Recent trends in cooperativeness among participants in the national survey of drug use and health 2002–2015

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ABSTRACT

Background: An important issue in alcohol and drug use research is the degree to which study participants cooperate with survey interviewers and provide accurate information. We examine the year-by-year trends in the perceived cooperativeness of participants in a large national survey focused on alcohol and drug use in the United States between 2002 and 2015.

Methods: We examine fourteen years of cross-sectional data (2002–2015) from the National Survey on Drug Use and Health (NSDUH) using the NSDUH's Restricted Data Analysis System. The main variable of interest was field interviewer reported *participant cooperativeness* (i.e., "How cooperative was the respondent?"). We present estimates of proportional rates of cooperation and examine the degree to which the estimated proportions for cooperativeness vary from 2002 to 2003 estimates based on non-overlapping 95% confidence intervals as a proxy for secular trend tests.

Results: The proportion of respondents classified as "very cooperative" was consistently elevated in all survey years, increasing significantly from 95.6% (CI = 95.4–95.8) in 2002–2003 to 96.7% (CI = 96.5–96.8) in 2014–2015. Elevated levels of cooperation were observed for participants reporting no/any past-year alcohol, marijuana, cocaine, and heroin use. Rates were elevated—96 to 98% in 2014–2015—among respondents of all sociodemographic backgrounds (i.e., age, gender, race/ethnicity, income, nativity). Only a fraction of participants were classified as "not very cooperative" (0.2-0.4%) or "openly hostile" (0.1%).

Conclusions: Cooperativeness with NSDUH survey research has been very high since the early 2000s with perceived participant cooperativeness increasing in recent years and consistently low rates of non-cooperativeness across all years.

1. Introduction

Worrisome declines in survey research participation rates have been widely reported (Czajka and Beyler (2016; Galea and Tracy, 2007; Johnson and Wislar, 2012; Meyer et al., 2015; Schoeni et al., 2015). In addition to participation in survey research, another issue is the degree to which survey respondents are cooperating and providing accurate information. The evaluation of cooperation by interviewer rating is but one line of inquiry within the total survey error paradigm (Groves and Lyberg, 2010) that confronts the inherent complexity of steps in survey research from population and sampling specification down to the dwelling and person being included for interview.

Interestingly, there has been relatively little research on the extent to which survey respondents are cooperating. This data is reliant on interviewer field ratings. Kirchner et al. (2017) examined data from the Work and Leisure Today Survey to explore how CATI interviewers form their evaluations of the quality of respondents' answers after completion of a survey interview. Their findings indicate that interviewers are more likely to base their evaluations on observable respondent behaviors (systematic processing) rather than relying on respondent characteristics and related stereotypes (heuristic processing). In a panel study of the same respondents, Liu (2019) explored whether interviewers' evaluation of the respondents' understanding of survey questions and respondents' attitudes towards the survey predicted respondents' participation in a subsequent survey. Results suggested that respondents with higher interviewer-rated understanding of the questions and friendlier attitudes were more likely to participate in a second survey. The stronger predictor was interviewer judgment of attitude

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rather than understanding. Interviewer evaluation was not, however, correlated with survey outcome or quality of the data provided by respondent.

Eckman et al. (2013) explored the ability of interviewers to rate whether survey respondents are likely to cooperate with telephone survey requests. In this study, interviewers rated the response likelihood of each potential respondent after each call. Results indicate that interviewer ratings are positively correlated with actual cooperation rates. Findings related to the effects of interview characteristics revealed that if an interviewer was more optimistic about refusal conversion, the procedures used to gain cooperation from a respondent who refused the initial request for participation, the higher the rating they give to respondents who initially refused to participate. In addition to apparent declines in survey participation, it is unknown if we are also witnessing decreased levels of cooperation among those who do participate. This is of critical importance because population health is dependent on the integrity of survey respondents to provide accurate information. If respondents are viewed as more cooperative, then we would expect that to be reflected in the quality and validity of survey data.

We employ data from the National Survey of Drug Use and Health (NSDUH), a data source that has seen important changes since its inception including an increase in sample size and concomitant increase in the number of staff needed for surveying, and method changes occurring about every 10–12 years such as a transition from paper/pencil to computer assisted self-interviewing. It is within this context that we provide evidence on interviewer ratings of cooperation using a representative set of variables, in particular those related to alcohol/drug use and substance use disorders.

