A Pilot Study of the Effects of Interview Content, Retention Interval, and Grade on Accuracy of Dietary Information From Children

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ABSTRACT

Objective: Investigate differences in dietary recall accuracy by interview content (diet only or diet and physical activity), retention interval (same day or previous day), and grade (third or fifth).

Methods: Thirty-two children observed eating school-provided meals and interviewed once each; interview content and retention interval randomly assigned. Multivariate analysis of variance on rates for omissions (foods observed but unreported) and intrusions (foods reported but unobserved); independent variables: interview content, retention interval, grade.

Results: Accuracy differed by retention interval ($P = .05$; better for same day [omission rate, intrusion rate: 28%, 20%] than previous day [54%, 45%]) but not interview content ($P > .48$; diet only: 41%, 33%; diet and physical activity: 41%, 33%) or grade ($P > .27$; third: 48%, 42%; fifth: 34%, 24%).

Conclusions and Implications: Although the small sample limits firm conclusions, results provide evidence-based direction to enhance accuracy: specifically, to shorten the retention interval. Larger validation studies need to investigate the combined effect of interview content, retention interval, and grade on accuracy.

Key Words: child, observation, diet, validation studies, dietary recall, physical activity recall (*J Nutr Educ Behav*. 2013;45:368-373.)

INTRODUCTION

Schools are common targets for interventions to improve children's dietary intake.[1-3] Because most parents lack firsthand knowledge of their children's intake at school, investigators rely on elementary school children in upper grade levels to provide dietary recalls.[4-6] Validation studies have identified errors in children's dietary recalls.[7-14] The few studies that examined elementary school children's age and dietary recall accuracy found it was better for children in upper than lower grades.[9,10,13] Validation studies pro-vide insight for improving fourth- and fifth-grade children's dietary recall accuracy: for example, minimizing the retention interval (elapsed time between to-be-reported meals and the report) improves accuracy.[8,11,14]

One approach to possibly improving accuracy is to combine recall of dietary intake with recall of physical activity.[5] Episodic memory and semantic memory have been differentiated[15]; episodic memories are context-bound (ie, particular events occurring in particular contexts), whereas semantic memory is situation-independent knowledge (eg, general information). Simultaneously recalling both dietary intake and physical activity might yield more accurate information than recalling dietary intake only by facilitating memory for specific/correct episodes of eating. Frank and colleagues[16] used activity prompts (eg, sports, party) with children's dietary recall to link the day's events with intake. Moore and colleagues[5] evaluated a computer program to assess children's simultaneous reports of dietary and physical activity behaviors. Children completed an interviewer-administered dietary recall immediately after a computer-administered diet and physical activity recall. Relative validity of dietary information (comparing each child's 2 recalls) showed good agreement for 18 of 21 food groups, although accuracy for food items and interviewer-administered dietary recalls was not assessed.[5] If combining recall of dietary intake with physical activity lengthens interviews but fails to improve dietary recall accuracy, or has deleterious effects on it, the practical value of having children provide integrated recalls of dietary intake and physical activity would be unclear.

This study investigated differences in dietary recall accuracy by interview content (diet-only or diet-and-physical-activity), retention interval (same-day recalls in the afternoon or previous-day recalls

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in the morning), and grade (third or fifth). It was hypothesized that accuracy would be better for diet-and-physical-activity than diet-only content, for same-day recalls in the afternoon than previous-day recalls in the morning, and for fifth- than third-grade children.

METHODS

The University of South Carolina Institutional Review Board approved the study. Written parental consent and child assent were obtained.

