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Compensating for Low Topic Interest and Long Surveys

A Field Experiment on Nonresponse in Web Surveys

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Certain survey characteristics proven to affect response rates, such as a survey's length and topic, are often under limited control of the researcher. Therefore, survey researchers sometimes seek to compensate for such undesired effects on response rates by employing countermeasures such as material or nonmaterial incentives. The scarce evidence on those factors' effects in web survey contexts is far from being conclusive. This study is aimed at filling this gap by examining the effects of four factors along with selected interactions presumed to affect response rates in web surveys. Requests to complete a web-based, self-administered survey were sent to 2,152 owners of personal websites. The $2 \times 2 \times 2 \times 2$ fully crossed factorial design encompassed the experimental conditions of (a) high versus low topic salience, (b) short versus long survey, (c) lottery incentive versus no incentive, and (d) no feedback and general feedback (study results) versus personal feedback (individual profile of results). As expected, highly salient and shorter surveys yielded considerably higher unit-response rates. Moreover, partial support was found for interaction hypotheses derived from the leverage-salience theory of survey participation. Offering personalized feedback compensated for the negative effects of low topic salience on response rates. Also, the lottery incentive tended to evoke more responses only if the survey was short (versus long), but this interaction effect was only marginally significant. The results stress the usefulness of a multifactorial approach encompassing interaction effects to understand participation differences in web surveys.

Keywords: *web surveys; response rates; incentives; personal websites*

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Introduction and Research Questions

The vast majority of studies on factors potentially affecting response rates in self-administered surveys has been conducted in the context of mailed surveys. These efforts have accumulated to an impressive body of research, synthesized with the aid of meta-analytic procedures (e.g., Edwards et al., 2002; Heberlein & Baumgartner, 1978; Yammarino, Skinner, & Childers, 1991; Yu & Cooper, 1983). According to these meta-analyses, the most well-established factors known to increase response rates in mail surveys are an interesting (or salient) topic of the survey, the number of contacts, and the use of monetary incentives (cash) prior to participation (see Church, 1993; Edwards et al.; and the meta-analyses summarized in Yammarino et al., 1991). Although the findings on survey length are less conclusive in older studies summarizing mainly nonexperimental sources with less powerful meta-analytic procedures (i.e., Heberlein & Baumgartner; Yammarino et al.; Yu & Cooper), the systematic review by Edwards et al. based on experimental studies showed a strong negative linear relation between survey length and response rates.

The relatively scarce evidence on factors affecting nonresponse in web-based data collection methods appears less conclusive. Specifically, two recent meta-analyses quantitatively summarized nonexperimental data on factors influencing response rates in Internet-based surveys (Cook, Heath, & Thompson, 2000; Sheehan, 2001).

Sheehan (2001) meta-analyzed 31 studies on e-mail surveys and found, among other effects, small positive bivariate relationships between response rates and both topic salience and survey length. Cook et al. (2000), who analyzed 68 web-based survey studies, reported a positive linear correlation ($r = .19$) of topic salience with response rates, but they also found that very salient surveys yielded fewer responses than somewhat salient ones. However, this unexpected latter difference may have been due to the small number ($K = 4$) of highly salient surveys in their meta-analysis. Survey length was uncorrelated with response rates ($r = .00$), whereas incentives had a slightly negative impact ($r = -.21$).

We suspect that the partially inconclusive findings from meta-analyses on web-based surveys might be due to statistical interaction effects underlying the phenomenon of survey participation. Besides a set of more or less robust main effects, most factors interact with the target groups' characteristics, on the one hand, and different survey implementation procedures, on the other. Because such interactions have not been modeled appropriately within the meta-analytic syntheses available, the composition of studies with their unique interaction effects might have contributed to the inconclusive and partly implausible results.

It is one of the major objectives of the present research to shed more light on these issues by means of combining a controlled experimental design with the realism of a "real-world" web-based survey. Specifically, we examine whether (a) established findings from research on mailed surveys, such as on topic interest and survey length, generalize to response rates in a web survey; and (b) whether selected survey implementation variants, such as the use of lottery incentives and the offer of personalized feedback about the results, interact with length and topic interest. Knowledge of these interaction effects may be used to implement measures that help compensate for low topic interest and long surveys, two unfavorable survey characteristics sometimes under limited control of the researcher.

