Assessing Mastery Motivation in 7- and 10-Year Olds:

Initial Findings and a Manual for Administering the Tasks

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Assessing Mastery Motivation in 7- and 10-Year Olds

The purpose of this study was to examine the reliability and construct validity of two types of measures of mastery motivation for elementary school children: the Dimensions of Mastery Questionnaire (DMQ) and structured behavioral mastery tasks. The study examines the relations among them and to selected scales from Harter’s self-perceived competence and intrinsic motivation measures. The DMQ and Harter measures were obtained from children, mothers, and teachers.

Mastery motivation is an inherent force that stimulates a person to attempt to master a skill or task that is at least moderately challenging for them. It is important to develop good measures of this motive because indicators of such motivation may be predictors of later school success, and no doubt mastery motivation is a precursor of achievement motivation (Morgan & Yang, 1995).

Mastery motivation has been studied primarily in children from 1 to 3 years of age, and persistence at object-oriented tasks has been the main way of operationalizing the concept (see MacTurk & Morgan, 1995). However, in recent years the construct has been expanded in several ways. First, questionnaire measures are now available for children as young as 6 months and as old as 19 years. Second, behavioral mastery tasks now have been used for children from 6 months to 10 years of age.

Third, the concept has been broadened to include persistence measures in four instrumental domains (persistence at object/cognitive tasks, persistence at social tasks with peers, persistence at social tasks with adults, and persistence at gross motor/athletic tasks) and two expressive measures: mastery pleasure and negative reaction to failure. Children may score high on one of these domains but low in another.
However, overall persistence scores seem appropriate because the four domain scores are moderately interrelated (Morgan et al., 2007).

In this paper we present some data about the current school-aged versions of the Dimensions of Mastery Questionnaire (DMQ17), which is one version newer than the ones used in the other papers presented in symposium (Knauf, Bobadilla, & Busch-Rossnagel, 1998; MacPhee, Fritz, Miller-Heyl, & Hite, 1998).

**Method**

**Participants**

The 64 participants were mostly middle class and Caucasian, living in a middle-sized city in the Rocky Mountain West. The sample had 31 boys and 33 girls; there were 34 7-year olds and 30 10-year olds. Three out of the 64 children were racial minorities. Five were from working class families; 39 were middle class; and 20 were upper middle class.

**Measures**

**Dimensions of Mastery Questionnaire (DMQ).** Mothers and teachers rated the children on the DMQ (Morgan et al., 1993, 2007). The DMQ scales were also administered orally to the children. Table 1 shows the design of the study and that the DMQ has four persistence/mastery motivation scales, which were summed to produce a total persistence scale. In addition, there were measures of mastery pleasure, negative reaction to failure, and general competence. Internal consistency of these scales was very good for mothers and teachers of elementary school children; alphas ranged from
.76 to .92, with a median of .88. For the children’s self ratings, alphas were somewhat lower, ranging from .60 to .86, with a median of .70 (see Table 2). In other studies, alphas have been generally good for parent and teacher/caregiver ratings of infants and preschoolers and also for teen self-ratings.

Principal components analysis for large, more diverse (in geography, age, and ethnicity) groups of parents and of children/teens support the grouping of items into the four persistence and the pleasure mastery domains. The analysis of parent responses is especially clear and consistent with the model. The analysis for self-ratings by children and teens is somewhat less clear, but still provides considerable support for the factorial validity of these five domains. Data from DMQ 17 fit our model better than did the preschool data from MacPhee et al. (1998) or our data using previous versions of the DMQ. We discuss below several possible reasons for this improvement.

Domain scale scores for the current sample of 7- and 10-year olds were moderately related. In general, the five persistence and pleasure scale scores were less highly correlated for the parent’s ratings (median $r = .20$) than for child-self ratings (median $r = .41$) or teacher ratings (median $r = .37$). The persistence and pleasure scales were modestly correlated with competence, except for teachers ($r = .77$) and parents ($r = .61$) who seem to view cognitive/object persistence and general competence as highly rated. The negative reaction to failure scale was unrelated or negatively related to mastery pleasure and the persistence scales.

