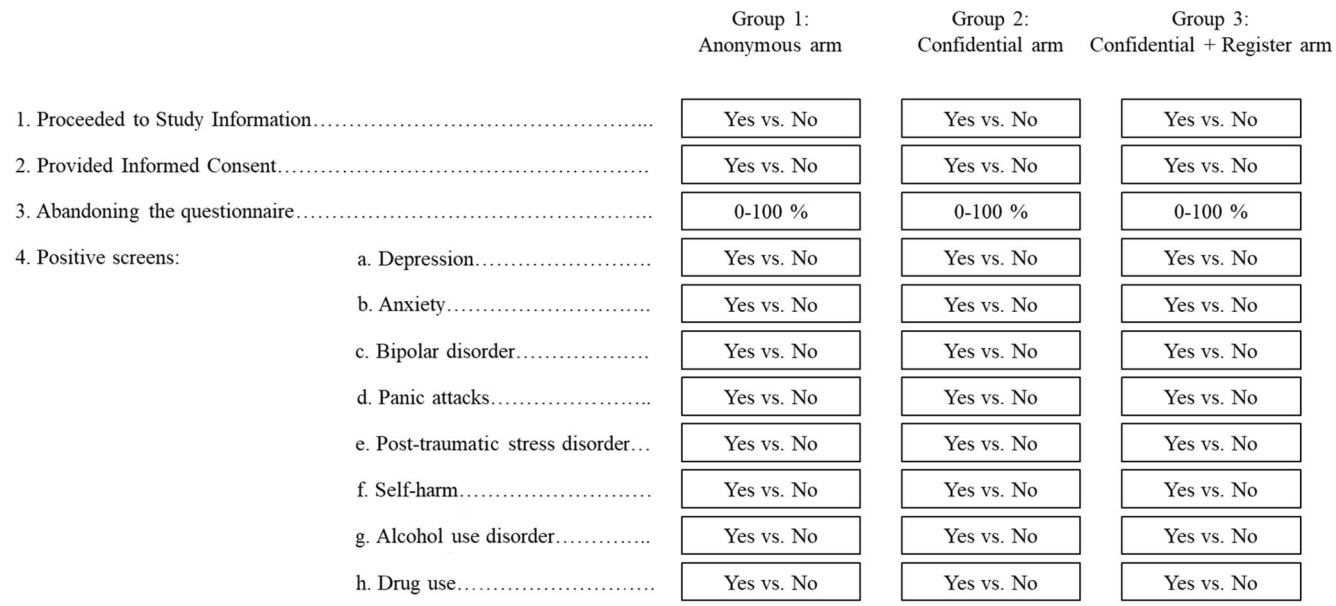

FIGURE 2 Four levels of group comparisons

psychiatric disorders: depression; anxiety; bipolar disorder; panic attacks; post-traumatic stress disorder; self-harm; alcohol use disorder; drug use. See Figure 2 for an overview.

All analyses, except where noted, were conducted according to intention to treat principles, analyzing participants within the groups to which they were randomly allocated. Analyses were conducted using available data, assuming that any missing data were missing at random. Imputation was not considered an option, since no baseline data were available prior to randomization and causal mechanisms underlying missingness in this context are not well understood due to the varied outcomes shown in currently published empirical research. Outcomes were analyzed using Chi-2 and regression models comparing the three groups pairwise: logistic for proportions and proportional hazard for cumulative proportions. Models were estimated by using Bayesian interference with standard (half-) normal priors. Marginal posterior probability of estimates being greater (or less) than the null are reported, and posterior medians are used as estimates of effects alongside 50% and 95% compatibility intervals. The Bayesian estimates are complemented with null hypothesis testing of maximum likelihood estimates of model covariates (at the 0.05 significant level). All models, except proportions of participants who pressed the hyperlink provided in invitation emails, and proportions of participants providing informed consent, were adjusted for gender identity and age. Effect-modification analyses were performed for all outcomes, except for proportions of participants who pressed the hyperlink in invitation emails and proportions of participants providing informed consent. These analyses were conducted by adding interaction terms between group allocation and the following potential effect modifiers: gender identity, age, international student, response language, current student status, and university.