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Theoretical Base and Hypotheses

Leverage-salience theory of survey participation (Groves, Singer, & Corning, 2000), a recent application and refinement of dual-process theories of persuasion (e.g., Chaiken, 1987; Petty & Cacioppo, 1986) tailored towards survey participation decisions, appears particularly well suited for our research questions. In essence, leverage-salience theory posits that target groups of potential respondents vary in the importance they assign to different aspects of survey requests. These aspects may, for instance, encompass interest in the topic, survey length preferences, and preferences related to incentives. The influence of each component of the request depends both on its value in the view of sampled individuals (leverage) and on its prominence in the request to participate (salience). One conclusion to be drawn is that certain aspects of the survey associated with low-response propensities (e.g., uninteresting topic and lengthy survey) may be compensated by heightening the salience of favorable survey features.

According to leverage-salience theory, a relatively uninteresting topic may be compensated by an immaterial incentive, such as the offer to get personalized feedback about the study's results. Although research focusing on nonpersonalized study results as immaterial incentives is rather inconclusive (Batinic & Moser, 2005; Bosnjak & Batinic, 2002), no systematic experimental research seems to be available for personalized feedback, the feedback about the individual respondents' answers in relation to the overall sample results. We assume that, by offering personalized feedback, the availability of self-referring cognitions is evoked, partly counterbalancing low topic salience by heightening personal involvement. Because of the heuristic nature of most survey participation decisions (Groves, Cialdini, & Couper, 1992), the effect of personalized feedback is not necessarily additive. That is, it does not need to affect decisions in low- and high-salience conditions equally. In heuristic decision making (e.g., Cialdini, 1993), one single favorable feature (i.e., personal feedback) should suffice to trigger compliant behavior. Adding one more "interesting" aspect (e.g., interesting topic and personal feedback) should not substantially augment the propensity to respond. In a nutshell, over and above the direct impact of topic salience on response rates, personalized feedback should interact with topic salience in the sense that it only compensates for low salience but cannot increase response rates if the topic is highly salient:

H1.1: A highly salient topic of a web-based survey leads to higher response rates than a less salient topic.
H1.2: Offering personal feedback on survey results positively affects response rates if the topic is less salient, but not if the topic is highly salient.

For survey length, leverage-salience theory would predict that material incentives should compensate for lengthy surveys. Lotteries are often used as material incentives (Bosnjak & Tuten, 2003; Tuten, Galesic, & Bosnjak, 2004), even though their effect on response rates in web surveys does not seem clear-cut (Göritz, 2004). Considering equity theory (Adams, 1965) in addition to leverage-salience theory may lead to more complex predictions. Compared to a no incentives condition, material incentives should render the equity of the social exchange situation cognitively more available. The cognitive availability of social exchange equity considerations should result in incentives fostering response in short

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surveys but may have even detrimental effects in longer surveys. Such an apparently counterintuitive prediction is rooted in equity theory's assumption that individuals compute a threshold of subjective equity in social interactions. A relationship is seen as satisfactory if subjective inputs and outputs are approximately equal, whereas the preponderance of either inputs or outputs leads to an undesirable state of cognitive dissonance. Applying this logic to material incentives, one would expect that an explicit reference to an incentive in a request to participate would make the incentive cognitively accessible. Equity theory, then, predicts that an incentive seen as equivalent to the investment of time required (such as a small gift or the uncertain chance to win in a lottery in return for a short questionnaire) would induce more responses, whereas an overly modest incentive could be regarded as violating equity and yield fewer responses than no incentive at all. Promising nothing in return may prevent participants from accessing the cognitive category *tangible rewards* and cause them to avoid evaluating the incentive as inappropriately small. Based on these considerations, we expect the following effects of announced survey length and its interaction with incentives on response rates:

H2.1: A longer web-based survey leads to a lower response rate than a shorter one.
H2.2: Offering participation in a lottery has a positive effect on response rates if the survey is short but a negative effect in a longer web-based survey.