**Mastery tasks.** Bartholomew & Morgan (1997) developed four sets of individualized mastery tasks (see appended manual). Scores were based on observations of the child’s behaviors while attempting to solve the tasks. The four types
or sets of tasks were: a) spatial matching (complex puzzles), b) goal formation (Tower of Hanoi), c) fine motor (pinball, etc.), and d) gross motor (ring toss). Each set had five levels of difficulty, varying from an easy level that all 7-year olds could solve in 1 minute to a very hard level that no 10-year old could solve in 5 minutes. Each child was given a task from each of the four sets that was relatively easy for them, in order to for us to estimate their skill/competence and to provide them a sense of accomplishment. Then the child was given a level of the task intended to be moderately challenging but somewhat too hard for him or her to complete fully in 5 minutes. The children were told that they could stop working on the task whenever they wanted. This harder task was judged to be appropriately challenging if the child could solve part of it, but not all of it, in 5 minutes. Occasionally, the child successfully completed all of the hard task early; in that case he/she was also given the next harder task.

After 5 minutes, the tester asked if the child would now like an easier task, a harder task, or continue with the same task. This was done in order to obtain a measure of preference for challenge. After 1 more minute, the tester stopped the tasks and asked the child if he or she wanted to stop now, go on a little longer, or spend a long time working on this task. Mastery motivation measures included the duration of the children’s persistence at each moderately hard task and ratings of their mastery pleasure. Reliability correlations for two observers scoring 10 children were .57 and .85 for pleasure on hard and easy tasks, respectively, and 1.00 for all persistence measures and preference for challenge.
**Perceived Competence.** Mothers and children answered three of Harter’s (1982) Self-Perceived Competence scales (scholastic, athletic, and peer acceptance). As with the DMQ, the Harter scales were orally administered to the child by the tester.

**Intrinsic vs. Extrinsic Motivation.** Two of Harter’s (1981) Intrinsic versus Extrinsic Motivation in the Classroom scales (preference for challenge and independent mastery) were rated by the teacher and child. Teachers were sent the DMQ and the in the Harter “in the classroom” scales and asked to mail them back to the researcher.

**Procedure**

The assessments were conducted in the child’s home, and were done in the following order:

1. Dimensions of Mastery Questionnaire
2. Cognitive/Spatial Set - Puzzles
3. Harter’s Perceived Competence Scales
4. Fine Motor Set - Pin Ball, etc.
5. Harter’s In the Classroom Scales
6. Cognitive/Goal Formation Set - Tower of Hanoi
7. Gross Motor Set - Ring Toss

In addition to the persistence, pleasure and choice for challenge scores coded during each task, overall ratings on four 5-point scales were made by the tester after each home visit. Reliability correlations for these ratings on 10 children were mixed: .42 for competence, .65 for pleasure, .80 for negative reaction to failure, and .93 for social mastery motivation.
Results

There were few significant gender or age differences, except 10-year olds were, as expected, rated more competent at the tasks.

Correlations of DMQ Scales Across Raters

Intercorrelations among the three raters (mothers, teachers, and children) on scales of the DMQ were quite varied (see Table 3). Note that parent-teacher correlations (median $r = .42$) tend to be stronger than those of either parent or teacher with child self-reports (median $r = .18$).

Correlations of the DMQ Scales With Harter Scales

Table 4 shows that correlations of DMQ persistence scales with parallel Harter measures of perceived competence were .37, .46, and .33 for children’s ratings of the cognitive, athletic, and social with peers domains, respectively, indicating significant overlap in the concepts but substantial differences. Parent’s DMQ scales on the same three pairs of scales were correlated .62, .68, and .54 with parallel Harter competence domains, indicating more overlap between DMQ persistence and Harter perceived competence for parents. Table 4 also shows moderately high correlations between child-child (.54 and .61) and teacher-teacher (.74 and .54) ratings of cognitive/object persistence on the DMQ and Harter’s preference for challenge and independent mastery, respectively.

Most of the correlations (10 out of 18) across raters between parallel DMQ persistence scales and Harter perceived competence scales were significant but
modest (range = -.04 to .58, median .27). Again, parent-teacher correlations were higher than those for parents or teachers with the child’s self reports.

**Correlations of the DMQ With Task Behaviors**

Table 5 shows that there was a modest but significant correlation between the child’s self report of DMQ total persistence and both their total persistence at the behavioral tasks and their behavioral preference for challenging tasks. Parent DMQ total persistence was correlated with behavioral task persistence scores but not with preference for challenge. However, teacher DMQ total persistence was not correlated with either task measure. Both child and teacher DMQ mastery pleasure scales were significantly correlated with observed pleasure during the tasks (see Table 5).