3 | RESULTS

3.1 | Participation overview

Figure 3 shows the participant flow for university students randomized into the three groups: anonymous (Group 1); confidential (Group 2); and confidential plus register arm (Group 3). Invitation emails including group specific content were sent to 16,152 university students. A total of 374 (2.3%) of the email addresses failed or bounced, resulting in a total of 15,778 receiving an invitation. Of those receiving an invitation, 2635 (16.7%) pressed a hyperlink in the email to continue to a webpage providing group-specific study information. Of these, a total of 2005 (76.1%) gave their consent to participation. Participants were then directed to the questionnaire (the same for all groups), which was completed by 1224 (61.0%) of the consenters. Relative to the total number of students who received the invitation, 12.7% agreed to participate and 7.8% completed the questionnaire.

3.2 | Study information and consent

Table 1 presents group comparisons of proportions of participants who initiated study participation by pressing a hyperlink in the invitation email (upper section), followed by group comparisons of proportions who consented participation (lower section). Analysis of those who pressed the link for study information showed that participants in the anonymous arm (Group 1) provided their informed consent to a larger extent than participants in both confidential arms (Groups 2 and 3; 79.3% vs. 73.4% and 75.5%).

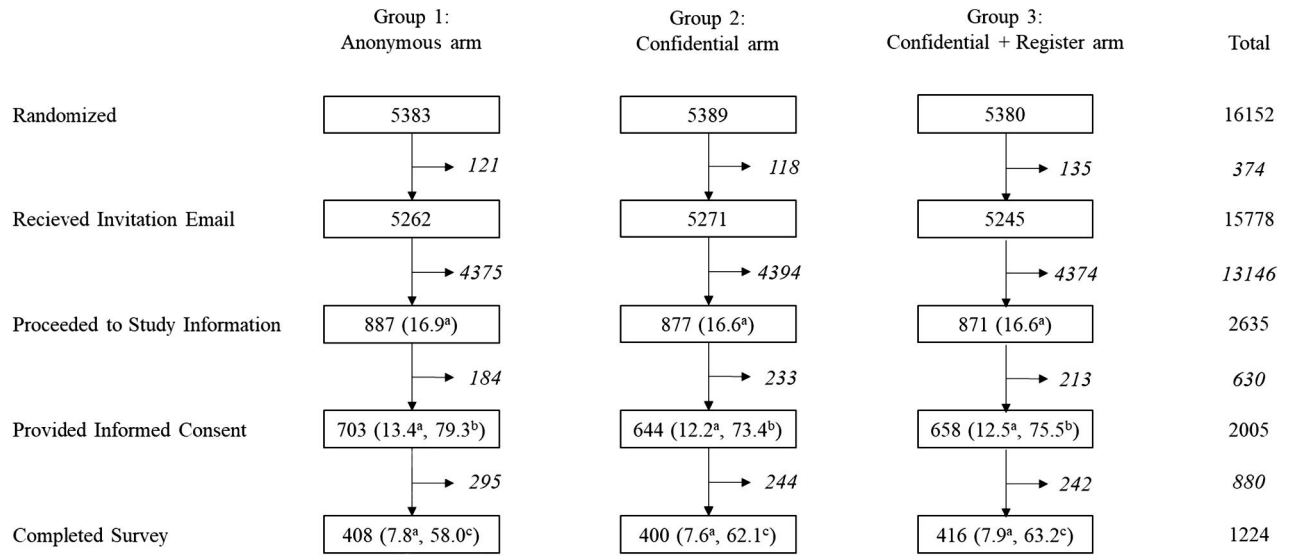

FIGURE 3 Participant flow. a = Percent of those who received email. b = Percent of those who proceeded to study information. c = Percent of those who provided consent. Italicized numbers indicate participants who did not proceed to the next step, thereby abandoning the survey

TABLE 1 Group comparisons of proportions of participants who pressed a hyperlink provided in emails to reach a webpage providing group-specific study information, and proportions of participants providing informed consent

		Bayesian marginal posterior distribution		Maximum Likelihood estimates and null hypothesis testing	
		Median (2.5%; 97.5%)	OR < 1	OR estimate (95% CI)	*p*-value
Study information	Group 2 vs. Group 1	0.98 (0.89; 1.09)	61.9%	0.98 (0.89; 1.09)	0.76
	Group 3 vs. Group 1	0.98 (0.89; 1.09)	63.8%	0.98 (0.89; 1.09)	0.73
	Group 3 vs. Group 2	1.00 (0.90; 1.11)	52.8%	1.00 (0.90; 1.11)	0.97
Informed consent	Group 2 vs. Group 1	0.73 (0.58; 0.90)	99.8%	0.72 (0.58; 0.90)	<0.01
	Group 3 vs. Group 1	0.81 (0.65; 1.02)	96.3%	0.81 (0.65; 1.01)	0.063
	Group 3 vs. Group 2	1.12 (0.90; 1.38)	15.2%	1.12 (0.90; 1.39)	0.31

