SUBMISSION TYPE

Poster

TITLE

Predictive Non-response via Item Characteristics

SHORTENED TITLE

Survey Non-response

ABSTRACT

Although missing data is commonly observed, the reason for it is an important consideration. This paper explores patterns of survey non-response (skipping questions) by item characteristics including item desirability and indices of readability, as well as the occurrence of missingness across different rating sources (i.e., from the target, and two informant raters). The results suggest that item skips are one strategy used (by all raters) to avoid responding to undesirable items, and that this effect is as strong or stronger than that of item readability.

WORD COUNT

2,993

Researchers have long grappled with the issue of missing data, which result from a very wide range of sources (e.g., fatigue, inattention, intentionally “skipping” questions, administration/data entry errors). Further, the challenge of missing data persists despite research suggesting that online administration increases self-disclosure (Joinson, 2001), and careful efforts to minimize missing responses. The current paper aims to explore patterns of missing data by item characteristics including item desirability and indices of readability, using both self and informant ratings, and classification of missing responses. The paper explores this question in three stages: 1) examining the most recent and uniquely apt General Social Survey data for patterns in the *reasons for non-response*, 2) exploring overall social desirability and readability as they relate to missing responses, and 3) considering potential differences in missing responses across self-, self-nominated other, and non-self-nominated other ratings. Uncovering patterns in missingness would suggest that the data are not missing completely at random, but rather point toward systematic drivers.

**Missingness Mechanisms: Reasons for Missing Data**

Within the survey response literature, there are three widely agreed upon classifications of missing data. Little and Rubin (2019) provide a thorough description, summarized quite briefly here. First, missing data can be completely at random (MCAR), which means there are not systematic differences between observed and missing data. Stated another way, “missingness” is entirely independent of the observed and the missing data. Data can also be missing at random (MAR), in which missingness is independent of the missing data, but it is dependent on the observed data. Data can also be missing not at random (MNAR). Here, missingness is tied to the missing data even after accounting for dependencies of the missingness on the observed data.

**More than Ease of Reading: Potential Influence of Social Desirability and Informant Ratings**

The historical focus on the detection and mitigation of method effects (of which we consider MNAR and MAR to be specific manifestations) in psychological assessment grew with Campbell and Fiske’s (1959) MTMM approach. Others have continued to broaden the scope of investigation since (e.g., Kammeyer-Mueller et al., 2010; Podsakoff et al., 2012; Podsakoff et al., 2003). Within these frameworks, informant raters are commonly considered unique sources of information, and they have been used to bypass the widely acknowledged measurement deficiencies in self-reports (e.g., Berry et al., 2012; Borkenau, & Ostendorf, 1989; Connelly & Ones, 2010; Connolly et al., 2007; John & Robins, 1993; Kammeyer-Mueller et al., 2010; Kolar et al., 1996; Leising et al., 2015; Letzring et al., 2006; Mount et al., 1994; Oh et al., 2011).

Podsakoff et al. (2003), in fact, recommend obtaining measures of independent and dependent variables from different sources to prevent any one individual rater from introducing associations due to intra-person factors such as consistency motifs or mood states. In line with this recommendation, Chang et al. (2012) applied meta-analysis to informant ratings, treating these sources as distinct methods of assessment. Conway and Lance (2010), however, argue quite strongly that researchers (and reviewers) have often misconstrued rating *source* as a measurement *method*. They further contend that informants/rating sources may, in fact, be prone to the same biases as self-raters – we also explore this possibility in the current study.

**Informants versus Selves – Divergent or Comparable Response Orientations**

Although missing data is commonplace with survey data, it is also problematic - particularly perhaps in studies that utilize informants to provide information about a target (Blozis et al., 2013; Phares, 1992), because it is more culturally acceptable to admit one’s own failings as opposed to calling out the failings of someone well-known (and also likely “liked”). Theory suggests that people have an unconscious desire to present themselves in ways they would like others to perceive them (Hogan & Blickle, 2018). Not unexpectedly, similar motives, when considered from the perspective of fellow members of one’s “in group” (social identity theory; Tajfel & Turner, 1979), would compel us to view those in our inner circles in a positive light (e.g., Murray et al., 1996). This perspective runs counter to elements in the personality and common method variance literatures that argue the use of informant ratings is a viable strategy to mitigate measurement artifacts. For example – self-ratings of job performance or organizational citizenship behaviors have received criticism for being methodologically flawed. Subsequently, many investigations and meta-analyses have investigated the comparative equivalence of self- and informant-ratings of these constructs, with the implication being that self-informant agreement represents evidence that self-ratings are acceptable (see, for example, the meta-analyses of Carpenter et al., 2014 and Heidemeier & Moser, 2009). In these studies, rating alignment is taken as a comfort. This implication of course depends on the quality of the comparative standard.