Method

Background and Procedure

This study applied basically the same procedures as an earlier survey on the motivation and the personality of persons operating a personal website for self-presentation purposes (cf. Machilek, Schütz, & Marcus, 2004; Marcus, Machilek, & Schütz, 2006; Marcus & Schütz, 2005), expended by experimental manipulations using a $2 \times 2 \times 2 \times 2$ factorial design described later. Personal websites in German were identified with the aid of a meta-crawler program and screened for the following eligibility criteria: The respective website had to meet Storrer's (1999) criteria (e.g., operated by a single person, noncommercial, and predominantly related to personal issues) and carry a contact e-mail address. Eligible website owners were precontacted with an e-mail stating the research purpose, in which topic salience was manipulated; a note on the expected time required to complete the survey according to manipulated length; and, if applicable, an announcement of the (im)material incentive offered. Ten days later, an invitation to participate and a link to the web survey were sent out, introduced by a summary of the information pertaining to manipulated variables. To avoid double participation and access by ineligible persons, an individual personal identification number (PIN) had to be typed in to access the questionnaire. Nonrespondents received one reminder 2 weeks later. The survey was fielded for 4 weeks, starting in December 2004.

Sample

2,174 precontact e-mails to owners of personal websites in German were originally sent out. The final sample was reduced to a total of 2,152 cases due to undeliverables, mistyped

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PINs, and duplicates. Overall, 530 persons (24.6%) provided complete responses (RR1; American Association for Public Opinion Research [AAPOR], 2005). Of those whose gender was known, only 17% were women. 11.8% of the respondents were younger than 20 years, 35.9% were between 20 and 29 years old, 29.6% were between 30 and 39, 13.3% were between 40 and 49, and 9.5% were 50 years or older. The majority (61.4%) of the respondents was either employed or self-employed, 19.9% were college students, and 10.6% were attending school.

Measures and Materials

Survey

The survey instruments contained a number of equal items across all conditions along with variations according to the manipulations. At the beginning, a set of items pertaining to the respondents' motives either for creating a personal website or for surfing the web was included. In the long version, a brief test of Internet competence followed. The next part contained a set of personality questionnaires. The long version of the survey was expanded by measures of self-concepts and motives. Demographics were requested next. Finally, respondents were asked a number of concluding questions.

Experimental Manipulations

Participants were randomly assigned to the experimental conditions in a fully crossed, 4-factorial design. The manipulations addressed the information received both in the precontact e-mail and in the invitation e-mail. This information corresponded to the survey that respondents received in terms of topic, length, and announced material and immaterial incentives, respectively.

The topic of the survey was described as pertaining to the motives and personality of personal website owners in the high salient condition, and as pertaining to psychological aspects of Internet usage in the low salient condition. The former topic was assumed to be particularly meaningful to persons investing considerable time in operating a personal website, whereas the latter topic resembles a common yet unspecific theme of many web surveys. The short version of the survey comprising 91 items was announced to take between 10 and 20 minutes to complete, and the long version consisting of 359 items between 30 and 60 minutes, which were judged to be realistic estimates after pretesting. The long version was identical to that used in previous nonexperimental studies, whereas portions across all parts of the survey were cut in the long version in order to leave content substantively unchanged (see "Background and Procedure," above). As a material incentive, a lottery ticket for two Internet bookstore vouchers of 25 euro each was offered, whereas no material reward was promised in the control condition. Again, the value of this incentive exactly replicated earlier nonexperimental research and is fairly typical for web surveys in general (e.g., Göritz, 2006). Finally, participants were offered personal feedback on individual results (e.g., on their personality scores) as compared with those of the entire group, general feedback on survey results, or no feedback at all. General and no feedback conditions did not differ with respect to response rate and were collapsed for the analyses.

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Dependent Variable

The dependent variable, *complete* (or usable) *unit response*, was operationalized according to AAPOR's RR1 definition (AAPOR, 2005, p. 23, 1b), which was deemed as the response definition of most interest to survey researchers.

Results

In hypotheses H1.1 and H2.1, we had specified our expectations concerning the main effects of topic salience and survey length on complete response, respectively. Furthermore, in H1.2, we expected that personal feedback should compensate for low topic salience but should not increase the propensity to respond to a survey on a highly salient topic. According to H.2.2, lottery incentives should increase response rates for the short survey but not for the long one. These hypotheses were tested with the aid of a series of logistic regression analyses. The results are summarized in Table 1, along with information on the response rates, split up for the levels of the experimental factors.