**Prediction of Child’s Task Persistence**

The combination of child DMQ total persistence (Beta = .28), parent DMQ cognitive/object persistence (Beta = .34), and the child’s rating of peer acceptance as unimportant (Beta = -.26) predicted the child’s overall behavioral task persistence \( r = .51 \), adjusted \( r^2 = 22 \).

**Predictions of School Behavior**

Using the teachers’ rating of the child’s general competence from the DMQ and intrinsic motivation (Harter, 1981) as criteria of potential for school success, we examined possible DMQ and mastery task predictors. Table 6 shows that children’s task behaviors (competence and persistence at the cognitive tasks) were predictive of school behavior as indicated by teacher ratings of the child’s competence and intrinsic
motivation. Likewise, parent DMQ ratings predicted school behaviors, but children’s DMQ ratings did not.

**Discussion**

These results provide some support for both the DMQ and behavioral task persistence as reliable and valid measures of mastery motivation in *middle class*, elementary school children. However, data presented in the other two symposium papers (MacPhee, et al., 1998; Knauf, et al., 1998) and in other research indicated that earlier versions of the DMQ did not work as well for parents of preschool children with lower reading levels. Principal components analysis of the most recent version of the DMQ (17) using a large diverse sample of parents did fit the five-domain model very well (Morgan et al., 2007). These better results could be due to changes in the current version of the DMQ, which was used in this study but not in the MacPhee et al., or Knauf et al. studies.

Our past findings showed that, especially with lower SES parents, the reversed items on the DMQ caused problems. These led to somewhat lower alphas and one factor that contained only reversed items from several intended domains. In revising the DMQ, we eliminated several of these reversed items and tried to make others more clear. Now (DMQ 17) there is only one reversed item for each scale, and there is a similar positively-worded item. Our intention is to develop a scoring template to identify respondents who consistently miscode the reversed items, either because they have trouble understanding them or because they are reading too fast and not paying attention. Such individual subjects might be deleted as providing invalid data.
In revising the DMQ we also made an effort to lower the reading level by shortening sentences and, where possible, using words that were common in school textbooks by the third grade. These changes, hopefully, make the DMQ 17 more appropriate for parents who do not read well and for elementary school children’s self ratings.

However, the finding that child DMQ scores were not related to teacher ratings of competence or intrinsic motivation, plus lower alphas and lower child-adult correlations on the DMQ may indicate that elementary school children under 10, have trouble rating themselves, especially with regard to negative reactions to failure, competence, cognitive persistence, and social persistence with adults. On the other hand, they may just have different perceptions than adults because parents, teachers, and children do view the child in different contexts and from different perspectives.

Although it is disappointing not to find higher correlations between the children and adults and between the DMQ and behavioral tasks scores, in many ways this is not surprising. As qualitative researchers often point out, every person has their own “reality” or, at least, perspective. Teachers and parents see the child in different settings and neither is with the child all the time or sees things from the child’s point of view. Furthermore, the mastery tasks are a very small slice of life in a somewhat artificial situation that probably reflect, in part, both aspects of a child’s cooperativeness and their cognitive ability. We have tried to control for the latter by individualizing the level of difficulty of the tasks given to each child so that more skilled children received harder tasks. We hope that each child received tasks that were moderately challenging for them, but it is not possible to be certain this goal is achieved in all cases.
In conclusion, we think that both the newly revised, age-expanded DMQ and the individualized mastery tasks for elementary school children show promise as measures of an important area of functioning, the motivation to master challenging tasks, which is not assessed well by other available measures.
References


Table 1
Measures Used to Assess the Construct Validity of the Children’s Dimensions of Mastery Questionnaire (DMQ)
(N = 34 7-year olds and 30 10-year olds)