Alternatively, evidence of equivalence *could* indicate that the rating sources are merely susceptible to similar flaws. Our interest in the current study is whether non-response can be predicted by item content, and furthermore whether or not this predictability transcends rating source. Researchers have suggested methods by which we might tease apart ratings of targets’ actual characteristics and perceivers’ evaluation of the positivity or negativity of item/characteristic (e.g., Leising et al., 2015; Peabody, 1967). Within yet other applications, researchers have documented that respondents provide socially desirable ratings of both significant others (e.g., Brown & Han, 2012), and children (e.g., Lench et al., 2006). This tendency to rate others that we like more favorably has in some contexts been referred to as the “letter of recommendation problem” (Klonsky et al., 2002).

The current study extends this perspective to examine additional plausible reasons for missing data. Theory would suggest that both the target and informant ratings are likely to “skip” over particularly undesirable questions with greater frequency than those that are qualitatively more desirable. We explore this question while also taking a variety of *readability* indices into account as well given the research on missing data suggests that there is an association between missing data and reading level (e.g., see Fongwa et al., 2010). We made the following predictions:

*H1: There exist differing reasons for non-response.*

*H2: Item readability is negatively associated with non-response.*

*H3: Item social desirability is negatively associated with non-response.*

*H4: Item social desirability will be more strongly related to non-response than readability.*

*H5: The item social desirability effect remains after making considerations of rater source.*

**Method**

**Participants and Procedure**

Data from three sources were used to explore the above predictions: 1) the 2020 data from the General Social Survey (https://gss.norc.org/), ratings of item social desirability, and personality ratings from undergraduate students, which are described in greater depth here. A total of 888 undergraduate students from 3 US universities were recruited via an online research participation website in exchange for course credit. Upon completion of the survey, participants were asked to provide the email address of someone who could make ratings of their personality. An invitation was generated to the person identified, and this “self-nominated” rater was then asked to rate the personality of the original participant using the same item set. Once more, this rater was asked to provide the email address of a second person to make ratings of the target (i.e., “non-self-nominated” source) From our 888 original student participants, we realized 460 self-nominated raters and 131 non-self-nominated raters for an experiment-wide totalof 1,479 respondents. These decreasing sample sizes were expected based on the nature of the nomination process (email invitation) and lack of researcher control regarding opportunities for response rate enhancement. Conservative screening of the data resulted in 306 raters matched across self, self-nominated, and non-self-nominated sources (all *n*’s = 102)[[1]](#footnote-1). Upon survey completion, participants were thanked and compensated via course credit (original student) or the opportunity to take part in a drawing for one of three gift cards (self- and non-self-nominated raters).

**Materials**

*Missingness Reason.* Responses to items in the 2020 administration of the General Social Survey contain codes for type of missing data, including the following reasons/categories: “don’t know” (respondents indicated they did not know the answer to a question), “no answer” (respondent refuses to answer a question), and “skipped on the web” (respondent skips a question in the web mode). “Non-applicable” responses were not utilized here.

*Item Social Desirability*. Ratings of the social desirability content of 2,413 personality indicators from the International Personality Item Pool (http://www.ipip.org) were made along a 9-point scale ranging from: (-4) *extremely undesirable* to (+4) *extremely desirable* (see, for example, Edwards, 1957). Our graduate student raters (*n* = 6) were provided with definitions of both ends of the social desirability continuum prior to making ratings. Inter-rater consistency estimates using a 2-way random model was .96.

*Readability.* Four readability indices were used: 1)Easy Listening Formula (ELF; Fang 1966). This index divides the number of 2+ syllable words by the number of sentences, where a score <12 indicates a statement that is easy to listen to and by extension, read to oneself; 2) The Navy’s Adaptation of Gunning’s Fog Index - FOG Navy Readability Index (FOG-NRI; Kincaid et al., 1975) considers number of words, sentences, and syllables, estimating the years of formal education needed to understand the text on the first reading; 3) the Flesch-Kincaid Grade Level (Flesch & Kincaid, 1975) indicates how difficult a passage in English is to understand, using average word and sentence length to determine reading level and does not have an upper bound; and 4) the New Dale-Chall formula uses a count of “hard” words and sentence length to compute the US grade level of a piece of text (Chall & Dale, 1995). Adjusted scores of <4.9 are rated at 4th grade level or below. Adjusted scores of 10+ are rated at the college reading level.

