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COGNITIVE ABILITY, SOCIAL DESIRABILITY, BODY MASS INDEX, AND SOCIOECONOMIC STATUS AS CORRELATES OF FOURTH-GRADE CHILDREN'S DIETARY-REPORTING ACCURACY

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Abstract

Objectives—To investigate the relationship of reporting accuracy in 24-h dietary recalls to child respondent characteristics—cognitive ability, social desirability, body mass index (BMI) percentile, and socioeconomic status (SES).

Subjects/Methods—Fourth-grade children (mean age 10.1 years) were observed eating two school meals and interviewed about dietary intake for 24-h that included those meals. (Eight multiple-pass interview protocols operationalized the conditions of an experiment that crossed two retention intervals—short and long—with four prompts [ways of eliciting reports in the first pass].) Academic achievement test scores indexed cognitive ability; social desirability was assessed by questionnaire; height and weight were measured to calculate BMI; nutrition-assistance program eligibility information was obtained to index SES. Reported intake was compared to observed intake to calculate measures of reporting accuracy for school meals at the food-item (omission rate; intrusion rate) and energy (correspondence rate; inflation ratio) levels. Complete data were available for 425 of 480 validation-study participants.

Results—Controlling for manipulated variables and other measured respondent characteristics, for one or more of the outcome variables, reporting accuracy increased with cognitive ability (omission rate, intrusion rate, correspondence rate, $P < .001$); decreased with social desirability (correspondence rate, $P = .0004$); decreased with BMI percentile (correspondence rate, $P = .001$),

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

and was better by higher than by lower SES children (intrusion rate, $P = .001$). Some of these effects were moderated by interactions with retention interval and sex.

Conclusions—Children’s dietary-reporting accuracy is systematically related to such respondent characteristics as cognitive ability, social desirability, BMI percentile, and SES.

Reports about dietary intake—as in 24-h recalls—are presumed to be reports about actual events, and so are correct or incorrect. Error in such reports is systematic if its presence, or amount, is predictable. Whereas random error in survey responses reduces statistical power, necessitating, for example, larger samples to obtain precise estimates of population characteristics and relationships between variables, systematic error may bias such estimates (1, 2). Systematic error may be related to—or even caused by—respondent characteristics.

The relationship of reporting error to respondent characteristics may be investigated in dietary-reporting validation studies, in which respondents’ reports about their dietary intake are compared to reference information about their intake. For example, research with adults has shown that dietary-reporting error is related to social desirability—a stable personality characteristic (3, 4)—and that energy underreporting is systematically, if modestly, related to such respondent characteristics as education and fear of negative evaluation (4). Using data from a validation study conducted to investigate the effects of retention interval (RI; time between the to-be-reported meals and recall) and school-meal observation on fourth-grade children’s dietary-reporting accuracy (5), we found relationships of dietary-reporting accuracy to cognitive ability (6) and to social desirability and body mass index (BMI) percentile (7). Specifically, over children, dietary-reporting accuracy increased as cognitive ability increased (6); energy-reporting accuracy decreased as social desirability increased; and energy overreporting decreased as BMI percentile increased (7).

For this article, we used data from a new validation study (8) to revisit the relationship of fourth-grade children’s dietary reporting accuracy to three previously studied respondent characteristics—cognitive ability (indexed by academic achievement-test scores), social desirability, and BMI percentile—and to socioeconomic status (SES). Examining the relationship of reporting accuracy to previously studied characteristics could strengthen or reduce confidence in earlier findings, or suggest reinterpretation of those findings (9).

