Who Cares and Who Is Careless? Insufficient Effort Responding as a Reflection of Respondent Personality

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Insufficient effort responding (IER) to surveys, which occurs when respondents fail to carefully read questionnaire instructions or item content, has recently gained attention as a source of inaccuracy in self-report data (Huang, Curran, Keeney, Poposki, & DeShon, 2012; Johnson, 2005; Maniaci & Rogge, 2014; Meade & Craig, 2012). Whereas previous studies have focused on IER as a *methodological nuisance*, the current studies examined IER as a *substantive variable*. Specifically, we hypothesized that IER is a reflection of enduring individual differences. In Study 1, we found that IER displayed rank-order consistency over the course of 13 months; in Studies 2 and 3, we found that IER displayed rank-order consistency across multiple research situations; in Study 4, we found that acquaintance-reported conscientiousness, agreeableness, extraversion, and emotional stability were each negatively related to IER; and in Study 5, we found that IER was related to college grade point average and class absences. Together, these 5 studies suggest that IER is in part a manifestation of enduring individual differences.

Keywords: insufficient effort responding, careless responding, response effort, behavioral consistency, personality

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Self-report measures are ubiquitous within psychological research, where they are used to assess a variety of constructs, such as attitudes, behaviors, and personality traits. A tacit assumption underlying the use of such measures is that participants are able and willing to provide accurate self-reports. However, the growing literature on insufficient effort responding (IER) to surveys—which occurs when research participants provide inaccurate data because they have failed to carefully read or comply with questionnaire instructions and item content—has recently challenged this assumption (Huang et al., 2012; Johnson, 2005; Meade & Craig, 2012).[1]

Researchers have generally treated IER as a *methodological nuisance* and have thus focused their attention on the detection and prevention of IER (e.g., Huang, Bowling, Liu, & Li, 2015; Johnson, 2005; Kurtz & Parrish, 2001). Consistent with a *substantive view*, however, the current article examines whether enduring individual differences exist in the extent to which one engages in IER. In Study 1, we examined IER's rank-order consistency across time; in Studies 2 and 3, we examined IER's rank-order consistency across research situations; in Study 4, we examined whether

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[1] IER is distinct from the various response styles that have long been discussed in the literature (e.g., socially desirable responding, response acquiesce, extreme responding) in that IER reflect a lack of attentiveness to item content, whereas response styles generally require respondent attentiveness (see Maniaci & Rogge, 2014; Meade & Craig, 2012). To respond in a socially desirable manner, for instance, a respondent must closely read each item before deciding what constitutes the socially preferred response.

acquaintance-reported Five Factor Model (FFM) personality traits (Costa & McCrae, 1992; Goldberg, 1990; McCrae & John, 1992) are related to IER; and in Study 5, we examined whether IER was related to college grade-point average (GPA) and class absences.

In the following section, we suggest that IER is influenced by the extent to which a participant is motivated to respond carefully. We further suggest that such motivation is a reflection of enduring individual differences in personality.

Individual Differences and the Motivation to Respond Carefully

Definitions of IER generally emphasize the role of participant motivation (Huang et al., 2012; Maniaci & Rogge, 2014; Meade & Craig, 2012). Huang et al., for instance, suggested that IER to surveys occurs when participants have ". . . low or little motivation to comply with survey instructions, correctly interpret item content, and provide accurate responses" (p. 100). Research has indeed provided evidence of such motivational influences. Huang et al., for example, found that warning participants that engaging in IER may result in the loss of research participation credits—which presumably increases participants' motivation to respond carefully—resulted in lower incidence of IER.

The presence of a motivational component further suggests that respondent personality may be related to IER (see Goldberg & Kilkowski, 1985; Johnson, 1981; Maniaci & Rogge, 2014; Meade & Pappalardo, 2013). As we discuss in the introduction to Study 4, we expect several personality traits to influence IER via effects on one's motivation to respond carefully. Among other things, careful responding may be motivated by (a) a willingness to be attentive to details (the motivation to be attentive), (b) a willingness to conform to instructions (the motivation to comply), (c) a desire to help the researcher (the motivation to be altruistic), and (d) an interest in learning about oneself or about others (the motivation to explore). Each of these motivations for responding carefully is likely influenced by one or more FFM traits. Conscientiousness, for instance, is likely related to the motivation to be attentive and the motivation to comply; agreeableness is likely related to the motive to be altruistic; and openness is likely related to the motivation to explore. To the extent that IER is influenced by temporally consistent personality traits, we expect that IER will itself display consistency across time and across situations (see Studies 1, 2, and 3). Furthermore, if IER is a reflection of respondent personality, then IER should be related to personality measures (see Study 4), and it should be related to criteria that are typically predicted by personality (e.g., academic performance; see Study 5).

The Consistency of IER Across Time and Across Situations

If IER is a manifestation of personality traits, then the degree to which a person engages in IER is expected to display rank-order consistency across time and across situations (for discussions of personality as a source of behavioral consistency, see Funder, 2001; Funder & Colvin, 1991; Leikas, Lönnqvist, & Verkasalo, 2012). Note that the current studies focus on rank-order consistency, which is the consistency of the relative level of one's behavior when compared with the behavior of others (Sherman, Nave, & Funder, 2010).

Research has indeed found consistency across tasks in the degree to which a given person engages in IER. Maniaci and Rogge (2014; Study 1), for example, found that the extent to which participants engaged in IER while completing a self-report questionnaire was positively related to the number of mistakes they made on a task requiring them to identify the pronouns contained within a passage. Similarly, Huang et al. (2015, Study 2) found that the degree to which participants engaged in IER while completing a self-report questionnaire was negatively related to the number of letters written in response to an open-ended question. These studies examined the consistency of IER displayed across tasks that were administered at the same time and within the same research situations. We build upon this research by examining the consistency of IER across time (see Study 1) and across different situations (see Studies 2 and 3).

Study 1

As we discuss in the introduction to Study 4, we predict that the extent to which one engages in IER is related to several FFM (Costa & McCrae, 1992; Goldberg, 1990; McCrae & John, 1992) personality traits. Because FFM traits are themselves consistent (Fraley & Roberts, 2005; Roberts & DelVecchio, 2000), we hypothesize rank-order consistency across time in the extent to which survey respondents engage in IER.