As expected, in hypotheses H1.1 and H2.1, topic salience and survey length had sizable effects on response rates. Although the response rate for low topic salience was 19.0%, it was 30.3% for the highly salient topic. For survey length, 30.8% responded to the short survey but only 18.6% to the longer one. In terms of odds ratios (OR; see model 1 in Table 1), the odds of responding to a highly salient topic are 1.87 times higher as compared to the odds of responding to a lowly salient topic (95% CI = 1.53 to 2.30). For survey length, the odds of responding in the group invited to participate in the lengthy survey is only 51% of those invited to participate in the short survey (OR = .51; 95% CI = .42 to .62). Because the regression coefficients for both topic salience and length are highly significant in the expected direction, and the confidence intervals of the OR estimates do not include unity, the data support hypotheses H1.1 and H2.1.

In model 2 (Table 1), the two additional experimental factors *personal feedback* (yes; no feedback or general feedback) and *lottery incentives* (yes; no) were added to the logistic equation predicting complete response. As can be seen from model 2 in Table 1, neither the feedback factor nor the lottery incentive factor exerted significant main effects on complete response (for feedback, B = .13, n.s.; for lottery incentive, B = .03, n.s.). As suggested by Thompson (2006), we also computed bivariate structure coefficients by correlating our independent variables with classification probabilities predicted by the regression equation. Similar to regression weights, structure coefficients were substantial for both survey length ($r = -.72$, $p < .001$) and salience ($r = .67$, $p < .001$), much smaller for personal feedback ($r = .13$, $p < .001$), and practically and statistically insignificant for lottery incentives ($r = .03$, n.s.). This suggests that the predictive power of our model 2 mainly stems from survey length and salience (cf. Courville & Thompson, 2001).

Beyond the four main effects added in model 2, the interaction effects as specified in H1.2 and H2.2 were added in model 3. The significant Feedback * Salience interaction (B = –.54, SE B = .22, $p < .05$; OR = .58, 95% CI = .38, .89) points to a possible effect expected in hypothesis H1.2. Figure 1 further illustrates this interaction effect and shows that, as expected, personal feedback positively affects complete response if the topic is less salient (23.5% for personal feedback versus 16.7% for no or general feedback, $p < .05$) but

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Table 1
Logistic Regression Analyses Predicting Complete Response (n = 2,152)

Model	Predictor	B	SE B	Response Rate (%)		Odds Ratio (95% CI)
				Low	High	
1	Salience (S)	.63***	.10	19.0%	30.3%	1.87 (1.53, 2.30)
				Short	Long	
	Survey length (L)	−.67***	.10	30.8%	18.6%	.51 (.42, .62)
	Constant	−1.15				
2	Salience (S)	.63***	.10			1.87 (1.53, 2.30)
	Survey length (L)	−.67***	.10			.51 (.42, .62)
				None/general	Personal	
	Personal feedback (F)	.13	.11	23.8%	26.2%	1.14 (.92, 1.40)
	Lottery incentive (I)			No lottery	Lottery	
		.03	.10	24.3%	24.9%	1.03 (.87, 1.21)
	Constant	−1.20				
3	Salience (S)	.82***	.13			2.27 (1.79, 2.93)
	Survey length (L)	−.51***	.15			.60 (.45, .80)
	Personal feedback (F)	.43***	.16			1.54 (1.12, 2.12)
	Lottery incentive (I)	.16	.13			1.18 (.91, 1.54)
	Incentive * Length	−.33*	.21			.72 (.48, 1.07)
	Feedback * Salience	−.54**	.22			.58 (.38, .89)
	Constant	−1.39				
	Hosmer and Lemeshow χ^2 (df, p)[a]	1.47 (8, .99)				
	Nagelkerke R^2	.041				
4	Salience (S)	.82***	.19			2.26 (1.56, 3.28)
	Survey length (L)	−.73***	.21			.47 (.31, .73)

