

Summary Report

Collecting Data from Children Ages 9-13

Prepared For

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COLLECTING DATA FROM CHILDREN AGES 9-13

INTRODUCTION

Researchers and practitioners use a range of approaches for collecting information from individuals (e.g., written surveys, in-person interviews, telephone interviews, computer-based surveys). The literature provides numerous studies to support the use of these approaches with adults but is much more limited in describing and testing the use of these methods with children. Recognizing the complexity of collecting information from children ages 9 to 13, the Lucile Packard Foundation for Children's Health commissioned ETR Associates to conduct an in-depth analysis of different research methods for soliciting information directly from children ages 9 to 13.

This report provides a practitioner-oriented summary of research on eight common methods used to collect data from children ages 9 to 13, including important considerations, advantages and drawbacks. The information stems from an array of disciplines, such as education, health promotion, sociology, psychology, and survey research methods. The report focuses only on studies that tested the use of the methods with children (e.g., compared methods, examined data quality), not on all studies in which these methods have been used.

METHODS

ETR conducted a literature search and analysis of the literature on the eight methods listed in Table 1. ETR also collected review articles that discussed general considerations for collecting information from children. The review was limited to relevant literature stemming from 1990 or later, with the exception of critical and relevant work dated prior to 1990. Given the scope of the project, the search was restricted to a standard set of databases including PsychInfo, PsychArticles, ELSEVIER, ERIC, Google, Google Scholar and Pubmed. Although the focus of this review was children ages 9-13, research in this particular age group was limited. Consequently, ETR sought all works related to children and adolescents, from 2 to 18 years old.

Table 1: Data Collection Methods Reviewed and Summarized	
Diaries	
Interviews	<ul style="list-style-type: none"> • In-person interviews • Focus group interviews • Telephone interviews (including computer assisted)
Observational Methods	
Surveys	<ul style="list-style-type: none"> • Computer-based surveys (includes Internet-based surveys) • Handhelds/PDAs • Written surveys
Other Methods	

ETR found articles using a combination of the following keywords: research methods and children, research methods and teens, research methods and preteens, electronic surveys and children, electronic surveys and teens, children as research respondents, diaries and teens, written surveys and children, surveys and children, surveys and teens, computer-based surveys, web-based surveys, web-based surveys and children, web-based surveys and teens, focus groups 9-13 year-olds, focus groups with children, research consistency and children, observational methods and preteens, observational methods, research and preteens, children and research method factors, children and research factors, computer-based surveys, researching children, research with children, research with 9-13 year-olds, survey methods 9-13 year-olds.

ETR identified over 80 articles, book chapters, and/or papers; these were assigned randomly to a team of five reviewers. Each person reviewed his/her assigned articles/chapters and filled out a standard review template. ETR used the review templates to summarize key information for this report and for the Data Collection Method Briefs in Appendix A.

RESULTS

GENERAL CONSIDERATIONS FOR COLLECTING DATA

WHAT SIMILARITIES AND DIFFERENCES ARE THERE AMONG CHILDREN AGES 9-13?

Children ages 9-13 are characterized in a variety of ways based on assumptions about their emotional, physical, social, and cognitive development and their health-related behaviors. For instance, according to the American Academy of Pediatrics, the 9-13 age range includes the end of “middle childhood” and the beginning of “adolescence.” The American Psychological Association posits that there is no standard definition of “adolescent” but that one of its dimensions, chronological age, can be viewed as being between 10-18 years. Marketing specialists have coined the term “tweens” to describe a potentially lucrative youth consumer group ages 8-12.

In California public schools, children ages 9-13 represent a range of grades, typically from fourth through eighth grades. These grades are commonly found in schools configured to accommodate upper elementary grade levels and/or middle school or junior high grades. Grade level and school configuration can influence student access time and the social milieu for data collection.

Of particular interest to those designing and conducting data collection activities with children ages 9-13 is their range of cognitive abilities and the potential impact of cognitive development on measurement. The work of Piaget and Vygotsky represents two distinct examples of theorists who had a significant impact on how children’s cognitive development is understood today (Thomas, 1999).

Piaget believed that human development arises from the interaction between heredity, physical experience, social transmission (education), and equilibrium in a sequential, genetically controlled progression regardless of culture. Vygotsky described human development as resulting primarily from an interaction between social activities and higher mental activities, emphasizing the effect of action on thought in a specific cultural and societal context.

Children ages 7-11. Piaget described children in this age range as being in the stage of concrete operations and, as such, able to perform logical mental operations on observable or imagined concrete objects and to recognize what aspects change when objects change from one form to another. Vygotsky, on the other hand, described the primary activity of this stage as learning and developing theoretical approaches to problem solving in a world of material things, with the beginnings of reflective thinking and mental schema development.

Children ages 11-15. Piaget described children in this age range as being in the stage of formal operations and, therefore, not limited by what is directly and presently observable. Within Piaget’s framework, youth in this stage can imagine how different variables affect a problem, including the variable of time (past, present, and future), and can hypothesize

what outcomes may occur under varying conditions. Vygotsky viewed the development of social communication skills necessary for problem solving as the primary activity of this stage; these skills include understanding other people's motives and consciously responding to recognized social norms.

Evidence supports the notion that children's cognitive abilities clearly do increase with age (Scott, 1997). It also is now generally acknowledged that, at any given age, children's abilities vary greatly. Scott's 1997 review of relevant research literature suggests that children ages 9 and over can participate in self-administered surveys and semi-structured or structured individual or group interviews. Children ages 8 and over can take on the view or perspective of others, learn classification and temporal relationships, and, in general, think logically and reason deductively, though their mental processes are still focused on the concrete operations of their immediate world until about age 11. Children under the age of 11 may have difficulty with indirect or "depersonalized" questions and may need visual as well as verbal stimuli to make a question topic concrete (Dashiff, 2001). Language and reading skills are still developing rapidly in children ages 8-11 and are strongly related to data quality (Borgers, de Leeuw, & Hox, 2000). Reading level tends to affect data quality even when questions are read aloud (Borgers, de Leeuw, & Hox, 2000), although reading questions aloud may reduce the impact.

Children ages 11 or older have memories like adults and understand the idea that people may view or interpret "facts" differently or have different beliefs. For children ages 11 or older, investigators can use standardized survey and interview questions with modifications for literacy, confidentiality, and context. However, once children become good survey respondents (i.e., can give information) they also become good at controlling what they reveal, particularly if they view the information to be private or sensitive (Scott, 1997). Like adults, children are more likely to disclose private or sensitive information if they have rapport with the data collector and they trust that their privacy is being respected.

When collecting data from children, then, survey researchers often use children's age and/or educational level as a proxy indicator of their level of cognitive sophistication (Borgers & Hox, 2002). Additionally, researchers consider the process that children may use to answer a survey question. Tourangeau and Rasinski (1988) present a general model that characterizes a standard question answering process that optimally involves four steps:

1. Understanding and interpreting the question being asked.
2. Retrieving the relevant information from memory.
3. Integrating this information into a summarized judgment.
4. Reporting this judgment by translating it to the format of the presented response scale.

When respondents do not complete all four steps of the question answering process, the quality of the answers may be diminished. There are several variables that may interfere with the completion of these processing steps. Krosnick (1991) described three overlapping factors that can influence the question answering process and its reliability:

1. The motivation of the respondent to perform the task.
2. The difficulty of the task.
3. The respondent's cognitive ability to perform the task.

For example, if a respondent is not highly motivated to complete the task, finds the task too difficult, or is overly challenged by the cognitive demands of the task, the respondent may skip the necessary steps for a high quality response. Specifically, the reliability¹ of the answers is likely to be lower when any of these conditions is present, and these conditions often occur together. As noted above, because children's cognitive skills are developing over time, there is considerable variation in cognitive ability across children. Children with different levels of cognitive skills are likely to use diverse strategies for question answering, which leads to variations in the reliability of their responses. In general, as children mature and become more educated, the reliability of their responses improves. The reliability of scales also tends to be higher among girls (Borgers & Hox, 2001).

Given the literature on cognitive development and the question answering process, current research on survey techniques with children suggests a number of strategies for improving data quality. These strategies are summarized as tips below.

TIPS FOR IMPROVING DATA QUALITY AMONG RESPONDENTS AGES 9-13

- Particularly for children younger than 11 years old, create or choose questions and responses that are simply stated, unambiguous and relevant to children's experiences. For example: "What do you like to eat with peanut butter?" (Mark all that apply.)
- Select questions that are positively worded and understood; inclusion of negatively worded items (e.g., "What is your least favorite vegetable?") affects the validity of children's responses, and double negative items (e.g., "I do not like broccoli..." strongly agree, agree, disagree, strongly disagree) require a higher level of verbal reasoning (Dashiff, 2001; Marsh, 1986). For children, negatively worded items tend to be interpreted differently than positively worded items covering the same content.
- Label all response options to increase validity² and reliability (Borgers, Hox, & Sikkell 2003), but avoid numbering response options when the numbers themselves are not part of the response. For example, it could be confusing to some children to list the response options for the peanut butter question above as:
 - 1. celery
 - 2. crackers
 - 3. sandwiches
 - 4. something else not listed

¹ Reliability in measurement is an indicator of consistency or stability in responses. There are different types of reliability evidence (e.g., internal consistency, test-retest, and inter-rater or inter-observer reliability). Measurement texts or websites provide more details on each type of reliability evidence.

² Validity in measurement is an indicator of the extent to which a tool measures what it claims to measure. There are different types of validity evidence (e.g., content validity, construct validity and criterion validity). Measurement texts or websites provide more details on each type of validity evidence.

- 5. I don't eat peanut butter

It would be clearer to list them without the numbers, as some children may think the numbers have true meaning (e.g., I like to eat peanut butter with 1 piece of celery or 2 crackers).