Hypothesis 1: IER Displays rank-order consistency across time.

Method

Procedure. We recruited nonfaculty employees of a university in the Midwestern United States to participate in a confidential self-report study sponsored by the university's human resources department. Most of the respondents completed online T1 and T2 questionnaires, while a few choose to complete paper versions of the questionnaires that they returned to the first author via campus mail. The study included two waves separated by approximately 13 months. Both the T1 and T2 questionnaires were distributed to all 1,488 of the university's nonfaculty employees. The anonymous T1 and T2 questionnaires were matched using unidentifiable codes participants had provided. To encourage participation in the T2 questionnaire, we offered participants the opportunity to be entered into a drawing for a free dinner. No incentive, however, was used to encourage participation in the T1 questionnaire.

Participants. Employees ($N = 364$) responded to the T1 questionnaire (response rate = 24%), and 466 employees responded to the T2 questionnaire (response rate = 31%). We conducted all of the Study 1 analyses using the 166 employees who responded to both the T1 and T2 questionnaires (response rate = 11%). The average participant within this final sample was 42 years old (ranging from 23 to 62 years; $SD = 10$) and had worked for the university for approximately 10 years. Eighty-six percent of participants were female, and 93% were Caucasian.

Measures.

Substantive measures. The T1 and T2 questionnaires were identical and included several substantive self-report measures, such as trait affectivity, core self-evaluations, and job and attitudes. These items were used to compute the post hoc IER indices described next.

IER indices. Study 1, as well as our other four studies, used a variety of indices to assess IER. This feature represents a strength of our research, because it allowed us to examine our hypotheses across a diverse set of indices, as recommended by Meade and Craig (2012). Note that each of the indices that we used in our five studies has been described in detail elsewhere (see Curran, in press; DeSimone, Harms, & DeSimone, 2015; Huang et al., 2012; Maniaci & Rogge, 2014; Meade & Craig, 2012); thus, we only briefly describe these indices.

In Study 1, we computed three types of IER inconsistency indices: (a) the individual reliability index, (b) the psychometric synonyms index, and (c) the psychometric antonyms index. We also computed one type of IER outlier index—Mahalanobis D ($\alpha = .61$ and $.65$ for T1 and T2, respectively). So that high scores on each index would reflect a high probability of IER, we multiplied both the individual reliability index and the psychometric synonyms index by -1 (the other two indices naturally reflect high IER). We refer to these two recoded indices as the *Individual Unreliability IER index* and the *Psychometric Synonyms IER index*, respectively.[2]

We also created an *Overall IER index* by computing the standardized average of the above four primary IER indices at both time points. The Overall IER indices were reliable ($\alpha = .78$ and $.82$ for T1 and T2, respectively).

Results and Discussion

Hypothesis 1, which predicted that IER would display significant temporal consistency, was supported (Table 1). Specifically, each IER index assessed at T1 yielded a significant ($p < .001$) positive relationship with each IER index assessed at T2 (mean $r = .46$ between T1 and T2 indices). It is of note, however, that IER indices assessed within the same time period yielded somewhat stronger correlations: Mean rs $= .59$ (between T1 indices) and $.64$ (between T2 indices), respectively. The relatively high correlations between indices assessed at the same time suggest that one or more unmeasured occasional factors (e.g., temporary situational influences, such as a short-lived environmental distraction) may also influence IER.

As we discussed previously, this temporal consistency may result if IER is a manifestation of one or more enduring personality traits (see Funder, 2001; Funder & Colvin, 1991; Leikas et al., 2012). Because consistency alone, however, says nothing about the effects any specific personality trait(s), the results of Study 1 provide only indirect evidence that IER is a manifestation of respondent personality. Rather than reflecting the influences of personality, the temporal consistency of IER may instead reflect the consistency of the situation in which the T1 and T2 questionnaires were completed. Indeed, the T1 and T2 questionnaires had several situational similarities to each other: Both were part of the same longitudinal study; both were administered by the same researchers; and both included the same set of closed-ended self-report questions. The temporal consistency of situations, therefore, may have contributed to the temporal consistency of IER observed in Study 1. In Studies 2 and 3, we thus examined the consistency of IER across different research situations.

Studies 2 and 3

As an extension of Hypothesis 1, which addressed the temporal consistency of IER, we hypothesized that the extent to which a given person engages in IER within one situation will be positively related to the extent to which he or she engages in IER within another situation. This latter hypothesis is rooted in the prediction that some FFM traits—particularly conscientiousness, agreeableness, and openness—are related to IER (see Study 4 for a discussion of the hypothesized relationships between FFM traits and IER). That is, we hypothesize consistency in IER across situations because some of the predictors of IER (i.e., FFM traits) produce effects that endure across situations. As described next, Studies 2 and 3 each examined this type of consistency across ostensibly unrelated surveys with different features.

> *Hypothesis 2:* IER displays rank-order consistency across situations.

Study 2 Method

Procedure. Study 2 used two surveys conducted within the Department of Psychology of a public university in the midwestern United States. Students enrolled in introductory psychology courses were invited to participate in the surveys in exchange for extra credit. Both surveys were completed within the same semester.

The first survey (*prescreen survey*) was a prescreening questionnaire available to all students who logged into the departmental survey website. The questionnaire contained demographic, socioeconomic, and psychological measures that multiple researchers could use to identify certain sample characteristics that were of relevance to their primary studies (e.g., a sample item asked whether respondents work more than 20 hr for pay each week, thus allowing researchers to identify and recruit students who worked at least part time). Students were encouraged to complete the prescreening questionnaire early in the semester because their responses would be used to determine eligibility for various primary studies. As a result, students were generally motivated to respond carefully on the prescreen survey.

The second survey (*main survey*) was one of the many primary studies available to potential participants. Any student who completed the prescreen survey was eligible to participate. The main survey was administered under the pretext of a study of personality and behavior. Several situational features helped to distinguish this main survey from the prescreen survey, thus making them ostensibly unrelated: (a) different researchers were listed on the respective informed-consent forms; (b) different survey websites with distinct survey designs were used; (c) separate credit assignments were awarded after completion. On average, participants completed the main survey 24 days after completing the prescreen survey.