In the new validation study (8), we investigated the joint effects of RI and prompts (instructions that elicit reports of intake during the first pass of a multiple-pass recall procedure) on fourth-grade children’s reporting accuracy for school meals within a 24-h recall. Each child was assigned to one of eight multiple-pass 24-h recall conditions devised by crossing two RIs with four prompts. The RI was short or long; the prompts during the first interview pass were one of no specific prompts (open); meal names; forward (i.e., to report temporally from the beginning of the target period to the end); and reverse (i.e., to report temporally from the end of the target period to the beginning). By design, half of the children in each condition were girls. As in previous studies (e.g., (5)), children reported more accurately with the short than the long RI. Reporting accuracy varied over prompts, and, overall, tended to be best with reverse prompts; this was clearer for long-RI than for short-RI conditions. For no outcome variable analyzed (which were those analyzed for this article) was there a significant effect of sex. However, the results included interactions

involving RI, prompts, and sex: For the outcome variables analyzed, the degree to which accuracy was higher with a short RI than with a long RI varied over prompts and, for some outcome variables, this variation was systematically related to sex.

In this article, we focus on relationships of reporting accuracy to the respondent characteristics *beyond* the effects of the manipulated variables—RI and prompts—and of sex. From previous research with children, we anticipated that over children, 1) reporting accuracy would increase as cognitive ability increases (6); 2) energy-reporting accuracy would decrease as social desirability increases; and 3) energy overreporting would decrease as BMI percentile increases (7). As girls might be more concerned about weight than boys, any relationship of BMI percentile to accuracy might depend on sex. We made no predictions about the relationship, if any, of SES to dietary-reporting accuracy. We thought it plausible that the relationship of reporting accuracy to any of the respondent characteristics would be stronger with the long than with the short RI.

SUBJECTS AND METHODS

Previously described aspects of the sample and data collection methods (8) are summarized here; we explain measurement of the respondent characteristics completely. The University of South Carolina's Institutional Review Board approved data collection procedures.

Data were collected from children from regular fourth-grade classes in 10 public schools in four school districts during three consecutive school years (from 2011 to 2014). Of 1780 children invited to participate, 1208 (68%) agreed by providing written parental consent and child assent; participants were randomly sampled, subject to the constraint that half were girls, from children who had agreed. The mean age of participating children was 10.1 years; their distribution by race/ethnicity (based on parents' reports to schools) was 54% African American, 31% White, 10% Hispanic, and 5% Other.

Each validation-study participant was observed eating breakfast and lunch obtained at school and later interviewed using one of eight multiple-pass recall protocols—created by crossing two RIs (short; long) with four prompts (open; meal; forward; reverse)—about 24 h that contained those meals (see (8)). The short RI was operationalized as an afternoon interview (after lunch) about the prior 24 h (i.e., from 24 h before the interview until the start of the interview); the long RI was operationalized as a morning interview (after breakfast) about midnight to midnight of the previous day. (Thus, short RI interviews occurred approximately 5 h after the target breakfast and 1 h after the target lunch, with no meals intervening between the target meals and the interview; long RI interviews occurred approximately 25 h after the target breakfast and 21 h after the target lunch, with an intervening nontarget school breakfast.) As summarized in the Introduction, the prompts varied in how dietary reports were elicited during the first interview pass. Each child was assigned at random to a protocol, subject to the constraints that 60 children, with half girls, be assigned to each.

One of three researchers observed one to three children simultaneously for each meal period and recorded items eaten and their amounts categorically in servings of standard school-meal portions (e.g., little bit, most). One of four researchers interviewed each child at school

using the protocol to which that child was assigned. (Although most interviewers were also observers, no researcher interviewed a child that she had observed for the target meals.) An interviewed child was to report everything consumed during the specified target period. For short RI interviews, children were asked to report intake first for the interview day, and then for the previous day beginning 24 h before the interview start time. Children reported amounts eaten categorically (e.g., little bit, most). Each interviewed child was mailed a \$10 check. Eighteen interviews in which interviewers did not adhere to the assigned protocol were replaced.

Respondent characteristics

To measure cognitive ability, for each child, we summed scores on the fourth-grade English Language Arts and Mathematics tests of the Palmetto Assessment of State Standards (PASS), the standardized testing program used in South Carolina during the data collection period. On each test, scores could range from 300 to 900; in each year, the reliability of each of these tests, quantified by Cronbach's alpha, was about 0.9 (10–12). For our participants, the correlation between scores on these tests was 0.65.

