

MEASURING BEHAVIORAL REGULATION AND ITS RELATION TO EARLY
LANGUAGE SKILLS AND TEACHER-RATED BEHAVIOR IN A CULTURALLY
DIVERSE SCHOOL DISTRICT

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ABSTRACT

Evidence suggests that behavioral regulation skills, including attention, working memory, and inhibitory control, are essential in the academic and social development of preschoolers. As the demands of formal schooling increase, behavioral regulation skills are necessary for school success. The current study focuses on a direct measure of behavior, the Head-Toes-Knees-Shoulders (HTKS) task, which requires children to respond to counterintuitive commands that target regulatory skills. Data were collected from 227 students in an urban, culturally diverse school district during the fall and spring of their prekindergarten school year. The nature of the HTKS was examined, including the variability of scores, correlation with demographic variables, and growth over the prekindergarten year. In addition, the relation between HTKS scores and measures of language skills and teacher-rated behavior were investigated. HTKS scores were significantly correlated with age, ethnicity, home language, and mothers' years of education. Significant gains in behavioral regulation were found. HTKS scores were significantly, positively related to vocabulary scores in the fall and spring. Fall HTKS scores significantly correlated with spring teacher-rated behavior. Limitations and implications of the current study are discussed.

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To those who have supported my escape from The Waiting Place, I am truly thankful.

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CHAPTER I

INTRODUCTION

The present study examined the nature of HTKS scores and their relation to measures of language and teacher-rated behavior using data collected from a urban, culturally diverse school district. First, the variability in and growth of the HTKS was analyzed. Second, behavior regulation scores were compared to measures of language and teacher-rated behavior to determine their relation. It was hypothesized that the HTKS would prove to be a valid measure of behavioral regulation in prekindergarten, and that it would related to measures of language and teacher-rated behavior.

Executive Function

Executive function is comprised of the basic skills needed to manage daily life. The skills to focus, maintain self-control, and manage multiple tasks despite desirability or distractions allow people to make decisions and achieve goals. The ability to attend to, analyze, and manipulate information in the brain while ignoring both intrinsic and extrinsic distractions in favor of goal attainment is a challenging, complex process. It involves selecting the information that is relevant to the task at hand, brainstorming potential solutions, and continually revising plans, all while suppressing the frustration to quit when mistakes are made or the task becomes too difficult or overwhelming (National Scientific Council on the Developing Child, 2011). Executive function is responsible for the most simple of tasks, from following the necessary steps to get dressed in the morning to choosing which movie to watch. Yet this foundation for making such decisions is also

involved in the most important aspects of life, such as planning for the future and responding to crisis. Executive function can be viewed as a continuous process of self-regulation that, when functioning at its best, allows one to utilize his or her skills to prioritize and direct activities for maximum performance and both short-term and long-term success.

People are not born with executive function skills; instead, they are genetically wired to develop these abilities as they grow, with variability in skill acquisition based at least in part on environmental differences experienced from prenatal to early childhood. Early childhood is a critical time for brain development including executive function, and fostering skill development during this time is essential in order to reach one's genetic potential. Self-regulation is learned through the modeling of appropriate behavior, opportunity to develop skills in real-life situations, and receiving appropriate feedback on performance. According to the National Scientific Council on the Developing Child (2011), exposure to situations in which children can practice executive function skills is the best way to develop the abilities to be successful in planning and achieving goals. They state, "Providing the support that children need to build these skills at home, in child care and preschool programs, and in other settings they experience regularly is one of society's most important responsibilities."

Formal schooling requires the use of executive function skills in order to focus on instruction, ignore classroom distractions, and learn and integrate information. It can be a difficult transition for young children lacking the skills to pay attention and control their impulses (Lewit & Shuurmann Baker, 1995; National Scientific Council On the Developing Child, 2011). Preschool is viewed as a time for young children to develop

executive skills before entering kindergarten, where academic instruction becomes more intense (Bowman, Donovan, & Burns, 2001). In addition, the school day becomes longer in kindergarten and schedule allows little or no time for napping, free play, and unstructured activities. These shifts in schedule and academic instruction demand an appropriate mastery of self-regulatory behaviors to be successful in kindergarten. Children are expected to enter kindergarten prepared for these changes, which makes preschool a critical time for executive skill building.

School Readiness

Preschool is an important time for young children, as they obtain academic and social skills that aid them in the transition to more formal schooling (Bowman, Donovan, & Burns, 2001). School readiness is a broad term referring to a child's preparedness to enter formal schooling. This includes both the ability to adhere to the structure and routine of the school environment and the demonstration of progress as outlined by educational curriculum standards. The concept of school readiness is distinct from that of learning readiness, as the latter relates to a child's capacity to excel academically. Research suggests that young children who are able to adjust quickly to the demands of schooling demonstrate more academic and social success. Children lacking school readiness skills are at risk of school failure (Lewit & Shuurmann Baker, 1995).

The most widely used indicator of school readiness is chronological age. Research suggests that chronological age is correlated with language skills and other achievement variables, though it does not take into account individual differences. Children may

enter school with the chronological age and developmental capability to learn and then struggle to be successful in school (Lewit & Shuurmann Baker, 1995). The ability to self-regulate has been shown to be a critical element of school readiness (Blair, 2002; Blair & Peters Razza, 2007).

Self-Regulation and Early Educational Achievement

As children move from preschool to kindergarten, there is an increased demand for self-regulatory behaviors (Pianta & Rimm-Kaufman, 2006), and research has shown that children begin early education with varying levels of skills in this area (Foulks & Morrow, 1989; Lin, Lawrence, & Gorrell, 2003; McClelland, et al., 2007). Self-regulation involves the management one's own attention, thoughts, emotions, and actions through inhibition and meaningful direction. A substantial growth in self-regulatory behaviors is typical in preschool-aged children as they experience an increased demand for skills in this area when exposed to the more structured environment (McClelland & Cameron, 2011).

The development of regulatory skills in early childhood is linked to a healthy adjustment to formal schooling (Blair, 2002). Self-regulation behaviors have been associated with academic achievement throughout preschool and elementary school, in part through the development of both desirable behaviors in the classroom and abilities that aid in academic achievement (Blair & Peters Razza, 2007; McClelland, et al., 2007). Research suggests that many children enter preschool without the necessary skills to adapt to the demands of a school routine (Blair, 2002; McClelland & Cameron, 2011). Studies show that children lacking appropriate self-regulatory skills are significantly

more likely to perform poorly in academics and be isolated by peers (Cooper & Farran, 1988; Ladd, Birch, & Buhs, 1999; McClelland, et al., 2007; McClelland, Morrison, & Holmes, 2000).

Behavioral Regulation and its Importance in Early Education

Although self-regulation has been shown to be related to several aspects of functioning, school demands the most from students in the area of behavior (McClelland & Cameron, 2011). Behavioral regulation is a specific type of self-regulation that specifically encompasses attention, inhibitory control, and working memory skills, which are important contributors to school readiness (Cameron Ponitz, et al. 2008; McClelland, et al., 2007).

Attention

Attention is a process in which one absorbs information through conscious mental effort. There are several aspects involved in attention that allow a person to learn. Focus must be maintained on the specific person or task in order to obtain information (Cameron Ponitz, et al., 2008; McClelland & Cameron, 2011). The demand for attention can be focused through all senses, though most tasks require attention to visual and auditory presentations. The duration of one's attention should vary depending on the length, importance, and complexity of the stimulus. Attention also involves shifting focus first to a new stimulus, then between stimuli as needed (Cameron Ponitz, et al., 2008; McClelland & Cameron, 2011). Finally, one should be able to filter any extraneous

distractions in order to sustain focus on the task at hand (Matthews, Cameron Ponitz, & Morrison, 2009).

Attention skills are still developing in early childhood. In preschool, children are asked to shift and maintain their focus when new concepts are introduced or when conducting sorting and matching activities. The development of attention in preschool-aged children helps to form a foundation for learning by honing a skill that vital to classroom functioning and academic progress. Attention is necessary for learning school rules and social norms, and has been shown to aid in later problem-solving and social interaction skills (National Scientific Council on the Developing Child, 2011).

Inhibitory Control

Inhibitory control refers to the ability to perform an appropriate behavior instead of a reflexive one (McClelland & Cameron, 2011). It is the internal force that resists the desire to act on one's impulse. It is a learned behavior that requires delaying gratification through a conscious effort of controlling one's thoughts and emotions that may reduce the likelihood of reaching a goal. Even when distractions exist and there are opportunities to engage in more pleasing activities, inhibitory control is the process that directs a person to the higher priority, less interesting task (National Scientific Council on the Developing Child, 2011).

For children, developing inhibitory control skills can be an especially grueling process. In school, children must learn to raise their hand and wait to speak until called upon (McClelland & Cameron, 2011; National Scientific Council on the Developing Child, 2011). They must accept that they can only play during specific times, even when

the toys and other engaging materials are within view throughout the day. They must resist the urge to leave their seat and instead follow the classroom rules to stay seated and listen to the teacher. In addition, they are expected to talk through their problems with peers instead of verbally or physically retaliating and even further, assess whether another's action was intentional or accidental. Popular early childhood games such as "Simon Says" and "Red Light/Green Light" test children's inhibitory control and give them an opportunity to practice this skill (National Scientific Council on the Developing Child, 2011).

Working Memory

Working memory is the process of keeping specific information in mind for a short amount of time with the intent to use it for problem solving or other tasks (National Scientific Council on the Developing Child, 2011). It integrates the storage and processing of new and previously learned information and allows people to perform more efficiently (McClelland & Cameron, 2011). Working memory is operating when one must follow oral and written multi-step directions, return to a task after a disruption, and connect information from multiple sources (National Scientific Council on the Developing Child, 2011).