Participants. Of the 1,273 students who completed the prescreen survey, 759 subsequently completed the main survey. We conducted analyses using only those participants who completed both surveys. The average participant was 22 years old (ranging

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[2] More information about how these indices were computed is available in the supplementary information available online.

Table 1
Descriptive Statistics and Correlations for Study 1 Variables

Variable	1	2	3	4	5	6	7	8	9	10
T1 IER indices										
1. T1 Individual unreliability IER	—									
2. T1 Psychometric synonyms IER	.30	—								
3. T1 Psychometric antonyms IER	.39	.62	—							
4. T1 Mahalanobis D IER	.37	.61	.53	*.61*						
5. T1 IER (standardized average)	.66	.81	.82	.81	*.78*					
T2 IER indices										
6. T2 Individual unreliability IER	**.77**	.27	.41	.35	.58	—				
7. T2 Psychometric synonym IER	.27	**.52**	.39	.36	.50	.42	—			
8. T2 Psychometric antonyms IER	.35	.38	**.42**	.39	.50	.48	.67	—		
9. T2 Mahalanobis D IER	.47	.47	.34	**.58**	.60	.41	.63	.59	*.65*	
10. T2 IER (standardized average)	.58	.51	.49	.52	**.67**	.72	.84	.85	.82	*.82*
M	−.75	−.76	−.71	.00	.00	−.76	−.78	−.66	.00	.00
SD	.16	.16	.20	.54	.78	.14	.16	.22	.50	.81

Note. IER = insufficient effort responding. $N = 166$. αs reported on the diagonal (in italicized font) when applicable. All ps < .001. Correlations in bold indicate the association between two corresponding IER indices over time.

from 16 to 62 years; $SD = 5$); 68% of participants were female. The majority of participants were Caucasian (52%), followed by African American (24%), and Asian (16%).

Measures.

Substantive measures. The prescreening survey included 57 actual prescreen items for various other primary studies and five infrequency IER items (see Prescreening IER index section below) scattered among 37 personality filler items. Because of the brevity of the prescreening survey, we were unable to compute post hoc IER indices; thus, the infrequency scale was the only prescreening IER index.

The main survey contained several substantive measures such as life satisfaction, personality, and social desirable responding, which we used to compute the post hoc IER indices discussed below. In addition, eight infrequency IER items (Huang, Bowling, et al., 2015) were interspersed within different sections of the main survey.

Prescreening IER index. We assessed IER in the prescreening survey using the average of five items from the Huang, Bowling, et al. (2015) infrequency scale. Following Huang, Bowling, et al. (2015), we scored the responses such that any disagreement to an implausible statement and any agreement to a plausible statement would be coded as non-IER (i.e., scored as 0), whereas failures to correctly indicate disagreement/agreement would be coded as IER (i.e., scored as 1). We used the average of these recoded items as participants' prescreening IER scale score (α = .52). The low alpha value may be due in part to the respondents' overall high response effort. That is, a reliability estimate is suppressed to the extent that true scores (i.e., IER in the current case) are uniformly low (Furr & Bacharach, 2014).

Main survey IER indices. We assessed IER in the main survey using six indices: an infrequency measure, individual reliability, psychometric synonyms, psychometric antonyms, Mahalanobis D, and page time. We describe each of these indices next.

The Infrequency IER index, which was computed from the average of eight items from Huang, Bowling, et al. (2015), was scored in the same manner as the infrequency items included in the prescreen survey. This measure yielded an α of .78. We followed procedures similar to those described in Study 1 to compute the four post hoc IER indices (i.e., Individual Unreliability, Psycho-

metric Synonyms, Psychometric Antonyms, and Mahalanobis D). The Mahalanobis D index yielded an α of .88.

The main survey website also allowed us to record the amount of time participants spent on each survey page. Because careful responding requires cognitive processing, unusually fast survey completion times suggest the presence of IER (Huang et al., 2012; Maniaci & Rogge, 2014; Meade & Craig, 2012). We used 2 s per item as the cutoff to detect rapid IER behavior on each web page (non-IER = 0; IER = 1), because previous research has found that this approach to calculating page time converges with other IER indices (see Huang et al., 2012). For instance, for a web page containing 20 items, response time shorter than 40 seconds would indicate IER. The resulting page time IER scores were averaged across the 11 survey pages into the page time IER index (α = .96). Finally, we computed an Overall IER index by averaging the standardized scores of the six main survey IER indices (α = .79).

Study 2 Results

As shown in Table 2, IER on the prescreen survey was significantly related to five of the six IER measures assessed during the subsequent main survey. The prescreen IER measure yielded a mean correlation of .23 across the six main survey IER indices and a correlation of .35 ($p < .001$) with the Overall IER index. As a whole, these findings supported Hypothesis 2.

Study 3 Method

Procedure. The Study 3 data set was originally collected as part of a project that examined whether individual difference variables influence the effectiveness of several happiness-inducing activities. Participants first completed an online initial assessment questionnaire, which included an instructed-response IER scale (see Measures section below) and substantive items that we used to compute several post hoc IER indices. During six subsequent weeks, participants completed the follow-up assessments, which consisted of a series of six online weekly journals entries (the first journal was completed 1 week after the initial assessment). As we discuss below, we assessed the amount of effort participants put into completing these weekly journals.

Table 2
Descriptive Statistics and Correlations for Study 2 Variables

Variable	1	2	3	4	5	6	7	8
Prescreening Survey IER Index								
1. Prescreen infrequency scale	*.52*							
Main Survey IER indices								
2. Main infrequency scale	.42	*.78*						
3. Individual reliability IER	.11	.19	—					
4. Psychometric synonyms IER	.24	.46	.42	—				
5. Psychometric antonyms IER	.24	.48	.29	.49	—			
6. Mahalanobis D IER	.03	.12	.25	.33	.29	*.88*		
7. Page time IER	.36	.74	.18	.55	.51	.18	*.96*	
8. IER (standardized average)	.35	.73	.56	.78	.74	.52	.77	*.79*
M	.14	.21	−.68	−.59	−.49	.01	.09	.00
SD	.20	.25	.21	.24	.26	.84	.24	.69

Note. IER = insufficient effort responding. $N = 759$. αs reported on the diagonal (in italicized font) when applicable. When $|r| > .07$, $p < .05$; when $|r| > .09$, $p < .01$; when $|r| > .11$, $p < .001$.