To assess social desirability, after the 24-h dietary recall, the interviewer administered the 14-item short form of the Children's Social Desirability scale (13, 14). Scores could range from 0 to 14; higher scores indicate higher social desirability. In a previous study (14), reliability, quantified by Cronbach's alpha, was 0.8. For this sample, reliability was 0.81.

To calculate BMI, researchers measured participants' height and weight immediately after morning interviews or on a morning within 10 days of afternoon interviews. To determine BMI percentile, age/sex BMI charts were used (15).

Each child's SES was classified according to family eligibility for Supplemental Nutrition Assistance Program benefits and for free/reduced-price school meals during the school year. A child from a family eligible for at least one of these programs was classified as lower SES; otherwise, the child was classified as higher SES. Benefits eligibility was ascertained by personnel in the state's Revenue and Fiscal Affairs (RFA) Office, Health and Demographics Section. With permission from the state's Departments of Education and of Social Services, RFA personnel linked PASS scores and benefits eligibility data to our dietary recall data and conducted analyses.

Outcome variables

Dietary-reporting accuracy was assessed only for school meals, because only school meals were observed. The criteria for a reported meal to be considered a report about a school meal were that the child had to refer to breakfast as "breakfast" or "school breakfast" and to lunch as "lunch" or "school lunch"; had to report the meal location as "school"; and had to report the mealtime to within 1 h of the observed mealtime.

Two (partially redundant) pairs of outcome variables were calculated. One pair characterizes reporting accuracy at the food-item level: For each child, for each school meal, each observed and each reported food item was classified as a match, an omission, or an intrusion. Matches are items that were observed eaten and reported eaten; omissions are

items that were observed eaten but not reported eaten; and intrusions are items that were not observed eaten but were reported eaten. After weighting items by meal component (combination entrée [e.g., spaghetti with meat sauce] = 2; condiment [e.g., ketchup] = 0.33; remaining meal components = 1), weighted matches, omissions, and intrusions were summed over school meals. *Omission rate* is the unreported percentage of weighted food items observed eaten, calculated as $((\text{weighted omissions}/(\text{weighted omissions} + \text{weighted matches})) \times 100)$; values range from 0% (indicating no observed item was omitted) to 100% (indicating all observed items were omitted). *Intrusion rate* is the percentage of weighted food items reported eaten that was not observed eaten, calculated as $((\text{weighted intrusions}/(\text{weighted intrusions} + \text{weighted matches})) \times 100)$; defined values range from 0% (indicating every reported item was observed) to 100% (indicating every reported item was intruded). If a child reported nothing that satisfied criteria to be a report about a school meal, the intrusion rate was undefined. Smaller omission and intrusion rates indicate higher accuracy.

The second pair of outcome variables—for energy-reporting accuracy—incorporated accuracy of reporting both items and amounts (16): Quantified servings of observed and reported items were multiplied by per-serving kilocalories. (The categorical amounts used for observations and reports were quantified as none = 0.00, taste = 0.10, little bit = 0.25, half = 0.50, most = 0.75, all = 1.00 or the actual number of servings if > 1.00 serving was observed and/or reported eaten; per-serving kilocalorie information was obtained from the University of Minnesota's Nutrition Coordinating Center Food and Nutrient Database (17).) *Correspondence rate* is the percentage of observed kilocalories reported correctly, calculated as $((\text{sum of corresponding kilocalories from matches})/(\text{total observed kilocalories})) \times 100$. Corresponding kilocalories from a match are the smaller of reported kilocalories and observed kilocalories for that item. Correspondence rate ranges from 0% (indicating that no items observed eaten were reported eaten) to 100% (indicating that all items observed eaten were reported eaten and all amounts reported eaten were at least as large as amounts observed eaten). Higher correspondence rates indicate higher accuracy. *Inflation ratio* a measure of overreported kilocalories, was calculated as: $\{[(\text{overreported kilocalories from matches}) + (\text{kilocalories from intrusions})] / (\text{total observed kilocalories})\} \times 100$. An inflation ratio of 0% indicates that a child's report included neither intrusions nor overreported amounts of matches; inflation ratio has no maximum. Smaller inflation ratios indicate less overreporting.