Note: Group 1 = anonymous response; Group 2 = confidential arm with personally identified data; Group 3 = confidential arm with personally identified data and linkage to register data. Second group is reference group.

3.3 | Abandoning the questionnaire

Table 2 compares the cumulative proportion of consenters abandoning the questionnaire per question presented, converted to a progress rate between 0 and 100 percent. Proportional hazard regression with adjustments for gender identity and age was conducted using two subsets: the left column includes participants who consented and initiated the survey; the right column excludes completers, since these are a strong majority skewing the distribution towards 100% progress. No marked between-group differences were found.

3.4 | Positive screens for psychiatric conditions

Table 3 presents group distributions of participants screening positive for any of the following eight psychiatric conditions: depression; anxiety; bipolar disorder; panic attacks; post-traumatic stress disorder; self-harm; alcohol use disorder; drug use. In each cell the percentage of positive screens is followed by the frequency of positive screens in relation to the total number of respondents.

Table 3 also presents the analyses of comparative proportions of positive screens on the eight psychiatric disorders in the three groups, expressed in odds ratios from logistic regression models with adjustments for gender identity and age. There were no findings that suggested any marked or consistent differences between the three groups, with the exception of screens for depression being in the direction of lower levels in both confidential groups (groups 2 and 3) compared to the anonymous survey group (group 1; see Table 3).

3.5 | Effect-modification analysis

Effect-modification analysis showed some indication of an attenuation with respect to age when analyzing those abandoning the

TABLE 2 Cumulative proportions abandoning the questionnaire per question presented

		Bayesian marginal posterior distribution			
		Subset 1: Consented and initiated survey (n = 1912)		Subset 2: Completers excluded (n = 694)	
		Median (2.5%; 97.5%)	HR > 1	Median (2.5%; 97.5%)	HR > 1
Group 1	Baseline hazard	0.018 (0.014; 0.022)	-	0.072 (0.049; 0.105)	-
Group 2	Hazard ratio	0.94 (0.84; 1.05)	12.3%	0.98 (0.82; 1.17)	41.3%
Group 3	Hazard ratio	0.95 (0.85; 1.06)	18.2%	1.05 (0.88; 1.26)	71.5%

Note: Proportional hazard regression with adjustments for gender identity and age. Group 1 = anonymous response; Group 2 = confidential arm with personally identified data; Group 3 = confidential arm with personally identified data and linkage to register data.

questionnaire, and with respect to age and male gender when analyzing positive screens. However, these findings were weak and inconsistent, thus indicating no evidence of moderation effects for any of the outcomes which could be reliably discerned from chance.

4 | DISCUSSION

The present study investigated different levels of personal integrity invasion in an online mental health survey with university students. The results indicated that study initiations, consent rates, completion rates and response patterns were, with two minor exceptions, equal among participants. A minor effect on consent rates suggested that those offered anonymous participation were more likely to consent in comparison to the confidential condition. Also, depression rates were in the direction of higher levels in the anonymous participation group as compared to both confidential groups.

Our findings indicate that conducting surveys on sensitive mental health data is largely unaffected by the level of personal integrity invasion. We suggest two possible explanations for this–first that social desirability bias only has marginal effects; secondly, that informed consent materials are not read and understood properly, suggesting a failure to experimentally manipulate the respondents in the present study. Given that consent materials in this study were developed according to guidelines set by the Swedish Ethical Review Authority, the latter prospect is a matter of concern.

Social desirability bias suggests that anonymously collected surveys should generate higher rates of informed consent and higher reporting of items with potential social desirability bias compared to confidential surveys (Nederhof, 1985). We evaluated several potential outcomes and found only that the proportions of informed consent and screening for depression were in the direction of higher levels in the anonymous group compared to the confidential groups. Our conclusion is that social desirability bias has marginal effects when collecting mental health data through online surveys in university students. The benefits a confidential survey offers in terms of follow-ups and record linkage outweigh the marginal negative effects that result from social desirability bias.