2. Methods

2.1. Data and sample

We examine data from the Substance Abuse & Mental Health Data Archive's (SAMHDA) Restricted-Use Data Analysis System (RDAS) which allows users to conduct crosstab analyses on NSDUH restricted data collected since 2002. The RDAS was utilized because information on cooperativeness is not available in the public NSDUH data files. Data were available for all years between 2002 and 2015 in two-year blocks. While the RDAS does not provide a specific total or year-by-year sample size, the RDAS is based on NSDUH data which includes an annual sample of roughly 60,000–70,000 participants.

The NSDUH is designed to provide population estimates of substance use in the US general population. It utilizes multistage area probability sampling methods to select a representative sample of the US civilian, noninstitutionalized population 12 years or older for participation. Multistage sampling designs commonly are used when attempting to provide nationally representative estimates. This is because interviewing all participants is not feasible, so larger units are the first stage selected from which subsequent levels of strata are partitioned until individuals from households are selected. With respect to the NSDUH, all 50 states and the District of Columbia were employed. Participants include household residents; residents of shelters, rooming houses, and group homes; and civilians on military bases.

NSDUH study participants were interviewed in private at their places of residence. Potential participants were assured that their names would not be recorded and that their responses would be kept strictly confidential. Participants were paid $30 for their participation. The NSDUH interview utilizes a computer-assisted interviewing (CAI) methodology to increase the likelihood of valid respondent reports of drug use behaviors (Substance Abuse and Mental Health Services Administration, 2016). The CAI methodology includes a combination of computer-assisted personal interviewing (CAPI) and audio computer assisted self-interviewing methodologies. A more detailed description of the NSDUH (see https://nsduhweb.rti.org/respweb/homepage.cfm)

and R-DAS (see https://rdas.samhsa.gov/) design and procedures is available elsewhere.

2.2. Measures

2.2.1. Cooperation of survey participants

Following the survey, interviewers were asked: "How cooperative has the respondent been?" Response options included "openly hostile", "not very cooperative", "fairly cooperative", and "very cooperative". The present analyses focused primarily on the *very cooperative* category as this was the most frequently selected category; however, we also provide general information as to the year-by-year proportional rates for all response options.

2.2.2. Substance use

Participants were asked if they used alcohol, cannabis, cocaine, or heroin within the previous 12 months. The NSDUH also provides information regarding alcohol or illicit drug use disorders for the aforementioned substances (either abuse or dependence) based on DSM-IV diagnostic criteria (American Psychiatric Association, 1994).

2.2.3. Sociodemographic factors

Sociodemographic variables age, gender, race/ethnicity, household income, and whether the individual was born in or outside of the US. We also examined past year arrest/booking (no, yes).

2.3. Analyses

We used the RDAS online system to generate estimates of proportional rates for field interviewer reported "very cooperative" participation across all survey years for the full sample and among key sociodemographic and substance use subgroups. We also report the year-by-year rates for the other response options in the results section. All NSDUH prevalence estimates and confidence intervals were weighted for the complex sampling design using the RDAS system.

The RDAS online data analytic software—the only software that can be used for RDAS analyses—produces results for contingency table analyses and allows for sample stratification, but does not allow for regression-based or multivariate approaches. Although we were not able to conduct formal statistical tests of trend, we note instances in which the prevalence of cannabis use is distinct from that of 2002–2003 data based on non-overlapping 95% confidence intervals. The examination of confidence interval overlap is a frequent, albeit conservative, approach for examining the differences in the magnitude of effects across categorical variables in large epidemiologic data files (Cumming & Finch, 2005; Knol et al., 2011). We also manually calculated 99% confidence intervals using the standard errors provided by the RDAS in supplemental analyses (available upon request).

3. Results

Our findings reveal that the proportion of respondents classified as "very cooperative" was consistently elevated in all survey years (95% of respondents or greater) and that—in examining the lack of overlap of 95% confidence intervals—the proportion of highly cooperative respondents increased slightly but significantly from 95.6% (CI = 95.4–95.8) in 2002–2003 to 96.7% (CI = 96.5–96.8) in 2014–2015. Across all survey years, only between 2% and 4% of respondents were classified as "fairly cooperative" with rates declining slightly from 3.9% (95% CI = 3.7–4.1) in 2002–2003 to 3.1% (95% CI = 2.9–3.2) in 2014–2015. Between 2002 and 2015, with no significant variation, only a fraction of participants were classified as "not very cooperative" (0.2-0.4%) or "openly hostile" (0.1%).