*Personality measure(s).* Four stratified random samplings of the 2,413 IPIP items were conducted. The strata were defined via the 9-point rating scale: stratum #1 = social desirability values below -3.01, stratum #2 = -3 to -2.01, stratum #3 = -2 to -1.01, stratum #4 = -1 to -.01, stratum #5 = 0 to 1, stratum #6 = 1.01 to 2, stratum #7 = 2.01 to 3, and stratum #8 = above 3.01 (e.g., *extremely desirable*). Ten items were randomly sampled four times from within each social desirability-defined stratum, and the very large number of original items permitted sampling without replacement. Thus, participants completed only one of four completely different versions of the inventory (all 320 administered items were completely unique). All participants made typical personality ratings on a 5-point Likert-type agreement scale ranging from *strongly disagree* to *strongly agree* to 80 items. These items were presented in fully randomized orderings. In addition to the five substantive response categories, a *not applicable* option was also provided. Here, the goal was to predict non-response, and a not applicable response was considered equivalent to choosing to “skip” a question.

**Results**

The first question was to consider overall reasons for missingness using data from the 2020 General Social Survey. Figure 1 illustrates the distribution of missingness frequencies by question (k = 183 questions). Across 5,215 total responses, 0.19% were missing when respondents reported “don’t know” and 0.09% were missing because respondents refused to answer (i.e., “no answer), or 0.17% skipped responses on the web supporting H1.

Next, the second stage was to consider two potential contributors to non-response in the sample overall: social desirability and item readability. A total of 24,114 (98.5%) prompts received a response; 366 (1.5%) prompts resulted in a non-response (including missing or not applicable). A simple regression revealed that frequency of missing responses decreases as social desirability increases, *F*(1, 22) = 6.77, *p* = .016. See Figure 2.

A series of t-tests explored whether responding or not (the IV in this case) differed based on item characteristics (e.g., desirability of the item, readability). Figure 3 illustrates differences for all item characteristics, which are presented as z-scores for comparison. Item desirability was significantly higher for items that were responded to (*M* = 4.86, *SD* = 2.24) than those that were skipped (*M* = 4.11, *SD* = 2.10), *t*(377.71) = 6.73, *p* < .001, *d* = .33.

Next, a number of readability indices were explored, the first of which was the ELF (Fang 1966). Here, the number of 2+ syllable words in a prompt is taken into account. The results suggest that ELF was significantly lower for items that were responded to (*M* = 2.03, *SD* = 1.43) than those that were skipped (*M* = 2.40, *SD* = 1.66), *t*(373.29) = -4.15, *p* < .001, *d* = .25. The results suggest that FOG-NRI readability was significantly lower for items that were responded to (*M* = -1.24, *SD* = 0.30) than those that were skipped (*M* = -1.16, *SD* = 0.42), *t*(370.85) = -3.67, *p* < .001, *d* = .26. The Flesch-Kincaid Readability Score (Kincaid et al., 1975) was also explored. The results suggest that Flesch-Kincaid readability was significantly easier for items that were responded to (*M* = 4.91, *SD* = 4.85) than those that were skipped (*M* = 5.46, *SD* = 4.16), *t*(380.26) = -2.48, *p* = .013, *d* = .11. Lastly, a second index of comprehension difficulty, the Dale-Chall Readability Score (Chall & Dale, 1995) was also explored. The results suggest that readability was significantly harder for items that were responded to (*M* = 42.87, *SD* = 17.94) than those that were skipped (*M* = 37.84, *SD* = 17.84), *t*(376.28) = -5.35, *p* < .001, *d* = .28.

Directly comparing the qualitative item characteristics with ratings of socially desirable content, we applied logistic regression, treating missed and non-missed responses as binary outcomes. In this comprehensive approach, the strongest unstandardized predictors were the Dale-Chall (*b* = -.03, *z* = -6.63, *p <* .001) and item social desirability (*b* = -.15, *z* = -6.23, *p <* .001). The Fog-NRI was the only non-significant predictor of missingness (*b* = .37, *z* = 1.91, *p* =.060). See Figure 3. Results are supportive of H2 and H3.

The final stage of this exploration considered rater source. As a check on possible differences in familiarity with the target, all self- and non-self-nominated raters were asked how well they knew as well as how frequently they interacted with the target. There were slight differences on responses to these questions across groups (“well-known” (3) = 10.03, *p* = .018; “frequently” (3) = 16.91, *p* = .001), but the differences were not sufficiently meaningful to justify inclusion of these variables into our analyses (87% of non-self-nominated and fully 95% of self-nominated raters indicated they knew the target either *very well* or *extremely well*, although 14% of non-self-nominated respondents indicated they only interacted with the target once a month or less frequently compared to 2% of self-nominated respondents).