In preschool, children are asked to use working memory skills to follow and summarize a story, identify and recite patterns, and make predictions by applying newly learned information to a concrete task. (McClelland & Cameron, 2011, National Scientific Council on the Developing Child, 2011). For example, shortly after a lesson on the basics of color mixing, students may be engaged in a hands-on paint mixing

experiment where they must first guess which primary colors can be combined to make a secondary color. This requires children to use working memory to both integrate and manipulate previously learned information and apply it to the current activity. Socially, children use working memory when taking turns, remembering the rules of a game, and playing creatively in a group (National Scientific Council on the Developing Child, 2011). The development of this skill can be seen in the classroom when a student raises his or her hand, waits patiently to be called upon, and remembers their thought when it is his or her turn.

Behavior Regulation in Early Education

Attention, inhibitory control, and working memory function interdependently. The process of learning demands integrated behavior regulation skills in order to be successful. However, behavior regulation is related to both academic and social performance in early education. In school, children are expected to simultaneously direct attention to specific tasks, control their behavior, and process and integrate information. When one aspect of a child's behavior regulation is not functioning, it will affect the others. For instance, without attending to new information, working memory cannot be tapped to utilize the information later. When a child cannot inhibit inappropriate behaviors, he or she will have difficulty paying attention.

Many times, elementary school teachers are the first to recognize students who lack age appropriate regulatory skills. This is in part due to typical increases in class size, emphasis on academics, and behavior expectations in formal schooling. Even if a child is academically ready for elementary school, a lack in behavior regulation decreases his or

her ability to learn, and affects the classroom by shifting the teacher's attention from academic instruction to behavior modification (National Scientific Council on the Developing Child, 2011; Cameron Ponitz, et al., 2008).

Teachers report that students who are able to ignore distractions in order to focus on a task demand are more successful in school. The ability to inhibit certain behaviors in favor of others has been shown to relate to later determination and interest in academics (Blair & Peters Razza, 2007). Behavioral regulation abilities are predictive of academic achievement, executive functioning, and overall school success (McClelland, Cameron, Wanless, & Murray, 2007). For example, the ability to pay attention in preschool has been found to predict reading and math skills at age four-and-a-half (NICHD Early Child Care Research Network, 2003). Working memory has been associated with academic skills at the elementary school level (Cameron Ponitz, et al., 2009; Gathercole & Pickering, 2000; Kail, 2003). Furthermore, children with a behavioral regulation deficit are more likely to have lower cognitive assessment performance, poor academic achievement, conduct issues, and high school dropout (Bronson, Tivnan, & Seppanen, 1995; Cameron Ponitz, et al., 2009; Duncan, et al., 2007; Eisenberg, et al., 2000; Shaw, Gilliom, Ingoldsby, & Nagin, 2003; Vitaro, Brendgen, Larose, & Tremblay., 2005). Lower parent education levels and emotional issues are identified risk factors linked to a lack of behavioral regulation (Bronson, et al., 1995).

Teacher reports have shown to be consistent with evidence linking behavioral regulation to academic achievement. According to teacher ratings, behavioral regulation was found to be more predictive of scholastic success than motivation (Lange, Farran, & Boyles, 1999). When asked what skills are "essential" or "very important" for

kindergarten students, sixty percent of kindergarten teachers answered following directions and not disrupting the class and forty-two percent listed sitting still and paying attention (Lewit & Schuurmann Baker, 1995). In another study, nearly half of kindergarten teachers stated that the majority of children in their classrooms do not begin the school year with adaptive behavioral regulation skills (Rimm-Kaufman, Pianta, & Cox, 2000). Overall, teacher reports suggest a deficit in student readiness related to regulating behavior, including taking turns and appropriately transitioning to new tasks (Cameron Ponitz, et al. 2008). These findings suggest that behavior regulation is one of the most indicators of classroom functioning and academic achievement, highlighting the need for further investigation and practical application.

Several background and demographic factors have been shown to relate to behavioral regulation. Although research is mixed with regard to attention or working memory, girls typically have more behavioral regulation skills in school, including inhibitory control and persistence, compared to boys (Cameron Ponitz, et al. 2008). In addition, some research has shown that children of ethnic minority status demonstrate a lesser ability to regulate behavior, though the effects diminish after controlling for socioeconomic status (Connell & Prinz, 2002). The relation of behavioral regulation scores to background and demographic variables (with the exception of gender) and other school success measures (i.e. teacher reports) is currently understudied (Cameron Ponitz, et al. 2008).

Assessment of School Readiness and Behavioral Regulation

As previously mentioned, chronological age is the most widely used measure of school readiness. However, because early childhood is a time of marked physical, cognitive, and social development, chronological age should not be the sole indicator of a child's ability to succeed in school. Growth in early childhood is highly variable due to individual differences and other factors such as prenatal care, nutrition, and prior exposure to academic concepts. It is important to understand and account for these differences in order for children to be successful in prekindergarten.

Yet, it is difficult to develop valid screening tools to determine children at-risk for school failure. Screening tools for children are typically modified versions of adult assessment measures. They incorporate measures of verbal, motor, and attentional skills, which are still developing in early childhood (Isquith, et al., 2005). Many instruments are available to measure basic language and mathematics skills, as the focus of screening has been on academic achievement outcomes. Historically, there has been less of a focus on social and behavioral aspects of school readiness, which play a critical role in school success.

The development of appropriate screening tools must not only incorporate relevant measures of the target behavior, but also an evaluation of the implications of the behavior in a school setting (Isquith, et al., 2005). It is important to note that although helpful in determining areas of strength and weakness, screening tools should be used as indicators of specific skills and abilities rather than determinants of school readiness (Isquith, et al., 2003; Lewit & Shuurmann Baker, 1995).

Behavioral regulation is an important area of study with regard to screening and early intervention (Blair, 2002). Although research has linked behavioral regulation and academic achievement, the developmental stage at which these skills become important is unknown (McClelland, et al., 2007). Due to the necessity of these skills, there is a need for a reliable and valid measure of behavioral regulation in early childhood that can predict academic outcomes and help preschool children transition to kindergarten (Cameron Ponitz, et al. 2008; Cameron Ponitz, et al., 2009). Current methods of assessment include teacher or parent reports, which are useful in providing information across settings, but subject to observer bias. Existing direct observation measures are intended for research in clinical settings that may lack practical application and typically to not cover the range of ages in early childhood education (McClelland & Cameron, 2011; McClelland, et al., 2007). Furthermore, many direct observation measures require specialized supplies and considerable time to administer, which may not be convenient. In addition, some young children may not have the fine motor skills necessary to complete the tasks that are typically incorporated, regardless of their ability to regulate their behavior (Cameron Ponitz, et al. 2008).

Perhaps most importantly with regard to behavior regulation in school is the need to incorporate context specific to the classroom environment in the measure. Existing behavioral regulation measures typically do not account for the complexity and often competing nature of task demands in school. In order for a measure of behavioral regulation in school to be ecologically valid, it must match the regulatory demands of the educational environment (McClelland & Cameron, 2011).

Description of the Head-Toes-Knees-Shoulders Task

The Head-to-Toes (HTT) Task was developed to measure the behaviors that are typically necessary for school success. The task requires counterintuitive responses to two commands: “touch your head” and “touch your toes” (Cameron Ponitz, et al., 2008). The Head-Toes-Knees-Shoulders (HTKS) task is an extension of the HTT Task, which includes more rules to remember in order to increase the difficulty of the task and possible range of scores (Cameron Ponitz, et al., 2008; Cameron Ponitz, et al., 2009). The HTKS task utilizes the abilities found to be related to behavioral regulation by the use of instructions that require children to attend, remember, and inhibit intuitive responses and instead perform the opposite behavior (Cameron Ponitz, et al., 2009; McClelland & Cameron, 2011). The incorporation of all three aspects of behavioral regulation suggests its utility as a screening tool in schools.

Evidence suggests HTKS demonstrates reliability among raters, scoring consistency, and an absence of practice effects (Cameron Ponitz, et al., 2009; McClelland & Cameron, 2011; Wanless, 2008). This behavioral regulation measure is predictive of academic achievement in elementary school, and is correlated with parent ratings of attention and inhibitory control and teacher ratings of classroom behavioral regulation (Burrage, et al., 2008; Connor, et al., 2007; Cameron Ponitz, et al., 2009; Matthews, Cameron, & Morrison, 2007). Though limited in scope, HTT (predecessor to HTKS) has been translated into several languages and administered in the United States and Asian countries, and demonstrated ecological validity (Cameron Ponitz, et al., 2009; McClelland & Cameron, 2011; McClelland, et al., 2011; Wanless, et al. 2008).

Overview of the Present Study

The present study examined the nature of HTKS scores and their relation to measures of language (Peabody Picture Vocabulary Test) and teacher-rated behavior (Social Skills Rating System) using data collected from an urban, culturally diverse school district. First, variability of and growth in HTKS scores was analyzed. Second, behavior regulation scores were compared to measures of language and teacher-rated behavior to determine their relation. It was hypothesized that HTKS scores will demonstrate evidence of variability and growth, and that measures of behavior regulation will be related to those of language and teacher-rated behavior.

CHAPTER II

METHOD

The present study examined the nature of HTKS scores and their relation to measures of language and teacher-rated behavior using data collected from a urban, culturally diverse school district. First, the variability in and growth of the HTKS was analyzed. Second, behavior regulation scores were compared to measures of language and teacher-rated behavior to determine their relation. It was hypothesized that the HTKS would prove to be a valid measure of behavioral regulation in prekindergarten, and that it would related to measures of language and teacher-rated behavior.