Participants. Study 3 participants were 229 undergraduate students enrolled in introductory psychology courses at a medium-sized university in the midwestern United States (Study 2 and Study 3 were conducted at two different universities). Participants were members of the Department of Psychology subject pool, and they received course credit for participating in the current research. The average participant was 20 years old (ranging from 17 to 34 years; $SD = 3$); 74% of participants were female; 74% were Caucasian.

Measures.

Substantive measures. The Initial Assessment questionnaire included several substantive measures, such as personality traits, depression, and life satisfaction, which were used to compute the post hoc IER indices discussed below.

Initial assessment IER indices. Study 3 included four instructed-response items, which ask participants to provide a specified response (e.g., "For this item, please select 'strongly agree'"; see Barber, Barnes, & Carlson, 2013; Ward & Pond, 2015). These items were scored dichotomously: 0 = *non-IER*; 1 = *IER*. We computed the instructed-response score by averaging participants' responses to these items ($\alpha = .53$). Using the same procedures described in Study 1, we computed Individual Unreliability, Psychometric Synonyms, Psychometric Antonyms, and

Mahalanobis D ($\alpha = .80$) indices. We also calculated an Overall IER index by averaging the standardized scores of the five initial assessment IER indices ($\alpha = .76$).

Effort completing weekly follow-up journals. We used two approaches to assess the amount of effort participants put into completing the six weekly follow-up journals. First, we recorded the number of weekly journals participants submitted. Second, four judges independently rated the amount of effort participants put into completing the journals ($\alpha = .93$). When making their ratings, the judges were asked to provide molar-level assessments of participant effort. The judges provided ratings on a 7-point scale from 1 (*little to no effort*) to 7 (*high level of effort*). Number of journals submitted and the average of the judges' ratings were strongly related to each other, $r = .90$, $p < .001$, which may be attributable to the fact that the judges were aware of the number of journals entries submitted by each participant.

Study 3 Results

As shown in Table 3, the levels of IER participants displayed in the initial assessment questionnaire were consistently related to effort displayed in the open-ended follow-up journals: The five primary IER indices yielded an average correlation of .23 with the

Table 3
Descriptive Statistics and Correlations for Study 3 Variables

Variables	1	2	3	4	5	6	7	8
Initial assessment IER Indices								
1. Individual reliability IER	—							
2. Psych synonyms IER	.63	—						
3. Psych antonyms IER	.48	.57	—					
4. Mahalanobis D IER	.41	.45	.37	*.80*				
5. Instructed-response IER	.28	.36	.18	−.02	*.53*			
6. IER (standardized average)	.79	.85	.73	.62	.51	*.76*		
Follow-up journal effort								
7. Number of journals completed	−.15	−.34	−.17	−.12	−.39	−.33	—	
8. Judge-rated effort	−.20	−.36	−.17	−.17	−.44	−.38	.90	*.93*
M	−.78	−.84	−.61	.00	.17	.00	4.68	4.84
SD	.11	.13	.26	.56	.23	.70	1.99	1.75

Note. IER = insufficient effort responding. $N = 229$. αs reported on the diagonal (in italicized font) when applicable. When $|r| \geq .13$, $p < .05$; when $|r| > .17$, $p < .01$; when $|r| > .21$, $p < .001$.

number of follow-up journals completed and an average correlation of .26 with judge-rated effort. It is also of note that the Overall IER index was significantly ($p < .001$) related to both number of follow-up journals completed ($r = -.33$) and judge-rated effort ($r = -.38$). The results of Study 3, therefore, generally supported Hypothesis 2.

Study 2 and 3 Discussion

Studies 2 and 3 both provide support for Hypothesis 2, which predicted that IER would be consistent across situations. Note that the prescreening survey and the main survey used in Study 2 had several situational features that distinguished them from each other—the two surveys appeared to have different researchers, different purposes, separate credit assignments, and they used different survey designs. Despite the dissimilarities between the prescreen survey and the main survey, however, they did share one obvious feature: They both consisted of Likert-type items. One might argue that the Study 2 results only reflected the consistency in response effort on closed-ended questions. Study 3, however, addressed this limitation by examining the relationship between IER in an initial closed-ended questionnaire and response effort in open-ended journals. Similar to Study 2, Study 3 found that IER was consistent across situations.

Study 4

Although evidence of IER's consistency over time and across situations is consistent with our thesis that IER is a manifestation of respondent personality, evidence linking specific personality traits to IER would provide more direct support for our position. This direct approach, in fact, was used by Goldberg and Kilkowski (1985); Johnson (1981); Maniaci and Rogge (2014), and Meade and Pappalardo (2013)—each of which examined the relationships between *self-reported* personality traits and IER. Although those studies found several statistically significant relationships between self-reported personality traits and IER, one should be cautious when interpreting those results. Because they require participants to be careful and attentive, self-report measures of substantive variables—in this case personality traits—likely have poor validity among participants who score high on IER indices. After all, how can a participant with a history of engaging in IER throughout the duration of a questionnaire be expected to carefully respond to self-report personality measures? As a result, the use of self-reported personality traits provides an ambiguous test of the relationships between respondent personality and IER.

To address the limitations of self-report measures, Study 4 used *acquaintance-reported* measures to assess respondent FFM traits (for a review of the use of acquaintance-reported personality measures, see Connelly & Ones, 2010). As described below, we hypothesized that three FFM traits—conscientiousness, agreeableness, and openness—would be related to IER.

Conscientiousness and IER

Conscientious participants may respond carefully because such behavior is a direct manifestation of their general tendency to be attentive and compliant (Hogan & Ones, 1997; Roberts, Jackson, Fayard, Edmonds, & Meints, 2009). Responding carefully to a questionnaire, in other words, requires attention to detail and a willingness to follow instructions. Compared with low-conscientiousness participants, high-conscientiousness participants are more likely to be motivated to display the attentiveness and compliance needed to respond carefully.