As shown in Table 1, among respondents of all sociodemographic backgrounds—age, gender, race/ethnicity, income, and US nativity—the overwhelming majority of respondents were classified as "very

Table 1
Prevalence of respondents classified as "very cooperative" by field interviewer in completing the National Survey on Drug Use and Health, 2002–2015.

	Survey Year Prevalence Estimate (95% Confidence Interval)												
	2002-2003		2004-2005		2006-2007		2008-2009		2010-2011		2012-2013		2014-2015	
Full Sample	95.6	(95.4-95.8)	95.6	(95.3-95.8)	**97.1**	(96.9-97.3)	**97.6**	(97.4-97.7)	**97.6**	(97.3-97.7)	**97.3**	(97.1-97.5)	**96.7**	(96.5-96.8)
Demographic Factors														
Age														
12-17 years	97.3	(97.1-97.5)	97.3	(97.1-97.5)	**98.6**	(98.4-98.8)	**98.6**	(98.4-98.7)	**98.6**	(98.4-98.8)	**98.5**	(98.4-98.7)	**98.1**	(97.9-98.3)
18 and older	95.3	(95.0-95.6)	95.3	(95.1-95.6)	**96.9**	(96.6-97.1)	**97.4**	(97.2-97.6)	**97.4**	(97.1-97.6)	**97.2**	(96.9-97.4)	**96.3**	(96.1-96.5)
Gender														
Male	95.1	(94.8-95.5)	95.2	(94.8-95.5)	**96.8**	(96.5-97.1)	**97.3**	(97.1-97.6)	**97.0**	(96.7-97.3)	**97.1**	(96.8-97.4)	**96.1**	(95.9-96.4)
Female	96.0	(95.6-96.3)	95.9	(95.6-96.2)	**97.3**	(97.0-97.5)	**97.7**	(97.5-98.0)	**97.9**	(97.7-98.2)	**97.5**	(97.2-97.7)	**96.8**	(96.5-97.0)
Race/Ethnicity														
White	95.9	(95.6-96.2)	96.2	(95.9-96.4)	**97.4**	(97.2-97.6)	**97.7**	(97.4-97.9)	**97.9**	(97.6-98.1)	**97.6**	(97.3-97.8)	**96.8**	(96.6-97.0)
African American	94.5	(93.7-95.2)	93.3	(92.4-94.1)	**96.2**	(95.6-96.8)	**97.1**	(96.4-97.6)	**96.3**	(95.4-97.1)	**96.7**	(96.1-97.2)	**95.8**	(95.3-96.3)
Hispanic	94.9	(94.1-95.6)	94.8	(94.1-95.4)	**96.5**	(95.7-97.1)	**97.3**	(97.0-97.9)	**97.3**	(96.7-97.7)	**96.6**	(96.0-97.1)	**96.3**	(95.8-96.7)
Native American	96.5	(93.9-98.0)	96.3	(93.9-97.7)	97.2	(94.7-98.5)	98.0	(96.3-98.9)	96.8	(93.1-98.6)	97.9	(96.1-98.9)	96.0	(92.2-98.0)
Asian	94.0	(92.3-95.4)	93.3	(91.4-94.8)	95.6	(94.1-96.7)	96.6	(95.4-97.5)	96.2	(94.3-97.4)	96.7	(95.3-97.6)	94.9	(93.6-95.9)
Pacific Islander	90.4	(82.0-95.1)	87.0	(72.6-94.4)	96.9	(92.8-98.7)	98.9	(96.0-99.7)	96.4	(92.5-98.3)	94.8	(88.6-97.7)	96.2	(94.1-97.5)