Analyses

For children who reported meals that satisfied the criteria to be counted as reports of school meals and for whom respondent-characteristic data was complete, we regressed each of omission rate, intrusion rate, correspondence rate, and square-root-transformed inflation ratio on cognitive ability, social desirability, BMI percentile, SES, the interactions of these variables with RI, and the BMI percentile \times sex interaction. Control variables included RI, prompt, sex, each of their two-way interactions, the RI \times prompt \times sex interaction, race/ethnicity, school year, and district. For each model, any interaction with a coefficient for which $P > .10$ was removed, the model was refit, and the resulting model was used as the final model. Statements about changes in outcome variables with changes in respondent characteristics are based on final models. (Effects of the manipulated variables—RI and

prompt—and of sex were described in (8) and summarized in the Introduction.) As in (8), we did not include in these regression analyses data from children who reported nothing that satisfied the criteria to be a report about a school meal, because for these children, intrusion rate was undefined and 0% inflation ratios counterintuitively indicated high accuracy.

We used generalized estimating equation methodology, assuming an exchangeable correlation structure, to account for possible correlation in response values within an interviewer. For all models, we ascertained that assumptions of constant error variance and normality of errors were justified. We used simultaneous Wald tests to jointly test for effects in each model, and the Benjamini-Hochberg procedure (18) to adjust for simultaneous tests on multiple variables and in multiple models, controlling the false discovery rate at .05. All *P*-values reported are 2-sided and adjusted.

For children for whom we had data for all respondent characteristics, we used logistic regression to investigate whether respondent characteristics predicted whether a child would report nothing that satisfied the criteria to be a report about a school meal.

Statistical analyses were conducted with SAS/STAT® (9.4© 2002-12, SAS Institute Inc., Cary, NC). The combination of the confidential nature of certain variables collected and analyzed for this article and a small highly localized sample precludes general release of these data.

RESULTS

Of the 480 validation-study participants, data for all respondent characteristics was obtained for 425. Of these, 403 satisfied the school-meal reporting criteria and 22 did not. (Of the 55 children for whom information about at least one respondent characteristic was missing, 52 satisfied the school-meal reporting criteria and 3 did not.)

Table 1 shows, for the 425 validation-study participants for whom we had complete respondent-characteristic data, means and standard deviations (SDs) for cognitive ability, social desirability, BMI percentile, and SES, and their pairwise correlations. (These values do not differ appreciably from those calculated for all participants for whom any data were available.) Some pairs of these variables were significantly, if modestly, correlated; examining these variables jointly permits statements about relationships of outcome variables to respondent characteristics controlling for the others. Table 1 also shows, for the 403 participants who satisfied the school-meal reporting criteria, the correlation between each outcome variable and each respondent characteristic (and the correlations between outcome variables). As we predicted, cognitive ability was negatively related to omission rate and intrusion rate and positively related to correspondence rate; and social desirability was positively related to omission rate and negatively related to correspondence rate. BMI percentile was negatively related to correspondence rate; the predicted negative relationship between BMI percentile and inflation ratio was not evident.

Relationships of Outcome Variables to Respondent Characteristics

Table 2 shows test statistics and P -values for effects of the respondent characteristics, and if $P < .10$, for their interactions with RI and for the BMI percentile \times sex interaction. (Bold type in Table 2 indicates $P < .05$.) In what follows, we discuss the relationship of each outcome variable to the respondent characteristics.

Omission rate was significantly related to cognitive ability and to the cognitive ability \times sex and SES \times sex interactions. (For the SES \times RI interaction, $P = .06$.) Controlling for other variables and interactions, for each SD increase in cognitive ability, omission rate decreased by 6.6% for girls and by 3.7% for boys. On average, omission rate for lower-SES boys exceeded that for higher-SES boys by 11%, but did not differ for lower- and higher-SES girls.