Participants

The sample was composed of 227 preschool children (125 girls) who participated in a two-year longitudinal study of a dual language (English/Spanish) immersion program in an urban, culturally diverse New Jersey school district (Grant #4-30841; DLL citation, in preparation). Children ranged in age from 3.75 to 5.25 years ($M = 4.47$, $SD = .30$ years), and all participants were in their second year of preschool. The average education level for mothers of participants approached a high school degree ($M = 11.69$), with 76% of mothers receiving at least a high school diploma/equivalent. Ninety percent ($n = 204$) of the participants were Hispanic, of which 37% spoke Spanish at home, 34% spoke English at home, and 29% spoke both Spanish and English at home. The remaining sample was 5% Asian, 4% Black, and 1% White. At the start of the study, 43% of students were Spanish dominant, 42% were English dominant, 13% spoke both English

and Spanish equally, and 2% (5 students) were dominant in a language other than English or Spanish.

In the first year of the study, six students were randomly selected from each classroom to participate in the study through the use of a computer-generated random number table. A written active consent form was sent home with students selected to participate, and those with returned consent forms signed by a parent or legal guardian were assessed. Passive consent forms were distributed to students in the sample during the second year of the study to continue participation in the study. Those who returned signed passive consent forms revoked permission to continue participation. This analysis used data from the second year of the study. Children were nested in 79 classrooms at 7 schools.

Procedure

Children were assessed in the fall and spring of their prekindergarten year by data collectors trained in the administration of the selected instruments. A full battery, consisting of the Peabody Picture Vocabulary Test (PPVT-III), Head-Toes-Knees-Shoulders (HTKS), and Social Skills Rating System (SSRS) was administered for all participants at each assessment.

The PPVT was administered to all students to determine their language skills. Children were assessed using the English and/or Spanish version(s) HTKS based on their fluency in either or both languages. Children who were administered both the English and Spanish versions of HTKS were assessed on two separate dates. The average time needed

to administer the complete assessment was fifteen minutes. As an incentive, children were given a sticker for each completed test battery.

Measures

Peabody Picture Vocabulary Test, Third Edition (PPVT-III)

The PPVT-III (Dunn & Dunn, 1981) is a norm-referenced measure of listening comprehension and receptive language skills in which a given word is identified by selecting one of four presented pictures. This assessment is designed for ages two-and-a-half to adult and can be used as a measure of general cognitive ability. Reliability coefficients for the PPVT-III range from .85 (test-retest) to .97 (internal consistency). Concurrent validity coefficients between .40 and .80 have been established through correlations with general intelligence tests.

Head-Toes-Knees-Shoulders (HTKS)

The HTKS was administered as a measure of behavioral regulation. Children were first introduced to the rules by touching their heads, and then their toes. Next, participants are asked to perform the opposite of the command (i.e. when asked to “touch your head,” the student should touch his or her toes). This process is repeated changing the body parts to “knees” and “shoulders.” Finally, the four body parts are included all together. The HTKS is comprised of twenty questions, each of which are worth 0-2 points. Total scores range from 0-40 points on this measure. Research demonstrates variability in scores, adequate interrater reliability, and construct validity (Cameron Ponitz, et al., 2009). There is evidence of convergent validity with teacher ratings, and an

absence of practice effects (McClelland, et al., 2007; Cameron Ponitz, et al., 2008). Two forms of the HTKS are available, Forms A and B, which reverse the Parts I and II of the task to avoid practice effects. Form A was used in the fall, and Form B was used in the spring. Each form is available in English and Spanish. For the present study, the HTKS was administered in either English, Spanish, or both languages based on the child's fluency in each language. Because the HTKS is identical in English and Spanish, best scores were calculated and inputted in subsequent analyses for students who were administered both English and Spanish versions of the task.

Social Skills Rating System (SSRS)

The SSRS Preschool Level Questionnaire- Teacher was distributed to the lead teacher of each participant to obtain a teacher rating of student behavior. The SSRS (Gresham & Elliot, 1990) is a 30-question rating scale with questions related to social skills and problem behaviors. The Social Skills Scale is comprised of three subscales (Cooperation, Assertion, and Self Control), and the Problem Behaviors Scale consists of two subscales (Externalizing and Internalizing). Teachers are asked to rate both the frequency of each behavior (never, sometimes, often), as well as how important each behavior is to him or her (not at all, somewhat, very). Coefficient alpha reliabilities for the SSRS Preschool Level Questionnaire- Teacher range from .74 to .94 based on the tryout sample, indicating good internal consistency (Gresham & Elliot, 1990).

CHAPTER III

RESULTS

The present study investigated the nature and variability of the HTKS in a culturally diverse sample. Behavioral regulation was further examined through its relation to achievement in language skills and teacher-rated behavior in the fall and spring of the prekindergarten year.

Missing Data

The current study had a participant retention rate of 93% from Year 1 to Year 2 of the study. Ongoing collaboration with the district and school staff aided the tracking of nearly every student in the study. Of the seventeen students who were not tested in the spring, six moved to other school districts prior to spring testing. The remaining students were either missed by assessors (4 students) or not located by the end of spring data collection (7 students). Fall HTKS data was missing from nine of the 227 students and spring HTKS data was missing from five of the remaining 210 participants, due to assessor errors that led to invalid test results. Data regarding language skills is complete for the fall and spring. Social skills scores for teacher-rated behavior are missing for 28% of students in the fall and 39% of students in the spring, with missing subscale scores ranging from between 15-22% of students in the fall and 35-37% of students in the spring. Most of the missingness in social skills scores is believed to be a result of teacher variables not investigated in the present study. Completeness of subscale score data

varies due to unanswered (skipped) questions on the measure, which also contributes to the number of missing social skills scores, as incomplete scales were not used in the present analysis.

Growth in behavioral regulation scores could not be calculated for the seventeen students who were not tested in the spring. In addition to those not tested in the spring, gains in behavior scores could not be determined for children missing HTKS data in the fall (4%) or spring (2%).

Nature, Variability, and Growth of HTKS Scores

Descriptive statistics indicated that variability was present in behavioral regulation scores in both the fall and spring (see Table 1). In the fall, the average HTKS score obtained was 6.37 ($SD = 10.01$), and the average HTKS score in the spring was 15.95 ($SD = 12.27$). Although there was some evidence of nonnormality in the distributions of HTKS scores, skewness (fall: 1.59, spring: .19) and kurtosis (fall: 1.23, spring: -1.29) values were not extreme (Kline, 2005). In the fall, about half of the children obtained final scores above floor and below ceiling levels (51%; see Table 2), with the remaining students earning 0 points on the task. In the spring, 85% of students earned scores between floor and ceiling levels, while 13% received scores of 0. Three students (1.5%) reached the ceiling in the spring. Item-level variability was evidenced by individual item scores ranging from 0 to 2 points, with standard deviations ranging from .30 to .34 in the fall, and .14 to .31 in the spring. Difficulty progression of the HTKS was also found, as the percentage of students receiving 2 points decreased as the task advanced (see Table 3).

Significant age differences were not evident in the fall, $F(1, 80) = 1.83, p > .05$, or in the spring, $F(1, 90) = 3.091, p > .05$. Results indicate that older students (at least 1 *SD* above the mean age) and younger students (at least 1 *SD* below the mean age) did not significantly differ in obtained HTKS scores. No significant gender differences were found in either the fall, $t(218) = -4.26, p > .05$ (girls $M = 6.12, SD = 9.69$; boys $M = 6.71, SD = 10.46$), or the spring, $t(206) = 1.24, p > .05$ (girls $M = 16.88, SD = 11.72$; boys $M = 14.76, SD = 12.75$).

Significant associations between behavioral regulation scores and several background variables were found. In both the fall and spring, children who scored higher on the HTKS were older ($r = .17, p > .05$ in the fall, $r = .23, p < .001$ in the spring) and were administered the task in English ($r = -.35, p < .001$ in the fall, $r = .30, p < .001$ in the spring). In addition, children receiving higher behavioral regulation scores in the fall had mothers with higher educational attainment.

Children also demonstrated significant growth in behavioral regulation over the course of the year, $t(196) = 9.02, p < .001$. The average HTKS score rose by 9.58 points from fall to spring. Fall and spring HTKS scores were significantly positively correlated ($r = .23$). Improvement in behavioral regulation is evidenced in the distribution of HTKS scores (see Table 2), as fewer children obtained scores of 0 (floor) and more children obtained scores approaching and reaching 40 (ceiling). Item-level scores (see Table 3) reveal similar patterns of growth.

Behavioral Regulation and Language Skills

Language scores were examined and found to be related to several demographic variables as well as behavior regulation scores. Ethnicity, language of the home, and mother's years of education were significantly positively correlated with fall and spring language scores. Child age was significantly positively related to fall language scores. Language scores were not correlated with gender at either time point. Correlations indicated that fall and spring HTKS scores were significantly positively related to early language skills at both time points (see Table 4). The strongest correlation was found between fall behavioral regulation and spring language scores ($r = .30$), and the weakest correlation was found to be between fall language and spring behavioral regulation ($r = .17$).

Behavioral Regulation and Teacher-Rated Behavior

Behavioral regulation and teacher-rated behavior were examined to determine whether there was a relation between the measures of behavior. An association was found between fall behavioral regulation and spring teacher-rated behavior ($r = .16$). Otherwise, there two measures of behavior were not correlated (see Table 4). Although no significant gender differences were found in HTKS scores, $F(1, 216) = .191, p > .05$, significant gender differences in teacher behavior ratings were present in both fall and spring. In the fall, teachers rated girls' behavior ($M = 44.44, SD = 9.42$) significantly higher than boys' behavior ($M = 38.49, SD = 10.44$), $F(1, 161) = 14.58, p < .001$. In the spring, teachers also rated girls' behavior ($M = 48.64, SD = 8.58$) significantly higher than that of boys ($M = 43.47, SD = 10.44$), $F(1, 136) = 10.17, p < .01$. In the fall, SSRS scores significantly

positively correlated with age ($r = .16$) and ethnicity ($r = .15$). However, similar to the HTKS, significant differences were not present in teacher ratings of behavior for older and younger students in either the fall, $F(1, 59) = 2.04, p > .05$, or spring, $F(1, 19) = .328, p > .05$. Based on this data, both direct observational and teacher-rated behavior regulation data did not show age differences, but gender differences were evident in teacher behavior ratings.