The three experimental conditions to which participants were randomized differed only in terms of the confidentiality-related information provided in the invitation emails, and in the informed consent materials provided prior to initiating the survey. All information followed guidelines from the Swedish Ethical Review Authority and was vetted by the same authority. Central documents guiding research ethics emphasize the necessity of obtaining informed consent in a way that allows participants to understand the risks and benefits of the intrusion of privacy (e.g., World Medical Association, 2013). Institutional Review Boards (IRBs) provide guidelines for creating informed consent documents that contain all necessary information, but studies have shown that participants do not read consent forms thoroughly and sign consent forms without having read them (Douglas et al., 2021; Pedersen et al., 2011). It can thus be argued that participants may not have taken the confidentiality condition into consideration when responding to the present survey. It is likely that IRB guidelines can be further developed regarding how information about confidentiality in consent forms is presented to potential participants; a corollary to such development would require improved procedures to confirm that participants have processed and understood this information. This could lead to clearer information about what study participation means, including risks and benefits. Swedish guidelines only state the need to present a clean text that describes how integrity issues are handled. It is possible that requiring individuals to confirm that they have read and understood the confidentiality content would to some extent improve communication on important ethical issues.

This study had several strengths relative to previous studies, which are rather inconclusive and only investigate specific populations, for example, postpartum women (Beatty et al., 2014) or the military (Fear et al., 2012). The present study expanded previous knowledge to cover several psychiatric conditions important for epidemiological and intervention studies in the field of mental health research on university students. Also, the present study used a widely used screening questionnaire from the global WMH-ICS consortium for screening and diagnostic assessment (Cuijpers et al., 2019). A further advantage to be noted involved the blinding of participants to the true study aim. However, some limitations should also be observed. A major cause of concern is the overall low interest that students showed in participation; four out of five students receiving the brief invitation email showed no interest in participating. Nonetheless, the response rate to this survey was not unusual

TABLE 3 Proportions of positive screens and group-comparisons of proportions screening positive for eight psychiatric disorders