<table>
<thead>
<tr>
<th>Child Motivation Questionnaire (DMQ) Rated by Child, Mom &amp; Teacher</th>
<th>Harter Perceived Competence Scale (SPCS) Rated by Child &amp; Mom</th>
<th>Harter Intrinsic vs. Extrinsic Orientation in the Classroom Rated by Child &amp; Teacher</th>
<th>Behavioral Mastery Tasks Rated or Scored by Tester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive/Academic Persistence</td>
<td>Scholastic Competence &amp; Importance</td>
<td>Preference for Challenge &amp; Independent Mastery</td>
<td>Cognitive Persistence</td>
</tr>
<tr>
<td>Gross Motor Persistence</td>
<td>Athletic Competence &amp; Importance</td>
<td></td>
<td>Puzzles &amp; Tower of Hanoi</td>
</tr>
<tr>
<td>Social Mastery Motivation with Adults</td>
<td>Peer Acceptance &amp; Importance</td>
<td></td>
<td>Preference for Challenge</td>
</tr>
<tr>
<td>TOTAL PERSISTENCE (sum of above)</td>
<td>Intrinsic Motivation (sum of above)</td>
<td></td>
<td>Rating of Overall Social Mastery Motivation</td>
</tr>
<tr>
<td>Mastery Pleasure</td>
<td></td>
<td></td>
<td>Score and Overall rating of Mastery Pleasure</td>
</tr>
<tr>
<td>General Competence</td>
<td>Scholastic Competence</td>
<td></td>
<td>Rating of Overall Competence</td>
</tr>
<tr>
<td>Negative Reaction to Failure</td>
<td></td>
<td></td>
<td>Rating of Overall Negative Reaction</td>
</tr>
</tbody>
</table>
Table 2
Internal Consistency of the Elementary School Dimensions of Mastery Questionnaire (DMQ 17) Scales

<table>
<thead>
<tr>
<th>DMQ Scales</th>
<th>Items in Scale</th>
<th>Parent Ratings</th>
<th>Child Ratings</th>
<th>Teacher Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>N = 79</td>
<td>71</td>
<td>42</td>
</tr>
<tr>
<td>Object Persistence</td>
<td>9</td>
<td>0.84</td>
<td>0.69</td>
<td>0.90</td>
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<tr>
<td>Gross Motor Persistence</td>
<td>8</td>
<td>0.92</td>
<td>0.81</td>
<td>0.91</td>
</tr>
<tr>
<td>Social Persistence with Adults</td>
<td>6</td>
<td>0.84</td>
<td>0.70</td>
<td>0.84</td>
</tr>
<tr>
<td>Social Persistence with Children</td>
<td>6</td>
<td>0.82</td>
<td>0.61</td>
<td>0.82</td>
</tr>
<tr>
<td>TOTAL Persistence</td>
<td>29</td>
<td>0.87</td>
<td>0.86</td>
<td>0.91</td>
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<tr>
<td>Mastery Pleasure</td>
<td>6</td>
<td>0.88</td>
<td>0.74</td>
<td>0.90</td>
</tr>
<tr>
<td>Negative Reaction to Failure</td>
<td>5</td>
<td>0.78</td>
<td>0.63</td>
<td>0.88</td>
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<tr>
<td>General Competence</td>
<td>5</td>
<td>0.76</td>
<td>0.60</td>
<td>0.90</td>
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</table>
### Table 3
Correlations between Raters on the Dimensions of Mastery (DMQ 17) Scales

<table>
<thead>
<tr>
<th>DMQ Scales</th>
<th>Elementary School</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Child-Parent</td>
</tr>
<tr>
<td></td>
<td>N = 71</td>
</tr>
<tr>
<td>Cognitive/Object Persistence</td>
<td>9</td>
</tr>
<tr>
<td>Gross Motor Persistence</td>
<td>8</td>
</tr>
<tr>
<td>Social Persistence with Adults</td>
<td>6</td>
</tr>
<tr>
<td>Social Persistence with Children</td>
<td>6</td>
</tr>
<tr>
<td>TOTAL Persistence</td>
<td>29</td>
</tr>
<tr>
<td>Mastery Pleasure</td>
<td>6</td>
</tr>
<tr>
<td>General Competence</td>
<td>5</td>
</tr>
<tr>
<td>Negative Reaction to Failure</td>
<td>5</td>
</tr>
</tbody>
</table>

* p < .05  
** p < .01

### Table 4
Correlations Between the DMQ Cognitive, Gross Motor, and Social Mastery With Peers Scales and the Corresponding Harter Scales

<table>
<thead>
<tr>
<th>Harter</th>
<th>Appropriate Child DMQ Persistence Scale</th>
<th>Appropriate Parent DMQ Persistence Scale</th>
<th>Teacher DMQ Cognitive Persistence Scale</th>
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</thead>
<tbody>
<tr>
<td>Scholastic Competence</td>
<td>.37 **</td>
<td>.62 **</td>
<td></td>
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<tr>
<td>Athletic Competence</td>
<td>.46 **</td>
<td>.68 **</td>
<td></td>
</tr>
<tr>
<td>Peer Acceptance</td>
<td>.33 **</td>
<td>.54 **</td>
<td></td>
</tr>
<tr>
<td>Preference for Challenge</td>
<td>.54 **</td>
<td></td>
<td>.74 **</td>
</tr>
<tr>
<td>Independent Mastery</td>
<td>.61 **</td>
<td></td>
<td>.54 **</td>
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</tbody>
</table>