CHAPTER IV

DISCUSSION

The purpose of this study was to examine behavioral regulation in preschool students using the Head-Toes-Knees-Shoulders (HTKS). This task requires children to utilize behavioral regulation skills (attention, working memory, and inhibitory control) to act in response to counterintuitive task demands. Results indicated that the HTKS captured variability in scores. HTKS scores significantly correlated with several background and outcome variables. In addition, students' behavioral regulation significantly improved over the course of the school year. HTKS scores were found to be correlated with a measure of language in both the beginning and end of prekindergarten, but the only significant correlation found between measures of behavior was between fall HTKS scores and spring teacher-rated behavior.

Behavior Regulation as an Indicator of School Readiness

Behavior regulation is a form of executive function by which people manage their attention, inhibitory control, and working memory to achieve goals. These processes operate simultaneously and aid in both routine tasks and vital life functions. Behavior regulation develops over time, with variability in regulatory skills based in part on individual differences, but also on prenatal and early childhood environments (National Scientific Council on the Developing Child, 2011). Studies show that behavior regulation is rated by teachers as an indicator of school readiness, and has been found to be more

valuable to classroom functioning and student achievement than prior knowledge, motivation, and chronological age (Lange, Farran, & Boyles, 1999; National Scientific Council on the Developing Child, 2011). Behavior regulation in early childhood is linked to academic achievement and social-emotional functioning in later years (Blair & Peters Razza, 2007; McClelland, et al., 2007). Based on this information, it is important to develop methods for measuring behavior regulation in early childhood and practices for increases regulatory skills in school and at home.

Head-Toes-Knees-Shoulders Task (HTKS)

The HTKS is a direct measure of assessing behavior regulation in early childhood. It incorporates all aspects of behavior regulation related to school success, as it requires attention to commands, inhibition of reflexive responses, and remembering of instructions (Cameron Ponitz, et al., 2009). An added benefit of this assessment tool is that it requires a simultaneous operation of behavioral regulation skills, which is expected of young children in a school setting (McClelland & Cameron, 2011). Prior research indicates that the skills captured by the HTKS (attention, working memory, and inhibitory control) are essential components of academic success (Gathercole & Pickering, 2000; Kail, 2003; NICHD Early Child Care Research Network, 2003; Cameron Ponitz, et al., 2009;).

Administration of HTKS

The predecessor to the HTKS, the Head-to-Toes (HTT) task, was initially designed for use with children ages three to six. The HTT authors then developed the

HTKS as an extension that incorporated an additional set of rules based on a growing body of research that suggests that older preschoolers are cognitively able to process a more complex behavior demand. The authors suggest using the HTT task for students ages three through five, and the more difficult HTKS task for students five to six years old, allowing some flexibility in determining which task to administer (Cameron Ponitz, et al., 2008; Cameron Ponitz, et al., 2009).

In the current study, the HTKS was used for all students even though their ages ranged from 3.75 to 5.25 years at the beginning of Year 2 of the longitudinal study from which the current data derives. There were several reasons for this decision. First, the longitudinal study was planned during 2008-2009, when the HTKS was recently developed and limited data was available regarding administration recommendations for age groups. Second, because the study was conducted over a two-year period, it was postulated that ceiling levels would be reached more quickly by Year 2 if the HTT was administered. It was decided that administering a slightly more difficult task would potentially yield greater data about both gains in behavior regulation and classroom-level variables not included in the present study.

Nature and Variability of HTKS

The primary aim of the current study was to assess the utility of the HTKS in an urban, culturally diverse school district. Data was collected determine whether the HTKS demonstrated usefulness and variability with this sample.

Results indicated variability in HTKS scores as evidenced by the distribution of final (see Table 2) and item-level scores (see Table 3). Many more students obtained total

scores of 0 in the fall than in the spring, which suggests that the HTKS was a difficult task for them to perform. Item-level scores in the fall reveal that most children obtained scores of 0 on the first three items of the measure. These data appear to confirm the difficulty many children had performing the task at that time point. Interestingly, the item-level data also relates to the administration of the HTKS task instead of the HTT task. The low rate of success in the beginning of the task suggests that their difficulty was not in managing two sets of directions (which begin at item 11), but in understanding or performing the task in general. Of the students who were able to move onto Part II, about half were able to adjust to a new set of directions.

HTKS Growth

Significant gains were made in HTKS scores from the fall to spring. In the fall, nearly half of the students obtained scores of 0 on the measure, and there were no instances of students reaching ceiling level (see Table 2). In the spring, the distribution of scores significantly shifted, with the vast majority of students obtaining scores between floor and ceiling levels. No students received scores of 0, and three students reached scores of 40 (ceiling). In addition, item-level scores improved over the course of the year, as less students received scores of 0 in the beginning, middle, and end of the task (see Table 3). Although familiarity with the task may have contributed to improved scores in the spring, research indicates that growth in Head-to-Toes Task (predecessor to HTKS) scores suggests that skill acquisition is predictive of behavioral regulation gains (Cameron Ponitz, et al., 2008; Cameron Ponitz, et al., 2009).

HTKS and Demographic Variables

HTKS scores were found to correlate with several background variables, including age, home language, mother's level of education, and language of task administration. HTKS scores did not significantly correlate with ethnicity or gender in the fall or spring.

HTKS and Age

Findings from the distribution of HTKS total scores (see Table 2) indicate that both younger and older students demonstrated variability in total scores obtained in both fall and spring. HTKS scores in the fall and spring were correlated with age (see Table 4), which is generally consistent with previous research (Cameron Ponitz, et al., 2009; Matthews, Cameron Ponitz, & Morrison, 2009; McClelland, et al., 2007). However, significant differences were not evident between the oldest and youngest students. This suggests that although a pattern emerged between student age and HTKS scores, differences in scores were not extreme between the oldest and youngest participants.

This differs from a study (Wanless, 2008) that did find significant age differences. Although comparatively the current study has a slightly more variable age range (.5 years), participants were also older (difference in average age: .38 years). It is hypothesized that age differences were not found in the present study because all participants had one year of prior schooling where they were exposed to behavior regulation demands. In addition, the age range of the participants is similar to that found in their preschool classrooms, so younger students may have been able to model older students' appropriate behavior, and/or older students may have had fewer demands

placed on them if behavior expectations were designed for the average age of the classroom.

HTKS and Gender

HTKS scores were not correlated with gender in either the fall or spring (see Table 4). No significant gender differences were noted at either time point. Relations between behavior regulation and gender have been mixed, with some evidence that girls outperform boys on the task (Cameron Ponitz, et al., 2009; McClelland, et al., 2007; Matthews, Cameron Ponitz, & Morrison, 2009; Wanless, 2008). In the present sample, prior school experience may have narrowed any gap between boys' and girls' behavior regulation skills.

HTKS and Ethnicity

The current study is based on a largely Hispanic sample, which is currently understudied in this area. Ethnicity was not found to correlate with HTKS scores at either time point. This may be because the sample is nearly 90 percent Hispanic, which accurately represents the school district population but also creates a very homogenous ethnic sample. However, based on the overall nature and variability of HTKS scores in this sample, it appears to be a valid measure of behavior regulation in dual language (English/Spanish) learning preschoolers.

HTKS and Language

The HTKS is available in both English and Spanish forms. English and Spanish language fluency was taken into account during administration. Students who spoke both English and Spanish were assessed in both languages, on separate days. Because the English and Spanish forms contain identical items, “best” HTKS scores were determined based on overall score and used for analysis. HTKS scores significantly correlated to the language of task administration in both the fall and spring, even after taking “best” scores into account.

This finding is similar to previous research (Cameron Ponitz, et al., 2009; McClelland, et al., 2007). It is possible that students with limited English proficiency have more difficulty regulating behavior in an environment where their primary language is not spoken. Research shows that students with limited English proficiency may demonstrate a lack of focus or inattention in the classroom due to limited comprehension, and have more difficulty developing behavior regulation skills when they are occupied with searching for meaning through context (Rhodes, Ochoa, & Ortiz, 2005). A delay in regulatory skills for students who are not fluent in English may be evident in HTKS scores. Further investigation of classroom-level variables, including teacher and assistant teacher language, is beyond the scope of the current study.

HTKS and Mother’s Education

The average education of a participant’s mother was slightly less than the equivalent of a high school diploma (11.69 years). This variable was significantly related to all outcome measures in the fall, and language scores in the spring. It is possible that

correlations with behavior measures reached nonsignificance in the spring because other factors, such as child education and exposure to school, had a greater impact on outcomes.

Behavioral Regulation and Language Skills

Results demonstrate that behavioral regulation is significantly related to receptive language. Correlations between HTKS and language skills reinforced prior findings that behavioral regulation is linked to academic achievement in early schooling (McClelland, et al., 2007; Cameron Ponitz, et al., 2009; Wanless, 2008). The highest correlation was found between fall behavior regulation and spring language scores. Further investigation of this relation may find evidence of the predictive ability of HTKS on language skills. These results were expected, as children with more advanced receptive language skills are familiar with more words and may have an advantage in comprehending directions, and children who are more regulated in school have an opportunity to learn more language.

