

**Study title:** Cognitive Interviewing of Survey Items for a Computer Adaptive Test of Parent Knowledge and Beliefs

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## **Cognitive Interviewing of Survey Items for a Computer Adaptive Test of Parent Knowledge and Beliefs**

TMW Center for Early Learning + Public Health

### Protocol Narrative

#### **Background**

A child's early language exposure is pivotal in language development and in ultimate educational and intellectual achievement (Bruner, 1981; Chapman, 2000; Gallaway & Richards, 1994; Hart & Risley, 1995; Huttenlocher, Haight, Bryk, Selzer, & Lyons, 1991; Rowe, 2008). Hart and Risley's landmark study demonstrated the tremendous impact of a child's early language milieu on future learning by revealing a significant correlation between the number of words a child is exposed to between ages 0-3 and his or her ultimate IQ and academic success (Hart & Risley, 1992; 1995). Their findings were both significant and alarming, demonstrating the critical and time-sensitive role that early language exposure plays in a child's life.

The concern for children born into poverty is the overwhelming inequity in their early language experience. Hart and Risley's study revealed a steep socioeconomic gradient in early exposure to words and language. At the end of their third year, children from high socioeconomic status (SES) families heard approximately forty-five million words; children from economically impoverished backgrounds heard only approximately thirteen million. Hart and Risley found that more parental talk equated to faster vocabulary growth and higher IQ test scores at three years and older. Their follow-up with these children at 9-10 years of age confirmed that preschool/school interventions came too late to alter these trajectories; the reverberations of early linguistic shortfall were likely to follow these children throughout their lives.

However, the challenges these children face is not unalterable. It is neither genetics nor a lack of potential that lie at the heart of this inequity, but rather parental knowledge. In 2008, Rowe demonstrated that the relationship between socioeconomic status and parental communication ability is mediated by parental knowledge (Rowe 2008). Other studies have corroborated these findings, demonstrating that the effect of socioeconomic status on a child's vocabulary was primarily dictated by maternal speech (Hoff 2003). Additionally, a recent study by the TMW Center shows that parents who have higher knowledge about infant development soon after birth are more likely to engage in behaviors that foster socio-emotional and cognitive growth, as well as respond to their infants' cues at the age of 9-months (Leung & Suskind, 2020). Encouragingly, studies have also demonstrated that a well-planned, parent-directed language intervention in low-income populations may positively affect parental speech behaviors by increasing the use of facilitative language with their children (Oneil-Pirozzi, 2009).

Given the pivotal role that parents and caregivers—and in particular, the interactions they share with children and the quality of language input they provide—play in shaping young children's cognitive and language development, it is necessary to assess what they know and believe about that process. Prior to the development of the SPEAK, however, this critical need was unmet in the early childhood field. Since 2013, Dr. Suskind and her research group have developed and refined the Survey of Parent/Provider Education and Knowledge (SPEAK). The SPEAK is a clinical and research tool to assess

parents' and providers' expectations and knowledge of early childhood cognitive and language development.

Two versions of the SPEAK survey, the 10-item SPEAK-C and the 20-item SPEAK-R have undergone rigorous item testing and evaluation to create a reliable and valid measure of parental knowledge (Suskind et. al, 2017). As the next phase of SPEAK development, the TMW Center is designing a computer adaptive test, called the SPEAK CAT, to streamline the assessment of an individual's knowledge and beliefs about child development. The computer adaptive test adjusts, in real time, the questions that it asks to tailor to a specific individual's knowledge level. This will allow researchers and clinicians to have a more precise measure that can be completed in a shorter amount of time. This data-driven approach can then support parents through targeted delivery of educational interventions or other support services dependent on the results of their SPEAK assessment.

**Purpose:**

Having a reliable and valid self-report measure, such as the SPEAK, is critical for researchers and clinicians to be able to correctly assess a parent's knowledge and beliefs about a child's early cognitive development. Too often, self-report surveys are developed without consideration of their psychometric properties, leading to low-quality results. The purpose of this research protocol is to conduct cognitive interviews with survey respondents. Cognitive interviewing is a technique used in survey development through which interviewees are asked to respond to survey questions and, through guided questions from the researcher, explain their rationale behind the answer they chose. Cognitive interviewing can increase validity of a measure to ensure that researchers and survey respondents derive the same meaning from questions and answer choices. The TMW Center proposes using cognitive interviews as part of the SPEAK CAT development process to ensure that:

- Survey questions and answer choices are free of jargon and at an appropriate reading level for the target audience (i.e. parents and providers working with children ages 0-6).
- Survey respondents are responding to the questions in a manner that is in concordance with their understanding of the question meaning
- Survey questions intended to measure the same construct are responded to similarly by survey respondents, and to gauge whether some phrasing variations of the same content are easier to understand than others.
- To brainstorm wording and format revisions that could make the survey more acceptable to the target audience.