- Limit response options to no more than four or five to provide adequate choice without too much cognitive burden (Borgers & Hox, 2002). With telephone interviewing, it may be necessary to offer fewer response options.
- Consider the potential impact of culture and native language on the understanding of concepts, terms, and relationships described in the survey (Dashiff, 2001).
- Use anchor points or periods of time (e.g., a specific holiday, school terms, events in personal life) to assist recall (Borgers & Hox, 2002; Holaday & Turner-Henson, 1989).
- Offering a “neutral” or “no opinion” midpoint can be meaningful on a bi-polar response scale (e.g., an agree-disagree scale). However, the meanings of midpoint responses can be dual: (1) a true neutral or indifferent opinion or (2) an opinion has not been formed (e.g., ‘don’t know’, ‘undecided’, ‘never thought about it’). Use of a neutral midpoint may discourage serious consideration of the question and of existing attitudes (Borgers, Hox & Sikkel, 2004), particularly among younger respondents, those who find the task overly challenging, or those who are less interested in the task. Some researchers recommend use of an explicit “don’t know” option in addition to a neutral midpoint to facilitate identification of respondents who are undecided from those who are neutral (Raaijmakers, van Hoof, Hart, Verbogt & Vollebergh, 2000). Because children are more likely to be undecided on their attitudes towards unfamiliar question content, selection of a neutral midpoint response can be expected to lessen as children gain more experience with the content and develop attitudes about it.
- A child should be allowed to answer “don’t know” when necessary. There is much debate over when to offer an explicit “don’t know” response category, however. For interviews, “don’t know” options typically are not explicitly offered to a child respondent but can be coded by the data collector. For self-administered surveys, it is generally recommended that researchers avoid use of an explicit “don’t know” response option unless this is a meaningful answer, e.g., in a knowledge scale (de Leeuw, Hox & Huisman, 2003). Children may select “don’t know” simply to avoid thinking about a question.
- Consider randomizing item position in a questionnaire. Given that the last third of a questionnaire may have higher reliability but also more item non-response, randomizing item order may randomize these effects across questions (Borgers & Hox, 2002).
- Be alert to maintaining children’s attention and motivation to be truthful and to complete all tasks required of question answering (Holaday & Turner-Henson, 1989).

This may be particularly challenging in group administered surveys where there may be multiple distractions and social pressure to finish early (Scott, 1997). Some strategies for holding interest include audio and visual presentation of questions. For younger children, keeping tasks short, concrete, and attractive will help maintain their attention.

- Pretest the question and answer process with a small number of respondents using cognitive interviews or focus group interviews. Revise items as necessary to increase understanding.
- Conduct a small scale pilot test of the revised instrument with full procedures in the field as a final check before actual data collection.

METHOD-SPECIFIC CONSIDERATIONS

DIARIES

Overview. Researchers and practitioners use diaries to collect health information from children so they can better understand their daily lives. The research on using diaries with children suggests that children ages 7 years and older can effectively use this method to document their health-related experiences (e.g., hypoglycemia, headaches, and recreational injuries). This method generally involves having children report information on a set interval (e.g., daily) using a paper-pencil diary or another format (e.g., telephone or electronic diaries).

Advantages. Using diaries to collect information can yield better data because respondents record their answers closer in time to the event being measured (Minnis & Padian, 2001). Diaries are relatively easy for youth to use (Andrasik et al., 2005). In fact, children ages 7-11 years old were found to have a good ability to self-report headache intensity and frequency; they were also able to report on duration with assistance from an adult (Andrasik et al., 2005). Children 12 years and older had an excellent ability to self-report on all three factors including intensity, frequency and duration (Andrasik et al., 2005). Diaries also can yield richness that may not be captured in other forms of data collection. To illustrate, youth tend to include more details and additional information (e.g., facial expressions that correlated with absence or presence of pain) in their diaries, which adds to the depth of information obtained (Maikler, 2000). Because of this detail and the temporal proximity of data collection to the phenomenon being assessed, diaries are more reliable than reports that are retrospective in nature (Grimmer et al., 2000; Scott, 1997). In addition, diaries can be inexpensive to use; the primary costs with paper-pencil diaries include printing and mailing (Maikler, 2000); electronic diaries are more expensive.

Drawbacks. Children must be trained on how to use diaries (Andrasik et al., 2005; Maikler, 2000) to ensure successful completion. Researchers and practitioners using this method also must take into consideration children's age, literacy skills, cognitive ability, and interest/commitment (Maikler, 2000). As an example, children under age 12 are not

very good at estimating duration (Andrasik et al., 2005), and require the assistance of an adult. Children may find filling out multiple diary entries boring and tedious (Maikler, 2000), and may stop filling them out for this reason. Researchers and practitioners using this method may find it difficult to determine if the diaries are missing information or if the information included is true or not. It also can be difficult to tell if entries are being completed by children or their parents (Maikler, 2000).

Like other self-report methods, reporting bias is a concern. Additionally, because children enter data in diaries over a period of time, children may change their prior entries. To date, the research evidence on the reliability and validity of data from diaries is mixed (Maikler, 2000). Similarly, researchers suggest that rates of reporting via diaries versus interviews are inconsistent (Minnis & Padian, 2001). Some researchers note that the process of filling out a diary could lead to behavior change, which could be problematic if this approach were being used for program evaluation (Minnis & Padian, 2001). Lastly, data from diaries are typically open-ended or include a mix of open-ended and close-ended responses. Data analysis of the open-ended responses requires more time to develop coding schemes, code the responses, and summarize the data (Maikler, 2000) than does analysis of written surveys.

Other Considerations. Researchers are exploring other diary formats. Minnis & Padian (2001) found that automated telephone diaries may yield more accurate reporting of sensitive behaviors than traditional paper-based diaries in a population of girls ages 15-19. With this approach youth recorded their diary entries via telephone. The adolescent girls in this study preferred the telephone diary over a written one for measuring high risk sexual behaviors. They felt it was more convenient, and less difficult than mailing written diaries (Minnis & Padian, 2001). It also eliminated the chance that youth could go back and change prior entries.

In another study (Tasker et al., 2007), researchers compared the use of standard written diaries with mobile phone text messaging and computer-based interviewing to collect data on the prevalence of mild hypoglycemia in a small sample of children ages 7-18 with diabetes. They found that text messaging and computer-based interviewing were good alternatives to diaries. The children liked using the other approaches and they reported more frequent episodes of hypoglycemia than when using written diaries. Palermo and colleagues (2004) compared paper-pencil diaries with electronic diaries collected using handheld devices in a sample of children ages 8 to 16 with headaches or juvenile arthritis. They found that children rated both formats highly; however, children using the e-diaries completed the diaries on more days and did so with fewer errors and omissions. The researchers also found that boys were more compliant using the e-version of the diary than the paper-based version.

INTERVIEWS

In-Person Individual Interviews

Overview. Researchers and practitioners use interviews to conduct clinical assessments and/or collect information (e.g., for surveillance or evaluation). The research on using this data collection method with children suggests that children 6 years of age and older have the cognitive and language abilities to be interviewed, but children under 11 years

of age may need visual as well as verbal stimuli to make issues concrete during the interview process (Deatrick & Ledlie, 2000). For children ages 11 and over, investigators can use standard interview questions (e.g., like those used for adults), but the questions should be modified to reflect children's literacy levels, address issues of confidentiality of reporting certain behaviors, and ensure they are relevant to children's main social context, such as home or school (Scott, 1997). Most individual interviews are conducted by having an interviewer record participants' answers on paper. Some researchers use computer-assisted personal interviewing (CAPI); this involves having the interviewer record answers on a computer.

Advantages. Research suggests that children ages 6 and older respond well to the opportunity to be interviewed (Claveirole, 2004) and can provide accurate, detailed and useful information (Bruck et al., 1998). This method has a number of advantages with regard to data quality compared with self-administered methods. For example, in-person interviews provide an opportunity to obtain more in-depth data than surveys because they allow interviewers and participants to ask clarifying questions. Further, this type of data collection method is ideal for children with lower literacy skills, which can enhance the generalizability of study data. Also, investigators can typically ask more questions in an in-person interview compared with a survey.

Individual interviews also have a number of advantages compared to other forms of interviews. They are preferred over group interviews for complex topics (Heary & Hennessy, 2002). They are also more private than group interviews (Coyne, 1998) and eliminate the possibility of peer group influence (Heary & Hennessy, 2002). Additionally, interviewers can cover more ideas and a greater range of themes in individual interviews than in group interviews (Heary & Hennessy, 2006; Heary & Hennessy, 2002). Similarly, in-person interviews allow for more control over the physical and social environment of the interview when compared with telephone interviews.

Drawbacks. Interviews with children can be more challenging to conduct than interviews with adults. Other drawbacks include data quality, data analysis, and cost.

- *Administration:* Conducting interviews with children requires careful planning and trained interviewers. Children may find it difficult or uncomfortable to be interviewed by an unknown adult (Coyne, 1998), thus, researchers and practitioners using this method need time to develop rapport between children and interviewers. Young children (e.g., those under age 10) typically have shorter attention spans and may get distracted more easily than older children (Deatrick & Ledlie, 2000). Consequently, children may need breaks (e.g., by drawing a picture or completing a puzzle); this is particularly important for longer interviews or those that might be emotionally or cognitively challenging (Coyne, 1998).
- *Data quality:* Interviewers' skills and experience affect data quality. Children's language comprehension, developmental stage, and affective relationship with the adult interviewer also can affect data quality (Claveirole, 2004; Docherty & Sandelowski, 1999; Parker, 1984; Scott, 1997). To help ensure data quality, researchers must account for the developmental stage of a child when developing interview protocols and training interviewers. For example, young

children have a tendency towards compliance and are prone to suggestibility (Krähenbühl, & Blades, 2006). Interviewers may influence children's responses if they use closed-ended questions instead of open-ended ones, use leading statements, or repeat questions multiple times, which may make children feel pressured to respond in a certain way (Bruck, Ceci, & Hembrooke, 1998; Krähenbühl, & Blades, 2006). Additionally, children ages 6-14 may control what they reveal to adults (Parker, 1984; Scott, 1997), requiring skillful questioning and probes to fully capture children's viewpoints.

Parents' presence during an interview also can affect data quality. Children may be reluctant to share certain information (e.g., sensitive information) in front of their parents or siblings if they feel it may displease them by doing so. The reactive effect of an interviewer or the presence of someone else can be mitigated by using audio-enhanced computer-assisted self interviewing (A-CASI) techniques for sensitive portions of an interview.

- *Data analysis:* Interview approaches may include a mix of closed- and open-ended questions. Data analysis of open-ended interview data requires more time for developing detailed coding schemes, coding transcripts, and summarizing the resulting data than for most written and survey data collection modes.
- *Cost:* Interviews are traditionally one of the most expensive data collection methods, particularly in-home interviewing. In general, school-based interviewing is more cost effective than in-home interviewing (Scott, 1997).

Focus Group Interviews

Overview. Researchers and practitioners use focus group interviews to develop and/or test programs, services, models, or evaluation tools; to explore children's views on a variety of issues; and for some types of program evaluation. The research on using this data collection method with children suggests that it can be used effectively with children 6 years of age and older. Focus group interviews are not appropriate for hypothesis testing or drawing inferences about larger populations (Heary, & Hennessy, 2002; Hennessy & Heary, 2004; Peterson-Sweeney, 2005); however, focus groups are often used in combination with other modes of data collection (e.g., surveys) to provide more in-depth information and/or explore findings.

