Administering Measures from the PRI Learning-Related Cognitive Self- Regulation Study

(Peg Tap, Head Toes Knees Shoulders, Dimensional Change Card Sort, Kansas Reflection-Impulsivity Scale for Preschoolers, Digit Span, Copy Design)

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OVERVIEW

The *Learning-Related Cognitive Self-Regulation School Readiness Measures for Preschool Children Study* (aka the Self-Regulation Measurement Study), was designed to develop measures of learning-related cognitive self-regulation for Pre-K children that are both 1) predictive of their achievement gains and 2) easily used in Pre-K settings (portable, do not require computer administration). Such measures are in great need for screening Pre-K children to identify those with weak cognitive self-regulation skills that put them at risk for poor academic achievement and for tracking improvements in cognitive self-regulation that result from classroom practices aimed at facilitating those skills in young children.

This project consisted of two phases. The goal of Phase One was to develop a child assessment battery and parallel teacher rating instrument that best met the above criteria. The goal of Phase Two was to cross-validate the refined child assessment battery and the parallel teacher rating instrument developed in Phase One.

This guide contains information on the administration and scoring for six measures of self-regulation identified in this study as being easily administered and the most predictive of achievement gains across the Pre-K year.

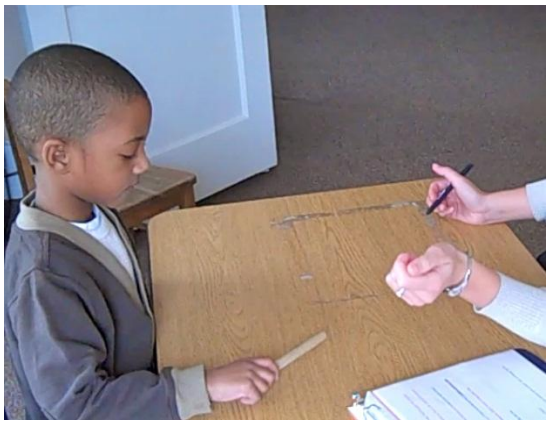
What's included in this manual for each measure:

- A short overview paragraph followed by the reference(s) for the measure.
- List of any materials needed to administer the measure.
- The full script as administered in this research study with the words to be said by the experimenter highlighted in gold.
- A copy of the paper record form to be used for recording and scoring the response to each item.
- Detailed information regarding scoring followed by psychometric data to use for reference purposes.
- Scoring rubric to provide feedback and certify the assessments are being administered reliably.
- Link to contact PRI for access to videos illustrating each assessment accompanied by a scoring key.

General guidelines for this battery of measures:

- Each measure should be administered verbatim according to the script.
- Score each response as it is administered (don't administer several items and wait to record the child's responses all at once).
- Only give praise or feedback when instructed to do so in the script.
- When giving all six measures, allow children to take a break as needed in between measures. Try to avoid stopping or taking a break within a measure.
- Avoid giving facial cues or using gestures that could reveal the answer to an item (ex. nodding when a child puts the DCCS card over the opening in the correct box).
- Practice administering each measure prior to administering during actual data collection. It is helpful to make a video of the experimenter administering the battery and score this against the included rubric prior to actual data collection as well. This rubric yields a score that can be used to document reliability on the administration of the measures.

PEG TAPPING TASK



Description of the Instrument

- The rules for the task are as follows: Immediately after the experimenter taps once with a wooden dowel (*6* inches long, *¼* inch in diameter), the child is to tap twice with the dowel. Immediately after the experimenter taps twice, the child is to tap once.

- The task was developed by Luria (1966) for his studies of adult patients with frontal-lobe damage and first used with children by Diamond & Taylor (1996). The task requires both the ability to hold two things in mind, 1) rule to tap once when experimenter taps twice and 2) rule to tap twice when experimenter taps once, and the ability to exercise inhibitory control over one's prepotent behavior, the natural tendency to mimic what the experimenter does. Common errors include 1) complying with only one of the two rules, 2) tapping many times regardless of what the experimenter did and 3) doing the same thing as the experimenter, rather than the opposite.

Base Reference/Primary Citation:

Luria, A. R. (1966). *Higher cortical functions in man*. New York: Basic Books.

Diamond, A., & Taylor, C. (1996). Development of an aspect of executive control: Development of the ability to remember what I said and to "do as I say, not as I do." *Developmental Psychobiology*, 29, 315-334. doi: 0012-1630/96/040315-20

Diamond, A., Prevor, M. B., Callender, G., & Druin. D. P. (1997). Prefrontal cortex cognitive deficits in children treated early and continuously for PKU. *Monographs of the Society for Research in Child Development*, 62(4, Serial No. 252). doi:10.2307/1166208

Peg Tapping Task Script

MATERIALS: 1 wooden dowel (*6* inches long, *¼* inch in diameter).

INTRODUCE THE ACTIVITY AS FOLLOWS:

Hold the peg in one hand and tell child, **We are going to play a new game.** Tap the peg one time on the table. Hand the peg to the child and tell him/her, **Now you tap one time on the table.** Continue practicing until the child only taps one time

Once the child has successfully tapped one time, take back the peg and tap two times on the table. Hand the peg back to the child and tell him/her, **Now you tap two times on the table.** Continue practicing until the child only taps two times.

PRACTICE:

RULE 1: **Great, now we are ready to play the game. When I tap one time** (tap one time and hand the child the peg) **I want you to tap two times.** Practice until the child is successful on two consecutive trials. Take the peg back and say,

RULE 2: **When I tap two times** (tap the peg two times on the table and hand it to the child) **I want you to tap one time.** Continue practicing until the child is successful on two consecutive trials. **Ready to play my game?**

*** If the child does respond correctly after 6 attempts on either Rule: Knock the number of times the child is supposed to tap on the table for both tries 7 & 8.

***If the child still does respond correctly after the 8th attempt STOP and go to next measure in the battery. Record this as an abort and give the child a score of -1.

***If child is successful on two consecutive trials of both Practice Rules go to the Pre-Test. There is no abort once you have reached this point.

PRETEST:

TRIAL 1: Tap one time and hand the peg over to the child to respond.

- If the child responds correctly, praise the child and proceed to Trial 2.
- If the child responds incorrectly or not at all, follow rules for Extended Practice.

TRIAL 2: Tap two times and hand the peg to the child to respond.

- If the child responds correctly again, praise the child and count these first two practice trials as trials 1 and 2 on the record form. GO TO TRIAL 3.
- If child responds incorrectly to either item or does not respond at all, read both rules below for Extended Practice.

Extended Practice (do not score these 2 re-trial items, you have already scored both pretest items above):

RULE 1:
Remember when I tap one time (tap one time and hand the child the peg) **I want you to tap two times.** Take the peg back and say:

RULE 2: **Remember when I tap two times** (tap the peg two times on the table and hand the child the peg) **I want you to tap one time.**

Ready to play my game?

RE-TRIAL 1: Tap one time and hand the peg to the child to respond.

RE-TRIAL 2**:** Tap two times and hand the peg to the child to respond.

TESTING: Administer the tapping in the order listed on the score sheet and record responses on the form. If the child taps other than the correct number of times, record the number of taps on the "child response" line.

Do NOT give feedback to the child during or between trials.

Peg Tapping Record Form

Trial	# Taps	Correct Response	Child Response (RECORD # OF TAPS)		Score (0-1)
1 (pretest)	1	2			
2 (pretest)	2	1			
3	2	1			
4	1	2			
5	2	1			
6	2	1			
7	1	2			
8	1	2			
9	1	2			
10	2	1			
11	1	2			
12	2	1			
13	2	1			
14	1	2			
15	1	2			
16	2	1			

Total Score (1-16, -1 for abort): _____

Peg Tapping Scoring

Each item is coded as follows:

0 = Incorrect number of taps

1 = Correct number of taps

Final Score:

Sum of all 16 items, children for whom the task was aborted received a score of -1.

