Supplemental Material S1. Description of each cognitive task and reliability information.

Fluid Reasoning

a. Figure Ground. The Figure Ground subtest of the Leiter International Performance Scale–Revised (Leiter-R; Roid & Miller, 1997) served as an index of children's ability to recognize and use holistic patterns in the service of solving a visual problem that involved identifying figures or designs that were embedded within complex stimuli. The dependent variable was the total number of items correct. Internal consistency reliability, as reported in the manual, varied from .74 to .80 across the ages of the children in this study.

b. Sequential Order Processing. The Sequential Order subtest of the Leiter-R served as an index of children's ability to recognize and use serial order patterns in the service of solving a visual processing task. The assumption was that serial order processing was required because children look at logical progressions of pictures or figures and select an item that goes next in the progression. The dependent variable was total number of items correct. Internal consistency reliability, as reported in the manual, varied from .71 to .81 across the ages of the children in this study.

c. Repeated Patterns. The repeated patterns subtest of the Leiter-R represented the third measure of focal attention. Children supplied the missing portion of a pattern of pictures or figures by moving cards into an easel. Children needed to attend to the pictures and mentally represent the pattern, then shift their attention back and forth from the examiner's model to the answer materials to select a card that fit the pattern. The dependent variable was total number of items correct. The internal consistency reliability across the ages of the children in this study varied from .70 to .81.

Controlled Attention

a. Sustained Attention. Children completed a sustained auditory attention measure adapted from the auditory vigilance subtest of the Gordon Diagnostics System (Gordon, McClure, & Aylward, 1996). Children were instructed to hold a very simple pattern in mind (the number sequence 1–9) and respond each time they heard pattern within a running stream of random numbers. The task required children to maintain attention over the course of 10 min and respond only when they heard the two-digit sequence (1–9). A correct response was a key press following a 1–9 sequence (and prior to the onset of the next digit in the stream). The primary dependent variable was PR, a discrimination index representing sensitivity to correctly responding to target items while withholding a response to nontargets: PR = H – FA where H is hits and FA is false alarms. Response bias was also calculated and found to be no different between the groups [$F(1, 231) = 0.69$, $p = .41$, $p\eta^2 = .003$]. Internal consistency reliability was .88. Scoring reliability agreement was 100% between the initial coding and re-analyzed coding of all trials.

b. Attention Switching. An auditory switching task (Evans, Gillam, & Montgomery, 2018) was used to index children's auditory attention switching abilities. The task was modeled after a two-speaker dichotic listening task designed by Ross and colleagues (Ross, Hillyard, & Picton, 2010). The stimuli consisted of male and female speakers saying numbers and letters. The auditory stimuli were letters (A–E) and numbers (1–5) generated from digitally created recordings using the AT&T speech generator. Groups of visual numbers and letters were also created for presentation on the touch screen. The visual items were all 32 pt Times New Roman font, each a different primary color. The numbers were grouped together in the upper center region of the screen and the letters were grouped together in the lower center region of the screen. Children were told that they were going to play a listening game in which they would hear a man in one ear and a woman in the other ear and that each person would saying number or letters at the same time. They were told that they would hear a beep periodically in one ear or the other and that the beep meant they needed to pay attention to what was being said only in that ear. Immediately after hearing the tone, they were instructed to touch as quickly as possible the blocks of letters or numbers on the screen representing the patterns they were listening to (letters or numbers) in the ear that the tone was in. The number and letter items were paired such that children only heard a number in one ear and a letter in the other ear, never a number or letter in both ears. The presentation of male/female speakers to the left/right ears was counterbalanced across children to control for any possible speaker or preferred ear bias. Trials were presented in a fixed random order. Item delivery and response collection was controlled by PsyScope (Cohen, MacWhinney, Flatt, & Provost, 1993). The primary dependent variable was total accuracy. Internal consistency

reliability was .94. Coding agreement between the initial coding and re-analyzed coding of correct switch trials was 100%.

Working Memory

a. High–Low Task. Children completed an experimental working memory task developed for children to assess the coordination of storage and processing (Magimairaj & Montgomery, 2012, 2013). The task was modeled after the Garavan paradigm for adults (Garavan, Ross, Li, & Stein, 2000). Prior to each tone, a fixation point appeared on the screen for 150, 300, or 600 ms (random across trials). After reporting the new count of high tones and low tones, they pressed the space bar for the next tone. At the end of each block, the monitor turned green, cueing children to verbally report each count. Each trial sequence consisted of seven to 11 tones with six trials at each sequence length, for a total of 30 trials. A score of 1 was given for every trial where both counts were recalled correctly, a score of .5 was given if 1 of the 2 counts was correct, and 0 if neither was correct (Magimairaj & Montgomery, 2012, 2013). The storage component was retaining the number of high and low tones heard and the processing component related to the children determining whether a tone was high or low. The primary dependent variable was percent trials count. The internal consistency reliability was .84. There was 100% agreement between the initial coding and re-analyzed coding for count scores.

b. Woodcock-Johnson III Auditory Working Memory. Children completed the standardized auditory working memory subtest of the *Woodcock-Johnson III* (Woodcock, McGrew, & Mather, 2001). Stimulus items included the digits one through nine and 50 words. The test comprised blocks of randomly presented items, with each block comprising three trials. The test began with 2-item blocks, with each subsequent block increasing by one item up to a final block of eight items. Children listened to a male voice saying a list of words and numbers (*4, orange, 1, bear, 7*). After each list they repeated the words in serial order (*orange, bear*) followed by the digits in serial order (*4, 1, 7*). The storage component involved the children remembering the items and the processing component entailed their organizing the items during recall into words and digits. The test was discontinued when the child missed all three trials within a block. Responses were scored online and digitally recorded for later transcription, scoring, and reliability checking. The primary dependent variable was total number of trials correct. Internal consistency reliability, as reported in the manual was .86. Item transcription and scoring reliability were at or above .97.

Long-Term Memory—Language Knowledge

a. Narrative Comprehension. Children listened to three recorded stories from the Test of Narrative Language (TNL; Gillam & Pearson, 2004). Children were instructed to listen carefully to each story and to look at the picture that accompanied the story as it was being told. Immediately following the story, comprehension was assessed by children responding to a set of literal and interferential questions. Children responded by providing a single word or short sentence to each question. Children's responses were recorded for later transcription, scoring, and reliability checking. The dependent variable was total raw score on all the TNL receptive items. Internal consistency reliability, as reported in the test manual, was .87. Scoring reliability between two independent listeners was .97.

b. Narrative Expression. A narrative expression task followed each comprehension task. Children retold a story about ordering at a restaurant, created their own story to correspond with a set of five sequenced pictures, and created a story to correspond to a picture of a complex scene. Each story was scored for story content, sentence complexity, grammaticality, story complexity, and story coherence. The dependent variable was the total raw score on all the TNL expressive items. Internal consistency reliability, as reported in the test manual, was .89. Transcription and scoring reliability between two independent listeners was .91.

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