Behavioral Regulation and Teacher-Rated Behavior

Correlations were not found between measures of behavior, with the exception of fall HTKS scores and spring SSRS scores ($r = .16$). Although data was nearly complete for HTKS, a large number of SSRS scores were missing at both time points (see Table 1). Missing SSRS scores are believed to be a result of several teacher variables not investigated in this study, including individual characteristics, the number of rating scales

teachers were asked to complete, decisions to skip items on the rating scale, and the ease in returning completed rating scales to data collectors.

Age differences were not found on either measure of behavior. As previously mentioned, this may be because classrooms contain a range of ages and teachers' expectations may reflect the average age of students in the classroom. Teachers rated girls' behavior as significantly better than boys, demonstrating a gender gap that was not found in HTKS scores. Research on teacher ratings in regarding gender, but some evidence suggests that teacher ratings yield more bias toward gender than other measures (Cooper & Farran, 1988).

Limitations of the Current Study

The current study demonstrated the utility of HTKS as a measure of behavior regulation in a predominately Hispanic sample, though several limitations should be acknowledged.

Measures

The HTKS task is a direct observation measure of early childhood behavior regulation that simultaneously targets regulatory skills linked to school readiness and achievement (McClelland & Cameron, 2011). In addition to the measures used in the current study, classroom observations and parent input may aid in further validating the HTKS task.

Variables

Although several background and demographic variables were taken into account, future research on preschool outcomes may benefit from obtaining data on rate of preschool attendance. A study on Latino preschool variables and mathematics achievement (Lopez, et al., 2007) found that preschool attendance was significantly correlated with English proficiency scores and mathematics achievement in middle school. In the current study, data collectors had difficulty assessing some students because of their absence from school.

In addition, future analysis of classroom-level variability is important because children were nested in seventy-nine classrooms at seven schools. Differences may emerge in behavior regulation trends when grouped by classroom and school, including classroom behavior expectations. It is especially important because the amount of English and Spanish instruction varied by classroom, training was provided to some teachers as part of the larger longitudinal study, and inconsistency was noted in the return rate of behavior rating scales.

Data Analysis

More intensive data analysis may aid in understanding the relation between HTKS and outcome variables. For example, overall SSRS scores were used for analysis. Although beyond the scope of the current study, subscale scores yielded more complete data and may have proven useful in comparing the measures of behavior. Future research should examine the correlation between behavioral regulation scores and Social Skills Rating Scale subscale scores, as some items may relate more to behavioral regulation

than others. In addition, further examination (Hierarchical Linear Modeling and/or regression) of the relation between HTKS and other outcome measures is beyond the scope of this study. This data would serve to determine the predictive ability of HTKS in academic achievement and school success.

Follow-Up

The current study analyzed data from a larger, two-year longitudinal study. Results from the larger study may yield more information about the academic progress of the students in relation to their behavioral regulation. In the future, a follow-up study on these students would help to understand how early educational behavior and achievement relates to later performance. These results would be particularly beneficial in the study of urban Hispanic students' achievement.

Implications for Practice

Research suggests that school readiness is a critical factor for success in formal schooling and that executive function, specifically in the area of behavior regulation, is a significant indicator school readiness. As practitioners screen entering preschoolers, it is important to determine not only their chronological age and current academic knowledge, but how the child will function in a classroom. The present study adds to the body of research suggesting that a combination of approaches is most useful when assessing preschool behavior (Bronson, Tivnan, & Seppanen, 1995). The incorporation of observational methods and rating scales aided in a fuller understanding of the participants in this study.

Screening measures are important tools for determining regulatory skills. They should be used in conjunction with observations, parent narratives, and other available information to evaluate each child's level of executive function prior to school entry. These measures can serve as a baseline for comparison at the end of the preschool year, not only to assess individual progress, but as an indicator of success for child, classroom, and school-wide interventions.

Previous research suggests that the development of behavior regulation, as well as executive function in general, relies on the ability for a young children to be exposed to situations requiring these skills. Research supports the use of scaffolding, in which adults support the emerging skills of children by “establishing routines, providing cues, [and] breaking big tasks into smaller chunks” (National Scientific Council on the Developing Child, 2011). For instance, to help children master the ability to follow multi-step directions, adults can ensure that children first practice one-step directions (i.e. “Please get your coat”) before more complex two- and three-step directions (i.e. “Please get your coat, put your books in your backpack, and meet me at the front door.”). Proficiency is evidenced by the ability to follow more complex directions without reminders (National Scientific Council on the Developing Child, 2011).

Young children can benefit socially from practicing behavior regulation while playing creatively with others. When preschool-aged children play, they commonly imitate adult life as a method for understanding role expectations and appropriate behavior. Cooperative play increases during this time, as children navigate the rules of acceptable play and develop the regulatory skills to accept and incorporate others' styles and ideas into their play (National Scientific Council on the Developing Child, 2011).

Several preschool interventions focusing on the development of executive function have been successful. Although a full description is beyond the scope of this study, it is important to note what approaches have demonstrated effectiveness. They include a specific focus on the skills encompassing executive function, aiding teachers in implementing classroom management strategies, and emphasizing social-emotional skills and prosocial behavior through teacher modeling. The effectiveness of these interventions suggest that improving the quality of preschool programs can help preschools develop the executive functioning skills necessary to transition to formal schooling, though further investigation is needed to better understand the relation (National Scientific Council on the Developing Child, 2011).

Conclusion

The HTKS task has demonstrated utility as a direct observation measure of behavior regulation in early childhood. The measure demonstrates variability in scores for students ages three to five, including growth over the prekindergarten year. Research suggests that the HTKS is effective in assessing regulatory skills in several languages, including English, Spanish, and Mandarin Chinese (Cameron Ponitz, et al., 2008; Cameron Ponitz, et al., 2008; Matthews, Cameron Ponitz, & Morrison, 2009; McClelland, et al., 2007; Wanless, 2008).

Results of the present study are aligned with previous findings that the HTKS is a valid measure of behavioral regulation in early childhood. This data adds to that by including a substantial Hispanic population. Behavioral regulation was correlated with a measure of language skills throughout the school year, and was less related to a measure

of teacher-rated behavior. This research highlights the importance of behavioral regulation in early education as a link to academic achievement.

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Table 1.
Descriptive statistics

Variable	<i>M</i>	<i>SD</i>	Range	N
Age at Time 1 (in years)	4.47	.31	3.75-5.25	227
Gender (percent girls)	.55	.50	0-1	227
Ethnicity (0=Hispanic, 1=Non-Hispanic)	.10	.30	0-1	227
Mother's Education Level (in years)	11.69	3.09	5-18	214
Fall PPVT Type (0=English, 1=Spanish)	.14	.50	0-1	227
Fall Language Skills	32.52	15.89	4-78	227
Fall Teacher-Rated Social Skills	41.87	10.30	16-60	186
Fall HTKS Type (0=English, 1=Spanish)	.39	.50	0-1	218
Fall Self-Regulation	6.37	10.01	0-38	218
Spring PPVT Type (0=English, 1=Spanish)	.06	.50	0-1	210
Spring Language Skills	43.83	14.34	11-94	210
Spring Teacher-Rated Social Skills	46.46	9.71	15-60	138
Spring HTKS Type (0=English, 1=Spanish)	.37	.5	0-1	206
Spring Self-Regulation	15.95	12.27	0-40	206

Table 2.

Distribution of Head-Toes-Knees-Shoulders total scores

HTKS Score	Fall (N= 218)			Spring (N= 206)		
	Percentage	Age in years <i>M (SD)</i>	Age Range	Percentage	Age in years <i>M (SD)</i>	Age Range
0 (Floor)	48.6%	4.43 (.30)	3.92-5.25	13.1%	5.01 (.27)	4.58-5.42
1-19	38.5%	4.48 (.31)	3.92-5.25	42.2%	5.03 (.29)	4.33-5.58
20-39	12.8%	4.57 (.34)	3.75-4.92	43.2%	5.13 (.31)	4.50-5.83
40 (Ceiling)	0.0%	-	-	1.5%	5.00 (.14)	4.83-5.08

Table 3.

Distribution of Head-Toes-Knees-Shoulders item-level scores

	Fall				Spring			
HTKS Part I	0	1	2	SD	0	1	2	SD
Beginning (1-3)	70%	4%	26%	.87	27%	11%	62%	.82
Middle (4-7)	76%	3%	21%	.82	44%	8%	49%	.96
End (8-10)	78%	2%	19%	.79	50%	3%	48%	.99
HTKS Part II	0	1	2	SD	0	1	2	SD
Beginning (11-13)	46%	8%	46%	.97	32%	9%	59%	.85
Middle (14-17)	70%	11%	20%	.80	61%	12%	27%	.86
End (18-20)	69%	4%	27%	.89	70%	5%	25%	.86

Table 4.
Correlations between Background and Outcome Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Age at Time 1 (in Years)	-												
2. Gender (0=Female, 1=Male)	.12 [†]	-											
3. Ethnicity (0=Hispanic, 1=Non-Hispanic)	.06	.02	-										
4. Home Language (0=English, 1=Spanish)	-.07	-.11	-.20**	-									
5. Mother's Education	-.01	-.04	.25***	-.19*	-								
6. Fall Language Skills	.25***	.02	.26***	-.34***	.34***	-							
7. Fall HTKS Type (0=English, 1=Spanish)	-.07	-.08	-.59***	.28***	-.18***	-.22***	-						
8. Fall Self-Regulation	.17*	.03	-.00	-.11 [†]	.14*	.27***	-.35***	-					
9. Fall Teacher-Rated Behavior	.16*	-.29***	-.10	-.08	.15 [†]	-.01	-.03	-.02	-				
10. Spring Language Skills	.11	.01	.25***	-.23**	.30***	.64***	-.22***	.30***	-.02	-			
11. Spring HTKS Type (0=English, 1=Spanish)	-.03	.01	-.30***	.27***	-.11	-.20***	.16**	-.11	-.04	-.19***	-		
12. Spring Self-Regulation	.23***	-.09	-.00	.16*	.08	.17*	.06	.23**	-.06	.21**	.30***	-	
13. Spring Teacher-Rated Behavior	.04	-.26**	-.01	-.08	.07	.18*	-.06	.16 [†]	.45***	.20*	.03	.13	-

[†] p < .10. * p < .05. ** p < .01. *** p < .001.