Psychometric Information (sample, reliability, validity)

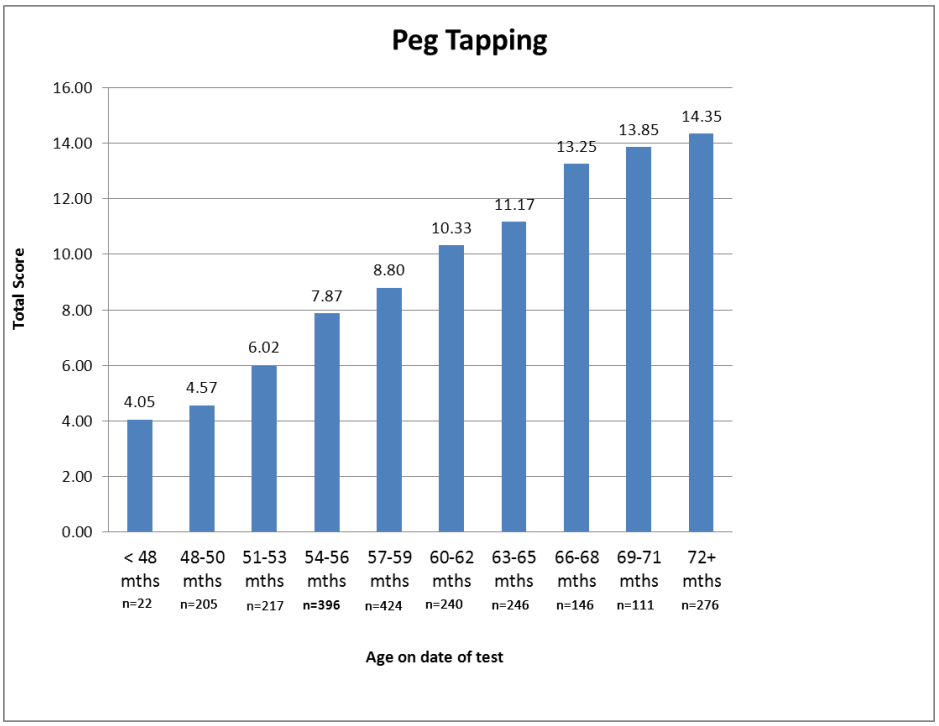
Peabody Research Institute (test-retest reliability & means by age)

Test/Retest Reliability Correlations

Measure	r
Peg Tapping	0.80

*test-retest sessions administered approximately 2 weeks apart.

Mean Scores by Age (from Self Regulation Measurement Study Sample)



External Studies (sample, reliability, validity)

Mean proportions correct as a function of age.

Age	Diamond & Taylor	Blair & Razza	Hala et al.,	Domitrovich et al.,	Bierman et al.
3.5	64 (24.70)		61 (25.4)		
4	81 (17.53)				
4.5	77 (21.66)		76 (25.4)	C = 59 (33.7) T = 61 (35.8)	46 (39.6)
5	88 (10.37)	56 (37.0)		C = 72 (34.8) T = 61 (36.7)	76 (34.7)
5.5	89 (16.30)				
6	94 (14.26)	89 (15.0)			
6.5	97 (5.54)				
7	98 (3.44)				

- **Diamond & Taylor (1996)**: 160 children between the ages of 3.5 to 7 years old from middle to upper-middle class homes. Found that older children were faster and more accurate than younger children, with most improvement at age 6. Found that all children understood the rules at onset of task; however performance in younger children seemed to decrease over course of task.
- **Blair & Razza (2007):** 170 children who attended Head Start. Children assessed in preschool and kindergarten. 80% white, all children from families living at or below poverty threshold. This sample was also used in Blair, Granger, & Razza (2005) and Blair, Peters, & Granger (2004). All three studies to some degree were examining the relation between EF and early school achievement. The latter two studies also examined the relation between cortisol/stress and EF abilities. Reliability coefficients for the study were $\alpha = .82$ in preschool and $\alpha = .75$ in kindergarten.
- **Hala, Hug, & Henderson (2003):** 48 children, 24 3-year-olds (*M* = 3y 7m), 24 4-year-olds (*M* = 4y 7m). Children were from middle class families and were recruited from daycares and preschools. The authors were examining the relation between EF and false-belief understanding.
- **Domitrovich, Cortes, & Greenberg (2007):** 246 children who took part in the randomized clinical trial evaluating PATHS in preschool-aged children in Head Start (10 classrooms, 5 treatment).Children were assessed at the beginning of preschool (mean age = 4.36 year for control and 4.20 years for treatment) and at the end of preschool (6-7 months later) PATHS had no effect on Peg Tapping performance.
- **Beirman, Nix, Greenberg, Blair, & Damitrovich (2008):** 356 children who took part in the randomized clinical trial evaluating REDI in preschool-aged children in Head Start (44 classrooms, 22 treatment). Children were assessed at the beginning of preschool (mean age = 4.49 year) and at the end of preschool (6-7 months later). There were no significant intervention effects for Peg Tapping and means presented were collapsed across condition. Reliability coefficients for the study were $\alpha = .87$ with 4.5-year olds and $\alpha = .84$ with 5-year olds.

HEAD TOES KNEES SHOULDERS (HTKS)

Description of the Instrument

- Children are asked to play a game in which they must do the opposite of what the experimenter says. The experimenter instructs children to touch their head (or their toes), but instead of following the command, the children are supposed to do the opposite and touch their toes (or their head). If children pass the head/toes part of the task, they complete an advanced trial where knees and shoulders commands are added. The HTKS task has been conceptualized by Ponitz, et al., (2008) as a measure of inhibitory control (a child must inhibit the dominant response of imitating the examiner), working memory (a child must remember the rules of the task) and attention focusing (must focus attention to the directions being presented by the examiner).

Base Reference/Primary Citation:

Ponitz, C. C., McClelland, M. M., Jewkes, A. M., Connor, C. M., Farris, C. L., & Morrison, F. J. (2008). Touch your toes! Developing a direct measure of behavioral regulation in early childhood. Early Childhood Research Quarterly, 23, 141–158. doi: 10.1016/j.ecresq.2007.01.004.

Ponitz, C. C., McClelland, M. M., Matthews, J. S., & Morrison, F. J. (2009). A structured observation of behavioral regulation and its contributions to kindergarten outcomes. Developmental Psychology, 45, 605-619. doi: 10.1037/a0015365

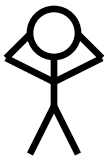
HTKS Task Script

Administer the task while seated; the child should stand about 3 feet from you throughout the entire task. The person symbol indicates when you should demonstrate the correct body motions.

If the child produces the correct response immediately, score the item "2". If they self-correct 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".

Copy Practice:

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. *(keep having child copy)*

Touch your head.

Touch your toes.

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"?

Circle child's response on the record form.

- If s/he hesitates or responds incorrectly, say:

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 again. Repeat A1 again.

If a child says an answer say: Show me

- 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"?**

- If s/he hesitates or responds incorrectly, say:

Remember, when I say to touch your toes, you touch your head, so you are doing something different from what I say. Let's try again. Repeat A2 again.

- If s/he responds correctly, say and proceed to B2:

That's exactly right.

***If child responds incorrectly a second time, repeat the reminder once more, then move on to the next question. Count only 1 retraining per training/practice item

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 (A items), then you may correct the child only once more in the PRACTICE items (B items). If the child cannot do the task after the third explanation, administer the 10 test items anyway with no further retraining.

PART I PRACTICE:

.

B1. **Touch your head**

B2. **Touch your toes**

B3. **Touch your head**

B4. **Touch your toes**

You may use any of the remaining retraining (up to 3 total on both rules and practice) on the practice:
If child responds incorrectly to a B item and you have retrainings left, say:
Remember, when I say to touch your toes (head), you touch your head (toes), so you are doing something different from what I say. Let's try again.
Read the item again, but do not re-score then move on to the next item.

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.**

1.	Touch your head
2.	Touch your toes
3.	Touch your toes
4.	Touch your head
5.	Touch your toes
6.	Touch your head
7.	Touch your head
8.	Touch your toes
9.	Touch your head
10.	Touch your toes

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.

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

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.

Touch your shoulders

Touch your knees

Touch your shoulders

Touch your knees

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?"**

If a child says an answer say:
Show me

- 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. Let's try again.
  Repeat C1 again.

PART II PRACTICE:

D1. **Touch your knees**

D2. **Touch your shoulders**

D3. **Touch your knees**

D4. **Touch your shoulders**

You may use any of the remaining retraining (up to 3 total on both rules and practice) on the practice:

Remember, when I say to touch your knees (shoulders), you touch your shoulders (knees), so you are doing something different from what I say. Let's try again.

Read the item again, but do not re-score then move on to the next item.

- **If the child gets two or fewer correct, say:**

Remember, I want you to keep doing the opposite from what I say, but this time, touch your knees and shoulders.

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 from 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.

11.	Touch your head
12.	Touch your toes
13.	Touch your knees
14.	Touch your toes
15.	Touch your shoulders
16.	Touch your head
17.	Touch your knees
18.	Touch your knees
19.	Touch your shoulders
20.	Touch your toes

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

HTKS Record Form

*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 1 TRAINING: (circle child's response)

	Retraining
A1. **What do you do if I say "touch your head"?** 0 (head) 1 2 (toes)	_____
A2. **What do you do if I say "touch your toes"?** 0 (toes) 1 2 (head)	_____

PART I PRACTICE: (circle child's response)

	Incorrect	Self-Correct*	Correct	Retraining
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)	

Retraining occurs only 3 times

PART I TESTING: (circle child's response)

		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)**

Total Points (Items A-10):_____

Number of Self Correct (1) responses (Items A-10):_____

NOTE

***Definition of self-correction**: Mark "self-correct" on any item if the child makes *any discernible* motion toward an *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 (do not count self-corrects towards the 5 correct items needed to move on to Part II).