		Positive screens		Group-comparison				
		% (*n*/*N*)		Chi-2	Bayesian marginal posterior distribution		Maximum likelihood estimates and null hypothesis testing	
				p value	Median (2.5%; 97.5%)	OR < 1	OR estimate (95% CI)	*p* value
Depression	Total	56.3 (937/1664)						
	Group 2 vs. Group 1	53.7 (286/533)	59.7 (339/568)	0.044	0.78 (0.61; 0.99)	97.8%	0.78 (0.61; 0.99)	0.045
	Group 3 vs. Group 1	55.4 (312/563)	59.7 (339/568)	0.15	0.84 (0.61; 1.07)	92.1%	0.84 (0.66; 1.06)	0.15
	Group 3 vs. Group 2	55.4 (312/563)	53.7 (286/533)	0.56	1.07 (0.84; 1.35)	27.8%	1.07 (0.84; 1.36)	0.57
Anxiety	Total	76.3 (1277/1673)						
	Group 2 vs. Group 1	76.6 (410/535)	76.4 (438/573)	0.94	1.03 (0.78; 1.36)	42.7%	1.03 (0.77; 1.36)	0.86
	Group 3 vs. Group 1	75.9 (429/565)	76.4 (438/573)	0.84	0.99 (0.75; 1.29)	53.9%	0.99 (0.75; 1.30)	0.92
	Group 3 vs. Group 2	75.9 (429/565)	76.6 (410/535)	0.79	0.95 (0.72; 1.26)	63.5%	0.95 (0.71; 1.26)	0.72
Bipolar disorder	Total	21.9 (277/1262)						
	Group 2 vs. Group 1	22.7 (92/431)	21.3 (92/431)	0.65	1.07 (0.77; 1.48)	33.4%	1.07 (0.77; 1.49)	0.67
	Group 3 vs. Group 1	21.9 (93/425)	21.3 (92/431)	0.85	1.01 (0.73; 1.41)	47.1%	1.01 (0.73; 1.41)	0.93
	Group 3 vs. Group 2	21.9 (93/425)	22.7 (92/431)	0.79	0.95 (0.69; 1.31)	62.0%	0.95 (0.68; 1.32)	0.75
Panic attacks	Total	50.6 (678/1341)						
	Group 2 vs. Group 1	48.7 (209/429)	50.8 (235/463)	0.54	0.94 (0.73; 1.23)	66.6%	0.94 (0.72; 1.23)	0.67
	Group 3 vs. Group 1	51.1 (234/449)	50.8 (235/463)	0.68	1.07 (0.83; 1.39)	29.1%	1.07 (0.82; 1.40)	0.60
	Group 3 vs. Group 2	51.1 (234/449)	48.7 (209/429)	0.31	1.15 (0.88; 1.49)	16.2%	1.15 (0.88; 1.50)	0.32
Post-traumatic stress disorder	Total	61.7 (819/1327)						
	Group 2 vs. Group 1	62.1 (267/430)	61.4 (277/451)	0.84	1.04 (0.79; 1.36)	37.9%	1.04 (0.79; 1.37)	0.76
	Group 3 vs. Group 1	61.7 (275/446)	61.4 (277/451)	0.94	1.04 (0.80; 1.36)	38.0%	1.04 (0.79; 1.37)	0.77
	Group 3 vs. Group 2	61.7 (275/446)	62.1 (267/430)	0.89	0.99 (0.75; 1.30)	53.0%	0.99 (0.75; 1.30)	0.93
Self-harm	Total	61.5 (783/1274)						
	Group 2 vs. Group 1	60.0 (252/420)	62.1 (265/427)	0.54	0.92 (0.70; 1.22)	72.0%	0.92 (0.70; 1.22)	0.56
	Group 3 vs. Group 1	62.3 (266/427)	62.1 (265/427)	0.94	0.99 (0.75; 1.31)	52.2%	0.99 (0.75; 1.31)	0.94
	Group 3 vs. Group 2	62.3 (266/427)	60.0 (252/420)	0.49	1.08 (0.82; 1.43)	28.9%	1.08 (0.82; 1.43)	0.59
Alcohol use disorder	Total	71.7 (929/1295)						
	Group 2 vs. Group 1	70.0 (297/424)	72.1 (316/438)	0.50	0.91 (0.68; 1.22)	72.4%	0.92 (0.68; 1.23)	0.56

(Continues)

TABLE 3 (Continued)

		Positive screens	Group-comparison			Maximum likelihood estimates and null hypothesis testing	
		% (n/N)	Chi-2 p value	Bayesian marginal posterior distribution			
				Median (2.5%; 97.5%)	OR < 1	OR estimate (95% CI)	p value
	Group 3 vs. Group 1	73.0 (316/433)	72.1 (316/438)	0.78	1.05 (0.78; 1.41)	37.4%	1.06 (0.78; 1.43)	0.73
	Group 3 vs. Group 2	73.0 (316/433)	70.0 (297/424)	0.34	1.17 (0.87; 1.57)	15.0%	1.18 (0.87; 1.59)	0.29
Drug use	Total	34.8 (447/1286)						
	Group 2 vs. Group 1	34.1 (144/422)	36.2 (158/436)	0.52	0.90 (0.68; 1.19)	77.9%	0.89 (0.67; 1.18)	0.43
	Group 3 vs. Group 1	33.9 (145/428)	36.2 (158/436)	0.47	0.87 (0.66; 1.16)	82.6%	0.87 (0.65; 1.15)	0.33
	Group 3 vs. Group 2	33.9 (145/428)	34.1 (144/422)	0.94	0.98 (0.74; 1.31)	55.5%	0.98 (0.73; 1.31)	0.90

Note: Logistic regression with adjustments for gender identity and age. Group 1 = anonymous response; Group 2 = confidential arm with personally identified data; Group 3 = confidential arm with personally identified data and linkage to register data. Second group is reference group.

for similar studies using the same questionnaire (Auerbach et al., 2018), and the number of respondents was substantial. The question of representativity is key to whether the response rate is cause for alarm. We requested permission from the national Swedish IRB to conduct a gender, age and study area analysis of non-respondents, but were denied permission since the students had not consented. A general comparison to publicly available statistics at the participating universities suggests that we recruited a somewhat elevated proportion of women (about 10%), but otherwise we cannot accurately assess representativity.