Hypothesis 3: Acquaintance-reported conscientiousness is negatively related to IER.

Agreeableness and IER

Agreeable participants may respond carefully because such behavior is a direct manifestation of their general tendency to be altruistic (Graziano & Eisenberg, 1997; Graziano & Tobin, 2009). These participants, in other words, may respond carefully out of a sense of personal duty to be helpful to the researcher.

Hypothesis 4: Acquaintance-reported agreeableness is negatively related to IER.

Openness and IER

We predict that openness to experience, an FFM characteristic that reflects the tendency to be generally curious and thoughtful (McCrae & Costa, 1997; McCrae & Sutin, 2009), will be negatively related to IER. Open participants, in other words, may respond carefully because they are genuinely interested in contributing to science or because they are interested in using participation in research as a means to learning about themselves or about other people (see Maniaci & Rogge, 2014; Meade & Craig, 2012).

Hypothesis 5: Acquaintance-reported openness is negatively related to IER.

Extraversion, Emotional Stability, and IER

We see no compelling conceptual basis to predict that extraversion and emotional stability would be related to IER. As a result, we explored the relationships between these traits and IER within two research questions.

Research Question 1: Is acquaintance-reported extraversion related to IER?

Research Question 2: Is acquaintance-reported emotional stability related to IER?

Method

Procedure. Study 4 participants completed an online self-report questionnaire. As part of this data collection, they were asked to provide e-mail address of one acquaintance. We e-mailed the acquaintance an online questionnaire that asked them to assess the participant's personality.

Participants. Study 4 participants were undergraduate students at the same university where the Study 3 participants were enrolled. Data for Studies 3 and 4 were collected during different semesters, thus minimizing participant overlap. Participants were members of the Department of Psychology subject pool and they received course credit for participating. Although 477 participants responded to the self-report questionnaire, we obtained acquaintance ratings for only 217 participants. Our analyses were conducted using only those participants for whom we had acquain-

tance data. The average participant was 20 years old (ranging from 16 to 55 years, *SD* = 4); 72% of participants were female.

Measures.

Substantive measures. Participants completed several self-report substantive measures, such as personality, trait affectivity, health symptoms, and life satisfaction scales. These measures were used to compute the four post hoc IER indices discussed next.

Self-Report Questionnaire IER indices. We followed the same procedures described in Study 1 to compute the Individual Unreliability, Psychometric Synonyms, Psychometric Antonyms, and Mahalanobis D (α = .88) IER indices. We also calculated an Overall IER index by computing an average of the standardized scores of the four individual IER indices (α = .79).

Acquaintance-reported personality. The acquaintances of the Study 4 participants provided reports of participant personality. Most acquaintances were family members (43%), friends (26%), or romantic partners (24%). The average acquaintance was 29 years old; most were female (72%); and they knew the participant for an average of 10 years. We used items from the International Personality Item Pool (Goldberg et al., 2006) to assess acquaintance's judgments of participant's personalities: conscientiousness (α = .90), agreeableness (α = .85), openness (α = .78), extraversion (α = .87), and emotional stability (α = .85). Each scale consisted of 10 items, rated on a 7-point scale (1 = *strongly disagree*; 7 = *strongly agree*). A sample (extraversion) item is "He/She makes friends easily."

Results and Discussion

Hypothesis 3, which predicted that acquaintance-reported conscientiousness would be negatively related to IER, was generally supported. As shown in Table 4, conscientiousness was significantly related to three of the four IER indices (across all four indices, mean r = −.17) and to the Overall IER index, r = −.22, p < .01. Hypothesis 4, which predicted that acquaintance-reported agreeableness would be negatively related to IER, was also generally supported. Specifically, agreeableness yielded significant negative correlations with three of the four IER indices (across all four indices, mean r = −.16) and with the Overall IER index,

r = −.20, p < .01. Contrary to Hypothesis 5, acquaintance-reported openness was generally unrelated to IER; the sole exception to these null findings was for the Individual Unreliability index, r = −.15, p < .05.

We also explored the relationships between acquaintance-reported extraversion and IER (Research Question 1) and between acquaintance-reported emotional stability and IER (Research Question 2). As show in Table 4, both of these personality traits were related to at least some of the IER indices. Specifically, extraversion was negatively related to two of the four IER indices (across all four indices, mean r = −.15) and to the Overall IER index, r = −.20, p < .01; emotional stability was negatively related to all four IER indices (across all four indices, mean r = −.23) and to the Overall IER index, r = −.29, p < .001.

Consistent with our hypotheses, Study 4 found that conscientiousness and agreeableness were both negatively related to IER. The presence of a negative conscientiousness–IER relationship suggests that IER partially reflects the degree to which respondents have a general tendency to be attentive and compliant; the presence of a negative agreeableness–IER relationship suggests that IER partially reflects the degree to which respondents have a general tendency to be altruistic. Conscientious participants, in other words, may respond carefully because they are willing to expend the effort needed to respond accurately; agreeable participants may respond carefully because they wish to help the researcher.

Contrary to our hypothesis, however, openness was unrelated to IER. We hypothesized a negative openness-IER relationship because IER may partially reflect the extent to which respondents are curious and thoughtful. The null finding for openness may be a reflection of the generally difficulties surrounding the conceptualization and measurement of openness (see McCrae & Sutin, 2009) or it may have resulted from acquaintances being unable to accurately observe participant levels of openness (see Connelly & Ones, 2010).