Advantages. Research on this mode of data collection suggests that children find participation in focus groups to be fun (Hill, 2006). They also feel more supported, safer, and less intimidated when participating in group interviews as compared to individual interviews (Heary & Hennessy, 2002; Hennessy & Heary, 2004; Lewis, 1992). Similarly, this mode of data collection can eliminate the power imbalance between a child and adult researcher that may be present in individual interviews (Heary & Hennessy, 2006; Peterson-Sweeney, 2005).

Focus groups provide an easy way to learn about the ideas and opinions of homogeneous groups, and allow for the observation of group interactions (Lewis, 1992; Peterson-Sweeney, 2005). They also may yield a greater range of responses and more

elaboration of ideas than individual interviews because participants can develop, challenge and suggest new ideas and react to differing viewpoints (Heary & Hennessy, 2006; Lewis, 1992; Peterson-Sweeney, 2005). Although focus groups can be more costly than some modes of data collection (e.g., paper-pencil surveys), they are typically less costly than individual interviews (Hennessy & Heary, 2004).

Drawbacks. Focus groups require careful planning and attention to a number of logistics that are not as central to the success of other methods. For example, issues such as recruitment and finding a time and location convenient to all participants can be challenging (Heary & Hennessy, 2002; Peterson-Sweeney, 2005). Because the goal of focus groups is to generate conversation among participants, the success of this method is dependent, in part, on the communication skills of the participants (Lewis, 1992). Some children (e.g., those who are shy or who do not like speaking in front of groups) may be uncomfortable taking part in focus groups (Hill, 2006), but there are facilitation techniques to encourage participation of quiet or shy individuals.

Focus groups are more prone to the influence of the individuals in a group and the resulting group dynamics (Heary & Hennessy, 2002) than are individual interviews. As an example, if one member of the group is dominant, this can affect the participation of other members if not addressed successfully by the facilitator.

Given the group format, this approach is not appropriate for exploring extremely sensitive issues. Indeed, it is more difficult to maintain confidentiality using focus group interviews compared to individual interviews (Lewis, 1992), and this may affect individuals' willingness to share information about highly sensitive topics. The level of sensitivity of a topic clearly would vary by population. For example, young children (e.g., those in 6th grade) may be very shy about discussing sexual risk taking behavior and the pressures and influences youth experience around that behavior, whereas youth in high school may feel much more comfortable discussing such a topic. Perhaps not surprising, focus groups may mask individual differences (Heary & Hennessy, 2006), as some individuals may not share their views even if they differ from those of others in the group.

Finally, analyzing focus group data is more time consuming than is analyzing survey data. Because focus group data are qualitative in nature, the data analysis process requires detailed coding (e.g., for each statement in focus group transcript) before the data can be summarized (Peterson-Sweeney, 2005).

Telephone Interviews

Overview. Researchers and practitioners use telephone interviews to collect information on a range of topics for surveillance, research or evaluation. The research on using this data collection method with children suggests that it can be used successfully with children ages 11 and older. Traditional telephone interviews involve having interviewers ask the survey questions by phone; the interviewers then record them on paper or on a computer (referred to as CATI--Computer-Assisted Telephone Interviewing). Telephone Audio Computer-Assisted Self Interviewing, or T-ACASI, is a more recent advance in survey technology. With this mode, an interviewer is used to

screen and recruit participants. After a few background and practice questions, the phone call is transferred over to a T-ACASI system in which pre-recorded questions are read to participants who give their answers by pressing keys on a touch tone phone.

Advantages. Research on the use of telephone interviews suggests this mode has a number of advantages over in-person interviews. To illustrate, in-person household surveys require more time and are more costly than are telephone interviews (Currivan, Nyman, Turner, & Biener, 2004). Phone interviews also have advantages over written surveys. When collecting data from school-aged populations, for example, telephone interview approaches allow for the inclusion of students who are frequently absent from school or who have dropped out of school (Currivan, Nyman, Turner, & Biener, 2004); this potential for reaching a broader population of youth can enhance the generalizability of the data. This mode of data collection also can easily accommodate children with a range of literacy skills.

Telephone surveying is perceived to be more private than in-home surveys, making it easier for youth to provide truthful answers (Currivan, Nyman, Turner, & Biener, 2004); nonetheless, some studies imply that a sizeable proportion of youth express concerns about privacy when completing phone interviews (Moskowitz, 2004).

Offering telephone surveys to individuals who do not respond to mail surveys may yield modest improvements in survey response rates among adolescents and their parents (Gallagher, Fowler, & Elliott, 2001). In this study, parents indicated a preference for completing a survey by telephone rather than by mail.

In examining different approaches to telephone interviewing, some studies suggest that T-ACASI yields higher reporting of risk behavior compared to interviewer-administered modes (Currivan, Nyman, Turner, & Biener, 2004; Moskowitz, 2004) because it does not require children to report negative behaviors to an adult whom they expect would disapprove.

Drawbacks. The drawbacks of using telephone interviews center on response rates, privacy, data quality (e.g., validity), and sample representativeness.

- *Response rates:* Response rates may be lower with telephone interviewing compared with other modes due to factors such as the wide use of answering machines, caller ID screening, assumptions that calls are associated with telemarketing, and inaccurate contact information (Moskowitz, 2004), although weighting the data can address some of the sample limitations.
A related drawback is the number of calls needed to secure participation. Several studies report using a large number of call attempts (up to 14) to complete an interview (Moskowitz, 2004). Finally, the results of one study (Gallagher, Fowler, & Elliott, 2001) suggest that response rates may vary by race/ethnicity. Indeed, Gallagher and colleagues (2001) found that Hispanic families were less likely to respond to a telephone interview than to a mailed survey.
- *Privacy:* Many youth completing telephone interviews report that they were concerned that parents or others may hear their responses even when completing T-ASCASI versions of a survey in which they entered their responses using a

touch tone phone (Currivan, Nyman, Turner, & Biener, 2004; Moskowitz, 2004). Both issues affect data quality, as noted below. Of note, Currivan et al., 2004 found that the impact of perceived privacy on reports of risk behaviors (i.e., smoking behavior) was greater for girls than boys.

- *Data quality*: Traditional telephone interviews (i.e., interviews in which a person asks questions over the phone) require youth to report their behaviors directly to an interviewer. Youth may intentionally misrepresent themselves because they are uncomfortable reporting an attitude or behavior that differs from what is accepted by society. Indeed, traditional telephone interviews have been generally regarded as inferior for collecting data on substance abuse because of low reporting in comparison to written surveys (Currivan, Nyman, Turner, & Biener, 2004). It is suspected that the tendency to report fewer socially undesirable behaviors is also affected by the presence of parents or the perceptions that parents can hear the interview and children's responses (Moskowitz, 2004).

Telephone Audio Computer Assisted Self Interviewing (T-ACASI) is often used to increase the sense of privacy, thereby enhancing the data quality. While T-ACASI does increase privacy (youth simply enter numeric responses via telephone) it is more prone to missing data than traditional or computer-assisted telephone interviewing because participants can simply hang up the phone to terminate the interview rather than having to tell an interviewer that they want to stop their participation (Moskowitz, 2004).

- *Sample representativeness*: Telephone interview samples exclude homes without telephone service, which could bias results (Moskowitz, 2004). Currently, they also exclude homes that rely exclusively on cell phones and no longer have landlines. According to a recent report by The Pew Research Center (2006), an estimated 7% to 9% of the general population report using cell phones exclusively. The study found that cell-only Americans are indeed different in a number of ways than individuals who still have landlines (e.g., they are more likely to be in the 18-29 year old age category, less likely to own a home, and are less affluent). Nonetheless, the Pew report indicates that excluding this group of individuals made little difference in the results of a study on political attitudes and political-party affiliations.

Cell phones are clearly becoming more commonplace, and should be considered by those planning to use telephone interviews for data collection. The Pew Research Center study (2006) examined the feasibility of conducting a telephone survey using a cell phone sampling frame. The study found that it was easier to reach people by cell phone, but much more difficult to get them to cooperate and take part in the survey. This led to a lower response rate in the cell-only survey compared to a landline survey (20% vs. 30%). Once respondents agreed to take part, interviewers found that cell phone respondents were as engaged as the landline respondents during the interview.

This study also found that surveying on cell phones was more expensive than surveying on landlines. As an example, when surveying by cell phone investigators must dial numbers manually rather than use automated dialing devices (as per federal law), which adds labor costs. The researchers also had to offer an incentive to cell-phone respondents (\$10.00) to off-set the fact that some cell customers pay for incoming calls.

The Pew study included adults 18 years and older. Less is known about cell use in teens. In a 2005 survey of 550 teens, CARAVAN Opinion Research Corporation, a consumer research firm, found that approximately 45% of children ages 12-17 years old had cell phones. Older teens (15-17 year olds) were more likely to have cell phones than were younger teens ages 12-14 (56% vs. 34%, respectively). Of those children with phones, most reported using their phones to send or receive text messages (85%) or to take pictures (44%). About one in five students (20%) said they used their phones to read and/or send e-mails.

OBSERVATIONAL METHODS

Overview. Researchers and practitioners use observations to collect information on children's health behaviors or temperament, for behavioral monitoring or assessment, and to measure program effects (Karp, Serbin, Stack, & Schwartzman, 2004; Mauthner, 1997; McConaughy, 2005). The research on using this data collection method with children suggests that it can be used successfully with children as young as 2 years of age. Investigators using observations conduct them in a laboratory or clinical setting or in a naturalistic setting (e.g., at home or in school). Some researchers or practitioners who are involved with health-related programs may use observations to assess program fidelity. In these cases the observers typically focus on the individual implementing the program, not the children receiving it.

Advantages. Because this approach does not require children to have language or cognitive skills, observational methods are appropriate for young children (Mauthner, 1997), are typically easy for the children involved, and can yield valuable information about children's behavior. Relatively few studies have compared observational methods with other data collection methods. In one study that involved observations of children's eating behaviors in three different settings, Mauthner (1997) found that children were more relaxed and insightful during the observation than when they were being interviewed. One of the unique advantages of this mode of data collection is that it allows researchers to compare children's behavior to other children in similar and different settings (McConaughy, 2005).

In recent years some researchers have focused their efforts on developing low cost, objective, and easy-to-administer tools for observing behavioral style, such as the Behavioral Style Observation System, or BSOS (Karp et al., 2004). This and similar standardized tools can greatly increase the reliability and validity of observational data (McConaughy, 2005). Further, some researchers are using handheld devices to simplify the collection of observational data (e.g., Sarkar et al., 2006). These devices share many of the advantages discussed for computer-based surveying (e.g., they reduce data entry time, reduce data entry errors, and enhance the number of interactions that can be

observed); however, they share drawbacks, too (e.g., programming costs, practice and training to use them consistently).