Circle child's response:

C1. **What do you do if I say "touch your knees?"** 0 (knees) 1 2 (shoulders)	**Retraining** _____

PART II PRACTICE:

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

PART II TESTING: (circle child's response)

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

Total Points (Items 11-20):_____

Number of Self-Correct (1) responses (Items 11-20):_____

Total Points (Items A-10 + 11-20, 0-52):_____

HTKS Scoring

Each item is coded as follows (Ponitz et al., 2008):

0 = Incorrect response
1 = Any motion to incorrect response, but self-corrected to end with correct response
2 = Correct response

Final Score:

The task begins with 6 practice items and between the first and second set of items there are 5 more practice trials. The final score is the sum of the first six practice items and the 20 test items. (Range: 0-52)

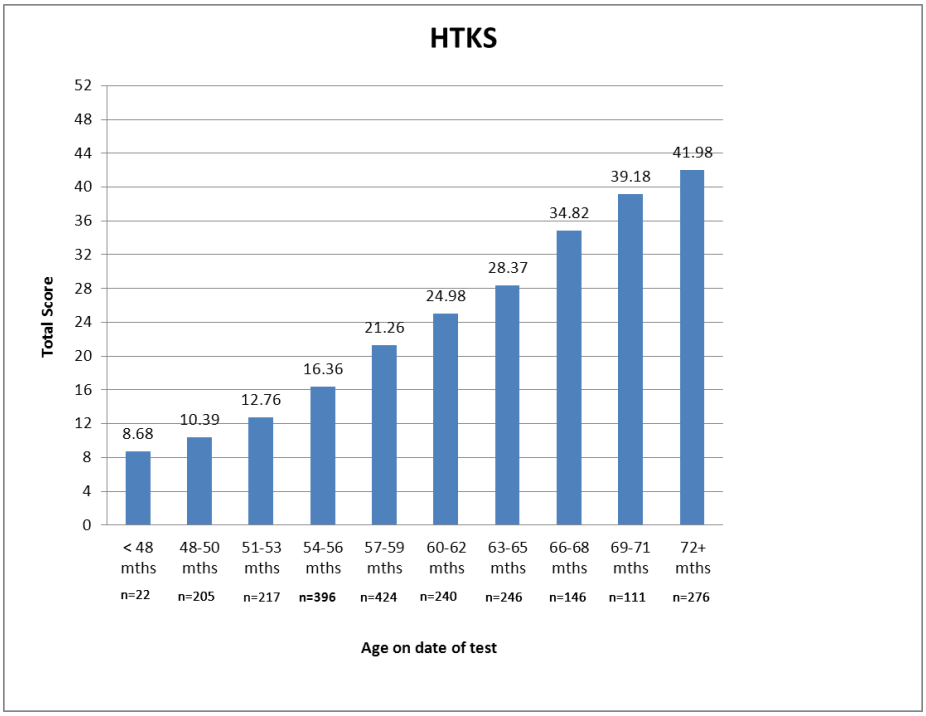
Psychometric Information (sample, reliability, validity)

Peabody Research Institute (test-retest reliability& means by age)

Test/Retest Reliability Correlations

Measure	r
Head Toes Knees Shoulders	0.80

Mean Scores by Age (from Self Regulation Measurement Study Sample)



External Studies (sample, reliability, validity)

Average Task Performance across Early Childhood

	HTKS (0-40)		Head-to-Toes (HTT; 0-20)		
Age	**Ponitz 2009 (Oregon)**	**Ponitz 2009 (Michigan) Matthews et al.**	**Ponitz 2008**	**McClelland et al. (Oregon)**	**McClelland et al. (Michigan)**
3			3		
3.5			4.3		
4			9.5		
4.5			12.3	8.86 (7.52)	10.42 (7.61)
5			14	13.23 (6.83)	13.24 (6.34)
5.5	26.80 (10.57)	27.50 (9.62)	17		
6	28.00 (11.39)	32.30 (7.55)	18		
6.5			19		

- **Ponitz, McClelland, Matthews, & Morrison (2009) - Oregon**: 62 kindergarteners participated at the Oregon site at time 1 and 59 of those children participated at time 2. The site was mixed-SES and rural. Compared with Michigan kindergarteners, children in Oregon were 2.3 months older in the fall (M = 5.63), and their parents had lower levels of education by 1.5 years (M = 14.42). There were more ethnic minorities in the Oregon sample: 56% White, 24% Latino, 13% Asian, and 7% other. No significant differences by examiner in the Fall on total scores and average number of self-corrects (p > .05). In the spring, examiner differences emerged for total score, $F(11, 169) = 4.58$, $p < .01$ and self corrects, $F(11, 169) = 5.25$, $p < .01$. Cross-examiner consistency for total score and self-correct responses was 66% and 75%, respectively.

- **Ponitz et al., (2009) – Michigan and Matthews, Ponitz, & Morrison (2009)**: 265 kindergarteners participated at the Oregon site at time 1 and 255 of those children participated in the study at time 2. The site was predominantly middle- to upper-middle class. Participants in Michigan had on average 10 fewer months of child care and preschool experience relative to Oregon participants (M = 12.48). The Michigan sample was 77% White, 8% Asian, 7% African American, 6% Arabic, and 3% Latino. No significant differences across examiners were found in overall scores and self-correct responses in the fall or spring all ps > .05).

- **Ponitz, McClelland, Jewkes, Connor, Ferris, & Morrison (2008):** There were two sites, one in Oregon and one in Michigan. The Michigan sample consisted of 353 children (178 girls). The average education level attained for both mothers and fathers was 16.0 (1.6). On average, children had spent about 13.9 months in childcare prior to data collection at Time 1 (S.D. = 16.15). Of the 319 children for whom we could obtain ethnicity, 76% were Caucasian, 8% were African American, 7.5% were East Indian or Asian, 2.5% were Latino/a, and 6% were Middle Eastern. The Oregon sample consisted of 92 children (48 girls). The mean parent education level was 14.6 years (3.9). On average, children had spent about 22 months in childcare prior to data collection at Time 1 (S.D. = 18.07 months). The Oregon sample was 48% Caucasian, 25% Latino, 19% Asian, and 8% other ethnic groups. At the Oregon site, no examiner differences found at Times 1–3 for both total scores and self-corrects, but a significant difference was found at Time 4 in total scores, $F(7, 51) = 2.95$; $p < 0.05$. This was due to one examiner, who only tested Spanish-speaking children, who had scored lower on the Head-to-Toes

Task compared to other children in the study. At the Michigan site, no examiner differences found at Times 1–3 for total scores and self-corrects. At Time 4, a significant difference emerged for self-corrects, $F(5, 242) = 5.26$, $p < 0.01$. Two out of six raters gave significantly higher average numbers of self-corrected responses, although this did not produce a difference in overall score.

- **McClelland, Cameron, Connor, Farris, Jewkes, & Morrison (2007) - Oregon:** 93 pre-k children participated at the Oregon site. The site was mixed-SES and rural. Children on average had spent about 22 months in child care prior to data collection. The average education level attained for mothers and fathers was approximately 14.63 years. The sample was 48% Caucasian, 25% Latino, 19% Asian, and 8% other ethnic groups. High inter-rater reliability was established on the Head Toes Task (κ = .90). No rater differences were found for both Fall and Spring testing, $F(5, 80) = 1.08$, $p > .05$ and $F(9, 72) = 0.76$, $p > .05$, respectively.
- **McClelland et al. (2007) – Michigan:** 217 pre-k children participated at the Oregon site. The site was predominantly middle- to upper-middle class. Children had spent an average of almost 12 months in child care prior to data collection. The average education level attained for both mothers and fathers was 15.95 years. 76% were Caucasian, 9% were African American or bi-racial, 7% were East Indian or Asian, 2% were Latino/a, and 6% were Middle Eastern. No rater differences were found for either Fall and Spring testing, $F(13, 181) = 1.36$, $p > .05$ and $F(13, 191) = 1.22$, $p > .05$, respectively.

DIMENSIONAL CHANGE CARD SORT (DCCS)

Description of the Instrument

- In the standard version of the DCCS task, children are required to sort first according to one dimension (e.g., color) and then according to another dimension (e.g., shape). The advanced version of the DCCS adds a third sorting dimension (e.g., border vs. non-border). The standard version of the task requires that the child shift their attention to a new dimension of the card between phases (pre- and post-switch); the advanced phase however requires that children shift the dimensional focus repeatedly across the phase (i.e., from card to card). The standard version has been conceptualized as the simplest possible test of task-switch (Rogers & Monsell, 1995).