Future studies might wish to replicate this trial but add confirmation questions immediately after consent, asking participants to confirm that they have understood the level of personal integrity offered, from complete anonymity to the condition that personal identifiers will be collected, and that linkage with register data will be completed. A second alternative would be to request two consents, one for the survey as a whole, and a second for the specific privacy invasion relevant for the respondent. Another option for future studies would be, for respondents who pressed the hyperlink to the detailed informed consent page, to measure the time spent on the page and the extent of scrolling down to peruse all information.

In conclusion, this study demonstrated that differing levels of personal integrity invasion did not generally correlate with the prevalence of mental health conditions among participants. We speculate that this may partly be due to current IRB practices requiring communication of information in detailed, lengthy texts, leading to a lack of attention among prospective respondents to the conditions under which they participate in research. However, given the lack of apparent social desirability bias, a more positive interpretation of the results would be that participants at different levels of personal integrity engaged in the research from a sense of trust for the university as a research institution for the public good, from a personal or societal concern for the suffering caused by the condition under investigation, or from a sense of altruism (Slegers et al., 2015), regardless of their concerns for personal integrity. The challenge facing researchers of mental health issues in populations such as university students might then be reformulated as relating to effective communication about the importance of responding to mental health surveys, for the current and future public good. A final point is that recent research suggests that low response rates do not necessarily reflect a non-response bias and, weighed in relation to the costs of efforts to increase response rates, a better strategy might involve accepting lower response rates and strategically monitoring non-response bias (Hendra & Hill, 2018). Nonetheless, based on our study, we recommend that future research on mental health among university students attend to effective communication about the conditions of the research, clear formulation of the overriding purpose of the research, and creative solutions to consistently monitor the nonresponse bias.

ACKNOWLEDGMENTS

This study was funded by the Swedish Research Council (Vetenskapsrådet), grant no 2019-01127 to author AHB. The funder had no role in designing, conducting, or analyzing the results for this study.

The authors would like to acknowledge participating universities and students.

CONFLICT OF INTERESTS

No conflicts of interest are declared.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author, upon reasonable request.

ORCID

Claes Andersson https://orcid.org/0000-0001-9819-2474
Marcus Bendtsen https://orcid.org/0000-0002-8678-1164
Petra Lindfors https://orcid.org/0000-0002-8213-1391
Olof Molander https://orcid.org/0000-0001-5348-051X
Naira Topooco https://orcid.org/0000-0001-5972-3041
Anne H. Berman https://orcid.org/0000-0002-7709-0230

REFERENCES

Albaum, G. (1987). Do source and anonymity affect mail survey results? *Journal of the Academy of Marketing Science*, *15*, 74–81. https://doi.org/10.1007/BF02722173

Andersson, C., Bendtsen, M., Lindfors, P., Engström, K., Lindner, P., Topooco, N., & Berman, A. H. (2020). *Response patterns by personal integrity*. osf.io/73esv

Auerbach, R. P., Mortier, P., Bruffaerts, R., Alonso, J., Benjet, C., Cuijpers, P., Demyttenaere, K., Ebert, D. D., Green, J. G., Hasking, P., Murray, E., Nock, M. K., Pinder-Amaker, S., Sampson, N. A., Stein, D. J., Vilagut, G., Zaslavsky, A. M., Kessler, R. C., Kessler R. C., & WHO WMH-ICS Collaborators. (2018). WHO World mental health surveys international College student project: Prevalence and distribution of mental disorders. *Journal of Abnormal Psychology*, *127*(7), 623–638. https://doi.org/10.1037/abn0000362

Beatty, J. R., Chase, S. K., & Ondersma, S. J. (2014). A randomized study of the effect of anonymity, quasi-anonymity, and Certificates of Confidentiality on postpartum women's disclosure of sensitive information. *Drug and Alcohol Dependence*, *134*, 280–284. https://doi.org/10.1016/j.drugalcdep.2013.10.016

Beebe, T. J., Harrison, P. A., Park, E., McRae, J. A., & Evans, J. (2006). The effects of data collection mode and disclosure on adolescent reporting of health behavior. *Social Science Computer Review*, *24*(4), 476–488. https://doi.org/10.1177/0894439306288690

Bjarnason, T., & Adalbjarnardottir, S. (2000). Anonymity and confidentiality in school surveys on alcohol, tobacco, and cannabis use. *Journal of Drug Issues*, *30*(2), 335–343. https://doi.org/10.1177/002204260003000206