Drawbacks. Direct observations with children are labor intensive and are more costly than other data collection methods (Karp et al., 2004). This method requires intensive training, which adds to the labor costs (McConaughy, 2005). Further, there is considerable variation in children's behavior by situation, making it difficult to generalize across situations (McConaughy, 2005). The settings in which the observations take place also may influence data interpretations. Laboratory settings are more controlled, but the findings cannot always be generalized to settings outside the laboratory. Observations in naturalistic settings are less controlled, but may be more subject to observer bias, that is, perceptions of the observer in a particular situation (Karp, et al., 2004). Some researchers and practitioners use videotaping during observations; this is useful for later data analysis, but it can create an artificial situation and affect the behavior being observed (Karp et al., 2004). Some researchers suggest using a multi-method approach (McConaughy, 2005) to collect information reflecting differing perspectives (e.g., observation combined with a parent or teacher rating or questionnaire). This provides richer data, but adds to the cost and complexity of a study.

SURVEYS

Computer-Based Surveys

Overview. Researchers and practitioners use computer-based surveys to collect health information and/or to measure program effects. Computer-based surveys have been used successfully with children ages 8 and older. These surveys may include an audio component (called A-CASI: Audio-Computer Assisted Self-Administered Interviewing) or feature multimedia that may include audio and video (called M-CASI: Multimedia Computer Assisted Self-Administered Interview). Some computer-based surveys involve having individuals use laptop or desktop computers, with or without audio (e.g., Brener et al., 2004). In other cases surveys may be administered using handheld or personal digital assistants (PDAs) (e.g., Trapl et al., 2005). Finally, some computer-based surveys are collected via the Internet (e.g., Rew et al., 2004). As noted previously, computers are also used as a way to record information with other data collection approaches (e.g., diaries, interviews, and observations).

Advantages. Research on the use of this method suggests that computerized approaches provide a number of benefits for collecting data, most of which fall within three broad categories: facilitating survey completion; improving data quality; and facilitating data entry and analysis.

Benefits related to survey completion. In general, children perceive computer-based surveys as fun and interactive (e.g., Bobula et al., 2004). A number of studies have looked at survey mode preference and found that a majority of children preferred computer-based surveys over written surveys (e.g., Brener et al., 2006; Paperny et al., 1990; Vereecken & Maes, 2006). These preferences can affect youth's level of engagement in survey completion, which could, in turn, enhance data quality (Vereecken & Maes, 2006). This mode lends itself to the use of graphics, messages, and color—strategies that can help keep children motivated and interested in a

survey task (Black & Ponirakis, 2000; Rew, Horner, Riesch, & Cauvin, 2004; Watson et al., 2001). Of importance, the addition of audio facilitates survey completion and is ideal to accommodate a range of literacy skills (Rew, Horner, Riesch, & Cauvin, 2004; Trapl et al., 2005), although it is not likely to equalize data quality among students with varying literacy levels (Borgers, de Leeuw, Hox, 2000; Trapl et al., 2005).

Computer-based surveys also enable students to complete more questions in a given timeframe, or complete a set number of questions more quickly (e.g., Trapl et al., 2005). This is an important benefit given the value of time at the individual, family and institutional levels. For example, in school settings there is increasing pressure to maximize instructional minutes in the classroom. Surveying is often perceived as a non-academic activity, and gaining approval for use of class time can be a challenge (e.g., L'Engle, Pardun, & Brown, 2004). Methods that reduce survey time and/or that introduce more flexibility about when data can be collected (e.g., in homeroom classes rather than academic classes) are of extreme value in some settings.

Benefits related to data quality. Computer-based surveys provide a number of benefits related to data quality including perceived privacy, reliability and validity of responses, and data completeness.

- **Privacy:** This mode tends to create a greater sense of privacy (e.g., answers are not visible on a sheet of paper), which contributes to children's sense of safety in answering questions truthfully (e.g., Rew et al., 2004; Watson et al., 2001); however, in group administrations, the proximity of the computers and screen size can affect children's sense of privacy. One study found that perceptions of privacy were maintained if computers were spaced five feet apart. When computers were closer together, students were concerned that others around them could view their responses (Beebe et al., 1998). Similarly, large screens or surveys that show multiple items per screen may be viewed as less private (Trapl et al., 2005). Handheld devices such as PDAs maximize the potential for privacy in a group administration. The screens are smaller, making it more difficult to read from afar. Additionally, surveys for the handheld devices are typically structured to show only one question at a time (Trapl et al., 2005). This small size helps with privacy, but, as noted below, it also has a few drawbacks.
- **Reliability:** The reliability and validity of survey responses are important indicators of data quality. Researchers have examined and compared these properties between computer-based surveys and paper-pencil or interview versions. Hagler and colleagues (2005) found that reliability estimates (internal consistency³ and test-retest⁴) for attitude and belief scales for fruit, vegetable, and dietary fat intake were comparable across computer-based and paper-pencil survey methods, although the estimates were slightly higher for the computer-

³ Consistency of responses within a set of items in a scale.

⁴ Consistency in responses from one time to another (assuming no major change in the constructs being measured between the two occasions).

based administrations. Wu and Newfield (2007) found similar results in their examination of the internal consistency estimates for five different scales (e.g., suicide probability, parent-youth communication). They reported reliability estimates (specifically Cronbach alpha estimates) ranging from .68 to .90 for the written version of their survey and .72 to .92 for the computer-based version. In testing scales related to physical activity and sedentary behaviors, Norman, Sallis and Gaskins (2005) found higher average internal consistency estimates for computer-based surveys over written surveys (Mean alpha=.82 vs. Mean alpha=.71). Test-retest indicators were not significantly different.

- **Validity:** Numerous studies have examined the effect of survey mode (computer vs. paper-pencil) on the accuracy of children's reporting of health behaviors and related factors. Studies show mixed results regarding effects of computer-based surveys on rates of reporting. Some studies show that youth report similar levels of behaviors on computer-based and written surveys for most behaviors (Mangunkusumo et al., 2005; Vereecken & Maes, 2006), whereas other studies show greater levels of behavioral reporting for computer-based methods (Borgers, Hox, & Sikkel, 2004; Turner et al., 1998). Overall, this mode is most likely to affect whether youth report the most sensitive, illegal, or socially stigmatized behaviors and behavioral ideations (e.g., illicit substance use, sexual behaviors, and suicide ideation). The studies show that there tends to be more equal reporting of less sensitive behaviors, such as nutrition and physical inactivity (Vereecken & Maes, 2006). Based on the general principal that self-reports of stigmatized or illegal behaviors are underreported, most researchers support the assumption that higher rates of reporting are more valid or accurate (Moskowitz, 2004). Willingness to report sensitive behaviors (e.g., use of alcohol and other substances, bullying) has differed by mode of data collection and gender but not by race among youth (Turner et al., 1998; Vereekcken & Maes, 2006; Webb et al., 1999).
- **Data completeness:** Several studies demonstrate the benefits of computer-based surveys for reducing missing data. In one study (Brener et al., 2004), computer-based surveys had an average of .6 percent of the items missing compared with an average of 1.6 to 2.1 percent with written surveys. Others have reported similar findings (Turner et al., 1998). Computer-based surveying can reduce skip pattern errors, as well. They also can reduce non-response by including reminders or survey completion cues if respondents leave an item blank. Missing data can have a significant effect on data quality.

Benefits related to data management and analysis. Numerous studies address the fact that computer-based surveying saves resources (e.g., survey administration time, data collection labor, paper, data entry costs, data cleaning time); it also facilitates data analysis by reducing the potential for data entry errors and reducing the time between data collection and analysis. Some of these benefits (e.g., reducing data entry errors) can help enhance data quality. Others (e.g., data entry and cleaning costs) affect the overall costs of a study. As noted below, one of the limitations of this mode of data collection is the initial start-up costs for equipment,

software, and survey development. These costs are off-set somewhat by savings in other areas such as data entry and cleaning.

Drawbacks. There are a number of drawbacks to using computer-based surveys as compared to paper-pencil surveys, most of which are associated with logistics and cost (Wu & Newfield, 2007). To illustrate, collecting data from a group of students in a school setting would require either arranging for the use of a computer lab (which vary in capacity across schools) or bringing a classroom set of computers to the school (e.g., using a portable cart built specifically to carry the laptops). Similarly, collecting data using an Internet-based survey would require a high-speed connection to the Internet. Relying on school equipment is difficult given the varying capacities in computing technology. Bringing computers to the school addresses the equipment issue, but introduces other potential challenges (e.g., the need for sufficient flat surface space or sufficient electrical outlets if laptop batteries are not available for the entire survey timeframe). Issues of appropriate surface area and electrical outlets could be problematic in home settings as well, although it may be easier to address such challenges in home settings. This was more of an issue years ago, but still can be an issue in some areas (Mangunkusumo et al., 2005).

Interest in and use of smaller handheld data collection devices (e.g., PDAs and cell phones) is growing given their flexibility and portability (Trapl et al., 2005); nonetheless, handhelds currently may not offer as much variety in the way of colorful graphics and other visuals compared with laptop, desktop or Internet-based surveys. Some students also prefer multiple items per screen, which is characteristic of laptops or desktops (Mangunkusumo et al., 2005).

Computer-based surveys also presents the potential for technical problems (e.g., slow Internet connections, network problems, software bugs, failing to log out properly) or theft compared to paper-pencil surveys, a potential limitation for any electronic device (e.g., Black & Ponirakis, 2000; Mangunkusumo et al., 2005; Rew et al., 2004). Additionally, computer-based surveying requires an initial investment in equipment, software, and survey development time (e.g., to learn new software or record audio). It also can require more resources for translations if the survey includes an audio component (Rew et al., 2004).

When comparing computer-based methods to paper-pencil methods from a data quality perspective, some investigators question the need for computer-based approaches (e.g., Brenner et al., 2006), but others feel the multitude of benefits outweigh the initial investment, particularly if this approach is to be used to collect longitudinal data or it can be used in multiple projects (Zwarenstein et al., 2006).

Written Surveys

Overview. Researchers and practitioners use written surveys (also referred to as paper-pencil surveys) to collect health information, conduct individual assessments and/or to measure program effects. Written surveys also are commonly used for program evaluation. They have been used with children as young as 5 years of age, but researchers agree that most children under 8 years of age face challenges in understanding abstract

terms and tend to use the most extreme response options when filling out surveys (Rebok et al., 2001).

Advantages. Written surveys have a number of advantages over other methods. For example, most children ages 9 and older understand, know terms, and can answer questions on a written survey (Riley et al., 2001). In one study, children as young as 8 years old were able to report on their health (Rebok et al., 2001). Further, this method is relatively easy to use and does not require special equipment. As noted earlier, written surveys do require special attention to the wording of survey questions, and issues such as response options and question ordering (Borgers, de Leeuw, & Hox, 2000). Another advantage of this method is that it avoids potential interviewer influence and social desirability effects that might be present in individual interviews (Vollebergh et al., 2006). It is also very familiar to students. Finally, this is one of the least expensive modes to develop and use, although the costs are clearly dependent on the sample size. In large studies with repeated measurements, using computer-based methods over paper-pencil surveys may be more cost effective due to the savings in data entry and data cleaning resources.