Base Reference/Primary Citation:

Zelazo, P. D., Frye, D. Rapus, T. (1996). An age-related dissociation between knowing rules and using them. *Cognitive Development, 11*, 37-63. doi:10.1016/S0885-2014(96)90027-1

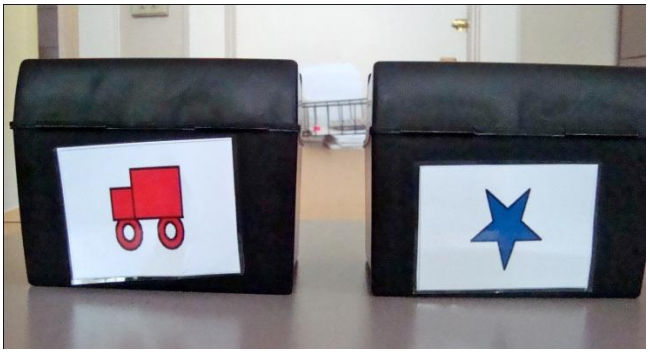
Zelazo, P. D. (2006). The dimensional change card sort (DCCS): A method of assessing executive function in children. *Nature Protocols, 1*, 297-301. doi: 10.1038/nprot.2006.46

Hongwanishkul, D., Happaney, K. R., Lee, W. S. C., & Zelazo, P. D. (2005). Assessment of hot and cool executive function in young children: Age-related changes and individual differences. *Developmental Neuropsychology, 28*, 617 – 644. doi: 10.1207/s15326942dn2802_4

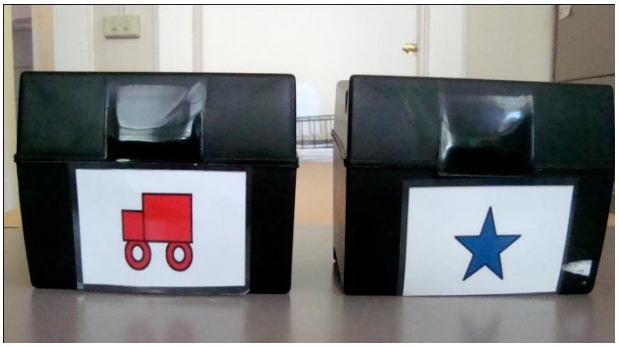
DCCS Materials

Boxes: Two black plastic recipe boxes with hole cut into the top. Boxes measure 6 ¾" in length, 4¾" in height, and 4½" in depth. Hole on top measures 5" by 2". Velcro is put on the front and the back of the box in order to adhere target card to each side.

FRONT

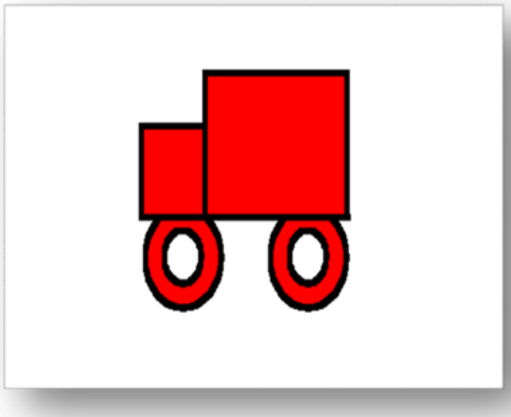


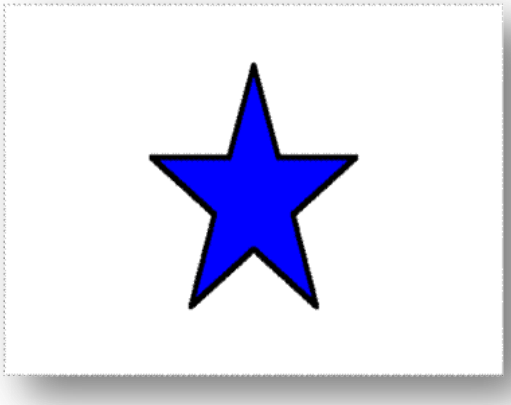
BACK



TOP

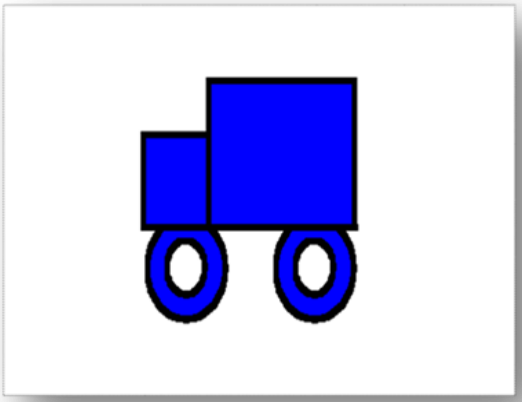
Integrated Model Cards for Boxes: Each card measures $3^{7}/_{8}$" by 4" and is laminated. Place Velcro on the back of the card in order to place card on the box. Two cards have a red truck on a white background and 2 cards have a blue star with a white background. Note that there is no border on these cards.





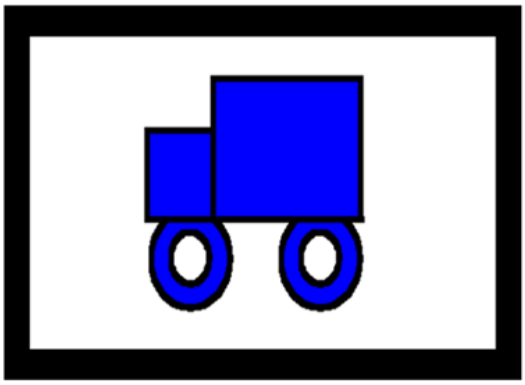
See Appendix for full-color sheets of all cards for printing purposes.

Cards for Color Game: For the color game there are 4 cards with a blue truck on a white background and 4 cards with a red star on a white background. Each card measures $3^{7}/_{8}$" by 4" and is laminated. Note that there is no border on these cards. Markings are made on the back of each card indicating its order of presentation (Blue Truck = P[ractice]1, C2, C3, C6 and Red Star = P2, C1, C4, C5).



Cards for Shape Game: For the shape game there are 3 cards with a blue truck on a white background and 3 cards with a red star on a white background (see images for color game). Each card measures $3^{7}/_{8}$" by 4" and is laminated. Note that there is no border on these cards. Markings are made on the back of each card indicating its order of presentation (Blue Truck = S1, S3, S4 and Red Star = S2, S5, S6).

Cards for Advanced Sort: For the advanced sort there are 4 cards with a blue truck on a white background with no border (see image for color game), 4 cards with a blue truck on a white background with a thick black border, 3 cards with a red star on a white background with no border (see image for color game), and 3 cards with a red star on a white background with a thick black border. Each card measures $3^{7}/_{8}$" by 4" and is laminated. Markings are made on the back of each card indicating its order of presentation (Blue Truck w/o Border = P.AS2, AS6, AS9, AS12; Blue Truck with Border = P.AS1, AS3, AS7, AS8; Red Star w/o Border = AS2. AS5, AS10; Red Star with Border = AS1, AS4, AS11).



DCCS Task Script

Materials: 2 sorting boxes, 4 integrated model cards for boxes, 8 cards for color game, 6 cards for shape game, and 14 cards for advance sort.

Place 2 boxes on the table approximately 8" from child's edge of table and 4" apart. Make sure they are angled the same way. Cards are labeled with integrated model cards, (colored shapes on white backgrounds). Red truck on assessor's right and blue star at assessor's left.

Here's a red truck and here's a blue star. Now, we're going to play a card game. This is the color game. In the color game all the blue ones go here (pointing to the box on the left) And all the red ones go here (pointing to the box on the right).

See, here's a blue one. So it goes here *(place it in box on the left).* If it's blue it goes here, but if it's red it goes here *(pointing to boxes to identify them).*

See, here's a red one. So it goes here *(place it in box on the right).* If it's blue it goes here, but if it's red it goes here *(pointing to boxes to identify them).*

Now it's your turn. So remember, if it's blue it goes here, but if it's red it goes here *(pointing to boxes).*

Rule Check

Can you show me where the blue ones go in the color game?

If Correct: *Very good, that's right.*

If Incorrect: *Uh oh. Remember, in the color game, all the blue ones go here, and all the red ones go here.* (Point to appropriate boxes. Repeat question and reminder 1 more time, only then mark as incorrect & move on.)

Response: Correct(1) Incorrect(0)

Can you show me where the red ones go in the color game?

If Correct: *Very good, that's right.*

If Incorrect: *Uh oh. Remember, in the color game, all the blue ones go here, and all the red ones go here.* (Point to appropriate boxes. Repeat question and reminder 1 more time, only then mark as incorrect & move on.)

Response: Correct(1) Incorrect(0)

Let's try this game

Color Test Trials

On each trial, say: If it is a blue one, then put it here, but if it is a red one, put it here.

- *If the child points to the box Assessor may sort the card for him/her. Do not say "okay" in response to sort. Say, "Let's do another one," "Let's do it again," etc.*
- *Point to boxes by touching the top with a finger.*
- *Do not bring out the card until the rule statement is complete.*
- ***Once card has been presented, Assessor CANNOT repeat the rule.***
- ***State "Here's a ___" while simultaneously presenting the card.***
- ***Hold the card above both boxes in the center (not over one box or the other).***

1.	*(red star)* Here's a red one.	Blue ____	**Red _____**
2.	*(blue truck)* Here's a blue one.	**Blue ____**	Red _____
3.	*(blue truck)* Here's a blue one.	**Blue ____**	Red _____
4.	*(red star)* Here's a red one.	Blue ____	**Red _____**
5.	*(red star)* Here's a red one.	Blue ____	**Red _____**
6.	*(blue truck)* Here's a blue one.	**Blue ____**	Red _____

**********CONTINUE if child gets at least 5/6 correct.**********

Card Sort – Integrated: Shape game

Keep cards in boxes.