Although we offered no a priori hypotheses for either extraversion or emotional stability, Study 4 found that both personality traits were negatively related to IER. As suggested by an anony-

Table 4

Descriptive Statistics and Correlations for Study 4 Variables

Variable	1	2	3	4	5	6	7	8	9	10
Acquaintance-reported personality										
1. Agreeableness	*.85*									
2. Conscientiousness	.46	*.90*								
3. Emotional stability	.53	.42	*.85*							
4. Openness	.28	.25	.21	*.78*						
5. Extraversion	.16	.29	.35	.31	*.87*					
Self-report questionnaire IER Indices										
6. Individual reliability IER	−.18	−.22	−.21	−.15	−.27	—				
7. Psychological synonyms IER	−.15	−.10	−.22	.04	−.07	.46	—			
8. Psychological antonyms IER	−.11	−.18	−.21	.03	−.17	.38	.64	—		
9. Mahalanobis D IER	−.20	−.21	−.28	.07	−.12	.58	.39	.37	*.88*	
10. IER (standardized average)	−.20	−.22	−.29	.00	−.20	.79	.80	.77	.75	*.79*
M	5.42	5.41	4.86	4.72	4.88	−.79	−.73	−.58	.00	.00
SD	1.01	1.04	1.09	.88	1.11	.13	.27	.31	.59	.78

Note. IER = insufficient effort responding. *N* = 215 to 217. αs reported on the diagonal (in italicized font) when applicable. When |r| ≥ .14, p < .05; when |r| ≥ .18, p < .01; when |r| > .22, p < .001.

mous reviewer, however, these results are consistent with the perspective that the validity of self-reports depends not only on literal accuracy, but also on the creation of accurate impressions (see Johnson, 1981, 1997, 2002). That is, high extraversion and high emotional stability may each contribute to one's level of social competence, which may in turn increase one's capacity to respond accurately (see Johnson & Hogan, 2006). To allow for direct tests of such mechanisms, future IER research should include indicators of social competence, such as sociability, empathy, perceptual conformance, and role-taking skills (see Johnson, 1981). Another possibility is that the frequent changes in mood and the negative emotions (e.g., anxiety, depression) experienced by survey respondents who are low in emotional stability may be a source of distraction that inhibits carefully responding.

Study 5

Studies 1 through 3 found that IER displayed rank-order consistency across time and across research situations and Study 4 found that several FFM personality traits were related to IER. Collectively, these four studies thus provide converging evidence that IER is in part a reflection of enduring individual differences. If IER is indeed a reflection of respondent personality, then it should predict criteria that are typically found to be related to personality. In Study 5, we thus examined IER's relationship with two widely studied criteria: college GPA and class absences. We examined these criteria because prior research has linked student personality traits—particularly conscientiousness—to both GPA and class absences (Credé, Roch, & Kieszczynska, 2010; McAbee & Oswald, 2013; Richardson, Abraham, & Bond, 2012).

Hypothesis 6: IER is negatively related to cumulative GPA and positively related to class absences.

Method

Procedure. Study 5, which was conducted at a large public university in the midwestern United States, was originally part of a scale development project that examined convergent and discriminant validity evidence for a newly developed eight-item personality scale. Participants completed an online questionnaire that included the new scale as well as various trait and perceptual measures (see description below of Study 5 measures).

Participants. Undergraduate students enrolled in introductory psychology courses participated in Study 5 in exchange for extra course credit. Note that these participants were recruited from a different university than were participants of our previous studies. Of the 381 participants who completed the questionnaire, 349 reported their GPA (92%) and were thus included in the current study. The average participant was 20 years old (ranging from 18 to 27; $SD = 2$); 63% of participants were female.

Measures.

Substantive measures. Participants completed the new scale as well as several substantive measures, such as personality, college satisfaction, and career planning scales. These substantive measures were used to compute the post hoc IER indices described below.

Criterion measures. Following Schmitt et al. (2009), we assessed academic performance using cumulative GPA and absence from class. Participants self-reported their cumulative GPA, which has been shown to correlate strongly with objective GPA obtained from school transcripts (see the meta-analysis by Kuncel, Credé, & Thomas, 2005, which reported a mean observed r of .90 between college students' self-reported GPAs and their official GPAs). Participants also reported their frequency of class absence over the previous 6 months using a 5-point scale from 1 (*less than 5 classes*) to 5 (*more than 30 classes*; Schmitt et al., 2009).

IER indices. Similar to earlier studies, we assessed IER using six indices: an 11-item infrequency scale ($\alpha = .88$) based on Huang, Bowling et al. (2015), individual reliability, psychometric synonym, psychometric antonym, Mahalanobis D ($\alpha = .84$), and page time ($\alpha = .94$). As in Studies 1 through 4, we also computed an Overall IER index by averaging the standardized scores of these six IER indices (Cronbach's $\alpha = .72$).

Results and Discussion

As predicted by Hypothesis 6, we found some evidence that IER was negatively related to GPA and positively related to class absences (Table 5). Specifically, five of the six IER indices were negatively correlated ($p < .01$) with cumulative GPA (across all six indices, mean $r = -.14$; for the Overall IER index, $r = -.23$,

Table 5
Descriptive Statistics and Correlations for Study 5 Variables

Variable	1	2	3	4	5	6	7	8	9
1. Infrequency IER scale	.88								
2. Individual reliability IER	.04	—							
3. Psychometric synonyms IER	.21	.51	—						
4. Psychometric antonyms IER	.53	.16	.39	—					
5. Mahalanobis D IER	.02	.44	.34	−.12	.84				
6. Page time IER	.78	.15	.21	.50	.10	.94			
7. IER (standardized average)	.67	.61	.71	.66	.49	.72	.72		
8. College GPA	−.14	−.17	−.16	−.17	−.14	−.08	−.23	—	
9. Class absences	.05	.05	.11	.04	.15	.12	.13	−.11	—
M	.14	−.72	−.71	−.40	9.70	.10	.00	3.19	1.89
SD	.24	.15	.19	.36	4.13	.23	.65	.47	.87

Note. IER = insufficient effort responding; GPA = grade-point average. $N = 347$ to 349. αs reported on the diagonal (in italicized font) when applicable. When $|r| \geq .11$, $p < .05$; when $|r| \geq .14$, $p < .01$; when $|r| \geq .18$, $p < .001$.

$p < .001$) and three of the six IER indices were positively correlated ($p < .05$) with class absence (across all six indices, mean $r = .08$; for the Overall IER index, $r = .13$, $p < .05$). Because student personality is related to both college GPA and class absence (Credé et al., 2010; McAbee & Oswald, 2013; Richardson et al., 2012), these findings give additional credence to our position that IER is a reflection of respondent personality. The results of Study 5 are also consistent with previous findings suggesting that lack of motivation in test taking can predict important life outcomes (see Duckworth, Quinn, Lynam, Loeber, & Stouthamer-Loeber, 2011).