Drawbacks. Written surveys have drawbacks that can affect students' motivation to complete them. They often appear long and seem more like school-work than would an interview or survey taken with another method (e.g., laptop or PDA). Researchers often include characters or pictures in written surveys to break up the pages and provide more visual appeal; several studies show that this increases motivation and interest (Borgers, Leeuw, & Hox, 2000; Holladay & Turner-Henson, 1989). As an example, Rebok and colleagues (2001) used visual analogue scales (VAS)⁵ to facilitate survey completion in younger populations. In that study, children related well to the cartoon characters used as anchors on either end of the scales. The children also preferred the use of graduated circles between the scale anchors instead of lines as response options.

Written surveys, like other self-administered methods, are subject to language mastery and the influence of cognitive and social development (Borgers, de Leeuw, & Hox, 2000; Rebok et al., 2001). Indeed, data quality is dependent on children's age--the older they are the better they are at understanding language and maintaining interest (Borgers & Hox, 2001; Borgers, Leeuw, & Hox, 2000).

Further, paper-pencil surveys do not allow for clarifying responses. For example, a response such as "I don't know" could mean children are not interested in taking the time to answer the question, they do not have an opinion, or that they do not understand the question (Holladay & Turner-Henson, 1989; Vollebergh et al., 2006). Some researchers feel face-to-face interviews may be better for school-age children because they provide the opportunity to observe body language, establish rapport with children, identify and clarify misunderstandings, and provide encouragement to children (Holladay & Turner-Henson, 1989). Researchers using written surveys also have no control over how respondents progress through the survey (e.g., they may skip around when answering questions or easily skip entire sections). This is more easily controlled with other data

⁵ VAS: A tool used to help a person rate the intensity of certain sensations and feelings, such as pain. In the example of pain intensity, the visual analog scale is a straight line with one end meaning no pain and the other end meaning the worst pain imaginable. A patient marks a point on the line that matches the amount of pain he or she feels. (National Cancer Institute: www.cancer.gov).

collection methods (e.g., interviews or computer-based surveys that prompt respondents if they skip a question).

OTHER METHODS

There is a growing body of research examining creative ways to obtain qualitative data with children and adolescents. Storygames, for example, is an exercise where each child adds a line to a created story; this approach was used to study the impact of social violence with 7-17-year-olds from a rural community in Rwanda (Veale, 2004). The stories reflect children's everyday lives and provide information about shared culture and beliefs, but they can be difficult to analyze and interpret. Similarly, drama is used in psychological research, health promotion, and in understanding the impact of violence in communities (Veale, 2004). Using drama is time-consuming and difficult to analyze, but it provides a way to obtain information on shared symbolic and cultural systems (Veale, 2004). Children's acceptance of these methods varied by age. Veale (2004) found that younger children preferred storytelling, while drama worked well with older children.

Yuen (2004) recently tried using drawing as a way to expand focus group interviews. Drawing gives children a voice, decreases language barriers and can provide valuable insights into their experiences (Veale, 2004; Yuen, 2004). On the other hand, drawing can be uncomfortable for children who dislike drawing or who feel their drawing skills are limited. It also can be time-consuming and a problem for researchers to interpret (Yuen, 2004). To prevent misinterpretation, researchers using this method suggest it works best in combination with other methods rather than as a sole mechanism for collecting data from children (Yuen, 2004).

As noted earlier, researchers are beginning to explore and test ways of using emerging technologies to collect data from children (e.g., text messaging, cell phones, and the Internet) in place of more traditional approaches such as in-person interviews or written surveys. Some researchers are also conducting analyses of children's interactions on the Internet (e.g., chat room communication, bulletin boards, blogs). Such studies provide insights on how children interact with their peers and provide a glimpse of peer culture that was not easily obtained in the past (Greenfield & Yan, 2006).

SUMMARY

The research on collecting data from children suggests that, in general, children ages 9 years and older are capable of contributing valid information about their own feelings, experiences, behaviors and physical symptoms through many of the traditional data collection methods, such as diaries, in-person interviews, written surveys, and computer-based surveys (Rebok et al., 2001). Observational methods also can be used with this age group. Children in the upper end of the 9-13 age range (i.e., 11-13) tend to have stronger language skills and higher levels of cognitive functioning, both of which contribute to better quality data. Nonetheless, researchers commonly collect and report on health-related data from younger children.

Individuals who collect data from children face many unique challenges in doing so. There are a number of important factors to consider when deciding on what method to use for gathering information from children ages 9-13 years:

- *Think about the purpose of data collection as well as the time and resources available.* Each method has advantages and drawbacks that can inform final decisions about which approach to use. As an example, programs wishing to collect data about what children think of a particular program or issue might consider using focus groups or a brief written survey, whereas programs that want to assess the impact of their program on children's behaviors might consider a written or computer-based survey.
- *Consider the content or topic of focus.* The literature on collecting data from children suggests that there are differences in reporting for some modes of data collection (e.g., computer-based methods vs. paper-pencil or interviews, or telephone audio computer assisted self interviewing vs. traditional telephone interviewing). This is particularly true for the most sensitive or socially stigmatized behaviors or emotions (e.g., suicide ideation, sexual behaviors), or behaviors that are subject to serious legal sanctions (e.g., illicit substance use). Some researchers have noted mode differences in reporting of affective feelings (e.g., feeling left out at school). The literature suggests that children's reporting of less sensitive behaviors such as nutrition and physical activity is more equal across methods (Vereecken & Maes, 2006).
- *Think about children's cognitive and social development when creating data collection tools* (Borgers, de Leeuw, and Hox, 2000). To improve data quality, survey or interview questions should be direct, clear, simple, and worded positively (Dashiff, 2001; Marsh, 1986). Response options should be labeled and limited to no more than four or five choices (Borgers & Hox, 2002). Surveys or diaries should be visually appealing and engaging to help keep children motivated and interested in the task. If youth lose motivation or concentration then data quality is likely to suffer.
- *Determine if children or other informants would be the best source of data.* Researchers now believe that children may be the best informants of their feelings and subjective experiences (Maikler, 2000; Scott, 1997). For phenomena that are observable to others, such as social behaviors, other individuals may be more objective reporters of relevant information. The best informant is likely to vary by age, direct knowledge of the topic, and motivation to disclose. As an example, parents and youth tend to be slightly better informants for internalizing symptoms (e.g., depression) and behaviors compared with other informants (e.g., teachers), whereas teachers may be slightly better informants of externalizing symptoms and behaviors (e.g., conduct disorders) (Goodman, Ford, Simmons, Gatward, & Meltzer, 2000). For behaviors that are hidden or concealed (e.g., substance use, bingeing and purging), youth themselves tend to be better informants than parents or teachers (van der Ende & Verhulst, 2005). For predictors of obesity, youth self-classification and parent descriptive reports are not good predictors, but BMI

calculated based on youth self-reported height and weight accurately classified 96% on obesity status (Goodman, Hinden, & Khandelwal, 2000).

- *Consider the need for multiple informants.* Researchers recommend using more than one source of data (i.e., multiple informants) when no single source of information exists that can validly measure the characteristic of interest. This approach helps increase confidence in the data collected, but it also can introduce complexities during analyses. For instance, multiple informants often provide discordant data, particularly in psychiatric research, because the informants typically represent different views. Studies that use multiple informants are challenged with the task of assigning priority to one informant over another for particular outcomes or devising a valid mechanism for combining information from multiple sources. Sometimes combining information can increase validity of the measure. Indeed, some psychiatric diagnoses require observation of symptoms in more than one setting (e.g., ADHD). In one study, when both youth and parent informants yielded positive screening scores on the Youth Behavior Checklist and Child Behavior Checklist, respectively, the odds of the youth meeting clinical diagnostic criteria for anxiety or depression were twice as high (Duke, Ireland, & Borowsky, 2005).
- *Consider the setting.* Some research has found that the setting in which children take surveys (e.g., home vs. school) may be more important than the survey method used. As an example, Brenner and colleagues (2006) found setting effects for 30 of 55 risk behaviors they studied; in all cases, rates of reporting were higher in the school-based setting as compared to a home setting. Others have found similar patterns (e.g., Vollebergh et al., 2006). There are a number of factors that could contribute to these differences (e.g., non-response biases, influence of parental presence, perceived privacy) (Mangunkusumo et al., 2005; Vollebergh et al., 2006). More research is needed to better understand how setting may influence children's self-reports.
- *Pilot test the methods.* When developing or selecting data collection tools for use with children it is critical to devote time and resources to pilot test them with participants who are similar in age and share other characteristics (e.g., from same region) of the study population. This process can help refine instructions, question wording, and design. It also allows investigators to explore how children are interpreting questions when responding.

CONCLUSIONS

Knowledge on how to collect data from children ages 9-13 continues to expand. This literature base provides important insights on the advantages and drawbacks of different methods. It also highlights the multitude of factors that can affect the data quality when collecting information from this population.

The field still lacks important insights on how to collect information from children. As an example, more research is needed on the conditions required to enhance children's ability to be good respondents (e.g., What are effective ways to motivate children to complete surveys or interviews? How do children process survey questions?). Research on children's use of newer technologies (e.g., text messaging, cell phones, social networks) also may benefit individuals interested in applying those approaches for data collection (e.g., How many children use various devices, and how do they use them?). Further, in the context of concerns about sharing personal information over the phone or Internet, the field could benefit from additional insights on how parents view these methods as a way to collect information from their children, and how that influences their willingness to provide consent for participation in data collection efforts.

In a broader context, more research is needed on understanding the limitations of the data collected from children (e.g., To what extent does the current research generalize to broader samples of children? How do varying parent consent laws affect the quality of the research conducted with children?). Other issues, such as gaining a better understanding of what contributes to the discrepancy between methods and settings, also warrant further exploration.

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APPENDIX A: METHOD BRIEFS

DATA COLLECTION METHOD BRIEFS

This collection of Method Briefs provides a summary of the advantages and drawbacks of using different methods for collecting data from children ages 9-13. The information highlighted in these briefs is based on studies and reviews focusing expressly on collecting data with children. These briefs are intended to assist individuals in identifying which methods might best meet their needs for collecting information from children. They are not intended to be “how to” documents.

This compilation includes briefs for the following eight data collection methods (listed in alphabetical order by major category). Table 2 provides an overview of general uses and key advantages and drawbacks of each method.