APPENDIX A

Head-Toes-Knees-Shoulders Task Forms

HEAD-TOES-KNEES-SHOULDERS TASK (FORM A)

Child name _____ Date _____
 ID # _____ Gender _____ Examiner name _____

*Administer the task seated or standing; the child should stand, about 3 feet from you, throughout the entire task. The person symbol indicates to demonstrate the correct body motions. If the child produces the correct response immediately, score the item “2”. If they self-correct (*see bottom of page 2) right away, without prompting, score the item “1”. If they do not touch the correct part of their body at all, score the item “0”.*

PART I TRAINING:

Now we’re going to play a game. The game has two parts. First, I want you to copy what I do. Touch your head.

Wait for the child to put BOTH his/her hands on head.



Good! Now touch your toes.

Wait for the child to put his/her hands on toes.

Good!

Repeat the two commands with motions again, or until the child imitates you correctly.

Now we’re going to be a little silly and do the opposite of what I say. When I say to touch your head, *instead* of touching your head, you touch your toes. When I say to touch your toes, you touch your head. So you’re doing something different from what I say.



A1. What do you do if I say “touch your head”?		
0 (head)	1	2 (toes)

*****EXPLANATION*****

If s/he hesitates or responds incorrectly, say and proceed to A2:

Remember, when I say to touch your head, you touch your toes, so you are doing something different from what I say. Let’s try another one.

If s/he responds correctly, say and proceed to A2:

That’s exactly right.

A2. What do you do if I say “touch your toes”?		
0 (toes)	1	2 (head)

You may re-explain (use EXPLANATION above) up to three times in the TRAINING (A1-A2) and PRACTICE (B1-B4) sections. If you have already given two explanations during the TRAINING questions, then you may correct them only once more in the PRACTICE items. If the child cannot do the task after the third explanation, administer the 10 test items anyway.

PART I PRACTICE:

	Incorrect	Self-Correct*	Correct
B1. Touch your head	0 (head)	1	2 (toes)
B2. Touch your toes	0 (toes)	1	2 (head)
B3. Touch your head	0 (head)	1	2 (toes)
B4. Touch your toes	0 (toes)	1	2 (head)

PART I TESTING:

We're going to keep playing this game, and you keep doing the opposite of what I say.

If the child does not understand the task, you will have gone through the directions at most four times (once at the beginning, and up to three times in the TRAINING and PRACTICE sections). DO NOT explain again after testing begins.

	Incorrect	Self-Correct*	Correct
1. Touch your head	0 (head)	1	2 (toes)
2. Touch your toes	0 (toes)	1	2 (head)
3. Touch your toes	0 (toes)	1	2 (head)
4. Touch your head	0 (head)	1	2 (toes)
5. Touch your toes	0 (toes)	1	2 (head)
6. Touch your head	0 (head)	1	2 (toes)
7. Touch your head	0 (head)	1	2 (toes)
8. Touch your toes	0 (toes)	1	2 (head)
9. Touch your head	0 (head)	1	2 (toes)
10. Touch your toes	0 (toes)	1	2 (head)

NOTE

***Definition of self-correction:** Mark "self-correct" on both the training and testing portion if the child makes *any discernible* motion toward the *incorrect* answer, but then changes his/her mind and makes the correct response. Pausing to think, not moving, and then responding correctly does *not* count as a self-correction.

PART II TRAINING:

Administer Part II if child responds correctly (include self-corrects) to 5 or more items on Part I of the task, or if child is in kindergarten or beyond.

Ok, now that you've got that part, we're going to add a part. Now, you're going to touch your shoulders and your knees. First, touch your shoulders.

Touch your shoulders; wait for the child to touch his/her shoulders with both hands.

Now, touch your knees.

Repeat with four alternating commands (no demo) until the child has imitated you correctly or it is clear the child does not comprehend the task.

Ok, now we're going to be silly again. You're going to keep doing the opposite of what I say like before. But this time, you're going to touch your knees and shoulders. When I say to touch your knees, you touch your shoulders, and when I say to touch your shoulders, you touch your knees.

C1. What do you do if I say "touch your knees?"

0 (knees)

1

2 (shoulders)

If response is correct, say and proceed to D1:

Good job! Let's practice.

If the response is incorrect, say and proceed to D1:

Remember, when I say to touch your knees, *instead of touching your knees*, you touch your shoulders. I want you to do the opposite of what I say.

PART II PRACTICE:

	Incorrect	Self-Correct*	Correct
D1. Touch your knees	0 (knees)	1	2 (shoulders)
D2. Touch your shoulders	0 (shoulders)	1	2 (knees)
D3. Touch your knees	0 (knees)	1	2 (shoulders)
D4. Touch your shoulders	0 (shoulders)	1	2 (knees)

If the child responds incorrectly, say NOT MORE THAN ONCE,

Remember, if I say to touch your knees, you touch your shoulders, and if I say to touch your shoulders, touch your knees. Do the opposite of what I say.

Proceed to Part II test section. Do not explain any parts of the task again.

PART II TESTING:

Now that you know all the parts, we're going to put them together. You're going to keep doing the opposite of what I say to do, but you won't know what I'm going to say.

There are four things I could say.

If I say to touch your head, you touch your toes.

If I say to touch your toes, you touch your head.

If I say to touch your knees, you touch your shoulders.

If I say to touch your shoulders, you touch your knees.

Are you ready? Let's try it.

	Incorrect	Self-Correct*	Correct
11. Touch your head	0 (head)	1	2 (toes)
12. Touch your toes	0 (toes)	1	2 (head)
13. Touch your knees	0 (knees)	1	2 (shoulders)
14. Touch your toes	0 (toes)	1	2 (head)
15. Touch your shoulders	0 (shoulders)	1	2 (knees)
16. Touch your head	0 (head)	1	2 (toes)
17. Touch your knees	0 (knees)	1	2 (shoulders)
18. Touch your knees	0 (knees)	1	2 (shoulders)
19. Touch your shoulders	0 (shoulders)	1	2 (knees)
20. Touch your toes	0 (toes)	1	2 (head)

After the child completes the task, say:
Thank you for playing this game with me today!

HTKS SCORING

Entering scores by item into your data analysis software is recommended. Below are directions for obtaining training and practice performance, self-correct data, and final scores to be used in analyses (Range: 0 – 40).

- a) Sum of items A1-A2: ____ c) Score on C1: ____
 b) Sum of items B1-B4: ____ d) Sum of items D1-D4: ____

Training and practice (Sum a-d): ____

Self-corrects (Number of responses scored "1" in items 1-20): ____

Final scores for analyses

- 1) PART I (Sum items 1-10): ____
 2) PART II (Sum items 11-20): ____

FINAL HTKS SCORE (Sum of Part I and Part II): ____

HEAD-TOES-KNEES-SHOULDERS TASK SPANISH (FORM A)

Starts with head & toes

Child name _____ Date _____
ID # _____ Gender _____ Examiner name _____

*Administer the task seated or standing; the child should stand, about 3 feet from you, throughout the entire task. The person symbol indicates to demonstrate the correct body motions. If the child produces the correct response immediately, then give them a "2". If they self-correct (*see bottom of page 2) right away, without prompting, then give them a "1". If they do not touch the correct part of their body at all, then give them a "0".*

PART I TRAINING:

Ahora vamos a jugar un juego . El juego tiene - dos partes. Primero quiero que - copies lo que yo lo haga. .Toca tu cabeza

Wait for the child to put BOTH his/her hands on head.

¡Bueno! Ahora toca tus pies.

Wait for the child to put his/her hands on toes.



¡Bueno!

Repeat the two commands with motions again, or until the child imitates you correctly.

Vamos a hacer algo divertido y haremos lo opuesto de lo que yo diga. Cuando te digo, "toca tu cabeza" en vez de tocar tu cabeza quiero que toques tus pies. Y cuando te digo, "toca tus pies" quiero que toques tu cabeza. Así que estás haciendo algo diferente de lo que yo digo.



A1. ¿Qué haces si digo, "toca tu cabeza?"

0 (head)

1

2 (feet)

*****EXPLANATION*****

If s/he hesitates or responds incorrectly, say and proceed to A2:

Recuerda, cuando digo toca tu cabeza, quiero que toques tus pies. Así que vas a hacer algo diferente de lo que yo digo. intentemos de nuevo.

If s/he responds correctly, say and proceed to A2:

¡Absolutamente correcto!

A2. ¿Qué haces si digo "toca tus pies"?

0 (toes)

1

2 (head)

You may re-explain (use EXPLANATION above) up to three times in the TRAINING (A1-A2) and PRACTICE (B1-B4) sections. If you have already given two explanations during the TRAINING questions, then you may correct them only once more in the PRACTICE items. If the child cannot do the task after the third explanation, administer the 10 test items anyway.

PART I PRACTICE:

	Incorrect	Self-Correct*	Correct
B1. Toca tu cabeza	0 (head)	1	2 (toes)
B2. Toca tus pies	0 (toes)	1	2 (head)
B3. Toca tu cabeza	0 (head)	1	2 (toes)
B4. Toca tus pies	0 (toes)	1	2 (head)

PART I TESTING:

Vamos a seguir jugando este juego, y quiero que tu sigas haciendo lo opuesto de lo que yo digo.