Campbell, M. J., & Waters, W. E. (1990). Does anonymity increase response rate in postal questionnaire surveys about sensitive subjects? A randomised trial. *Journal of Epidemiology & Community Health*, *44*(1), 75–76. https://doi.org/10.1136/jech.44.1.75

Chase, S. K., Beatty, J. R., & Ondersma, S. J. (2013). A randomized trial of the effects of anonymity and quasi anonymity on disclosure of child maltreatment-related outcomes among postpartum women. *Child Maltreatment*, *16*(1), 33–40. https://doi.org/10.1177/1077559510387659

Cuijpers, P., Auerbach, R. P., Benjet, C., Bruffaerts, R., Ebert, D., Karyotaki, E., & Kessler, R. C. (2019). The World Health Organization World Mental Health International College student initiative: An overview. *International Journal of Methods in Psychiatric Research*, *28*(2), e1761. https://doi.org/10.1002/mpr.1761

Da Silva, M., Coeli, C., Ventura, M., Palacios, M., Magnanini, M., Camargo, T., & Camargo, K. (2012). Informed consent for record linkage: A systematic review. *Journal of Medical Ethics*, *38*(10), 639-642.

D'Orazio, M. (2015). Integration and imputation of survey data in R: The StatMatch package. *Revista Romana de Statistica*, *63*(2), 57–68.

Douglas, B. D., McGorray, E. L., & Ewell, P. J. (2021). Some researchers wear yellow pants, but even fewer participants read consent forms: Exploring and improving consent form reading in human subjects research. *Psychological Methods*, *26*(1), 61–68. https://doi.org/10.1037/met0000267

Durant, L. E., Carey, M. P., & Schroder, K. E. E. (2002). Effects of anonymity, gender, and erotophilia on the quality of data obtained from self-reports of socially sensitive behaviors. *Journal of Behavioral Medicine*, *25*(5), 439–467. https://doi.org/10.1023/A:1020419023766

Esposito, J. L., Agard, E., & Rosnow, R. L. (1984). Can confidentiality of data pay off? *Personality and Individual Differences*, *5*(4), 477-480. https://doi.org/10.1016/0191-8869(84)90016-3

Fear, N. T., Seddon, R., Jones, N., Greenberg, N., & Wessley, S. (2012). Does anonymity increase the reporting om mental health symptoms? *BMC Public Health*, *12*, 797. https://doi.org/10.1186/1471-2458-12-797

Futrell, C. M., Stem, D. E., & Fortune, B. D. (1978). Effects of signed versus unsigned internally administered questionnaires for managers, *Journal of Business Research*, *6*(2), 91-98. https://doi.org/10.1016/0148-2963(78)90001-2

Hendra, R., & Hill, A. (2018). Rethinking response rates: New evidence of little relationship between survey response rates and nonresponse bias. *Evaluation Review*, *43*(5), 307-330. https://doi.org/10.1177/0193841x18807719

Krumpal, I. (2013). Determinants of social desirability bias in sensitive surveys: A literature review. *Quality and Quantity*, *47*(4), 2025–2047. https://doi.org/10.1007/s11135-011-9640-9

Kundig, F., Staines, A., Kinge, T., & Perneger, T. V. (2011). Numbering questionnaires had no impact on the response rate and only a slight influence on the response content of a patient safety culture survey: A randomized trial. *Journal of Clinical Epidemiology*, *64*(11), 1262-1265. https://doi.org/10.1016/j.jclinepi.2011.02.008

Malvin, J. H. & Moskowitz, J. M. (1983). Anonymous versus identifiable self-reports of adolescent drug attitudes, intentions, and use. *Public Opinion Quarterly*, *47*(4), 557.

McKee, D. O. (1992). The effect of using questionnaire identification code and message about non-response follow-up plans on mail survey response characteristics. *Market Research Society*, *23*(2), 179-191.