We wondered whether item desirability influenced non-response the same or differently across rater type. Using only summaries of missingness within social desirability stratum, as well as an indication of source (self, self-nominated, or non-self-nominated), the overall R2 was .89 (*F*(5,18) = 28.18, *p* < .001).There were strong main effects for social desirability stratum (*F*(1,22) = 6.77, *p* = .016) as well as rater type (DeltaF(2,20) = 42.49, *p* < .001). The interaction effect (rater type x social desirability stratum) was non-significant (DeltaF(2,18) = 2.57, *p* = .100). See Figure 4. These results are in contrast with the expectation that self-nominated rating sources would possibly be more influenced by item desirability (“skip” a larger number of undesirable items).

**Discussion**

Self-report measures of psychological constructs are commonly criticized for their vulnerability to response biases (e.g., Spector, 2006). These perspectives regarding self-evaluations are likely not surprising to the reader who is familiar with the issue of social desirability in personality assessment (e.g., Asendorpf & Ostendorf, 1988; Dilchert et al., 2006; Edwards, 1957) or common method variance across measurement domains (e.g., Kammeyer-Mueller et al., 2010; Podsakoff et al., 2003). Many researchers propose that by collecting informant ratings, they circumvent some of the psychometric concerns traditionally associated uniquely with self-ratings (e.g., Chang et al., 2012; Kolar et al.,1996; Podsakoff et al., 2012; Robins & John, 1997). The current study explored whether the desirability of items could explain the choice to answer a question about a target 1) more strongly than the readability of the item prompts, and 2) for informant raters.

In sum, the results suggest social desirability predicts non-response, in this case, perhaps as much or more so than the readability of the items and generally across ratings sources. These results are in contrast with the expectation that those closer to a target would be more influenced by item desirability (“miss” a larger number of items). However, as noted above, all raters were quite familiar with the targets. Theory would actually suggest our obtained pattern of findings given how well informants (both self- and non-self-nominated) knew the targets they were rating. Interestingly, the pattern was nearly identical for targets and non-self-nominated raters (moderate negative slope), but although the trend was in the same direction, this pattern was less dramatic for self-nominated raters. The reason for this difference is unclear, and somewhat contrary to theory would suggest – in that those close to a target would be quite similarly biased and by extension, “miss” undesirable questions with similar frequency.

**Limitations and Future Directions**

We note a number of limitations and subsequent directions for future work in this area. First, our project explored personality only. We note that missing data happens much more broadly, and for more reasons than were feasible to explore here. In addition, future study would benefit from consideration of a larger number of potential reasons for non-response, and in other contexts. It would be of value to conduct a larger analysis across studies to document the percentage of missing data along to look for additional patterns of systematic non-response.

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**Figure 1**

*Frequency of “Don’t Know” and “No Answer” by Question from the 2020 General Social Survey*

**Chart

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**Figure 2**

*Smoothed (Regression-predicted) Missing Value Estimates Across Social Desirability Strata*

**Chart, line chart, scatter chart

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**Figure 3**

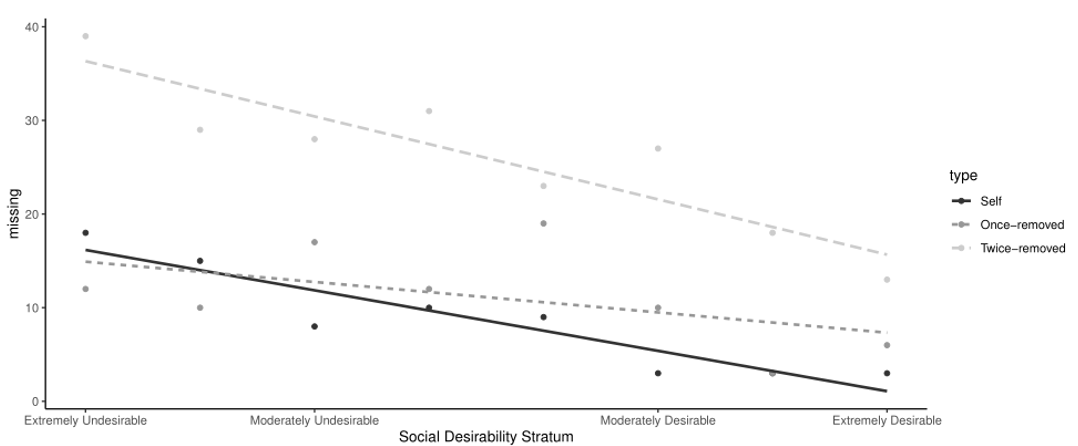
*Comparison of Standardized Values for Valid and Missing (NA) Responses across DVs*

Chart, box and whisker chart

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**Figure 4**

*Smoothed (Regression-predicted) Missing Value Estimates Across Social Desirability Strata by Rater Type*

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1. Self- and non-self-nominated responses were screened by asking “who is supposed to be rated” prior to item administration and “who was rated” upon survey completion. Respondents who missed the answer were excluded. [↑](#footnote-ref-1)