** p < .01
### Table 5
**Correlations of Child’s Task Directed Behaviors/Persistence with the DMQ**

<table>
<thead>
<tr>
<th></th>
<th>Total Task Persistence</th>
<th>Total Preference for Challenge</th>
<th>Pleasure During Hard Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child Total DMQ Persistence</td>
<td>.29 **</td>
<td>.30 **</td>
<td>.30 **</td>
</tr>
<tr>
<td>Child DMQ Mastery Pleasure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent Total DMQ Persistence</td>
<td>.23 *</td>
<td>.11</td>
<td>.10</td>
</tr>
<tr>
<td>Parent DMQ Mastery Pleasure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher Total DMQ Persistence</td>
<td>.10</td>
<td>.03</td>
<td>.33 **</td>
</tr>
<tr>
<td>Teacher DMQ Mastery Pleasure</td>
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</table>

* p < .05, one tailed
** p < .01, one tailed

### Table 6
**Predictions of Teacher Ratings of School Behavior from Mastery Tasks And Parent and Child DMQ Scale Scores**

<table>
<thead>
<tr>
<th></th>
<th>Teacher DMQ Competence</th>
<th>Teacher Harter Intrinsic Motivation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tasks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Persistence at Cognitive Tasks</td>
<td>.39**</td>
<td>.35**</td>
</tr>
<tr>
<td>Overall Competence Rating</td>
<td>.24</td>
<td>.31**</td>
</tr>
<tr>
<td>Parent DMQ</td>
<td></td>
<td></td>
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<tr>
<td>Cognitive/Object Persistence</td>
<td>.48**</td>
<td>.40**</td>
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<tr>
<td>General Competence</td>
<td>.43**</td>
<td>.27*</td>
</tr>
<tr>
<td>Negative Reaction to Failure</td>
<td>-.28*</td>
<td>-.34**</td>
</tr>
<tr>
<td>Child DMQ</td>
<td></td>
<td></td>
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<tr>
<td>Cognitive/Object Persistence</td>
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<td>.03</td>
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<td>General Competence</td>
<td>.11</td>
<td>.16</td>
</tr>
<tr>
<td>Negative Reaction to Failure</td>
<td>.04</td>
<td>.15</td>
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</table>

* p < .05, one tailed
** p < .01, one tailed
Procedural and Scoring Manual for the 7- and 10-Year Old
Children’s Motivation Study

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A. Dimensions of Mastery Questionnaire for Child

Instructions to a child:

“I am going to ask you some questions about your interests. Listen really carefully to the questions because each of them is a little bit different from the others. Let me know if there is a word that you don’t understand and remember that any answer you give me is okay, just be sure that you tell me what YOU are really like.”

Show child sheet with squares and say: “I am going to read a sentence to you and you can point to these squares to show me how much that sentence is like you. This small square means that it is not at all like you and this big one means it is very much like you. The one in the middle means that it is like a lot of children, sort of an average. Let’s try one.”

Sample question: “I try really hard to complete my schoolwork. Now, show me how much that sentence is like you.”

Administer the rest of items.

B. Spatial matching: Puzzles:

“Now, you get to do some fun puzzles and games. Some are really easy and some are hard. I am going to time you on some of the games, but it’s not really to see how fast you do them. Take the time that you need. You can do the puzzles for awhile and you can stop any time you want. Let me know if you decide to stop. Sometimes I might interrupt you to ask some questions.”

START ON EASY TASK AND USE THE FOLLOWING GUIDELINES:

*Easy tasks should be solved in 60 sec. or less. (Use task #1 below for both ages)
*Next, administer much harder task that should take more than 5 minutes to solve, (usually #2 or 3). If child solves it in under 5 minutes, then continue with an even harder task and do not reset timer.
ORDER OF DIFFICULTY AND INSTRUCTIONS:
1. THREE-PIECE SQUARE PUZZLE for 7YR & 10YR OLDS
   “For this you need to match these fish pieces in a straight line. Be sure to tell me
   when you decide to stop.”