Personal feedback (F)	.35	.22	1.42 (.93, 2.17)
Lottery incentive (I)	.26	.20	1.30 (.89, 1.91)
Feedback * Length	.35	.22	1.42 (.93, 2.17)
Incentive * Length	−.32	.21	.72 (.48, 1.09)
Length * Salience	.16	.21	1.17 (.77, 1.78)
Incentive * Salience	−.11	.21	.89 (.60, 1.35)
Feedback * Salience	−.56***	.22	.57 (.37, .87)
Feedback * Incentive	−.11	.21	.89 (.59, 1.37)
Constant	−1.35		
Hosmer and Lemeshow χ^2 (*df*, *p*)	.77(8. .99)		
Nagelkerke R^2	.043		

Note: Response rate across all experimental groups: 24.6%. The criterion variable complete response, operationalized according to RR1 in American Association for Public Opinion Research (AAPOR; 2005), was coded as follows with the respective reference category in *italics*: *0 = no response*, 1 = response. Predictors were coded as follows: salience (*0 = low*,1 = high), length (*0 = short*, 1 = long), personal feedback (*0 = none or general feedback*, 1 = personal), and lottery (*0 = no lottery announced*, 1 = lottery announced).

a. Due to its sensitivity to departures from model fit when calculated from fewer than six groups, the Hosmer-Lemeshow goodness-of-fit test statistic is reported for models 3 and 4 only (see Hosmer & Lemeshow, 1989).

*.05 < *p* < .10. **p < .05. *** p < .01.

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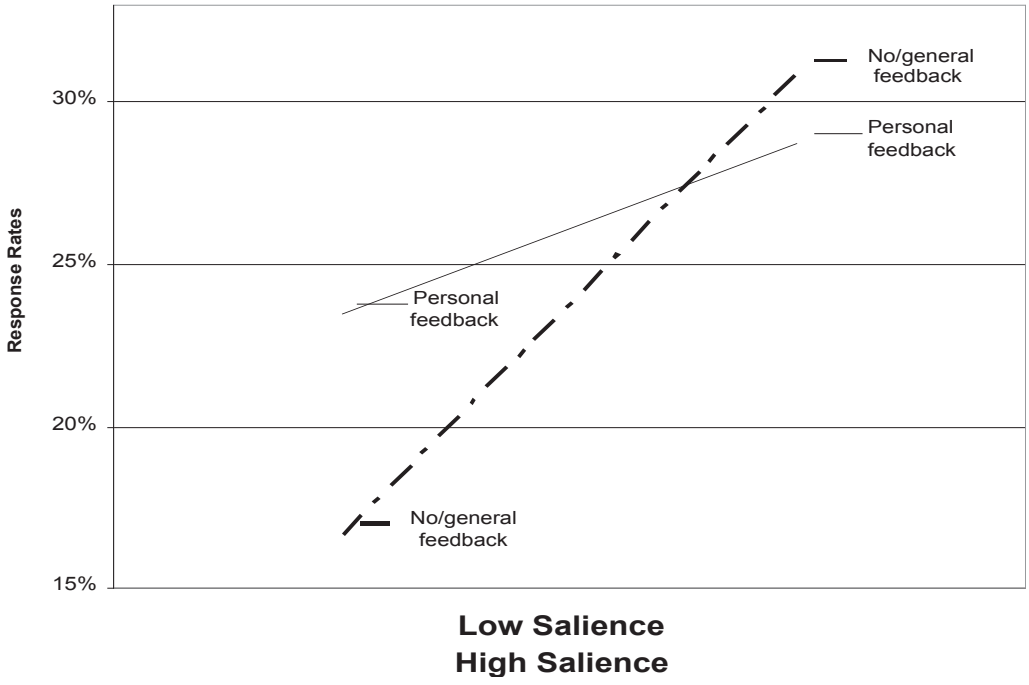
Figure 1
Effects of Topic Salience × Feedback Interaction on Response Rates



has no effect in the high-salience condition (28.8% for personal feedback versus 31.0% for no or general feedback, n.s.).