Intrusion rate was significantly related to cognitive ability, to SES, and to the BMI percentile \times sex interaction. (For the BMI percentile \times RI interaction, $P = .08$.) Controlling for other variables and interactions, for each SD increase in cognitive ability, intrusion rate decreased by 3.1%. Average intrusion rate of lower-SES children exceeded that of higher-SES children by 6.9%. On average, for every increase of 10 in BMI percentile, intrusion rate increased by about 1.6% for girls and by about 0.6% for boys.

Correspondence rate was significantly related to cognitive ability, social desirability, and BMI percentile, and to the cognitive ability \times sex and SES \times sex interactions. (Correspondence rate and omission rate were highly correlated, so the similarity of the respondent characteristics to which these outcome variables are related is unsurprising.) Controlling for other variables and interactions, for each SD increase in cognitive ability, correspondence rate increased by 5.5% for girls and by 1.3% for boys. For every SD increase in social desirability, correspondence rate decreased by 2.9%, and for every increase of 10 in BMI percentile, correspondence rate decreased by 0.8%. Average correspondence rate of higher-SES boys exceeded by 14% that of lower-SES boys, higher-SES girls, and lower-SES girls.

Inflation ratio was significantly related to the BMI percentile \times RI and SES \times sex interactions. On average, over children, at the long RI, inflation ratio was essentially independent of BMI percentile, whereas at the short RI, inflation ratio decreased by 0.36% for every increase of 10 in BMI percentile. Predicted inflation ratios of lower-SES girls exceeded those for higher-SES girls by 1.3%, whereas predicted inflation ratios for higher-SES boys exceeded those of lower-SES boys by 0.36%. (These effects, although statistically significant, are very small.)

Relationship of Reporting Status to Respondent Characteristics

For the 425 children for whom we had complete respondent-characteristic data, of which 22 reported nothing that satisfied criteria to be reports about school meals and 403 were children whose data were analyzed for the previous section, we regressed an indicator of whether a child reported nothing that satisfied the criteria on the four respondent characteristics, sex, and RI. Controlling for all other variables, sex ($\chi^2(1) = 3.7$, $P = .054$) and RI ($\chi^2(1) = 3.2$, $P = .08$) were modestly related to this indicator, with boys more likely

than girls, and children with the long RI more likely than those with the short RI, to have reported nothing that satisfied criteria to be a report about a school meal. Of the respondent characteristics, cognitive ability was significantly related to this indicator ($\chi^2(1) = 15.7$, $P < .0001$); social desirability, BMI percentile, and SES were not ($\chi^2(1)s = 0.7, 1.4, \text{ and } 0.5$, respectively; all P s $> .2$). The mean summed PASS score of the 403 children whose reports satisfied the criteria was 1263 (SD = 80); that for the 22 children who reported nothing that satisfied the criteria was 1191 (SD = 62).

DISCUSSION

Using data from a dietary recall validation experiment, we investigated the relationship of reporting accuracy to four characteristics of child respondents—cognitive ability, social desirability, BMI percentile, and SES. We quantified reporting accuracy at the food-item and energy levels: Food-item error variables indexed both participants' omissions from their reports of eaten food items and intrusions of items they were not observed eating; energy variables quantified the extent to which reported energy matched, and the extent to which it exceeded, what had been observed.

Reporting accuracy improved with cognitive ability; this was as predicted, and consistent with previous findings (6). For omission rate and correspondence rate, the amount of improvement with cognitive ability was larger for girls than for boys. The relationships of omission rate and intrusion rate to cognitive ability may be compared to the effect of RI on these variables (8): Our results indicate that over the 4 SDs of cognitive ability that bracket the center 95% of the distribution of cognitive ability, omission rate would improve by about 25% for girls and 15% for boys; in comparison, overall, the amount by which omission rate with the short RI was better than that with the long RI conditions was 23%. Analogously, over 4 SDs of cognitive ability, on average for all children, intrusion rate would improve by 12%; by comparison, the amount by which intrusion rate with the short RI was better than that with the long RI was 18%. As cognitive ability increases, children tend more to report what they should report, and tend less to intrude into their reports items that should not be reported.