2. TRIANGLE PUZZLE for 7 YEAR OLDS; GO TO #3 FOR 10 YR. OLDS.
   “For this puzzle you need to match all of the heads and tails and remember to match
   along the sides of the puzzle. Let me know if you’re ready for the next puzzle.”

3. STAR-LADYBUG PUZZLE
   “This puzzle is a star shape and you need to match all of the ladybugs with each other
   and match them along the sides. Let me know if you want to go to the next puzzle.”

4. SIX-PIECE SQUARE PUZZLE
   “You can use this board to try to match 6 of these pieces in these two lines. Let me
   know if you decide to stop.”

5. NINE-PIECE SQUARE PUZZLE
   “Now you can try to match all nine pieces of this puzzle in the squares on this board.
   Let me know if you want to stop.”

Probes for use after the child gives up or goes over 5 minutes:
   “Now, would you like to continue with the same, OR do a harder, OR an easier
   puzzle?” Do task that child requests. After 1 minute say: “We need to go on to
   the next game now. How much longer do you think you would want to spend
   with this game if I let you? Would you stop right now OR try a little while longer
   OR go on for a long time?”

C. Harter—What I am Like:

   “Now, I’m going to ask you some questions like the ones we did first but in a different way.
   I am going to read a sentence for each of these kids.” [Point to stick figures on the sheet.
   “You can point to the one that is the most like you. Then you can point to the big circle, if
   that sentence is REALLY like you, or the small one if it is just sort of like you. Again, let
   me know if you have any questions or if you need help understanding some words.”

Sample item: “Let’s try one: ‘Some kids would rather play outdoors in their spare time,
BUT other kids would rather watch TV.’”

Administer other items.
D. **Fine motor: Small toys:**

Bring out clear cube with rings and magnetic ball game. Do not let child see the pinball game yet. (It may be a distraction for the other tasks...)

**START ON EASY TASK AND USE THE FOLLOWING GUIDELINES:**
*Easy tasks should be solved in 60 sec or less. (Usually use #1 for both 7 and 10 year olds.)
*Next, administer much harder task that should take more than 5 minutes to solve, usually #3). If child solves it in under 5 minutes, then go to an even harder task and do not reset timer.

**(ORDER OF DIFFICULTY AND INSTRUCTIONS:)**

1. **BALLS AND RINGS—2 BALLS IN 2 RINGS → START HERE FOR 7 AND 10 YR. OLDS.**
   “You need to get two of the balls into any two of the rings. Just shake it up to get them in.”

2. **MAGNETIC BALLS—1 BALL.**
   “This toy has balls that move when you pull them with this magnet stick.” SHOW CHILD HOW THEY MOVE. “You try to get one of the balls into a hole, but you need to keep it sitting on the table when you do it. You can move it around like this if you want to. Let me know if you decide to stop.”

3. **MAGNETIC BALLS—ALL FIVE BALLS:**
   “This time you need to try to get all five of the balls in the holes. Let me know if you want to stop at any time and go on to the next game.”

4. **PINBALL GAME—1 BALL:**
   “This is a pinball game and you have to wind this up here to start it. You try to get just one ball down to this spot by pushing this button to make the ball move. Let me know if you have any questions and if you want to stop.”

5. **PINBALL GAME—2 BALLS:**
   “This time see if you can get two balls into this space here. Let me know if you want to go on to the next game.”

**Probes for use after the child gives up or goes over 5 minutes:**
“Now, would you like to continue with the same, or do a harder, or an easier puzzle?” Do task that child requests. After 1 minute say: “We need to go on to the next game now. How much longer do you think you would want to spend working on this game if I let you? Would you stop right now OR try a little while longer OR go on for a long time?”

E. **Harter: In the classroom:**

Use same instructions as for “C.”
F. **Goal formation: Tower of Hanoi:**
Get out pieces and wooden pegboard.

**START ON EASY TASK AND USE THE FOLLOWING GUIDELINES:**
* Easy tasks should be solved in 60 sec. or less. (Usually use #1 for 7 yr. olds and #2 for 10 yr. olds; If not solved in 60 sec., go to an easier task.)
* Next, administer much harder task that should take more than 5 minutes to solve, (usually #3). If child solves it in under 5 minutes, then go to an even harder task and do not reset timer.