If the child does not understand the task, you will have gone through the directions at most four times (once at the beginning, and up to three times in the TRAINING and PRACTICE sections). DO NOT explain again after testing begins.

	Incorrect	Self-Correct*	Correct
21. Toca tu cabeza	0 (head)	1	2 (toes)
22. Toca tus pies	0 (toes)	1	2 (head)
23. Toca tus pies	0 (toes)	1	2 (head)
24. Toca tu cabeza	0 (head)	1	2 (toes)
25. Toca tus pies	0 (toes)	1	2 (head)
26. Toca tu cabeza	0 (head)	1	2 (toes)
27. Toca tu cabeza	0 (head)	1	2 (toes)
28. Toca tus pies	0 (toes)	1	2 (head)
29. Toca tu cabeza	0 (head)	1	2 (toes)
30. Toca tus pies	0 (toes)	1	2 (head)

NOTE

***Definition of self-correction:** Mark “self-correct” on both the training and testing portion if the child makes *any discernible* motion toward the *incorrect* answer, but then changes his/her mind and makes the correct response. Pausing to think, not moving, and then responding correctly does *not* count as a self-correction.

PART II TRAINING:

Administer Part II if child responds correctly to 5 or more items on Part I of the task, or if child is in kindergarten or beyond.

Okay,, ya que entiendes esta parte, vamos a añadir otra parte. Ahora, vas a tocar tus hombros y las rodillas. Primero, toca tus hombros.

Touch your head; wait for the child to touch his/her shoulders with both hands.

Ahora, toca tus rodillas.

Repeat with four alternating commands (no demo) until the child has imitated you correctly or it is clear the child does not comprehend the task.

Okay, ahora vamos a hacer algo divertido otra vez. Vas a continuar haciendo lo opuesto de lo que yo te digo, igual que como hicimos antes,, pero esta vez, vas a tocar tus rodillas y tus hombros.. Cuando te digo, “toca tus rodillas”, vas a tocar tus hombros , y cuando te digo “toca tus hombros ”, tocas tus rodillas..

C1. ¿Que vas a hacer si digo “toca tus rodillas”?

0 (knees)

1

2 (shoulders)

If response is correct, say and proceed to D1:

Muy bien! Vamos a practicar.

If the response is incorrect, say and proceed to D1:

Recuerda, cuando te digo “toca tus rodillas”, en vez de tocar tus rodillas, tocas tus hombros. Quiero que hagas lo opuesto de lo que yo digo.

PART II PRACTICE:

	Incorrect	Self-Correct*	Correct
D1. Toca tus rodillas	0 (knees)	1	2 (shoulders)
D2. Toca tus hombros	0 (shoulders)	1	2 (knees)
D3. Toca tus rodillas	0 (knees)	1	2 (shoulders)
D4. Toca tus hombros	0 (shoulders)	1	2 (knees)

If the child gets two or fewer correct, say,

Recuerda, si yo digo toca tus rodillas, tu tocas tus hombros, y si yo digo toca tus hombros, tocas tus rodillas quiero que tú hagas lo opuesto de lo que yo digo.

Proceed to Part II test section. Do not explain any parts of the task again.

PART II TESTING:

Ya que conoces todas las partes, vamos a ponerlas juntas. Vas a seguir haciendo lo opuesto de lo que yo digo que hagas, pero no vas a saber lo que voy a decir.

Hay cuatro partes que te puedo decir.

Si digo toca tu cabeza, quiero que toques tus pies.

Si digo toca tus pies, quiero que toques tu cabeza.

Si digo toca tus rodillas, quiero que toques tus hombros.

Si digo toca tus hombros, toca tus rodillas.

¿Listo/a? Empezamos.

	Incorrect	Self-Correct*	Correct
31. Toca tu cabeza	0 (head)	1	2 (toes)
32. Toca tus pies	0 (toes)	1	2 (head)
33. Toca tus rodillas	0 (knees)	1	2 (shoulders)
34. Toca tus pies	0 (toes)	1	2 (head)
35. Toca tus hombros	0 (shoulders)	1	2 (knees)
36. Toca tu cabeza	0 (head)	1	2 (toes)
37. Toca tus rodillas	0 (knees)	1	2 (shoulders)
38. Toca tus rodillas	0 (knees)	1	2 (shoulders)
39. Toca tus hombros	0 (shoulders)	1	2 (knees)
40. Toca tus pies	0 (toes)	1	2 (head)

HTKS SCORING

Entering scores by item into your data analysis software is recommended. Below are directions for obtaining training and practice performance, self-correct data, and final scores to be used in analyses (Range: 0 – 40).

a) Sum of items A1-A2: ____

c) Score on C1: ____

b) Sum of items B1-B4: ____

d) Sum of items D1-D4: ____

Training and practice (Sum a-d): ____

Self-corrects (Number of “1” responses in items 1-20): ____

Final scores for analyses

1) PART I (Sum items 1-10): ____

2) PART II (Sum items 11-20): ____

FINAL HTKS SCORE (Sum of Part I and Part II): ____

HEAD-TOES-KNEES-SHOULDERS TASK (FORM B)

Child name _____ Date _____
 ID # _____ Gender _____ Examiner name _____

*Administer the task seated or standing; the child should stand, about 3 feet from you, throughout the entire task. The person symbol indicates to demonstrate the correct body motions. If the child produces the correct response immediately, then give them a “2”. If they self-correct (*see bottom of page 2) right away, without prompting, then give them a “1”. If they do not touch the correct part of their body at all, then give them a “0”.*

PART I TRAINING:

Now we’re going to play a game with our knees and our shoulders. The game has two parts. First, I want you to copy what I do. Touch your knees.

Wait for the child to put BOTH his/her hands on knees.



Good! Now touch your shoulders.

Wait for the child to put his/her hands on shoulders.

Good!

Repeat the two commands with motions again, or until the child imitates you correctly.

Now we’re going to be silly and do the opposite of what I say. When I say to touch your knees, *instead* of touching your knees, you touch your shoulders. When I say to touch your shoulders, you touch your knees. So you’re doing something different from what I say.



A1. What do you do if I say “touch your knees”?

0 (knees) 1 2 (shoulders)

*****EXPLANATION*****

If s/he hesitates or responds incorrectly, say and proceed to A2:

Remember, when I say to touch your knees, you touch your shoulders, so you are doing something different from what I say. Let’s try another one.

If s/he responds correctly, say and proceed to A2:

That’s exactly right.

A2. What do you do if I say “touch your shoulders”?

0 (shoulders) 1 2 (knees)

You may re-explain (use EXPLANATION above) up to three times in the TRAINING (A1-A2) and PRACTICE (B1-B4) sections. If you have already given two explanations during the TRAINING questions, then you may correct them only once more in the PRACTICE items. If the child cannot do the task after the third explanation, administer the 10 test items anyway.

PART I PRACTICE:

	Incorrect	Self-Correct*	Correct
B1. Touch your knees	0 (knees)	1	2 (shoulders)
B2. Touch your shoulders	0 (shoulders)	1	2 (knees)
B3. Touch your knees	0 (knees)	1	2 (shoulders)
B4. Touch your shoulders	0 (shoulders)	1	2 (knees)

PART I TESTING:

We're going to keep playing this game, and you keep doing the opposite of what I say.

If the child does not understand the task, you will have gone through the directions at most four times (once at the beginning, and up to three times in the TRAINING and PRACTICE sections). DO NOT explain again after testing begins.

	Incorrect	Self-Correct*	Correct
41. Touch your knees	0 (knees)	1	2 (shoulders)
42. Touch your shoulders	0 (shoulders)	1	2 (knees)
43. Touch your shoulders	0 (shoulders)	1	2 (knees)
44. Touch your knees	0 (knees)	1	2 (shoulders)
45. Touch your shoulders	0 (shoulders)	1	2 (knees)
46. Touch your knees	0 (knees)	1	2 (shoulders)
47. Touch your knees	0 (knees)	1	2 (shoulders)
48. Touch your shoulders	0 (shoulders)	1	2 (knees)
49. Touch your knees	0 (knees)	1	2 (shoulders)
50. Touch your shoulders	0 (shoulders)	1	2 (knees)

NOTE

***Definition of self-correction:** Mark "self-correct" on both the training and testing portion if the child makes *any discernible* motion toward the *incorrect* answer, but then changes his/her mind and makes the correct response. Pausing to think, not moving, and then responding correctly does *not* count as a self-correction.

PART II TRAINING:

Administer Part II if child responds correctly (include self-corrects) to 5 or more items on Part I of the task, or if child is in kindergarten or beyond.

Ok, now that you've got that part, we're going to add a part. Now, you're going to touch your head and your toes. First, touch your head.

Touch your head; wait for the child to touch his/her head with both hands.

Now, touch your toes.

Repeat with four alternating commands (no demo) until the child has imitated you correctly or it is clear the child does not comprehend the task.

Ok, now we're going to be silly again. You're going to keep doing the opposite of what I say like before. But this time, you're going to touch your head and toes. When I say to touch your head, you touch your toes, and when I say to touch your toes, you touch your head.

C1. What do you do if I say "touch your head?"		
0 (head)	1	2 (toes)

If response is correct, say and proceed to D1:

Good job! Let's practice.

If the response is incorrect, say and proceed to D1:

Remember, when I say to touch your head, *instead of touching your head*, you touch your toes. I want you to do the opposite of what I say.

PART II PRACTICE:

	Incorrect	Self-Correct*	Correct
D1. Touch your head	0 (head)	1	2 (toes)
D2. Touch your toes	0 (toes)	1	2 (head)
D3. Touch your head	0 (head)	1	2 (toes)
D4. Touch your toes	0 (toes)	1	2 (head)

*If the child responds incorrectly, say **NOT MORE THAN ONCE**,*

Remember, if I say to touch your head, you touch your toes, and if I say to touch your toes, touch your head. Do the opposite of what I say.