General Discussion

In the current article, we examined whether the degree to which a participant engages in IER is a direct manifestation of personality traits—particularly conscientiousness, agreeableness, and openness. Because these personality traits are themselves consistent (Fraley & Roberts, 2005; Roberts & DelVecchio, 2000), we predicted that IER would display rank-order consistency across time and across situations. We further argue that IER would be related to criteria that personality traits typically predict—in this case, college GPA and class absences.

Consistent with our position that IER is in part a reflection of respondent personality traits, we found considerable evidence for the rank-order consistency of IER: Study 1 found that IER was consistent over the span of 13 months; Studies 2 and 3 found that IER was consistent across distinct research situations. Because Studies 1, 2, and 3 did not directly examine the role of personality traits; however, they provide only indirect evidence that IER is a manifestation of respondent personality. Study 4, which provided a direct test of this prediction, found that acquaintance-reported conscientiousness, agreeableness, extraversion, and emotional stability were each negatively related to IER. Contrary to our hypothesis, however, acquaintance-reported openness was unrelated to IER. Finally, Study 5 found that IER was negatively related to college GPA and positively related to class absences. Given that student personality traits have been linked to both of these criteria (Credé et al., 2010; McAbee & Oswald, 2013; Richardson et al., 2012), these latter findings provide additional evidence for our contention that IER is in part a reflection of respondent personality.

Although we examined IER as a substantive variable, it is important to reiterate that IER is also a methodological nuisance. Researchers should therefore be mindful of the potentially undesirable effects of IER on data quality (see Huang, Liu, & Bowling, 2015; Johnson, 2005; Maniaci & Rogge, 2014; McGonagle, Huang, & Walsh, in press; McGrath, Mitchell, Kim, & Hough, 2010).

Conceptual and Practical Implications

The current research has several important implications. First, our findings suggest that IER is partially the result of enduring individual differences. This contributes to the IER literature, which has given little attention to IER as a substantive variable. We should note, however, that our findings do not preclude the possibility that IER is influenced by situational factors. Although we observed statistically significant levels in the rank-order consistency of IER, situational influences may produce changes in *absolute* levels of IER. Furthermore, the personality–IER correlations reported in Study 4, although statistically significant, were modest. As a result, there is ample room for situational factors to impact IER.

Second, our findings have broad implications for the effective use of self-report measures. Specifically, we found evidence of IER in each of our five samples. Despite the apparent ubiquity of IER, however, we recognize the value of self-report measures—self-report measures, for example, are convenient and are perhaps the best means available for assessing internal psychological constructs, such as attitudes, emotions, and thoughts. Although we believe that self-report measures should continue to be used, we caution researchers about the dangers of ignoring IER. Indeed, previous studies have demonstrated that IER can produce misleading research findings (see Huang, Liu, & Bowling, 2015; McGrath et al., 2010). Fortunately, two general approaches exist for minimizing the effects of IER: (a) researchers can use one or more IER indices to identify and discard data provided by high-IER respondents and (b) researchers can implement strategies to prevent IER from occurring (e.g., they can offer incentives to participants who respond carefully; see Huang et al., 2012; Johnson, 2005; Maniaci & Rogge, 2014; Meade & Craig, 2012, for discussions of these two approaches).

Our findings, however, suggest that efforts to encourage careful responding may be preferable to the detection and removal of data provided by high-IER participants. Although some IER researchers have recommended the deletion of data provided by participants who have engaged in IER (Huang et al., 2012; Johnson, 2005; Meade & Craig, 2012), such data screening approaches may result in the systematic exclusion of participants, thus damaging the representativeness of a one's sample (see Ward & Pond, 2015). In other words, if particular people—such as those low in conscientiousness, agreeableness, extraversion, or emotional stability (see Study 4)—are predisposed to engage in IER, then data screening will result in the systematic exclusion of participants based on personality. Thus, IER prevention strategies, such as offering an incentive for careful responding, may be preferred over data screening.

Future Research

Until recently, IER has received only occasional research attention; thus, many unanswered questions remain regarding its measurement, nature, causes, and consequences. In the following subsections we describe several questions that await future research.

How is IER most effectively measured? In addition to addressing various substantive questions, researchers should give particular attention to how IER can be most effectively measured. Consistent with previous research (Huang et al., 2012; Maniaci & Rogge, 2014; Meade & Craig, 2012), we found that the various IER indices generally converged with one another. This suggests that several indices may effectively measure IER. That being said, however, we tentatively recommend infrequency scales over other IER indices, because they are easy to implement and because several studies have supported their validity as measures of IER (see Huang, Bowling, et al., 2015; Maniaci & Rogge, 2014; Meade & Craig, 2012). Other IER indices, such as inconsistency indices and Mahalanobis D, may be less useful because their post hoc nature precludes comparisons across studies that use different

substantive measures. The preferred measurement approach, therefore, would involve the inclusion of a priori IER measures (e.g., infrequency indices) for which previously determined cut scores are available. To achieve this ideal, more research is needed to establish cut scores for a priori IER indices.

How prevalent is IER? Within each of our data sets, we found—as other researchers have (e.g., Huang et al., 2012; Johnson, 2005; Maniaci & Rogge, 2014; Meade & Craig, 2012)—that a small proportion of participants clearly engaged in IER. This is most evident in the IER scale means reported in each of our tables. Sufficient amounts of IER, however, were present in each data set to allow us to observe significant relationships between various IER indices and between IER and its hypothesized predictors (i.e., acquaintance-reported personality; see Study 4) and consequences (i.e., college GPA and class absences; see Study 5). In the absence of well-established cut scores, however, it is difficult to provide an exact estimate of the prevalence of IER within a given data set.