**(ORDER OF DIFFICULTY AND INSTRUCTIONS:)**

1. **TOWER—2 PIECES** → Start here for 7 yr. olds:
   “What you need to do with this game is to get these 2 pieces from this peg over to this peg.” POINT to pegs. “They need to go from biggest on the bottom to the smallest on top just like this. And there are two rules: You can’t put bigger ones on top of the smaller ones; and you can only move one piece at a time. Let me know if you decide to stop.”

2. **TOWER—2 PIECES** → Start here for 10 yr. olds:
   “What you need to do with this game is to get these 3 pieces from this peg over to this peg.” POINT to pegs. “They need to go from biggest on the bottom to the smallest on top just like this. And there are two rules: You can’t put bigger ones on top of the smaller ones; and you can only move one piece at a time. Let me know if you decide to stop.”

3. **TOWER—5 PIECES:**
   “Now you get to try it with 5 pieces. Remember that you can only move one piece at a time and you can’t put bigger ones on smaller ones. Let me know if you want to stop.”

4. **TOWER—6 PIECES:**

5. **TOWER—7 PIECES:**

Probes for use after the child give up or goes over 5:
“Now, would you like the same, a harder, or an easier puzzle?” Do task that child requests. After 1 minute say: “We need to go on to the next game now. How much longer do you think you would want to work with this game if I let you? Would you stop right now OR try a little while longer OR go on for a long time?”

G. **Gross motor: Ring toss:**
**TRIAL ONE:** “With this game you need to throw the rings to get them on the post. I will move the post farther away while you stand here on this line. If you get at least one on the post I’ll move it back.”

*LET CHILD THROW ALL FOUR RINGS. IF ANY REMAIN ON THE POST, MOVE THE POST BACK TO THE NEXT MARK ON THE LINE. STOP WHEN CHILD MISSES ALL FOUR RINGS.*

**TRIAL TWO:** “Now you can keep throwing the rings to this post until you get them all on. You get to pick them up when you miss. You can also stop at any time you want to, just let me know.” Let child try for up to 5 minutes. If child gets all of the rings on in under 5 minutes, then move post back to the next hardest distance and DO NOT reset timer.

*Continued from Trial Two:* Let child continue until 5 minutes is reached and say: “Nice job. We need to stop now,” then ask child, “Would you like to try the same, OR an easier, OR a harder distance?” Let child do for 1 minute. Then ask: “If I let you continue, would you want to stop right now, OR try for a little while longer, OR try it for a long time more?”

**Overall Child Ratings:** (Rate 1 for very low to 5 for very high.)

**Mastery pleasure:**
1 = Child shows no positive affect at completion or successful points of the tasks
2 = Very few (1 or 2) smiles or brief laugh at completion or successful points of the tasks.
3 = Broad smiles or laughter at successful attempts at tasks. [“3” is an average reaction.]
4 = Broad, long-lasting smiles or laughs, and exclamations about success (i.e., “YES! I DID IT”).
5 = Same as 4, but child additionally shows clear physical excitement. (i.e., child jumps up and down, raises arms up into the air.)

**Negative reaction to failure:**
1 = No evidence of anger, disappointment or sadness during task failure.
2 = Slight and very short-lived frustration or sadness and possibly 1 or 2 verbal remarks about failure or task.
3 = Child shows obvious disappointment and makes several remarks about his/her failure during one or two tasks.
4 = Marked disappointment or frustration at task, makes several remarks about failure during several of the tasks.
5 = Same as 4, but child shows anger or hostility, child may refuse to continue and avoid looking at experimenter.
[Examples of remarks: “This is really hard.” “I can’t do this.” “I’m not good at this.” “I don’t like this game.” “I’ll never get this one done.” Etc.]
**Competence for age:**

1=Child has difficulty solving or understanding easiest tasks; goes over limit on 3 out of 4 tasks.
2=Below average-child needs extra explanations to solve easy tasks; may go over limit on 1 or 2 easy/start tasks.
3=Average-child solves easy puzzles easily and has more difficulty with harder and much harder tasks; may not solve most difficult tasks.
4=Above average-child solves easy puzzles quickly and is successful on 1 or 2 of the most difficult tasks.
5=Exceptional-child solves tasks relatively quickly compared to others and solves most of the difficult tasks during the allowed time limit.

**Social Mastery Motivation:**

[This measure rates the children according to their interaction with the experimenter and parents only, not siblings or friends.]