DIARIES

INTERVIEWS

- In-person interviews
- In-person focus group interviews
- Telephone interviews (including computer assisted)

OBSERVATIONAL METHODS

SURVEYS

- Computer-based surveys (includes Internet-based surveys)
- Handhelds/PDAs
- Written surveys

Table 2: Method Summary Table

Method	Use Within 9-13 Age Group	Burden on Participants (Assuming equal administration time and content)	Key Resource Requirements	Commonly Used...	Key Advantages	Key Drawbacks
Diaries	Ages 9-11 good ability to report Ages 12-13 excellent ability to report	Medium/High (depends on frequency)	*Participant training	... to gather in-depth descriptive data (e.g., food intake, exercise, physical symptoms, narratives). ... to document the experience of every day life. ... to collect data from smaller samples (<100 persons).	<ul style="list-style-type: none"> ☺ Can yield detailed data on daily life experiences. ☺ Relatively low cost and easy for children to fill out. ☺ Data are recorded closer in time to when an event actually happens. 	<ul style="list-style-type: none"> ☹ Children may find filling out multiple diary entries boring and tedious. ☹ Children may forget to record data. ☹ Data analysis can be time consuming.
In-Person Interviews	Ages 9-13 (ages 9-10 years may need visual cues)	Medium	*Interviewer training *Space for interviews *Personnel time	... to conduct clinical assessments. ... to gather descriptive data (e.g., quantitative and/or qualitative). ... to measure program effects. ... to collect data from small to larger samples (<100 to 500 persons).	<ul style="list-style-type: none"> ☺ Interviewers can explore answers to get more details. ☺ Ideal for children with lower literacy levels. ☺ Private. 	<ul style="list-style-type: none"> ☹ Costly to implement. ☹ Children tend to be compliant and to say what they think adults want to hear.

Method	Use Within 9-13 Age Group	Burden on Participants (Assuming equal administration time and content)	Key Resource Requirements	Commonly Used...	Key Advantages	Key Drawbacks
Focus Group Interviews	Ages 9-13 (ages 9-10 years may need visual cues)	Low	*Training for interviewer and note-taker *Space for focus groups *Refreshments *Personnel time *Person and/or equipment to record discussion	... to gather data on children's views and opinions on a range of topics. ... with small groups of 6-10 similar participants (e.g., children in fifth grade). ... to collect data from smaller samples (<100 persons).	☺ Can yield rich, descriptive data. ☺ Fun and easy for children.	☹ Logistics can be challenging. ☹ Group dynamics can hinder expression of diverse opinions. ☹ Not a good format for collecting data on sensitive subjects. ☹ Data analysis can be time consuming.
Telephone Interviews	Ages 11-13	Low	*Training for interviewers *Equipment *Personnel time	... to gather population-level data. ... to measure program effects. ... to collect data from medium to larger-sized samples (>100 persons).	☺ Can reach large numbers of respondents. ☺ Computer-assisted versions facilitate surveying. ☺ Perceived to be more private than in-home surveying.	☹ Can require many call attempts to complete an interview. ☹ Children may worry about privacy, which can affect data quality. ☹ Sample size capacity linked to available equipment and staff.

Method	Use Within 9-13 Age Group	Burden on Participants (Assuming equal administration time and content)	Key Resource Requirements	Commonly Used...	Key Advantages	Key Drawbacks
Direct Observation	Ages 9-13	Low	*Training for observers *Personnel time	<p>... to document the occurrence of events, behaviors and/or interactions.</p> <p>... with individuals, dyads, and families.</p> <p>... to collect data on smaller samples (<25 persons or groups).</p>	<p>☺ Provides independent observation of an event or set of behaviors.</p> <p>☺ Typically easy for children to be involved.</p>	<p>☹ Training essential to consistent measurement.</p> <p>☹ Setting of observation may affect results.</p> <p>☹ Labor intensive.</p>
Computer-Based Surveys	Ages 9-13	Medium	*Training for data collectors *Equipment *Personnel time	<p>... to collect health information and/or measure program effects.</p> <p>... as an alternative to written-surveys.</p> <p>... to collect data from medium to larger-sized samples (>100 persons).</p>	<p>☺ Can reach large numbers of respondents.</p> <p>☺ Preferred by many youth over written surveys.</p> <p>☺ Can increase participants' sense of privacy.</p> <p>☺ Compared with written surveys, youth can answer more questions in a given period of time.</p> <p>☺ Reduces data entry costs and can improve data quality.</p>	<p>☹ Requires technical proficiency to develop or resources to outsource development.</p> <p>☹ Requires equipment or access to it.</p> <p>☹ Potential for technical problems.</p> <p>☹ Computer screen privacy needs to be addressed.</p>

Method	Use Within 9-13 Age Group	Burden on Participants (Assuming equal administration time and content)	Key Resource Requirements	Commonly Used...	Key Advantages	Key Drawbacks
Handhelds (PDAs)	Ages 9-13	Medium	*Training for data collectors *Equipment *Personnel time	<p>... to collect health information and/or measure program effects.</p> <p>... as an alternative to written surveys.</p> <p>... to collect data from medium to larger-sized samples (>100 persons).</p>	<ul style="list-style-type: none"> ☺ Youth-friendly. ☺ More portable than laptops. ☺ Can increase participants' sense of privacy. ☺ Compared with written surveys, youth can answer more questions in a given period of time. ☺ Reduces data entry costs and can improve data quality. 	<ul style="list-style-type: none"> ☹ Requires technical proficiency to develop, or resources to outsource development. ☹ Requires equipment or access to it. ☹ Potential for technical problems. ☹ Small screen.
Written Surveys	Ages 9-13 (ages 9-10 may need visual cues)	Medium/High (depending on length)	*Training for data collectors *Personnel time	<p>... to gather descriptive data (e.g., quantitative and/or qualitative).</p> <p>... to measure program effects.</p> <p>... in community-based program evaluation.</p> <p>... to collect data from small, medium, or larger samples.</p>	<ul style="list-style-type: none"> ☺ Easy to use. ☺ Familiar to youth. ☺ Relatively inexpensive to implement. 	<ul style="list-style-type: none"> ☹ Can be less engaging than other more visually stimulating methods. ☹ Youth may equate it with testing. ☹ No control over respondent progression through survey. ☹ Requires data cleaning and entry.

Diaries

<p>How have diaries been used for collecting information from children?</p> <p>Researchers and practitioners use diaries to collect health information from children so they can better understand their daily lives. The research on using diaries with children suggests that children ages 7 and older can use this method to document their health-related experiences (e.g., hypoglycemia, headaches, recreational injuries). This method generally involves having children report information on a set interval (e.g., daily) using a paper-pencil diary or another format (e.g., telephone or electronic diaries).</p>	
<p>What are important considerations when using diaries with children?</p>	<ul style="list-style-type: none"> ✓ Diary formats can vary widely and often include ratings and open-ended questions. ✓ The age and cognitive ability of children affect their ability to fill out diaries. Children under age 11 can learn classification as well as time relationships, but may be challenged by important concepts in diaries such as duration (e.g., length of symptoms). Parents may need to help younger children in filling out diaries. ✓ Children's level of interest and motivation to fill out diaries affects the success of using this method. ✓ Using novel formats (e.g., electronic diaries) may enhance the appeal of this mode of data collection.
<p>What are the advantages of using this approach?</p> <ul style="list-style-type: none"> • In-depth information • Cost 	<p>What the Research Says...</p> <ul style="list-style-type: none"> ✓ Children 7-11 years old were found to have a <i>good</i> ability to self-report intensity and frequency (of headaches); children 12 and older found to have an <i>excellent</i> ability to self-report on these factors.¹ ✓ The process of recording daily events often produced better data compared to in-person interviews where children tried to recall information that happened in the past.^{2,4} ✓ Children often include more detailed information (e.g., facial expressions that correlated with absence or presence of pain) in their diaries; this adds to the depth of information obtained.³ ✓ Diaries can be a relatively low cost way to collect information from children if they are distributed and collected directly rather than mailed.³
<p>What are the drawbacks of this approach?</p> <ul style="list-style-type: none"> • Preparation • Response rate • Data quality • Data management 	<p>What the Research Says...</p> <ul style="list-style-type: none"> ✓ Children need a lot of preparation and training to make sure they know how to complete the diary.^{1,3} ✓ The dropout rate is often high in diary studies, which may be because of children's lack of interest and boredom with having to record entries too often or for too long.³ ✓ It is difficult to verify if the diary is being completed as requested, and if it is only being completed by the children and not their parents.³ ✓ Evidence of the validity and reliability of the diary is limited and conflicting; some evidence suggests diary reports are consistent with data collected via interviews, but other studies suggest that diaries are less prone to social desirability than interview-administered surveys.^{3,4} ✓ When analyzing data it is difficult to determine if data are missing.³ ✓ Data analysis of diaries requires detailed coding prior to analysis.³

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In-Person Interviews

<p>How have in-person interviews been used for collecting information from children?</p> <p>Researchers and practitioners use interviews to conduct clinical assessments and/or collect information (e.g., for surveillance or evaluation). Research suggests that children ages 6 and older have the cognitive and language abilities to be interviewed but that younger children may need visual as well as verbal stimuli to make issues concrete during the interview process.⁴ Most individual interviews are conducted by having an interviewer record participants' answers on paper. Some researchers use computer-assisted personal interviewing (CAPI); this involves having the interviewer record answers on a computer.</p>	
<p>What are important considerations when using interviews with children?</p>	<ul style="list-style-type: none"> ✓ Investigators can use standard interview questions with children ages 11 and over, but the questions must be modified to reflect children's cognitive and language abilities, address issues of confidentiality of reporting certain behaviors, and ensure they are relevant to children's main social and cultural context (e.g., home or school) ✓ This type of data collection method is ideal for children with lower literacy skills. ✓ Interviews provide an opportunity to obtain more in-depth data than written surveys because they allow interviewers and participants to ask clarifying questions. ✓ It is important to include extra time when using interviews with children to develop rapport and get to know the children before the interview. ✓ It is critical to include interviewer training when using this approach because the quality of the data from interviews depends on the skills, experience, and interest of the interviewers. ✓ In general, school-based interviewing is more cost effective than in-home interviewing.¹²
<p>What are the advantages of using this approach?</p> <ul style="list-style-type: none"> • Flexibility • Privacy • In-depth information 	<p>What the Research Says...</p> <ul style="list-style-type: none"> ✓ Interviewers have greater control when asking questions of individuals than when facilitating focus group interviews.⁶ ✓ Individual interviews are preferred over group interviews for complex and sensitive topics.⁷ ✓ This approach eliminates the possibility of peer group influence.⁷ ✓ Interviewers can cover more ideas and a greater range of themes in individual interviews than in group interviews.^{6,7}
<p>What are the drawbacks of this approach?</p> <ul style="list-style-type: none"> • Preparation • Data quality • Cost 	<p>What the Research Says...</p> <ul style="list-style-type: none"> ✓ Young children may find it difficult or uncomfortable to be interviewed by an unknown adult.³ ✓ Children may need breaks during an individual interview (e.g., by drawing a picture or completing a puzzle); this is particularly important for longer interviews or those that might be emotionally or cognitively challenging.³ ✓ Parents' presence during an interview may affect the data quality (e.g., parents may interject comments that could compromise the data or children may not

	<p>share certain information in the presence of their parents).⁸</p> <ul style="list-style-type: none"> ✓ Data quality also can be affected by children's tendency towards compliance and suggestibility,¹⁰ and because children ages 6-14 (particularly those ages 12-14) tend to withdraw personal information from adults and edit their answers.^{11,12} ✓ Reliability and validity of individual interview data are affected by a number of factors (e.g., language comprehension, child's development and gender, child's willingness to articulate subjective experience, and the affective relationship between adult interviewer and child respondent).^{2,5,11,12} ✓ In-person interviews are costly to implement.¹²
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In-Person Focus Group Interviews

How have focus groups been used for collecting information from children?