Responses from the cognitive interviews will allow the TMW Center to finalize an item bank of questions that will be used in the SPEAK CAT tool.

**Procedures**

The TMW Center will conduct cognitive interviews with enrolled participants to guide the development of new SPEAK CAT survey items. In-person interviews will take place in a private room at the University of Chicago Medical Center or another community location (such as a local library). Virtual interviews will take place over a video calling program, such as Zoom. Each interview will last approximately 1 hour and will be audio or video recorded so that the participant's responses may be reviewed and analyzed.

At the start of the first interview, right after consent is obtained, the participant will be asked to complete a brief survey (*The Family Supports and Beliefs Survey*), which will measure their existing beliefs about the role of societal resources in supporting families and young children. Participants will randomly see one of four fictional scenarios and then be asked questions related to that scenario as well as items related to stress and self-efficacy. We hypothesize that the type of scenario a participant is presented with before taking a survey may affect how they answer subsequent questions. We may also use these survey responses as a way to cross-check that the way participants are responding to the SPEAK CAT items during the interview is congruous to other measures of their beliefs.

We will then begin the cognitive interview. During each session, the participant will complete SPEAK survey items and then will answer interviewer questions related to these items. Survey items may be completed on paper or via REDCap. The interviewer will ask questions related to the items that the participant answered. These questions are meant to probe the design and readability of the question, and not the participant's knowledge about the subject. For example,

- *What does the word 'math subjects' mean to you when you read this question?*
- *Can you please rephrase this question in a different way?*
- *When you were answering this question, how did you interpret the difference between the answer choice "definitely true" and the answer choice "probably true"?*

An interview guide will be uploaded with this protocol submission. However, this will be used as a starting point for the interviewer. Some questions may be skipped and other questions may be asked based on how the respondent answers previous questions. Additionally, as additional SPEAK CAT items are developed or refined as part of the cognitive interviewing process, the interviewer may ask questions that are not in the guide to measure those items. Due to variations in participant speed and length of interview response, some participants may be asked more interview questions than others during the one-hour session.

At the end of the interview, the participant will be asked to fill out an optional demographics form to help researchers to understand any trends in survey responses. No identifying information will be recorded on this survey, which will be collected on paper or through REDCap. It will be linked to their survey responses and interview transcripts by a study ID.

Participants who are interested in completing more than one interview will give verbal permission to keep their contact information on file in order to contact them about future opportunities within this study protocol. There is no requirement that participants come back for more than one session, and they may continue to come back for as many sessions as they'd like, or until they have been interviewed about all items currently under development. No participant will complete more than 5 interviews under this protocol. Participants who complete more than one interview will take the Demographics and Family Supports and Beliefs survey only once.

### **Compensation**

For each interview a participant completes (lasting approximately 1 hour), they will receive \$20 in the form of cash or a gift card. The maximum amount any single participant will receive in this study is \$100 (if they choose to complete the maximum of 5 interviews). Participants who complete their

interview in-person at the University of Chicago campus will be offered a parking voucher or bus pass to cover transportation costs.

### **Study Population and Recruitment**

Approximately 5000 participants will be enrolled in this study throughout the United States. Participation will be limited to adults over the age of 18. Participants who would be unable to respond to interviewer questions in English or Spanish will be excluded from participation. For interviews that are conducted over video conferencing, participants must use a device that allows their camera to be on throughout the interview. Participants who are unable to join via video at the start of the interview will be asked to reschedule to another time when they have a camera available. To ensure a representative sample, we plan to recruit up to 2500 participants with less than a college education and up to 2500 participants with a college education or more. Of these participants, we aim to recruit an equal number of parents and non-parents.

A variety of recruitment channels will be pursued in order to enroll a diverse sample. Fliers will be placed around the University of Chicago Medical Center campus as well as in various community locations, such as grocery stores, laundromats, and other public areas. Additionally, the researchers will reach out to existing contacts via phone calls or emails, and rely on word of mouth referrals to expand our reach. The research team will work with the University of Chicago Center for Decision Research (CDR), who maintains a recruitment listserv of individuals interested in being contacted for research opportunities as well runs a walk-in survey center. This center connects interested participants with available survey and interview-based studies. CDR staff will post information about the study on their website, include information in their email newsletters, and offer the study to individuals who come to the walk-in center. CDR staff will not consent participants or administer any study procedures.