Now we're going to play a new game. We're not going to play the color game anymore *(Shake head no).* We're going to play the ***shape*** game. In the shape game, all of the stars go here *(pointing to box on the left)* and all of the trucks go here *(pointing to box on the right).*

Rule Check

Can you show me where the stars go in the shape game?

If Correct: *Very good, that's right.*

If Incorrect: Uh oh. Remember, in the shape game, all the stars go here, and all the trucks go here.

(Point to appropriate boxes. Repeat question and reminder 1 more time, only then mark as incorrect & move on.)

Response: Correct(1) Incorrect(0)

Can you show me where the trucks go in the shape game?

If Correct: *Very good, that's right.*

If Incorrect: Uh oh. Remember, in the shape game, all the stars go here, and all the trucks go here.

(Point to appropriate boxes. Repeat question and reminder 1 more time, only then mark as incorrect & move on.)

Response: Correct(1) Incorrect(0)

Let's try this game!

Shape Test Trials

On each trial, say: If it is a star, then put it here, but if it is a truck, put it here.

- *If the child points to the box Assessor may sort the card for him/her. Do not say "okay" in response to sort. Say, "Let's do another one," "Let's do it again," etc.*
- *Point to boxes by touching the top with a finger .*
- *Do not bring out the card until the rule statement is complete.*
- ***Once card has been presented, Experimenter CANNOT repeat the rule.***
- ***State "Here's a ___" while simultaneously presenting the card.***
- ***Hold the card above both boxes in the center (not over one box or the other).***

Shape Test Trials:

1. *(blue truck)*	Here's a truck.	Star _____	**Truck** _____
2. *(red star)*	Here's a star.	**Star** _____	Truck _____
3. *(blue truck)*	Here's a truck.	Star _____	**Truck** _____
4. *(blue truck)*	Here's a truck.	Star _____	**Truck** _____
5. *(red star)*	Here's a star.	**Star** _____	Truck _____
6. *(red star)*	Here's a star.	**Star** _____	Truck _____

**********CONTINUE if child gets at least 5/6 correct.**********

Card Sort - Advanced

Note: NEVER START HERE- Only after integrated level.

Assessor is using the same target cards as in the integrated level.
Leave sorted cards in boxes.

Let's try one more game with cards!
Say all of these rules very slowly and deliberately!
In this game, you sometimes get cards that have a black border around it just like this one *(show a blue truck card with a border. Draw your finger around the border of the card).* If you see cards with a ***black border***, you have to play the ***color*** game. In the color game, blue ones go here and red ones go here *(point to respective boxes).* This one's blue, so I'm going to put it right here *(placing it down in the appropriate box).*

But if the cards have ***no black border***, like this one *(show them a blue truck card without a border. (Draw your finger around the outside of a card to show that there is no border.*), you have to play the ***shape*** game. In the shape game, if it's a star, we put it here, but if it's a truck, we put it here (*point to the respective boxes).* This one's a truck, so I'm going to put it right here *(place it down in the appropriate box).*

Rule Check *(Assessor is not showing a card during these checks***)**
So what game do you play if there is a border? *(color game).*

> ***If Correct:*** *Very good, that's right.*
>
> ***If Incorrect:*** *Uh oh. Remember, if there's a* **border**, *play the* **color** *game. If there is* **no border**, *play the* **shape** *game.* (Repeat question and reminder 1 more time, only then mark as incorrect & move on.)
>
> **Response: Correct(1) Incorrect(0)**

What game do you play if there is no border? *(shape game).*

> ***If Correct:*** *Very good, that's right.*
>
> ***If Incorrect:*** *Uh oh. Remember, if there's a* **border**, *play the* **color** *game. If there is* **no border**, *play the* **shape** *game.* (Repeat question and reminder 1 more time, only then mark as incorrect & move on.)
>
> **Response: Correct(1) Incorrect(0)**

Let's try this game!

Advanced Trials

<u>On each trial, say</u>: If there's a border, play the color game. If there is no border, play the shape game.

- *If the child points to the box Assessor may sort the card for him/her. Do not say "okay" in response to sort. Say, "Let's do another one," "Let's do it again," etc.*
- *Point to boxes by touching the top with a finger .*
- *Do not bring out the card until the rule statement is complete.*
- ***Once card has been presented, Experimenter CANNOT repeat the rule.***
- ***State "Here's a ___" while simultaneously presenting the card.***
- ***Hold the card above both boxes in the center (not over one box or the other).***

1. *(<u>red star **border**</u>)* Here's one with a border.	Blue ____	**Red _____**
2. *(<u>red star</u>)* Here's one without a border.	**Star** ____	Truck **____**
3. *(<u>blue truck **border**</u>)* Here's one with a border.	**Blue ____**	Red _____
4. *(<u>red star **border**</u>)* Here's one with a border.	Blue ____	**Red _____**
5. *(<u>red star</u>)* Here's one without a border.	**Star** ____	Truck **____**
6. *(<u>blue truck</u>)* Here's one without a border.	Star **____**	**Truck** ____
7. *(<u>blue truck **border**</u>)* Here's one with a border.	**Blue ____**	Red _____
8. *(<u>blue truck **border**</u>)* Here's one with a border.	**Blue ____**	Red _____
9. *(<u>blue truck</u>)* Here's one without a border.	Star **____**	**Truck** ____
10. *(<u>red star</u>)* Here's one without a border.	**Star** ____	Truck **____**
11. *(<u>red star **border**</u>)* Here's one with a border.	Blue ____	**Red _____**
12. *(<u>blue truck</u>)* Here's one without a border.	Star **____**	**Truck** ____

"Great job!" *Put away all boxes & cards.* **"Now we're ready for a new game."**

DCCS Record Form

Color Game

Rule Check Color Game

Can you show me where the blue ones go in the color game?

	1st attempt		2nd attempt (if 1st incorrect)	
Circle Response:	***Correct (1)***	***Incorrect (0)***	***Correct (1)***	***Incorrect (0)***

Can you show me where the red ones go in the color game?

	1st attempt		2nd attempt (if 1st incorrect)	
Circle Response:	***Correct (1)***	***Incorrect (0)***	***Correct (1)***	***Incorrect (0)***

Color Test Trials:

1. *(red star)* *Here's a red one.* Blue ____ **Red** _____
2. *(blue truck)* *Here's a blue one.* **Blue** ____ Red _____
3. *(blue truck)* *Here's a blue one.* **Blue** ____ Red _____
4. *(red star)* *Here's a red one.* Blue ____ **Red** _____
5. *(red star)* *Here's a red one.* Blue ____ **Red** _____
6. *(blue truck)* *Here's a blue one.* **Blue** ____ Red _____

********Continue if child gets at least 5/6 correct*********

Total Color (0-6):_____

Pass/Fail Color (0-1):_____
(0 if < 5 correct, 1 if ≥ 5)

Shape Game

Rule Check Shape Game

Can you show me where the stars go in the shape game?

	1st attempt		2nd attempt (if 1st incorrect)	
Response:	***Correct (1)***	***Incorrect (0)***	***Correct (1)***	***Incorrect (0)***

Can you show me where the trucks go in the shape game?

	1st attempt		2nd attempt (if 1st incorrect)	
Response:	***Correct (1)***	***Incorrect (0)***	***Correct (1)***	***Incorrect (0)***

Shape Test Trials

1. *(blue truck) Here's a truck.* Star _____ **Truck** _____
2. *(red star) Here's a star.* **Star** _____Truck _____
3. *(blue truck) Here's a truck.* Star _____ **Truck** _____
4. *(blue truck) Here's a truck.* Star _____ **Truck** _____
5. *(red star) Here's a star.* **Star** _____Truck _____
6. *(red star) Here's a star.* **Star** _____Truck _____

********Continue if child gets at least 5/6 correct*********

Total Shape (0-6):_____

Pass/Fail Shape (1-2):_____
(1 if < 5 correct, 2 if ≥ 5)

Advanced Sort

Rule Check
So what game do you play if there is a border? *(color game).*

	1st attempt		2nd attempt (if 1st incorrect)	
Response:	***Correct (1)***	***Incorrect (0)***	***Correct (1)***	***Incorrect (0)***

What game do you play if there is no border? *(shape game).*

	1st attempt		2nd attempt (if 1st incorrect)	
Response:	***Correct (1)***	***Incorrect (0)***	***Correct (1)***	***Incorrect (0)***