1=Very little child imitation of conversation or questions. Avoidance of gaze or negative expression or behavior.
2=Child initiates some questions about procedures and responds to questions, but does not try to involve experimenter or parent in the tasks or extraneous conversation.
3=An appropriate amount of child-initiated conversation with present parent(s) and with experimenter after rapport has been established.
4=Immediate child engagement with experimenter. Child talks about tasks or other topics (usually school or other toys) during procedures and makes attempts to include parent(s) and experimenter in conversation.
5=Same as 4 with obvious attempts to draw others into conversations, tasks. Child appears to hold expectations for parent or experimenter to respond reciprocally. With the experimenter, the child will often want to share aspects of their lives beyond the immediate tasks and procedures (i.e., “PLEASE, YOU HAVE TO COME SEE MY NEW BUNNY RABBIT, ROOM, ETC. WHEN ARE YOU COMING OVER AGAIN?”).

May 20, 1997
| Task rating sheet: Sub. #:_________ Date: __________ |
|-----------------|------------------|
| **Spatial Matching:**                      |
| **Start task:** 3 piece square puzzle or triangle puzzle |
| **Result:** Solve early  Give up  Overlimit |
| **Time:** __________ sec  __________ sec  >60 sec |
| **Next task:** HARDER  EASIER  EASIER |
| **Pleasure:** 1 2 3 |

| Task: __________/__________ |
|-----------------|------------------|
| **Result:** Solve early  Give up  Overlimit |
| **Time:** __________ sec  __________ sec  >300 sec |
| **Next task:** HARDER  P: E, S, H  P: E, S, H |
| **Pleasure:** 1 2 3 |

| Task: __________/__________ |
|-----------------|------------------|
| **Result:** Solve early  Give up  Overlimit |
| **Time:** __________ sec  __________ sec  >300 sec |
| **Next task:** HARDER  P: E, S, H  P: E, S, H |
| **Pleasure:** 1 2 3 |

**How much longer:** 0 1 2
| Comments: | |

| Child comments: | |

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<table>
<thead>
<tr>
<th>Fine Motor:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Start task:</strong> Magnetic balls-1 ball</td>
</tr>
<tr>
<td><strong>Result:</strong> Solve early  Give up  Overlimit</td>
</tr>
<tr>
<td><strong>Time:</strong> __________ sec  __________ sec  &gt;60 sec</td>
</tr>
<tr>
<td><strong>Next task:</strong> HARDER  EASIER  EASIER</td>
</tr>
<tr>
<td><strong>Pleasure:</strong> 1 2 3</td>
</tr>
</tbody>
</table>

| Task: __________/__________ |
|-----------------|------------------|
| **Result:** Solve early  Give up  Overlimit |
| **Time:** __________ sec  __________ sec  300 sec |
| **Next task:** HARDER  P: E, S, H  P: E, S, H |
| **Pleasure:** 1 2 3 |

| Task: __________/__________ |
|-----------------|------------------|
| **Result:** Solve early  Give up  Overlimit |
| **Time:** __________ sec  __________ sec  300 sec |
| **Next task:** HARDER  P: E, S, H  P: E, S, H |
| **Pleasure:** 1 2 3 |

**How much longer:** 0 1 2
| Comments: | |

| Child comments: | |
Goal formation/planning:
Start task: Tower of Hanoi-three block-rings:
Result: Solve early Give up Overlimit
Time: _____ sec _____ sec >60 sec
Next task: HARDER EASIER EASIER
Pleasure: 1 2 3

Task: __________________________
Result: Solve early Give up Overlimit
Time: _____ sec _____ sec >300 sec
Next task: HARDER P: E, S, H P: E, S, H
Pleasure: 1 2 3

How much longer: 0 1 2
Comments:__________________________________

Child comments:_____________________________________________________

__________________________

Gross Motor:
Start task: Ring Toss
TRIAL ONE:
Distance: 1 ft. 4 ft. 7 ft. 10 ft. 13 ft.
# of rings: _____ _____ _____ _____ _____
Pleasure: 1 2 3

TRIAL TWO:
Distance: ___________ ft. Time: ______Sec # of rings on post:____

TRIAL THREE:
Distance: ___________ ft. Time: ______Sec # of rings on post:____
Preference: E S H
How much longer: 0 1 2
Comments:__________________________________________________________

Child comments:_____________________________________________________

__________________________

OVERALL RATINGS: v1-------->vh
1. Pleasure: 1 2 3 4 5
2. Negative reaction to failure: 1 2 3 4 5
3. Competence for age: 1 2 3 4 5
4. Social Mastery Motivation: 1 2 3 4 5