Proceed to Part II test section. Do not explain any parts of the task again.

PART II TESTING:

Now that you know all the parts, we're going to put them together. You're going to keep doing the opposite of what I say to do, but you won't know what I'm going to say. There are four things I could say.

If I say to touch your head, you touch your toes.

If I say to touch your toes, you touch your head.

If I say to touch your knees, you touch your shoulders.

If I say to touch your shoulders, you touch your knees.

Are you ready? Let's try it.

	Incorrect	Self-Correct*	Correct
51. Touch your head	0 (head)	1	2 (toes)
52. Touch your toes	0 (toes)	1	2 (head)
53. Touch your knees	0 (knees)	1	2 (shoulders)
54. Touch your toes	0 (toes)	1	2 (head)
55. Touch your shoulders	0 (shoulders)	1	2 (knees)
56. Touch your head	0 (head)	1	2 (toes)
57. Touch your knees	0 (knees)	1	2 (shoulders)
58. Touch your knees	0 (knees)	1	2 (shoulders)
59. Touch your shoulders	0 (shoulders)	1	2 (knees)
60. Touch your toes	0 (toes)	1	2 (head)

After the child completes the task, say:

Thank you for playing this game with me today!

HTKS SCORING

Entering scores by item into your data analysis software is recommended. Below are directions for obtaining training and practice performance, self-correct data, and final scores to be used in analyses (Range: 0 – 40).

- a) Sum of items A1-A2: ____ c) Score on C1: ____
 b) Sum of items B1-B4: ____ d) Sum of items D1-D4: ____

Training and practice (Sum a-d): ____

Self-corrects (Number of "1" responses in items 1-20): ____

Final scores for analyses

- 1) PART I (Sum items 1-10): ____
 2) PART II (Sum items 11-20): ____

FINAL HTKS SCORE (Sum of Part I and Part II): ____

HEAD-TOES-KNEES-SHOULDERS TASK SPANISH (FORM B)

Starts with shoulders & knees

Child name _____ Date _____
ID # _____ Gender _____ Examiner name _____

*Administer the task seated or standing; the child should stand, about 3 feet from you, throughout the entire task. The person symbol indicates to demonstrate the correct body motions. If the child produces the correct response immediately, then give them a “2”. If they self-correct (*see bottom of page 2) right away, without prompting, then give them a “1”. If they do not touch the correct part of their body at all, then give them a “0”.*

PART I TRAINING:

Ahora vamos a jugar un juego con nuestras rodillas y los hombros. El juego tiene dos partes. Primero quiero que – copies lo que yo lo hago. Toca tus rodillas.

Wait for the child to put BOTH his/her hands on knees.



¡Bueno! Ahora toca tus hombros.

Wait for the child to put his/her hands on shoulders.

¡Bueno!

Repeat the two commands with motions again, or until the child imitates you correctly.

Vamos a hacer algo divertido y haremos lo opuesto de lo que yo diga. Cuando te digo, “toca tus rodillas” en vez de tocar tus rodillas quiero que toques tus hombros. Y cuando te digo, “toca tus hombros” quiero que toques tus rodillas. Así que no estás haciendo lo opuesto de lo que yo digo.



A1. ¿Qué haces si digo, “toca tus rodillas?”

0 (knees)

1

2 (shoulders)

*****EXPLANATION*****

If s/he hesitates or responds incorrectly, say and proceed to A2:

Recuerda, cuando digo toca tus rodillas, tu tocas tus hombros. Así que vas a hacer algo diferente de lo que yo digo. intentemos de nuevo.

If s/he responds correctly, say and proceed to A2:

¡Absolutamente correcto!

A2. ¿Qué haces si digo “toca tus hombros”?

0 (shoulders)

1

2 (knees)

You may re-explain (use *EXPLANATION* above) up to three times in the *TRAINING* (A1-A2) and *PRACTICE* (B1-B4) sections. If you have already given two explanations during the *TRAINING* questions, then you may correct them only once more in the *PRACTICE* items. If the child cannot do the task after the third explanation, administer the 10 test items anyway.

PART I PRACTICE:

	Incorrect	Self-Correct*	Correct
B1. Toca tus rodillas	0 (knees)	1	2 (shoulders)
B2. Toca tus hombros	0 (shoulders)	1	2 (knees)
B3. Toca tus rodillas	0 (knees)	1	2 (shoulders)
B4. Toca tus hombros	0 (shoulders)	1	2 (knees)

PART I TESTING:

Vamos a seguir jugando este juego, y tu sigues haciendo lo opuesto de lo que yo digo

*If the child does not understand the task, you will have gone through the directions at most four times (once at the beginning, and up to three times in the *TRAINING* and *PRACTICE* sections).*

DO NOT explain again after testing begins.

	Incorrect	Self-Correct*	Correct
61. Toca tus rodillas	0 (knees)	1	2 (shoulders)
62. Toca tus hombros	0 (shoulders)	1	2 (knees)
63. Toca tus hombros	0 (shoulders)	1	2 (knees)
64. Toca tus rodillas	0 (knees)	1	2 (shoulders)
65. Toca tus hombros	0 (shoulders)	1	2 (knees)
66. Toca tus rodillas	0 (knees)	1	2 (shoulders)
67. Toca tus rodillas	0 (knees)	1	2 (shoulders)
68. Toca tus hombros	0 (shoulders)	1	2 (knees)
69. Toca tus rodillas	0 (knees)	1	2 (shoulders)
70. Toca tus hombros	0 (shoulders)	1	2 (knees)

NOTE

***Definition of self-correction:** Mark “self-correct” on both the training and testing portion if the child makes *any* discernible motion toward the *incorrect* answer, but then changes his/her mind and makes the correct response. Pausing to think, not moving, and then responding correctly does *not* count as a self-correction.

PART II TRAINING:

Administer Part II if child responds correctly to 5 or more items on Part I of the task, or if child is in kindergarten or beyond.

okay, ya que – entiendes esta parte, vamos a añadir otra parte. Ahora, vas a tocar tu cabeza y tus pies. Primero, toca tu cabeza.

Touch your head; wait for the child to touch his/her head with both hands.

Ahora, toca tus pies.

Repeat with four alternating commands (no demo) until the child has imitated you correctly or it is clear the child does not comprehend the task.

Okay, ahora vamos a hacer algo divertido otra vez. Vas a continuar haciendo lo opuesto de lo que yo te digo, igual que como hicimos antes -, pero esta vez, vas a usar tu cabeza y tus pies. Cuando te digo, “toca tu cabeza”, vas tocar tus pies, y cuando te digo “toca tus pies”, tocas tu cabeza.

C1. ¿Que vas a hacer si digo “toca tu cabeza”?		
0 (head)	1	2 (toes)

If response is correct, say and proceed to D1:

Muy bien! Vamos a practicar.

If the response is incorrect, say and proceed to D1:

Recuerda, cuando te digo “toca tu cabeza”, en vez de tocar tu cabeza, tocas tus pies. Quiero que hagas lo opuesto de lo que yo digo.

PART II PRACTICE:

	Incorrect	Self-Correct*	Correct
D1. Toca tu cabeza	0 (head)	1	2 (toes)
D2. Toca tus pies	0 (toes)	1	2 (head)
D3. Toca tu cabeza	0 (head)	1	2 (toes)
D4. Toca tus pies	0 (toes)	1	2 (head)

If the child gets two or fewer correct, say,

Recuerda, si yo digo toca tus rodillas, tu vas a tocar tus hombros, y si yo digo toca tus hombros, tocas tus rodillas. Quiero que tú hagas lo opuesto de lo que yo digo.

Proceed to Part II test section. Do not explain any parts of the task again.

PART II TESTING:

Ya que conoces todas las partes, vamos a ponerlas juntas. Vas a seguir haciendo lo opuesto de lo que yo digo que hagas, pero no vas a saber lo que yo voy a decir.

Hay cuatro partes que te puedo decir.

Si digo toca tu cabeza, quiero que toques tus pies.

Si digo toca tus pies, quiero que toques tu cabeza.

Si digo toca tus rodillas, quiero que toques tus hombros.

Si digo toca tus hombros, toca tus rodillas.

¿Listo/a? Empezamos.

	Incorrect	Self-Correct*	Correct
71. Toca tu cabeza	0 (head)	1	2 (toes)
72. Toca tus pies	0 (toes)	1	2 (head)
73. Toca tus rodillas	0 (knees)	1	2 (shoulders)
74. Toca tus pies	0 (toes)	1	2 (head)
75. Toca tus hombros	0 (shoulders)	1	2 (knees)
76. Toca tu cabeza	0 (head)	1	2 (toes)
77. Toca tus rodillas	0 (knees)	1	2 (shoulders)
78. Toca tus rodillas	0 (knees)	1	2 (shoulders)
79. Toca tus hombros	0 (shoulders)	1	2 (knees)
80. Toca tus pies	0 (toes)	1	2 (head)

HTKS SCORING

Entering scores by item into your data analysis software is recommended. Below are directions for obtaining training and practice performance, self-correct data, and final scores to be used in analyses (Range: 0 – 40).

a) Sum of items A1-A2: ____

c) Score on C1: ____

b) Sum of items B1-B4: ____

d) Sum of items D1-D4: ____

Training and practice (Sum a-d): ____

Self-corrects (Number of “1” responses in items 1-20): ____

Final scores for analyses

1) PART I (Sum items 1-10): ____

2) PART II (Sum items 11-20): ____

FINAL HTKS SCORE (Sum of Part I and Part II): ____