For the Incentive * Length interaction stated in hypothesis H 2.2, an effect of borderline significance ($.05 < p < .10$) emerged. In line with expectations, the lottery had a small positive effect on complete response for the short survey (32.5 versus 29.0%), whereas the response rate was even slightly lower (17.3 versus 19.8%) when incentives were added to the long version. Neither of these single contrasts was statistically significant, though. In model 4, all first-level interaction terms were included to examine the robustness of results. In essence, all main effects as described above as well as the Feedback * Salience interaction remained robust, but the Incentive * Length interaction fell short of being significant ($p = .11$).

Discussion

In the present study, we aimed at combining the realism of a field study with the control of a randomized experiment to address two questions of potential interest to researchers conducting web-based surveys.

First, we tested whether findings on the effects of topic salience and survey length on response rate established for mail surveys would hold for a web-based survey, despite meta-analytic evidence apparently pointing to the contrary. Our findings show that both salience and

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survey length had sizable effects in the same direction as is familiar from classical self-administered survey modes. Although, technically, a primary study cannot invalidate meta-analyses of similar research, we argue that the present study differs substantively from meta-analyses on web-based surveys. Unlike our study, meta-analyses in that domain were not able to use experimental controls, so their partially implausible findings are subject to alternative explanations. For example, Cook et al.'s (2000) failure to find systematic linear effects of survey length and, in part, of salience may well be due to a confounding of these and other important factors in the primary studies analyzed. The present study's design controlled for such potential artifacts, and our sample was sufficiently large to keep random error at reasonably low levels for primary research. We found effects that were both plausible and in line with well-established findings from experimental research on mailed surveys. Thus, we are inclined to conclude that there is probably nothing so special about the Internet as a survey mode that would cause the necessity to rethink the effects of salience or length.

Our second research question was more specific and novel with respect to survey research in general. Recent theoretical developments suggest that the decision to participate in a survey might be affected by various survey characteristics in more complex ways than previously believed. We tested two such potential interaction effects between factors typically not under the full control of survey researchers and factors under their control, and found partial support for moderation. Specifically, personalized feedback partially compensated for the detrimental effect of low salience. This finding is of particular practical relevance, as topic salience is perhaps the least controllable factor in a survey, and offering personalized feedback is perhaps one of the most underutilized methods to compensate for low salience. In other modes, offering every single participant individually tailored feedback may have been too costly to pay off. With computerized administration, it is much more cost-effective to write a program that automatically feeds back an individual's standing on the variables measured in the survey as compared to the entire sample. The present results point to the conclusion that personalizing feedback on results may become a viable means to induce responses to web-based surveys, especially when the general topic is of limited interest to the respondents but some parts of the survey may attract their attention.

Finally, we predicted that the effect of material incentives may in part depend on those incentives' reciprocal correspondence to the effort requested from participants. Although small incentives may be effective in not very time-consuming studies, they may even have negative effects with longer surveys. In the latter case, researchers may run at risk of heightening potential respondents' awareness that they are asked more than they are offered in return. Although, theoretically, researchers may deliberately choose the length of their survey, consideration of the specific research questions or the necessity to use validated instruments to measure specific constructs often requires longer surveys than considering maximization of response rates only would suggest. Admittedly, support for the hypothesis of opposing effects of incentives with long and short surveys was limited in our results. These effects, though in the expected direction, were small and statistically only marginally significant. We may have found stronger effects with stronger experimental manipulations, but our emphasis in this study was rather on external validity (i.e., enhancing realism to increase generalizability to actual surveys). Thus, we basically replicated the design of a previous actual field survey and did not change the incentives chosen there. Clearly, our

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results on that particular hypothesis were not very conclusive and should be backed up by future research.

In addition to the limitation just mentioned, the generalizability of our results may be argued on the grounds that we surveyed a relatively specific population. It is true that our sample was composed predominantly of men. Other than this gender difference, however, the present and earlier research on random samples of website owners show that this group differs only moderately from the general population on standard sociodemographic variables as well as a broad range of personality variables (Machilek et al., 2004; Marcus et al., 2006). Thus, the present results may not generalize well to research in which gender is an important issue, but otherwise there is little evidence of specificity of our sample in terms of both sociodemographic and psychological profiles. Still, replicating the present findings in different populations, settings, and cultures would certainly be desirable.

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