2.	*(red star **border**) Here's one with a border.*	Blue ____	**Red _____**
2.	*(red star) Here's one without a border.*	**Star** ____	Truck **____**
3.	*(blue truck **border**) Here's one with a border.*	**Blue ____**	Red _____
4.	*(red star **border**) Here's one with a border.*	Blue ____	**Red _____**
5.	*(red star) Here's one without a border.*	**Star** ____	Truck **____**
6.	*(blue truck) Here's one without a border.*	Star **____**	**Truck** ____
7.	*(blue truck **border**) Here's one with a border.*	**Blue ____**	Red _____
8.	*(blue truck **border**) Here's one with a border.*	**Blue ____**	Red _____
9.	*(blue truck) Here's one without a border.*	Star **____**	**Truck** ____
10.	*(red star) Here's one without a border.*	**Star** ____	Truck **____**
11.	*(red star **border**) Here's one with a border.*	Blue ____	**Red _____**
12.	*(blue truck) Here's one without a border.*	Star **____**	**Truck** ____

Total Advanced (0-12):_____

Pass/Fail Advanced (2-3):_____
(2 if < 9 correct, 3 if ≥ 9)

DCCS Scoring

Each item is coded as follows:

0 = Incorrect sort

1 = Correct sort

Final Score: Zelazo's (2006) pass/fail coding scheme

0 = did not pass color sort
(Less than 5/6 items correct on color sort)

1 = pass color sort, fail on shape sort
(At least 5/6 items correct on color sort but less than 5/6 items correct on shape sort)

2 = pass shape sort, fail advanced trials
(At least 5/6 items correct on both color and shape sort but less than 9/12 items correct on advance/border sort)

3 = pass advanced trials
(At least 5/6 items correct on both color and shape sort and at least 9/12 items correct on advance/border sort

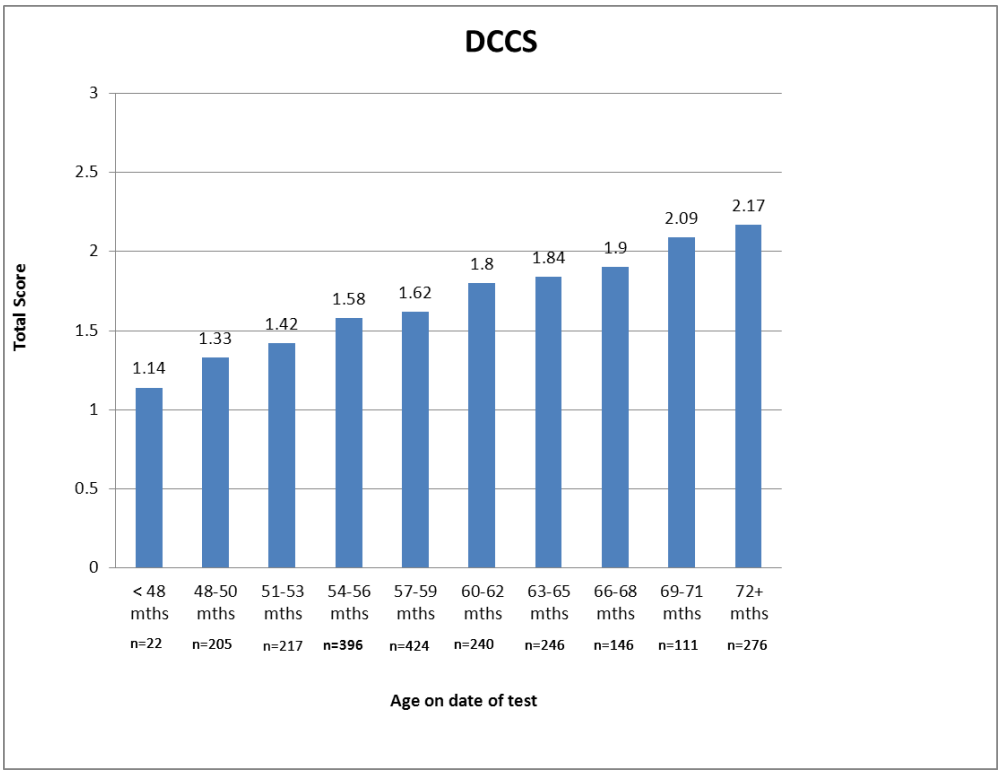
Psychometric Information (sample, reliability, validity)

Peabody Research Institute (test-retest reliability & means by age)

Test/Retest Reliability Correlations

Measure	r
Dimensional Change Card Sort	0.48

Mean Scores by Age (from Self Regulation Measurement Study Sample)



External Studies (sample, reliability, validity)

Note that the studies listed used the advanced DCCS sort. Studies that only used the standard sort are not included)

- **Hongwanishkul, et al., (2005):** Study consisted of 98 children from age 3.0 to 5.9 years. The study had two separate sessions, which occurred approximately 2 weeks apart. Six of the initial 106 children did not return for the second session, and 2 refused to play during both sessions. Children were divided into three age groups, with the final sample consisting of 33 children at 3 years (16 girls; M = 41.02), 32 at 4 years (16 girls, M= 54.06), and 33 at 5 years (16 girls, M= 66.13). No information about SES was provided. Graph illustration highest level of performance on the DCCS by age is presented below.

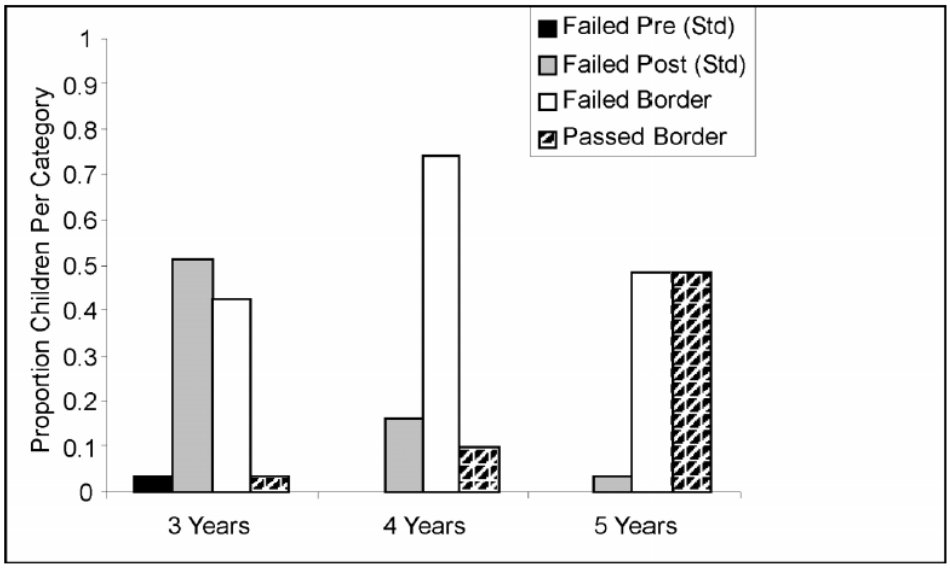


FIGURE 4 Classifications based on children's highest level of performance on the Dimensional Change Card Sort. Percentages of children at each age who were classified as (a) failing the preswitch phase of the standard version, (b) passing the preswitch phase of the standard version but failing the postswitch phase, (c) passing the standard version but failing the border version, and (d) passing both the standard and border versions.

- **Carlson (2005)**: Children were primarily middle-class and European American. Children younger than 5 were only given the standard DCCS, children 5 & 6 were only given the advanced DCCS. In the post-switch phase of the task five cards were used, two were compatible with the first sorting rule and 3 were incompatible with the first sorting rule. Only the performance on the incompatible post-switch trials was used for scoring pass/fail (3/3 based on binomial theorem). There was no indication of the passing criteria for the advanced trials; however, it is noted that for the advanced there were 20 trials. Four cards had what is equivalent to a border and 16 did not. The bordered cards only were used

in the analysis. Assuming the probability of passing at chance was less than .05; pass should have been 3 out of 4.

- **Low (2010) Study 2:** The study used the Zelazo (2006) 0 to 3 coding scheme; however, they treated the variable as continuous, so only means and standard deviation were provided (i.e., do not know the breakdown of the percentage of children who passed each phase of the task). The sample consisted of 18 3-year-olds (5 females, mean age = 3.6) and 18 4-year-olds (6 females, mean age = 4.4). No information about SES was provided. There were significant differences between 3- and 4-year-olds on the task, $F(1, 34) = 12.71^{**}$, $\eta^2 = .27$.

- **Low (2010) Study 3:** The sample consisted of 21 3-year-olds (13 females, mean age = 3.4) and 21 4-year-olds (9 females, mean age = 4.5). No information about SES was provided. There were significant differences between 3- and 4-year-olds on the task, $F(1, 40) = 21.32^{**}$, $\eta^2 = .35$.