Multiple Categories	95.9	(95.5-97.4)	96.3	(94.6-97.4)	95.8	(92.4-97.7)	96.8	(95.0-98.0)	97.7	(95.9-98.7)	97.5	(96.0-97.6)	96.9	95.6-97.8)
Income														
< $20,000	94.6	(94.0-95.2)	94.3	(93.7-94.8)	**96.0**	(95.5-96.5)	**97.0**	(96.5-97.5)	**96.6**	(95.9-97.1)	**96.7**	(96.2-97.2)	**95.9**	(95.4-96.3)
$20,000-$49,999	95.2	(94.9-95.6)	95.6	(95.2-96.0)	**96.6**	(96.2-96.9)	**97.5**	(97.2-97.8)	**97.6**	(97.3-97.9)	**97.0**	(96.6-97.3)	**96.1**	(95.8-96.4)
$50,000-$74,999	96.3	(95.8-96.8)	95.9	(95.4-96.4)	**97.7**	(97.3-98.0)	**97.7**	(97.3-98.0)	**97.8**	(97.3-98.1)	97.3	(96.7-97.8)	96.7	(96.3-97.1)
$75,000 or more	96.1	(95.6-96.6)	96.1	(95.6-96.5)	**97.8**	(97.5-98.1)	**97.7**	(97.4-98.0)	**97.8**	(97.4-98.1)	**97.9**	(97.5-98.2)	**97.0**	(96.7-97.3)
Nativity														
Foreign Born	93.8	(92.9-94.6)	93.5	(92.7-94.2)	**96.0**	(95.3-96.6)	**97.0**	(96.4-97.5)	**96.9**	(96.3-97.4)	**96.1**	(95.4-96.7)	–	–
US Born	95.8	(95.5-96.0)	95.9	(95.6-96.1)	**97.2**	(97.0-97.4)	**97.6**	(97.4-97.8)	**97.6**	(97.4-97.8)	**97.5**	(97.3-97.7)	–	–
Substance Use (Past Year)														
Alcohol														
No	94.8	(94.3-95.2)	95.2	(94.8-95.7)	**96.8**	(96.4-97.1)	**97.3**	(96.9-97.6)	**96.9**	(96.5-97.3)	**96.8**	(96.3-97.2)	**96.0**	(95.7-96.3)
Yes	95.9	(95.6-96.2)	95.7	(95.4-95.9)	**97.2**	(96.9-97.4)	**97.6**	(97.4-97.9)	**97.8**	(97.6-98.0)	**97.5**	(97.3-97.8)	**96.7**	(96.5-96.9)
Cannabis														
No	95.6	(95.3-95.8)	95.5	(95.3-95.8)	**97.0**	(96.8-97.2)	**97.5**	(97.3-97.7)	**97.4**	(97.2-97.7)	**97.2**	(97.0-97.4)	**96.4**	(96.2-96.6)
Yes	95.2	(94.6-95.8)	95.5	(95.0-86.0)	**97.4**	(97.0-97.8)	**97.8**	(97.4-98.1)	**98.0**	(97.6-98.3)	**97.7**	(97.1-98.1	**97.1**	(96.7-97.4)
Cocaine														
No	95.5	(95.3-95.8)	95.5	(95.3-95.8)	**97.0**	(96.8-97.2)	**97.5**	(97.4-97.7)	**97.5**	(97.3-97.7)	**97.3**	(97.1-97.5)	**96.5**	(96.3-96.6)
Yes	95.1	(93.3-96.4)	95.1	(94.0-96.0)	97.3	(96.3-98.1)	97.0	(95.7-98.0)	97.0	(95.6-97.9)	97.0	(95.2-98.1)	96.6	(95.3-97.5)
Heroin														
No	95.5	(95.3-95.8)	95.5	(95.3-95.8)	**97.0**	(96.8-97.2)	**97.5**	(97.3-97.7)	**97.5**	(97.3-97.7)	**97.3**	(97.1-97.5)	**96.5**	(96.3-96.6)
Yes	97.0	(93.5-98.7)	92.4	(86.4-95.9)	99.2	(98.4-99.6)	93.8	(84.9-97.6)	98.1	(91.4-89.6)	97.1	(93.7-98.7)	96.1	(92.8-97.9)