Does IER display absolute change? In addition to examining the rank-order consistency of IER—the focus of Studies 1, 2, and 3—future research should also examine absolute change in IER. There are grounds to expect that IER might either decrease or increase across successive data collections. We refer to these as the "rapport hypothesis" and the "fatigue hypothesis," respectively. According to the rapport hypothesis, participants who engage in IER while completing an initial questionnaire may generally avoid engaging in IER during subsequent questionnaire administrations because completing the initial questionnaire provided an opportunity for participants to develop a cooperative relationship with the researcher. Alternatively, the fatigue hypothesis suggests that participants may find it bothersome to be repeatedly contacted by the same researcher. Support for the fatigue hypothesis is especially likely to be found when subsequent questionnaires have similar or identical content to the initial questionnaire and when little time has passed between the initial questionnaire and subsequent questionnaire administrations.

Is IER a function of both the motivation and the capacity to respond carefully? As we described in the introduction, researchers have generally emphasized the lack of *motivation* to respond carefully as the immediate cause of IER (see Huang et al., 2012; Maniaci & Rogge, 2014; Meade & Craig, 2012). IER, however, may also occur because survey respondents lack the *capacity* to respond carefully. Simply put, responding carefully to self-report survey items requires the availability of cognitive resources, such as the resources used to interpret item meaning, the resources used to recall item-relevant information, and the resources used to translate item-relevant information into survey responses (see Krosnick, 1991; Tourangeau, 1984). If these resources are insufficient—perhaps because the respondent has poor reading skills, for instance, or is physically exhausted (see Barber et al., 2013)—then that respondent will lack the capacity to respond carefully and would thus be more likely to engage in IER. Indeed, there is some evidence for a link between respondent capacity and IER (see Goldberg & Kilkowski, 1985; Johnson, 1981). Goldberg and Kilkowski, for instance, found that respondent verbal intelligence and education were negatively related to inconsistency indices. Note, however, that participants' capacity to respond carefully is likely high within our five data sets, given that

each study involved giving simple self-report items to well-educated participants.

Research examining the motivation to respond carefully vis-à-vis the capacity to respond carefully could be framed around the distinction between the *self-disclosure* and the *self-presentation* perspectives on self-report accuracy (see Johnson, 1981, 1997, 2002; Johnson & Hogan, 2006). In short, the self-disclosure perspective equates self-report accuracy with responding in a manner that is literally true, whereas the self-presentation perspective equates self-report accuracy with responding in a manner that creates a valid impression of the respondent. Because providing responses that are literally true is primarily a function of the respondent's willingness to respond accurately, the self-disclosure perspective suggests that IER largely results from a lack of motivation. On the other hand, because providing responses that create an accurate impression is primarily a function of the respondent's impression-creation skills, the self-presentation perspective suggests that IER largely results from a lack of capacity. Following the approach of Johnson (1981), future IER research should test these two perspectives by comparing the effects of motivational factors advanced by the self-disclosure perspective (e.g., cooperativeness, self-control) with the effects of capacity factors advanced by the self-presentation perspective (e.g., self-knowledge, self-expression skills).

How do personality traits and situational factors interact to influence IER? Future IER research should simultaneously examine the effects of participant personality and situational factors. Research on Personality × Situation interactions may be particularly fruitful. We predict, for instance, that some participants (e.g., those high in conscientiousness) may respond carefully regardless of the presence or absence of situational influences. For these participants, careful responding might be intrinsically rewarding and thus it would be unnecessary to use extrinsic rewards or punishments to discourage them from engaging in IER. Other participants (e.g., those low in conscientiousness) may respond carefully only when the situation encourages careful responding, such as when participants are rewarded for careful responding.

Does IER predict important criteria? Study 5 found that IER was related to college GPA and class absences. Although these correlations were modest, they are comparable to the personality–GPA and personality–class absence correlations reported in prior meta-analyses (see Credé et al., 2010; McAbee & Oswald, 2013; Richardson et al., 2012). Given the promising findings of Study 5, we believe that research should examine whether IER predicts other important criteria—particularly criteria that require attentiveness or compliance, such as responsible financial behavior, compliance with safety regulations, and health maintenance behaviors. To the extent that IER is a reflection of enduring personal qualities, we expect that it would predict many important outcomes. IER indices, in fact, could be used to help overcome some of the limitations of self-report personality measures (e.g., faking, poor self-insight); thus, they may serve as useful complements to self-reports.

Limitations

Limitations of Studies 1, 2, and 3. Studies 1, 2, and 3 would have provided stronger tests of the consistency of IER across situations if they had used situations that were more distinct from

each other. Consider, for example, the initial assessment and follow-up situations used in Study 3. Although these two situations were different from each other in some ways—the former situation involved closed-ended questions, whereas the latter situation involved open-ended journal responses—they nevertheless shared similarities. The initial assessment situation and the follow-up situation, for instance, were both conducted online and were both part of the same study sponsored by the same researchers. Future research should thus examine the consistency of IER across dramatically different situations. Such research, for example, could examine whether IER displayed on an unproctored closed-ended questionnaire predicts IER displayed on an open-ended laboratory task performed in the presence of the experimenter.

Limitations of Study 4. Study 4 used personality data provided by a single acquaintance. We would have obtained a more reliable assessment of personality—and thus would likely have observed stronger personality–IER relationships—had we collected personality data from multiple acquaintances (see Connelly & Ones, 2010). Indeed, this may provide an explanation for the modest relationships we observed for conscientiousness, agreeableness, extraversion, and emotional stability, and the nonsignificant relationships we observed for openness.

Limitations of Study 5. Study 5 examined IER's relationship with self-report measures of college GPA and class absences. Although prior research suggests that self-reported college GPA converges with official GPA obtained from school transcripts ($r = .90$; Kuncel et al., 2005), our Study 5 criterion measures may still be problematic. Specifically, one could argue that it is untenable to assume that the subset of participants who have a personal history of engaging in IER could be relied upon to provide valid criterion data. Future research, therefore, should examine IER's relationships with objective criteria.

Summary

We found rank-order consistency of IER across time (Study 1) and across different research situations (Studies 2 and 3). Furthermore, we found that acquaintance-reported conscientiousness, agreeableness, extraversion, and emotional stability were each negatively related to IER (Study 4) and that IER was negatively related to college GPA and positively related to class absences (Study 5). Together, these five studies provide converging evidence that IER partially reflects respondent personality. Given the conceptual and practical implications of our findings, we encourage additional research on the causes of IER.

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