Researchers and practitioners use focus group interviews to develop and/or test programs, services, models, or evaluation tools; to explore children’s views on a variety of issues; and for some types of program evaluation. Research suggests that it can be used effectively with children 6 years of age and older. Focus group interviews are not appropriate for hypothesis testing or drawing inferences about larger populations;^{2,3,6} however, this method is often used in combination with other modes of data collection (e.g., surveys) to provide more in-depth information and/or explore findings.

What are important considerations when using focus group interviews with children?

- ✓ Children under 11 years of age may need visual as well as verbal stimuli to make issues concrete.
- ✓ Investigators can use standard interview questions with children ages 11 and older, but the questions must be modified to reflect children’s cognitive and language abilities, address issues of confidentiality of reporting certain behaviors, and ensure they are relevant to children’s main social and cultural context (e.g., home or school).
- ✓ This method is ideal for children with lower literacy skills.
- ✓ Focus groups provide an opportunity to obtain more in-depth data than written surveys because they allow focus group facilitators and participants to ask clarifying questions.
- ✓ It is preferable to have slightly smaller groups when conducting focus groups with children than with adults (ideally 4-6 children).
- ✓ Mixed gender focus groups work well with 9-13 year olds, but it may be beneficial to consider gender-specific groups for some topics (e.g., sexual risk taking).
- ✓ It is preferable to keep the length of focus group interviews shorter with children (e.g., 30-60 minutes) than with adults.
- ✓ It is important to include time to develop rapport and get to know the children before the focus group begins.
- ✓ It is critical to include facilitator training when using this approach because the quality of the data from focus group interviews is dependent on the skills, experience, and interest of the facilitator.
- ✓ Some research and evaluation groups are now using telephone-based focus groups with adults; use of telephone-based focus groups with children has not yet been reported in the literature.

<p>What are the advantages of using this approach?</p> <ul style="list-style-type: none"> • Acceptability • Ease of use • Flexible • In-depth information 	<p>What the Research Says...</p> <ul style="list-style-type: none"> ✓ Participation in focus groups was perceived as “fun” by some children.⁴ ✓ Children may feel more supported, safer, and less intimidated taking part in group interviews with peers as compared to individual interviews.^{2,3,5} ✓ Focus groups provide an easy way to learn about the ideas and opinions of homogeneous groups.^{5,6} ✓ This method can be combined easily with other data collection methods.² ✓ Focus groups eliminate the power imbalance between child and adult researcher that may be present in individual interviews.^{1,6} ✓ Group interviews may generate a greater range of responses than individual interviews because participants can develop, challenge and suggest new ideas and react to differing viewpoints.^{1,5,6} ✓ Focus groups tend to be less costly than individual interviews.³
<p>What are the drawbacks of this approach?</p> <ul style="list-style-type: none"> • Preparation • Privacy • Data quality • Data management 	<p>What the Research Says...</p> <ul style="list-style-type: none"> ✓ Scheduling a time and location that is convenient for all participants can be challenging.^{2,6} ✓ The success of the focus group is dependent, in part, on the communication skills of the participants.⁵ ✓ Some children (e.g., those who are shy or who do not like speaking in front of groups) may be uncomfortable taking part in focus groups.⁴ ✓ Group interviews can be influenced by individuals within a group.² ✓ It is more difficult to maintain confidentiality using focus group interviews compared to individual interviews.⁵ ✓ Focus group interviews are not good for hypothesis testing or drawing inferences about larger populations.^{2,3,6} ✓ This approach may mask individual differences.¹ ✓ Focus group data require detailed coding for analysis.⁶
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Telephone Interviews

<p>How have telephone interviews been used for collecting information from children?</p> <p>Researchers and practitioners use telephone interviews to collect information on a range of topics for surveillance, research or evaluation. Research suggests that it can be used successfully with children ages 11 and older. Traditional telephone interviews involve having interviewers ask the survey questions by phone; the interviewers then record them on paper or on a computer (called CATI--Computer-Assisted Telephone Interviewing). Telephone Audio Computer-Assisted Self Interviewing, or T-ACASI, is a more recent advance in survey technology. With this mode, an interviewer is used to screen and recruit participants. After a few background and practice questions, the phone call is transferred over to a T-ACASI system in which pre-recorded questions are read to participants who give their answers by pressing keys on a touchtone phone.</p>	
<p>What are important considerations when using telephone interviews with children?</p>	<ul style="list-style-type: none"> ✓ Investigators can use standard interview questions with children, but the questions must be modified to reflect children’s cognitive and language abilities, address issues of confidentiality of reporting certain behaviors, and ensure they are relevant to children’s main social and cultural context (e.g., home or school). ✓ Collecting data using interviews is ideal for children with lower literacy skills. ✓ Interviews provide an opportunity to obtain more in-depth data than written surveys because they allow interviewers and participants to ask clarifying questions. ✓ Interviewer training is essential to ensure data quality. ✓ T-ACASI standardizes the question-asking process by using a recorded voice. ✓ Telephone interviews, while less expensive than in-person interviews, tend to be more expensive than written surveys.
<p>What are the advantages of using this approach?</p> <ul style="list-style-type: none"> • Data quality • Cost 	<p>What the Research Says...</p> <ul style="list-style-type: none"> ✓ With school-aged populations, telephone interview approaches allows for the inclusion of students who are frequently absent from school or who have dropped out of school.¹ ✓ T-ACASI may yield higher reports of risk behavior compared to CATI.^{1,4} ✓ Data accuracy from this approach is comparable to in-person interviews.³ ✓ T-ACASI is more cost-efficient than in-home or in-school surveys and a more cost-effective method for obtaining a representative sample of adolescents.^{1,4} ✓ Telephone surveys are less expensive than in-person interviews.¹

<p>What are the drawbacks of this approach?</p> <ul style="list-style-type: none"> • Ease of use • Response rate • Privacy • Data quality 	<p>What the Research Says...</p> <ul style="list-style-type: none"> ✓ In some studies, youth reported concerns that parents or others may hear their responses.^{1,4} ✓ Inaccurate contact information is a particular challenge with this method over other in-person methods.² ✓ Some populations (e.g., Hispanics in one study) may be more likely to respond by mail than by phone.² ✓ Response rates may be lower with telephone interviewing due to factors such as the wide use of answering machines and caller ID screening, and assumptions that calls are associated with telemarketing.⁴ ✓ Parental presence increases the likelihood of response bias and affects the validity of the data.⁴ ✓ The impact of privacy on responses to telephone surveys may depend on children’s demographic characteristics (e.g., gender).¹ ✓ Evidence is mixed on how telephone interviewing affects the rate of reporting risk behaviors--(some studies found higher rates, whereas others found lower rates).^{1,4} ✓ This methods excludes homes without telephone service, which could bias results.⁴ ✓ Telephone surveys may be more prone to socially desirable responses than written surveys.⁴ For example, traditional telephone interviews (i.e., interviews in which a person asks questions over the phone) have been generally regarded as inferior for collecting data on substance abuse because of low reporting in comparison to written surveys.¹ ✓ T-ACASI surveys may be more prone to missing data than CATI surveys because participants can simply hang up to terminate the interview.⁴
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Observational Methods

How have observational methods been used for collecting information from children?

Researchers and practitioners use observations to collect information on children's health behaviors or temperament, for behavioral monitoring or assessment, and to measure program effects.^{1,2,3} Research suggests that it can be used successfully with children as young as 2 years of age. Investigators using observations conduct them in a laboratory or clinical setting or in a naturalistic setting (e.g., at home or in school). Some researchers or practitioners who are involved with health-related programs may use observations to assess program fidelity. In these cases the observers typically focus on the individual implementing the program, not the children receiving it.

What are important considerations when using observational methods with children?

- ✓ Observations are valuable for collecting data on children's behaviors (e.g., social interactions, health practices).
- ✓ This method requires observers to be trained before they collect data.
- ✓ Videotaping observations may create an artificial situation and affect the behavior being observed.
- ✓ The settings in which the observations take place may influence data interpretations—laboratory settings are more controlled, but the findings cannot always be generalized to settings outside the laboratory. Observations in naturalistic settings are less controlled, but may be more subject to observer bias (i.e., perceptions of the observer in a particular situation).
- ✓ Observations can be completed by parents or by other observers, but they are likely to view behavior from different perspectives.
- ✓ Observations are among the most costly forms of data collection.

What are the advantages of using this approach?

- Ease of use
- Data quality

What the Research Says...

- ✓ Existing systems (e.g., Behavioral Style Observation System) are available that are objective, short, and easy to administer.¹
- ✓ Using standardized observation measures greatly increases the reliability and validity of the observational data.³
- ✓ Observations allow for the comparison of a child's behavior to other children in similar and different settings.³

What are the drawbacks of this approach?

- Preparation
- Cost

What the Research Says...

- ✓ Parenting stress affects the data quality of parent observer ratings--as the level of parenting stress increases, the accuracy of parents' perceptions of their children's behavior decreases.¹
- ✓ There is considerable variation in children's behavior by situation, making it difficult to generalize across situations.³
- ✓ Observations are labor intensive.¹
- ✓ Observations cannot adequately capture children's thoughts, feelings and subjective experiences.

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Computer-Based Surveys

How have computer-based surveys been used for collecting information from children?