Age	Carlson (2005)	Low (2010) Study 2	Low (2010) Study 3
<3.5	10% (*N* =29) (standard sort only)	1.11(0.76) (range = 0-3)	1.33(0.86) (range = 0-3)
>3.5	25% (*N* = 79) (standard sort only)		
<4.5	48% (*N* = 65) (standard sort only)	1.94 (0.64) (range = 0-3)	2.38 (0.60) (range = 0-3)
>4.5	76% (*N* = 38) (standard sort only)		
5 - 6	~38% (*N* = 83) (advance sort only)		

KANSAS REFLECTION-IMPULSIVITY SCALE FOR PRESCHOOLERS (KRISP)

Description of the Instrument

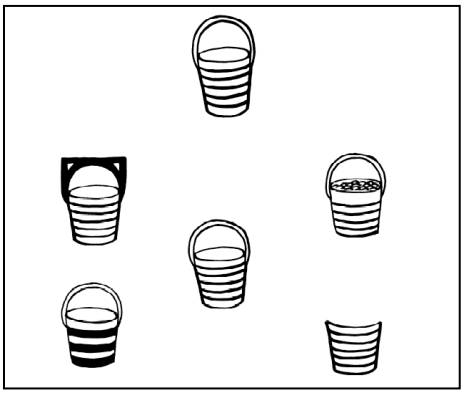
- The KRISP (Wright, 1971) is a match-to-sample task based on the Matching Familiar Figures Test (Kagan, 1965). The rules for the task are as follows: children are presented with an array of line drawings and asked to identify the drawing that is an exact duplicate of a standard/target item. The example on the right illustrates the task with the target item on top and the possible choices below it.

- The task was developed as an assessment of attentiveness, reflexive processing, and sustained focus. Also considered a measure of conceptual tempo.

Base Reference/Primary Citation:

Wright, J. C. (1971). Kansas Reflection-Impulsivity Scale for Preschoolers (KRISP). St. Louis: CEMREL, Inc.

Gaddis, L. R. & Martin, R. P. (1989). Relationship among measures of impulsivity for preschoolers. Journal of Psychoeducational Assessment, 7, 284-295. doi:10.1177/073428298900700401

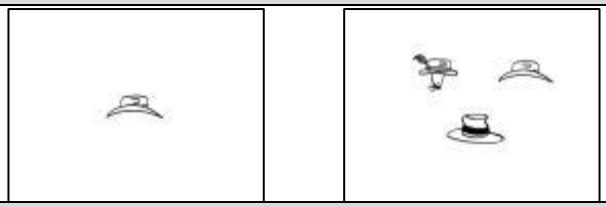
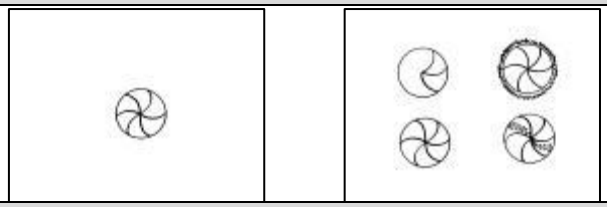
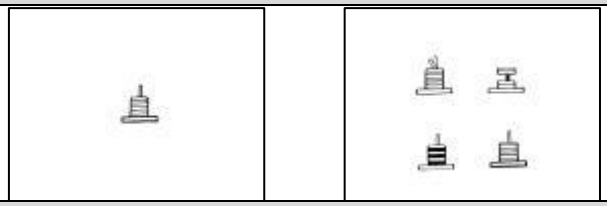
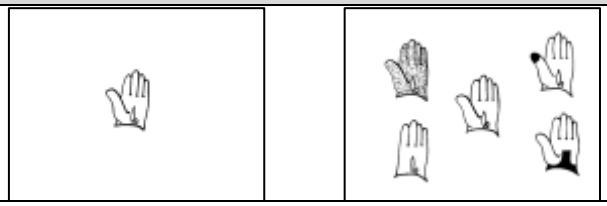


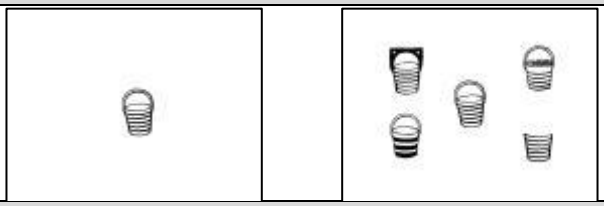
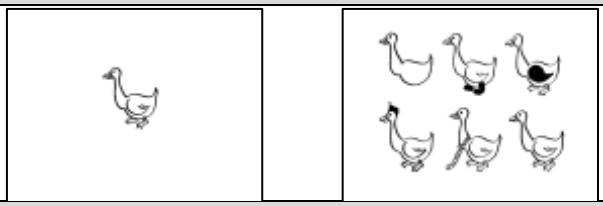
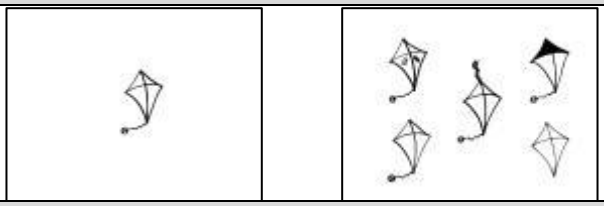
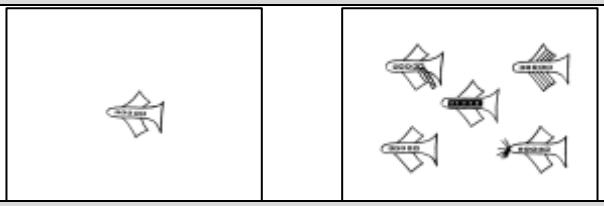
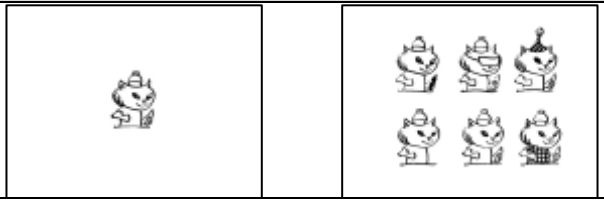
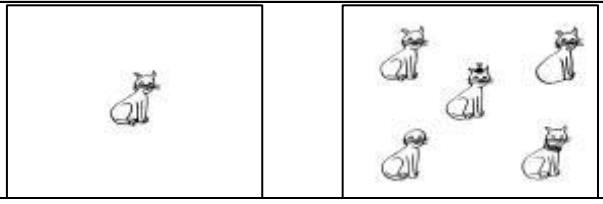
KRISP Materials

The KRISP picture book consisted of 32 pictures; 16 pictures of the standard, to be matched images and 16 pictures containing the array of potential matches for the standard. There are separate sets of images for Pre-Kindergarteners and Kindergarteners. Images of the items in their order of presentation are given below.

Images are inserted into clear plastic cover sheets and placed into a 1" 3-ring binder. Images are arranged so the when the binder is open, the standard image is presented on a top and the array of choices are presented on the bottom (see image on right). Each set of items are separated by a set of blank sheets, so that when the page is turned, no item is presented.

See Appendix for full sheets of all pictures for printing purposes.

Item 1	**Item 2**
	
Item 3	**Item 4**
	
Item 5	**Item 6**
	

Item 7	Item 8
	
Item 9	**Item 10**
	
Item 11	**Item 12**
	
Item 13	**Item 14**
	
Item 15	**Item 16**
	

KRISP Task Script

We have a new game to play today. Here's how we play the game: Open book to first practice item (Hat).

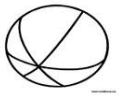
Practice items:

Do you see this picture on the top? Point and make sure the child is looking at the picture on the top page. **Can you find the picture down here** (point to array on lower page) **that looks just like the one up here?** (point to the top page)

- If the child points to the correct choice say: **Very good. Let's do that every time. Always point to one down here that is just exactly like the one up here.** (turn to blank page)

- If the child points to the incorrect choice, say: **No, that's not exactly the same as the one up here, because it is** (describe the discrepancy)**. Now point to the one that is exactly like this one up here.**

Test items:



Proceed with the next item (Ball) While on the blank page between items say: **O.k. when I turn the page, point to the picture down here** (indicate) **that is exactly the same as the one you will see up here** (point). **Ready?**

Turn the page and ask: **Which one down here is just like this one? Can you point to it the first time?**

- If the child points to the correct choice say: **Very good. Let's do that every time. Always point to one down here that is just exactly like the one up here.** (turn to blank page)

- If the child points to the incorrect choice, say: **No, that's not exactly the same as the one up here, because it is** (describe the discrepancy)**. Now point to the one that is exactly like this one up here.**

On blank page before the umbrella say: **Remember, only one is exactly the same. Always try to find it the first time. Are you ready?**

Turn the page and allow child to make choice.

- If the child is correct, give brief and varied social reinforcement without reminders or instructions.
- If the child is incorrect **do not** point out the discrepancy. Instead point to the item on the top page and say: **No, look up here. Can you find the one that is exactly like this one up here?**

Say nothing during the display of the preceding blank pages except: **Ok, ready for the next one?**

- If the child is correct, give brief and varied social reinforcement without reminders or instructions.
- If the child is incorrect **do not** point out the discrepancy. Instead point to the item on the top page and say: **No, look up here. Can you find the one that is exactly like this one up here?**

If a second error is made, do the above instructions again. But if the third choice is still incorrect turn the page and say: **Ok, let's go on to the next one. Remember, only one is exactly the same as the one up here. Can you find it the first time?**

- Turn page immediately after correct response (or the third error on the same page) and immediately record responses on the coding sheet.