Note:Cells with a dash ("-") represent data unavailable via the R-DAS system. Estimates in bold font indicate that the 95% confidence interval (CI) for the respective year does not overlap with the 95% CI for 2002–2003. All estimates were automatically adjusted for the complex sampling design of the NSDUH by the R-DAS system.

cooperative" (in 2014–2015 the lowest subgroup rate was 94.9% among Asians and the highest was 98.1% among adolescents). Significant increases from 2002 to 2003, based on non-overlapping 95% confidence intervals, were observed for adolescents and adults, males and females, and US-born and foreign-born participants. Closer inspection of age revealed that levels of cooperativeness gradually dropped from 97 to 98% among respondents 12–17 to 94–96% among respondents ages 50 and older. In terms of racial/ethnic groups, significant increases were observed among white, African American, and Hispanic respondents, but not among the other subgroups. The largest increases in reported cooperation were found among African-Americans (94.5% to 95.8%), Hispanics (94.9% to 96.3%), foreign-born (93.8% to 96.1%), and those reporting household incomes of less than $20,000 (94.6% to 95.9%). Fig. 1 displays selected trends in cooperativeness for age groups, US nativity, race/ethnicity, and past year arrest.

In terms of cooperation among substance users versus abstainers, we see consistently high rates of "very cooperative" classification among both those reporting *no* (96.0% or higher in 2014–2015) and *any* (96.1% or higher in 2014–2015) past-year use. Significant increases in the proportion of "very cooperative" participants as observed among those reporting no/any alcohol or marijuana use as well as those reporting no cocaine or heroin use. Among alcohol and marijuana users, the proportion of "not very cooperative" and "openly hostile" was no

different from that observed in the general population (the RDAS suppressed output for these categories among cocaine and heroin users due to low cell sizes). In examining 2014–2015 data, we also observed high proportion of "very cooperative" respondents among those meeting criteria for a past-year substance use disorder (alcohol: 97.0, 95% CI = 96.4–97.5; cannabis: 97.0, 95% CI = 96.2–98.0; cocaine: 95.9, 95% CI = 91.0–98.2; heroin: 95.2, 95% CI = 90.8–97.5).

We also conducted supplemental analyses examining the year-by-year proportions for *very cooperative* using 99% confidence intervals. In terms of trend tests, results indicated an identical pattern of results for the full sample and across age, gender, nativity, and substance use subgroups. Several minor differences were identified for African Americans (2010–2011 and 2014–2015 were not significantly different from 2002 to 2003) and Hispanics (2006–2007, and 2012–2015 were not different from 2002 to 2003), but the general pattern of results was comparable to results when using 95% confidence intervals.

4. Discussion

Results provide clear evidence that interviewer ratings of cooperation among survey participants have been very high since 2002, with cooperativeness increasing in recently years. Estimated proportional rates of interview reported cooperativeness increased from 95.6% in
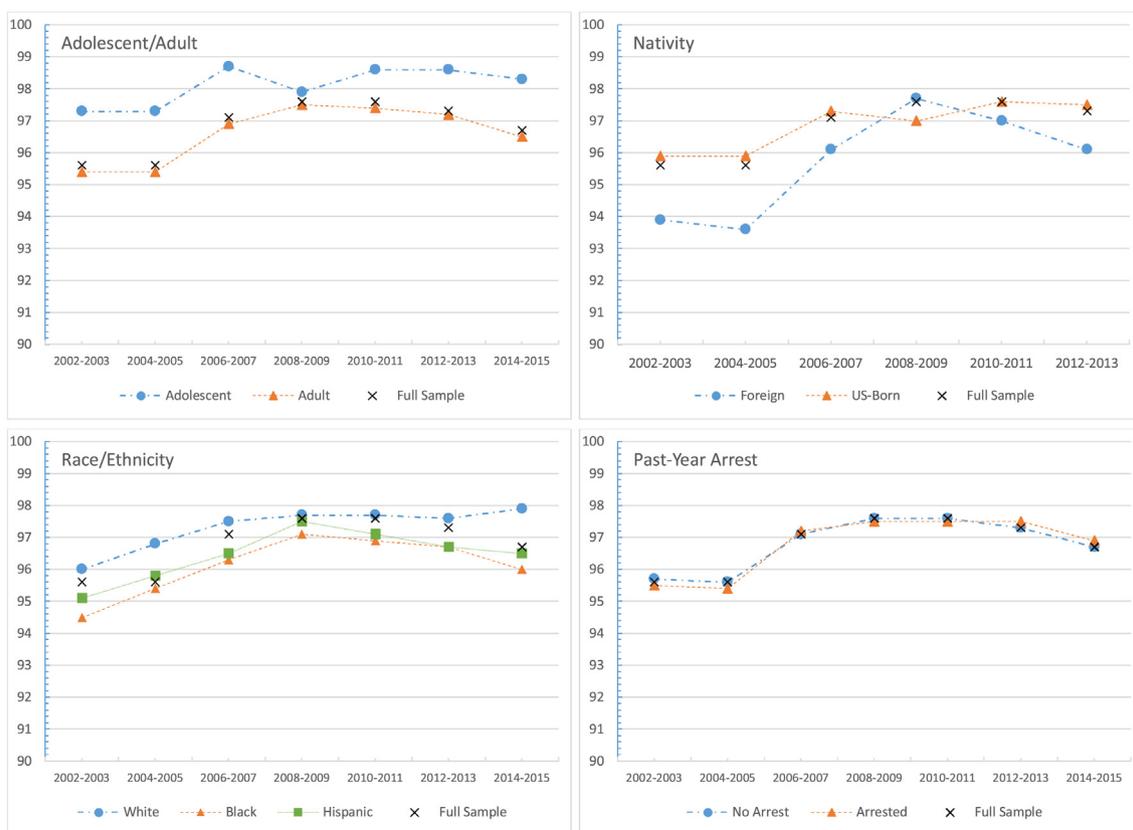
Fig. 1. Selected trends in respondents classified as "very cooperative" by NSDUH field interviewer, 2002-2015.