In addition, among the studied respondent characteristics, RI, and sex, only cognitive ability was significantly related to whether a child reported anything that satisfied the criteria to be a report of a school meal. Although few children reported nothing that satisfied those criteria, achievement-test scores of those children averaged about 1 SD lower than scores of children whose reports satisfied the criteria.

Reporting accuracy measured at the food-item level was not significantly related to social desirability. However, as social desirability increased, correspondence rate, a measure of energy-reporting accuracy, decreased. This, too, was predicted and consistent with previous results (7).

Reporting accuracy decreased as BMI percentile increased for two outcome variables: Correspondence rate decreased, and for girls, intrusion rate increased. However, as in our previous study (7), inflation ratio decreased as BMI percentile increased (although only at

the short RI), which may be construed as increased reporting accuracy with increasing BMI percentile. The decrease of both correspondence rate and inflation ratio with increasing BMI percentile is consistent with a lower rate of increase with BMI percentile for reported than for observed energy. Each of the statistically significant BMI effects, controlling for the other studied respondent characteristics, was small. The significant relationship of correspondence rate but not omission rate to BMI percentile, and the significant, but directionally opposite relationships of inflation ratio and intrusion rate (at the short RI) to BMI percentile, indicate the importance of analyzing separately reports about items and their amounts (energy) when assessing dietary reporting accuracy.

Finally, reporting accuracy was related to SES. In general, even controlling for the other respondent characteristics, reporting accuracy by higher SES children was superior to that of lower SES children, with the size and nature of the relationship contingent on sex for some outcome variables: The average omission rate of higher-SES boys was lower than that of lower-SES boys; the average intrusion rate of higher-SES children was lower than that of lower-SES children; and the average correspondence rate of higher-SES boys exceeded that of other children.

To summarize, dietary reporting accuracy was related to respondent characteristics—generally as predicted and consistent with previous results—as strongly as to such powerful investigator-controlled manipulations as RI. These results augment previous evidence that dietary-reporting accuracy in particular, and health-survey reporting accuracy more generally, is related to respondent characteristics (see, e.g., (3, 4, 6, 7,19, 20)). One strength of this study is that multiple respondent characteristics were investigated simultaneously, so the results we have reported for any of these characteristics control for the others. (In analyses of our previous validation study (5), we investigated the relationship of reporting accuracy to cognitive ability (6) separately from its relationship to social desirability and BMI percentile (7).) A notable strength of our results concerning cognitive ability is that whereas some research has shown that health-survey reporting accuracy is related to education (in adults), which may be a proxy for cognitive ability (e.g., (19, 20)), we showed that accuracy is related to cognitive ability within a level of education.

The studied respondent characteristics are correlates of dietary-reporting accuracy. The results concerning cognitive ability are of particular interest given that the 24-h recall is intended to be a dietary-data collection method that requires considerably less cognitive sophistication than, say, food frequency questionnaires, and that data from 24-h recalls are used as the reference in evaluating other dietary data-collection methods.

We have suspicions about why some of the studied respondent characteristics are correlated with dietary-reporting accuracy, but do not understand the mechanisms that underlie these relationships. If these relationships are found consistently, over multiple studies by multiple investigators, efforts to understand the mechanisms could contribute to improving methods to elicit dietary data; these might include arranging conditions to minimize the contribution of respondent characteristics. (That among the participant variables, only BMI percentile interacted with RI, and not as predicted, was surprising: We expected smaller relationships

of accuracy to respondent characteristics at a shorter than at a longer RI. This deserves further scrutiny.