Murdoch, M., Simon, A. B., Pousny, M. A., Bangerter, A. K., Grill, J. P., Noorbaloochi, S., & Partin, M. R. (2014). Impact of different privacy conditions and incentives on survey response rate, participant representativeness, and disclosure of sensitive information: A randomized controlled trial. *BMC Medical Research Methodology*, *14*(1), 90-100. https://doi.org/10.1186/1471-2288-14-90

Nederhof, A. J. (1985). Methods of coping with social desirability bias: A review. *European Journal of Social Psychology*, *15*(3), 263–280. https://doi.org/10.1002/ejsp.2420150303

Olson, C. B., Stander, V. A., & Merrill, L. L. (2004). The influence of survey confidentiality and construct measurement in estimating rates of childhood victimization among Navy recruits, *Military Psychology*, *16*(1), 53–69. https://doi.org/10.1207/s15327876mp1601_4

O'Malley, P. M., Johnston, L. D., Bachman, J. G., & Schulenberg, J. (2000). A comparison of confidential versus anonymous survey procedures: Effects on reporting of drug use and related attitudes and beliefs in a national study of students. *Journal of Drug Issues*, *30*(1), 35–54. https://doi.org/10.1177/002204260003000103

Ong, A. D., & Weiss, D. J. (2000). The impact of anonymity on responses to sensitive questions. *Journal of Applied Social Psychology*, *30*, 1691–1708. https://doi.org/10.1111/j.1559-1816.2000.tb02462.x

Orne, M. T. (1962). On the social psychology of the psychological experiment: With particular reference to demand characteristics and their

implications. *American Psychologist*, *17*(11), 776–783. https://doi.org/10.1037/h0043424

Pedersen, E., Neighbors, C., Tidwell, J., & Lostutter, T. (2011). Do undergraduate student research participants read psychological research consent forms? Examining memory effects, condition effects, and individual differences. *Ethics & Behavior*, *21*(4), 332–350. https://doi.org/10.1080/10508422.2011.585601

Richman, W. L., Weisband, S., Kiesler, S., & Drasgow, F. (1999). A meta-analytic study of social disability distortion in computer-administered questionnaires, traditional questionnaires, and interviews. *Journal of Applied Psychology*, *84*(5), 754-775. https://doi.org/10.1037/0021-9010.84.5.754

Rolnick, S. J., Gross, C. R., Garrard, J., & Gibson, R. W. (1989). A comparison of response rate, data quality, and cost in the collection of data on sexual history and personal behaviors: Mail survey approaches and in-person interview. *American Journal of Epidemiology*, *129*(5), 1052–1061. https://doi.org/10.1093/oxfordjournals.aje.a115209

Singer, E., Mathiowetz, N. A., & Couper, M. P. (1993). The impact of privacy and confidentiality concerns on survey participation: The case of the 1990 U.S. Census. *Public Opinion Quarterly*, *57*(4), 465–482.

Slegers, C., Zion, D., Glass, D., Kelsall, H., Fritschi, L., Brown, N., & Loff, B. (2015). Why do people participate in epidemiological research? *Journal of bioethical inquiry*, *12*(2), 227–237. https://doi.org/10.1007/s11673-015-9611-2

Stander, V. A., Olson, C. B., & Merrill, L. L. (2002). Self-definition as a survivor of childhood sexual abuse among navy recruits. *Journal of Consulting and Clinical Psychology*, *70*(2), 369–377.

van de Looij-Jansen, P. M., Goldschmeding, J. E. J., & de Wilde, E. J. (2006). Comparison of anonymous versus confidential survey procedures: Effects on health indicators in Dutch adolescents. *Journal of Youth and Adolescence*, *35*(4), 652–658. https://doi.org/10.1007/s10964-005-9027-0

Werch, C. E. (1990). Two procedures to reduce response bias in reports of alcohol consumption. *Journal of Studies on Alcohol*, *51*(4), 327–330.

World Medical Association. (2013). World medical association declaration of helsinki: Ethical principles for medical research involving human subjects. *Journal of the American Medical Association*, *310*(20), 2191–2194. https://doi.org/10.1001/jama.2013.281053

Zagumny, M. J., Ramsey, R. J., & Upchurch, M. P. (1996). Is anonymity important in AIDS survey research? *Psychological Reports*, *78*(1), 270. https://doi.org/10.2466/pr0.1996.78.1.270

How to cite this article: Andersson, C., Bendtsen, M., Lindfors, P., Molander, O., Lindner, P., Topooco, N., Engström, K., & Berman, A. H. (2021). Does the management of personal integrity information lead to differing participation rates and response patterns in mental health surveys with young adults? A three-armed methodological experiment. *International Journal of Methods in Psychiatric Research*, *30*(4), e1891. https://doi.org/10.1002/mpr.1891