2002 to almost 97% in 2016 with the largest increases observed for African-Americans, Hispanics, and foreign-born respondents. These results suggest that, despite worrisome declines in survey participation, we are seeing promising increases in cooperativeness among those who do participate, especially among racial and ethnic groups that may have good reasons to be distrustful of research (Corbie-Smith et al., 2002).

However, it is important to point out that cooperation does not mean honesty and participants could be cooperating just to get through the survey as quickly as possible and not provide useful information. Further, these findings can be interpreted as resulting from stability in the procedures and increases in the number of staff and their experience driving the way the interview process and its subsequent rating of co-operativeness unfolds. Future research suggestions include an analytic study of "house effects" considering specific changes in field inter-viewer numbers and experience. In addition, subsample research on both the more cooperative and less cooperative participants to better understand their willingness to participate in and cooperate with the surveys could be useful.

Major limitations of the current study include that all data were derived from interviewer ratings and may be biased by their views of the participant's background and responses. Moreover, there is no variables on interviewers to assess their characteristics in relation to their ratings. Additionally, the NSDUH data allow for trend analyses, however, they are cross-sectional and therefore, do not allow for ex-amination of changes in cooperation among the same individuals over time.

5. Conclusions

While participation in survey research has waned somewhat over the past 30–40 years, we find, among those who choose to participate, increases in cooperation. Overall, our findings suggest that decreased survey participation rates may be accompanied by a countervailing

force of increased cooperation, especially among important subgroups, that bodes well for ongoing data validity.

Contributors

Dr. Vaughn and Dr. Salas-Wright conceptualized the overall study and conducted the statistical analysis. Dr. Vaughn led the writing of the manuscript. Ms. Cohen and Ms. Holzer contributed to the writing of the overall manuscript. All authors provided critical feedback and edits throughout the preparation of the manuscript. All authors have ap-proved the final article.

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Declaration of Competing Interest

No conflict declared.

References

Corbie-Smith, G., Thomas, S.B., George, D.M.M.S., 2002. Distrust, race, and research. Arch. Intern. Med. 162 (21), 2458–2463.

Czajka, J.L., Beyler, A., 2016. Declining response rates in federal surveys: trends and implications. Mathematica Policy Res. 1 Retrieved from. https://aspe.hhs.gov/system/files/pdf/255531/Decliningresponserates.pdf.

Eckman, S., Sinibaldi, J., Möntmann-Hertz, A., 2013. Can interviewers effectively rate the likelihood of cases to cooperate? Public Opin. Q. 77 (2), 561–573.

Galea, S., Tracy, M., 2007. Participation rates in epidemiologic studies. Ann. Epidemiol. 17, 643–653.

Groves, R.M., Lyberg, L., 2010. Total survey error: past, present, and future. Public Opin. Q. 74 (5), 849–879.

Johnson, J.P., Wislar, J.S., 2012. Response rates and nonresponse errors in surveys. JAMA 307, 1805–1806.

Kirchner, A., Olson, K., Smyth, J.D., 2017. Do interviewer postsurvey evaluations of

respondents' engagement measure who respondents are or what they do? A behavior coding study. Public Opin. Q. 81 (4), 817–846.

Liu, M., 2019. The effect of interviewer evaluation of respondents' attitudes and understanding on future survey participation in a panel study. Int. J. Soc. Res. Methodol. 22 (4), 393–402.

Meyer, B.D., Mok, W.K., Sullivan, J.X., 2015. Household surveys in crisis. J. Econ. Perspect. 29, 199–226.

Substance Abuse and Mental Health Services Administration, 2016. Results from the 2015 National Survey on Drug Use and Health: Detailed Tables. Substance Abuse and Mental Health Services Administration, Rockville.

Schoeni, R.F., Stafford, F., McGonagle, K.A., Andreski, P., 2015. Response rates in national panel surveys. Ann. Am. Acad. Pol. Soc. Sci. 645, 60–87.