Interested participants will be asked to share their first name and phone number and/or email address via a REDCap survey so that the research staff can schedule and confirm their interview time with them. This contact information will be kept separate from their interview responses. They will also be asked to complete a short screening questionnaire in REDCap providing basic demographics information. This will allow the researchers to know basic characteristics about gender, education level, and parent status in advance of the first interview session, which is important in selecting what items that participant will be asked to review. Because not all participants will have time to see each item that is under development, asking these screening questions is necessary to ensure that a representative sample sees each interview item. Participants will not be excluded from participation based on their responses to the screening questions except for those items that specifically ask about the exclusion criteria listed above. This survey will also capture the user's IP address, using a built in functionality in REDCap. We will use this information as an additional method of detecting potential duplicates in the screener results. Participants will be informed in writing at the start of the screener that by completing this survey, their IP address will be stored.

After completing the screening questionnaire, participants will be given instructions on how to sign-up for an interview timeslot using [calendly.com](https://calendly.com). Calendly (which has received approval to operate from BSD ISO) is a platform that will allow the SPEAK CAT researchers to post their availability for interviews. Participants can then sign up for a time that works best for them. Time slots that are claimed will be automatically removed from the calendar; thereby, streamlining the sign up process. Interested participants will receive an email from the research team with a link to the Calendly page and

instructions on how to sign up for an interview timeslot. This will include entering their name and email address. Once they have selected a timeslot, they will receive a confirmation email with information about their scheduled session from the research teams BSD email address. Calendly will be also be used in the same manner for participants who have given us permission to store their contact information after the first study session and have expressed interest in being contacted for future interviews, as described in the Procedures section above.

In both instances, participants will be given the alternative option to schedule interview sessions with the research team directly, via email or phone conversation. While we will encourage participants to use Calendly for ease of scheduling, maintaining this option will allow individuals to participate even if they are not comfortable sharing their information to the external website of Calendly.

### **Potential Risks**

Anticipated risks are minimal. Some participants may feel discomfort describing their opinions or reactions to survey questions. To mitigate this risk, we will remind participants that our questions are optional and are designed to test the survey items themselves, not the participant. Interviewers will be trained on cognitive interviewing techniques to limit the potential discomfort. Because the sessions will be audio/video recorded, there is some risk of privacy loss. However, all data will be saved on secure BSD servers and only approved research personnel will have access. Names and other identifying information will not be associated with the recordings.

### **Potential Benefits**

We do not expect participants to benefit directly from their participation in this research. There may be a benefit to society because parents and providers can find ways to increase their knowledge and encourage positive behaviors to support a child's cognitive development using the resulting SPEAK CAT tool.

### **Data Storage and Usage**

Survey data, including SPEAK questions answered as part of the interviews, the Family Supports and Beliefs Survey, and the demographics questionnaire, will be collected on paper or electronically, via REDCap. If data is collected on paper, a research assistant will enter the data into the REDCap project and then dispose of the paper copy. Survey data responses will be stored indefinitely, and will contain no identifying information. Audio/video recordings of the interview sessions will be saved under an ID number on BSD servers and will only accessible by members of the TMW Center team. The TMW Center will primarily use these recordings to qualitatively analyze interview responses. These recordings will also be used to train a speech recognition algorithm that TMW Center researchers are building. The algorithm takes audio/video clips as an input, and conducts speaker identification i.e. predicting whether the speaker is male or female or child etc. and runs analyses to track conversational turns between speakers. Members of the TMW Center team may listen to segments of the audio/video files to validate accuracy of the algorithm.

Audio/video files will be deleted within 14 years after the date they are collected. These recordings may be coded or transcribed. Transcriptions of the audio/video file and any resulting coded data will be kept indefinitely. Transcripts will be de-identified and not able to be linked back to a specific individual.

## **Consent**

At the start of the first interviewing session, the interviewer (who will be a member of research team, as listed on the study protocol) will read a consent script aloud to the participant, describing the study procedures and explaining the risks and benefits of participating. The interviewer will remind the participant that the interview is voluntary and that they may discontinue at any time. Participants will be asked to verbally acknowledge whether they would like to continue with the interview. We request a waiver of documentation of consent, because the study is minimal risk and the consent form would be the only document linking the participant's name to their study data.

If a participant chooses to complete more than one interview session, they will not complete the verbal consent process at each session. The interviewer will remind them of key details at the start of each session and let them know about any changes to procedures or risks/benefits that may have occurred since their last meeting.

## **Statistical and Publication Plan**

Qualitative results from the cognitive interviews will be used by the TMW Center to inform SPEAK item development and refinement. Non-identifiable quotes from the interviews may be used in publications or presentations about the SPEAK survey. Responses to SPEAK and demographic data may be used in aggregate to validate the SPEAK measure. Responses to the Family Supports and Beliefs Survey will be used in aggregate to study people's beliefs about the role of family supports for the success of children and the relation between these beliefs and stress and self-efficacy perceptions. TMW Center may publish results in scientific journals. No individually identifying information will be published or used in presentations without separate written consent from the participants.

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