Researchers and practitioners use computer-based surveys to collect health information and/or to measure program effects. Computer-based surveys have been used successfully with children ages 8 and older. Some computer-based surveys involve having individuals use laptop or desktop computers. These surveys may include an audio component (called A-CASI: Audio-Computer Assisted Self-Administered Interviewing) or feature multimedia (called M-CASI: Multimedia Computer Assisted Self-Administered Interview). Surveys are now administered using handheld or personal digital assistants (PDAs) and via the Internet. Computers are also used as a way to record information with other data collection approaches (e.g., diaries, interviews, and observations).

What are important considerations when using computer-based surveys with children?

- ✓ Children under 11 years of age may need visual as well as verbal stimuli to make issues concrete.
- ✓ Investigators can use standard survey questions with children 11 years of age and older, but the questions must be modified to reflect children’s cognitive and language abilities, address issues of confidentiality of reporting certain behaviors, and ensure they are relevant to children’s main social and cultural context (e.g., home or school).
- ✓ In general, children perceive computer-based surveys as fun and interactive.^{3,16,21}
- ✓ The increase of computers in schools makes it more practical and economical to use computer-based surveys in school settings, but computing capacity still varies widely across school districts.¹⁹
- ✓ Filling out computer-based surveys is typically easier for children than filling out written surveys because of features such as audio and automatic skip patterns.²²
- ✓ The inclusion of graphics, encouraging words, and color help keep children motivated and interested in computer-based surveys.^{1,16,21}
- ✓ The use of audio-enhanced computer-based surveying is ideal for children with lower literacy skills.^{1,3,16,18,19,21} It also can provide an opportunity for children to hear a culturally familiar voice.^{1,3,16}
- ✓ Children can typically complete more questions in a given timeframe on computer-based surveys than on written surveys.
- ✓ Computer-based surveying saves resources (e.g., paper, data entry costs, data cleaning time).^{8,12,14,16,17,21-23} It also facilitates data analysis by reducing the potential for data entry errors and reducing the time between data collection and analysis.^{8,16,21-23}
- ✓ The number of children interviewed at a single time is limited by the number of computers available for surveying.
- ✓ Hardware and/or software purchases can increase the cost of data collection, particularly for one-time data collection efforts.¹⁶
- ✓ Children’s self-reported rates of risk behaviors or socially undesirable behaviors tend to be higher using computer-based surveys compared to other methods (e.g., written surveys).^{1,3,15,17,19,21,22}

	<ul style="list-style-type: none"> ✓ Some research shows that children who complete surveys at school report higher levels of some risk behaviors than those who complete surveys at home.⁴
<p>What are the advantages of using this approach?</p> <ul style="list-style-type: none"> • Acceptability • Ease of use • Flexibility • Privacy • Data quality • Data management • Cost 	<p>What the Research Says...</p> <ul style="list-style-type: none"> ✓ Children ages 10 years and older prefer computer-based surveys over written surveys.^{5, 10-12, 15, 19} ✓ This approach is particularly beneficial for youth who are easily distracted or bored with written surveys.¹⁶ ✓ Computer-based surveys can reduce stress and discomfort that some youth experience in personal interviews.^{1, 3, 15, 17} ✓ Depending on the computer screen, this method can offer more privacy for sensitive questions compared to written surveys.^{1, 3, 7, 16, 17, 19, 20} ✓ Computer-based surveys are less vulnerable to potential variation in question asking that can occur in individual interviews.^{1, 3, 4, 18} ✓ The reliability and validity of responses using computer-based surveys is typically better than other methods (e.g., written surveys and interviews).^{8, 14, 16, 17, 23} ✓ The data quality from Internet-based surveys was compatible to written surveys.¹³ ✓ This approach enables the use of prompts for skipped items, which reduces the likelihood of missing data.⁸ ✓ Internet-based approaches offer several cost benefits for surveying and evaluating programs with large samples.^{12, 13}
<p>What are the drawbacks of this approach?</p> <ul style="list-style-type: none"> • Logistics and use • Cost 	<p>What the Research Says...</p> <ul style="list-style-type: none"> ✓ There are relatively few comprehensive reports about Internet-based surveys as a method of data collection with children.^{12, 17, 20} ✓ There is more potential for technical problems or theft with computer-based surveys (e.g., with laptops) as compared to written surveys.^{1, 16} ✓ Computer-based surveys require more logistics planning than do written surveys.²³ ✓ Computer-based surveying lacks the option of asking follow-up questions, like in an in-person interview.^{1, 6} ✓ Translation of computer-based surveys may require more resources than would be needed for a written survey if there is an audio component.¹⁶ ✓ There is relatively little research comparing written surveys and Internet-based surveys with children on issues related to confidentiality.¹³

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Handhelds/Personal Digital Assistants (PDAs)

How have PDAs been used for collecting information from children?

Researchers and practitioners use handheld/PDA-based surveys to collect health information and/or to measure program effects. Surveys using handheld/PDA devices have been used successfully with children ages 9 years and older.

What are important considerations when using handheld/PDA surveys with children?

- ✓ Children under 11 years of age may need visual as well as verbal stimuli to make issues concrete.
- ✓ Investigators can use standard survey questions with children ages 11 and older, but the questions must be modified to reflect children’s cognitive and language abilities, address issues of confidentiality of reporting certain behaviors, and ensure they are relevant to children’s main social and cultural context (e.g., home or school).
- ✓ In general, children perceive computer-based surveys, particularly those using PDAs, as fun and interactive.
- ✓ Filling out handheld/PDA surveys is typically easier for children than filling out written surveys because of features such as audio and automatic skip patterns.
- ✓ The use of audio-enhanced surveying is ideal for children with lower literacy skills; it also can provide an opportunity for children to hear a culturally familiar voice.
- ✓ Children can typically complete more questions in a given timeframe using handheld devices than on written surveys.
- ✓ Surveying using handheld devices saves resources (e.g., paper, data entry costs); it also facilitates data analysis by reducing the potential for data entry errors and reducing the time between data collection and analysis.
- ✓ The number of children interviewed at a single time is limited by the number of handheld devices/PDAs available for surveying.
- ✓ This method requires specialized software, and may require time to become familiar with the technology when creating surveys.
- ✓ Hardware and software purchases can increase the setup cost the first time this method is used, with total costs going down for future uses.

What are the advantages of using this approach?

- Acceptability
- Ease of use
- Flexibility
- Privacy
- Data quality
- Data management

What the Research Says...

- ✓ Data collectors and youth report positive experiences with PDA-based data collection and preferences for this mode over written surveys.
- ✓ Using PDAs is convenient for data collection in diverse settings and in resource poor environments.³
- ✓ PDAs are more portable than laptop computers.^{1,2}
- ✓ Data collectors and youth need relatively little training to use the PDAs.³
- ✓ Data collectors report relatively few technical problems.³
- ✓ The inclusion of an audio component allows students with cognitive deficits and language barriers to complete PDA surveys in a similar amount of time as other students.²
- ✓ PDAs offer more privacy than written surveys and other computer-based methods that have larger display screens (laptops and desktops), making it easier for youth to

	<p>provide truthful answers to sensitive questions.^{1,2,3}</p> <ul style="list-style-type: none"> ✓ Compared with written surveys, reliability estimates were found to be adequate and similar.³
<p>What are the drawbacks of this approach?</p> <ul style="list-style-type: none"> • Equipment • Data quality • Cost 	<p>What the Research Says...</p> <ul style="list-style-type: none"> ✓ Use of PDAs for data collection requires access to adequate numbers of PDAs that are loaded with survey software. Depending on the needs of the project, these purchases can be costly. ✓ The effect of audio enhancement on reliability estimates and missing data for students with special education needs or for English learners is unclear and requires further investigation.² ✓ Reliability estimates for special education students were notably lower than for regular or English learner students. Studies on whether PDAs yield better data for special education students as compared to written surveys are forthcoming.² ✓ The small size of the PDA screen may make it more difficult to answer users' questions about what is on the screen without getting very close to students and infringing on their personal space.¹
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Written Surveys

<p>How have written surveys been used for collecting information from children?</p> <p>Researchers and practitioners use written surveys (also referred to as paper-pencil surveys) to collect health information, conduct individual assessments and/or to measure program effects. Written surveys also are commonly used for program evaluation. Written surveys have been used with children as young as 5 years of age, but researchers agree that most children under 8 years of age face challenges in understanding abstract terms and tend to use the most extreme response options when filling out surveys.⁶</p>	
<p>What are important considerations when using written surveys with children?</p>	<ul style="list-style-type: none"> ✓ Children under 11 years of age may need visual as well as verbal stimuli to make issues concrete. ✓ Investigators can use standard survey questions with children ages 11 years and older, but the questions must be modified to reflect children’s cognitive and language abilities, address issues of confidentiality of reporting certain behaviors, and ensure they are relevant to children’s main social and cultural context (e.g., home or school). ✓ Data quality depends on children’s age; the older children are the better they are at understanding language, and maintaining interest.^{1,2,7} ✓ Children’s attitudes towards written surveys are likely to be influenced by their classmates. ✓ Children are especially prone to “satisficing” (i.e., taking cognitive short cuts) when bored or under motivated. Maintaining attention and motivation during classroom administered surveys can be challenging. ✓ Individuals in charge of giving written surveys should be trained before collecting data on issues such as maintaining privacy and motivation. ✓ Some research shows that children who complete surveys at school report higher levels of some risk behaviors than those who complete surveys at home.⁹ ✓ Written surveys are perceived to be among the least expensive methods of data collection, but they do require resources for data collection (e.g., multiple copies of survey), data entry and data cleaning.
<p>What are the advantages of using this approach?</p> <ul style="list-style-type: none"> • Ease of use • Data quality • Cost 	<p>What the Research Says...</p> <ul style="list-style-type: none"> ✓ Visual stimuli (e.g., illustrations of characters) can be used to increase motivation and interest in written surveys.^{2,3} ✓ Boys and girls are equally able to understand items on a survey.⁶ ✓ The use of written surveys avoids potential interviewer influence and social desirability effects that might be present in individual interviews.⁹ ✓ Classroom surveys are more cost-effective when compared with individual interviews.⁹

<p>What are the drawbacks of this approach?</p> <ul style="list-style-type: none"> • Acceptability • Flexibility • Data quality 	<p>What the Research Says...</p> <ul style="list-style-type: none"> ✓ This method has greater potential for low motivation and disinterest among children compared to more visually stimulating surveys such as computer-based or PDAs.^{2,3} ✓ Language mastery, reading comprehension, and cognitive and social development can affect children’s ability to complete written surveys.^{2,4,6,7} ✓ Written surveys do not easily allow for clarifying responses. For example, a response such as “I don’t know” could mean children are not interested, they do not have an opinion or that they do not understand the question.^{3,9} ✓ In-person interviews may be better for children than written surveys because they provide the ability to observe body language, establish rapport with children, answer questions, identify misunderstandings and provide encouragement to children.³
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