Participants and Design

Recruitment occurred in 7 third-grade and 6 fifth-grade classes during the 2009–2010 school year at 2 schools in 1 district in Columbia, SC. Of 230 children (51% boys; 85% black) invited to participate, 152 children (43% boys; 85% black) agreed. In spring 2010, 32 randomly selected children were each observed eating school-provided breakfast and lunch in the cafeteria on a school day. These 32 children were then interviewed about time at school (from arrival at school until school dismissal) that occurred on their observation day; assignment to interview content and retention interval was random with the following constraints: The final sample of 32 children had 16 third-grade children (half girls) and 16 fifth-grade children (half girls); interview content was diet-only for 8 children (half girls) per grade, and diet-and-physical-activity for 8 children (half girls) per grade; and retention interval was same-day recalls in the afternoon for 4 children (half girls) per content per grade, and previous-day recalls in the morning for 4 children (half girls) per content per grade. School staff and children did not know in advance when observations and/or interviews would occur, or the interview content and/or retention interval to which children were assigned. More children were recruited than were needed to ensure random selection, and so children could not determine who specifically was being observed and/or would be interviewed.

Meal Observations

Two researchers observed school-provided meals according to an established, written protocol.[8,11] Observers were trained with practice and assessment of pre–data collection interobserver reliability. During regular meal periods, each observer simultaneously watched 1–3 children seated according to their school's typical arrangement. Researchers used paper forms to record items and amounts eaten in servings of standardized school meal portions. During data collection, interobserver reliability was assessed weekly (on 4 days total) using established procedures[8,11] on 7 children (4 girls) for breakfast and 8 children (4 girls) for lunch. Mean agreement between observers to within one-quarter serving on amounts eaten was acceptable (breakfast = 95%; lunch = 93%), and kappa statistic between observers for absolute agreement was substantial (breakfast = .80; lunch = .68).[17]

> Validation studies provide evidence-based direction for enhancing children's dietary recall accuracy.

Interviews

Three researchers conducted individual, in-person interviews in private locations at children's schools after lunch on Mondays through Fridays (for same-day recalls in the afternoon), and after breakfast on Tuesdays through Fridays (for previous-day recalls in the morning). Although 2 researchers also conducted observations, a child's interviewer had not observed the child's meals. Interviewers were trained using modeling, practice, and assessment of pre–data collection quality control for interviews. Four written, multiple-pass interview protocols were created by crossing 2 interview contents (diet-only; diet-and-physical-activity) with 2 retention intervals (same-day recalls in the afternoon; previous-day recalls in the morning). Table 1 describes the interview protocols that were modeled on the Nutrition Data System for Research protocol (Nutrition Coordinating Center, Minneapolis, MN, 2007) and adapted for retention interval as in other studies.[8,11] Interviewers used paper forms to note information reported by children and document each interview's beginning and ending times. Interviews were audio recorded and transcribed. Each interviewed child was mailed a $10 check. Throughout data collection, quality control for interviews was assessed using established procedures;[8,11] each interview's audio recording and typed transcript were reviewed by 2 researchers: an interviewer other than the 1 who conducted the interview and a non-interviewing researcher. Each interview had satisfactory adherence to the specific protocol.

Analyses

Accuracy was assessed for only the school meal parts of recalls because only school meals were observed. As in earlier studies,[8,11] for reported items to be treated as reports about school meals, children had to identify *school* as the location where items were eaten, refer to breakfast as *school breakfast* or *breakfast*, refer to lunch as *school lunch* or *lunch*, and report mealtimes to within 1 hour of observed mealtimes.

Because people report intake as foods, accuracy was assessed for foods rather than nutrients. For each meal per child, there were 2 sets of food items; 1 set contained items observed eaten, and the other set contained items reported eaten. As in other studies,[8,11] a meal-component weight was assigned to each item observed eaten and/or reported eaten at a school meal (Table 2, footnote a). According to an established classification system,[7-9,11,18,19] items in both sets were *matches*, items only in the reported set were *intrusions*, and items only in the observed set were *omissions*. For each interviewed child's 2 school meals, weighted matches, omissions, and intrusions were summed, and *omission rate* and *intrusion rate* were calculated (Table 2, footnotes b and c). Smaller rates indicate better accuracy.

Amounts eaten were observed, reported, and scored in servings of standardized school meal portions (Table 2, footnote a). These procedures, which have been used in other school-based dietary reporting validation studies,[8,11] were applied