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Table 1
Descriptive Statistics for Participant and Outcome Variables, and Pairwise Correlations Among and Between Them

Variable	n	Mean	SD	Bivariate Correlations									
				CA	SocDes	BMI	SES	Om	Int	CR	IR		
Cognitive Ability	425	12.59	80	1									
Social Desirability	425	8.3	3.5	-0.14^b	1								
BMI Percentile	425	71.9	28.0	-0.15^b	-0.01	1							
Socioeconomic Status	425	0.1	0.3	0.12^a	-0.11^a	0	1						
Omission Rate	403	44.6%	27.8%	-0.20^c	0.11^a	0.11 ^a	-0.11^a	1					
Intrusion Rate	403	25.9%	27.6%	-0.13^b	0.09	0.10 ^a	-0.13^b	0.65^c	1				
Correspondence Rate	403	49.4%	28.6%	0.16^b	-0.13^b	-0.15^b	0.13^b	-0.89^c	-0.60^c	1			
Inflation Ratio	403	22.4%	30.5%	-0.05	0	-0.03	-0.05	0.18^c	0.63^c	-0.16^b	1		

Notes: SD = standard deviation; CA = cognitive ability; SocDes = social desirability; BMI = body mass index percentile; SES = socioeconomic status; Om = omission rate; Int = intrusion rate; CR = correspondence rate; IR = inflation ratio.

For SES, lower SES was coded 0; higher SES was coded 1.

Cognitive ability and social desirability were centered for regression analyses; the means shown are of raw values of these variables. Inflation ratio was square-root transformed to calculate correlations and for regression analyses, but the mean and SD shown are for raw values of this variable.

For 22 participants who reported nothing that satisfied the criteria to be a report of a school meal, intrusion rate was undefined. Because these participants were not included in the regression analyses, their data are not included in the means for any of the outcome variables, nor in the correlations among respondent characteristics or between respondent characteristics and outcome variables.

^a .01 < *P* < .05;

^b .001 < *P* < .01;

^c *P* < .001.

Bold indicates *P* < .05.

Table 2

Test Statistics and P-values from Final Regression Models

Effect	Outcome Variable			
	Omission Rate	Intrusion Rate	Correspondence Rate	Inflation Ratio
n of Children	403	403	403	403
Cognitive Ability	$\chi^2(1) = 12.4$ <i>P</i> = .0012	$\chi^2(1) = 31.5$ <i>P</i> < .0004	$\chi^2(1) = 50.4$ <i>P</i> < .0004	$\chi^2(1) = 1.8$ <i>P</i> = .2195
Social Desirability	$\chi^2(1) = 3.1$ <i>P</i> = .1255	$\chi^2(1) = 0.9$ <i>P</i> = .3833	$\chi^2(1) = 16.9$ <i>P</i> < .0004	$\chi^2(1) = 0.2$ <i>P</i> = .6995
BMI Percentile	$\chi^2(1) = 2.4$ <i>P</i> = .1646	$\chi^2(1) = 2.6$ <i>P</i> = .1522	$\chi^2(1) = 13.3$ <i>P</i> = .0011	$\chi^2(1) = 0.7$ <i>P</i> = .4135
SES	$\chi^2(1) = 1.5$ <i>P</i> = .2578	$\chi^2(1) = 8.3$ <i>P</i> = .0098	$\chi^2(1) = 2.6$ <i>P</i> = .1522	$\chi^2(1) = 1.5$ <i>P</i> = .2578
Cognitive Ability × RI				
Social Desirability × RI				
BMI Percentile × RI		$\chi^2(1) = 4.0$ <i>P</i> = .0765		$\chi^2(1) = 22.0$ <i>P</i> < .0004
SES × RI	$\chi^2(1) = 4.6$ <i>P</i> = .0586			
Cognitive Ability × Sex	$\chi^2(1) = 26.7$ <i>P</i> < .0004		$\chi^2(1) = 11.9$ <i>P</i> = .0014	
BMI Percentile × Sex		$\chi^2(1) = 18.2$ <i>P</i> < .0004		
SES × Sex	$\chi^2(1) = 5.5$ <i>P</i> = .0398		$\chi^2(1) = 5.1$ <i>P</i> = .0460	$\chi^2(1) = 5.6$ <i>P</i> = .0398

Notes: Analyses included only those children who reported something that met criterion to be classified as a school meal and for whom all information about predictors was complete. Statistics for interactions are shown only if *P* < .10. Bold indicates *P* < .05.

BMI = body mass index percentile; SES = socioeconomic status; RI = retention interval