Prompts:

Standard prompts are to be used in the event that the child says or does certain things indicating that he/she is having difficulty. These prompts can be used throughout the assessment.

- Child says: "None of these match" or equivalent.
  Assessor: **Yes, there is one that is exactly the same. Keep looking and see if you can find it.**

- Child says: "All of them are the same" or equivalent.
  Assessor: **No, some are different. (pause) Only one is exactly the same. Can you find it?**

- Child says: "I don't know" or equivalent.
  Assessor: **Keep looking. Try to find the one that's the same as the one on top.**

- Child points to one and says: "That's not it" or equivalent.
  Assessor: **Just point to the one that is exactly the same. Try to find it the first time.**

- Child points rapidly to more than one alternative.
  Assessor: **Which one did you point to first? Just point to the one that is the same, but don't point to the others.**

KRISP Record Form

Stimulus	*Number of Errors (0-3)*	*Comments*
1. Hat (practice)		
2. Ball		
3. Umbrella		
4. Candle		
5. Coat		
6. Glove		
7. Pail		
8. Wagon		
9. Pan		
10. Goose		
11. Kite		
12. Truck		
13. Rocket		
14. Mouse		
15. Cat		
16. Kitten		

TOTAL NUMBER OF ERRORS FOR ITEMS 2-16: _____

KRISP Scoring

Each item is scored based on the number of incorrect responses made on that item, up to 3 errors. Therefore, each item can have a score of 0, 1, 2, or 3 errors made.

Final Score: The total number of errors possible minus the number of actual errors made is used so that higher scores on the measure would reflect better self-regulation.

- **Total Score**: The value of the total number of errors possible (45) minus the actual number of errors made on items 2 through 16.

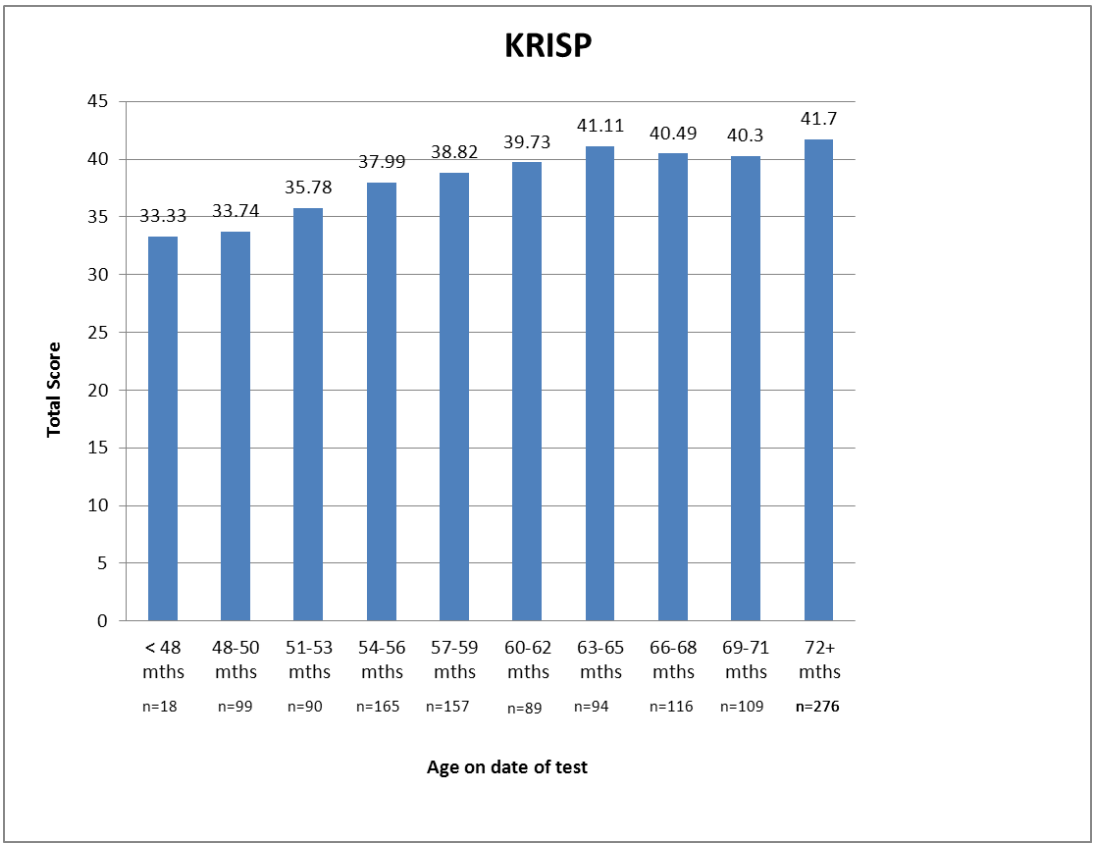
Psychometric Information (sample, reliability, validity)

Peabody Research Institute (test-retest reliability, mean scores)

Test/Retest Reliability Correlations

Measure	r
Kansas Reflection-Impulsivity Scale	0.71

Mean Scores by Age (from Self Regulation Measurement Study Sample)



External Studies (sample, reliability, validity)

- **Wright, 1973** (via Gaddis & Martin, 1989): Report moderate to strong reliabilities for the KRISP. 99.4% rater agreement on errors made. Test-retest reliability (1- to 8-week delay) was .75.
- **Gaddis & Martin (1989)**: 39 children between the ages of 46 & 62 months (*M* = 53.67, *SD* = 4.54 from middle to upper-middle class homes. Families were 97.4% Caucasian and well educated; on average 83.5% of parents had a bachelor's degree and 53.5% held a graduated degree. Gave 10 items to children and reported mean errors of 2.95 (2.33).
- **Carlson (2005):** The goal of the study was to provide age-related trends in performance on a series of measures of executive function, including KRISP, for early childhood (2 to 6 years of age). Data was aggregated across multiple studies conducted by the author. The samples were predominantly middle class and Caucasian. Raw scores for the task were not provided; instead performance on the task was converted to a pass/fail score where the probability of passing by chance was less than .05. For the KRISP was a score of 8 or more correct out of 10 on first try. Percentage of children passing the KRISP were as follows: Young 3 = 0%, Older 3 = 41%, Younger 4 = 81%, Older 4 = 75%, and 5 = 94%.
- **Carlson & Meltzoff (2008):** The study examined differences on the KRISP among native Spanish-English bilinguals, English monolinguals, and English speakers enrolled in second-language immersion kindergarten. Study consisted of 50 kindergarteners and their parents. Mean age was 72 months (*SD* = 5.68 months). The native bilinguals were from homes with median maternal and paternal education level of high school and annual incomes of about $25,000, while the other groups were from homes with median maternal and paternal education level of college and annual income of about $70,000. Children were allowed up to 3 errors per each of the task's 15 items. No differences were seen between groups and on average children made 5.75 errors (*SD* = 2.83).
- **Carlson & Moses (2001):** Study examined differences in measures of inhibitory control and theory of mind between 107 predominantly white 3- and 4-year-olds. Allowed 3 errors for each of the 10 items presented. 3-year-olds (mean age 3 years 8 months) made 9.4 errors, while 4-year-olds (mean age 4 years 5 months) made 5 errors. There was a significant age difference. The study also examined the interrelations among the KRISP and other measures of inhibitory control.
- **Sabbagh, Xu, Carlson, Moses, & Lee (2006):** The study examined group differences between Chinese and U.S. preschooler's executive function, including the KRISP. The study included 109 Chinese and 107 U.S. preschoolers; mean age = 48.28 and 47.36 months, respectively. In both groups, children attended preschools serving middle-class families. KRISP was scored as the number of correct responses, which ranged from 0 to 10. The study only reported standardized scores and did not indicate specifically if there were age and country differences for the KRISP. However, MANCOVA analysis with the KRISP and other EF measures as dependent variables indicated that there were age and country differences favoring older and Chinese children. The graphs provided seemed to illustrate a linear age effect, but not a country difference for the KRISP.

- **Murray & Kochanska (2002):** The study used the KRISP as part of a behavioral battery of effortful control. Three different batteries were given at the three assessment time points (toddlerhood, preschool, and early school age) for this longitudinal study of 103 children. The KRISP was only given when children were in preschool (mean age = 46.01 months, *N* = 99) and early school (mean age = 65.89 months, *N* = 83). The sample was diverse in terms of education and income, but was predominantly Caucasian. The KRISP consisted of 20 items. Only one attempt per item. Preschoolers had an average 8.09 (*SD* = 4.70) errors and early school children averaged 2.93 (*SD* = 3.29) errors.

DIGIT SPAN

Description of the Instrument

- Children are told they are going to play a number game. The children are told that they will hear some numbers and they will need first repeat the numbers to the examiner and then later they are asked to repeat the numbers backwards (e. g., If I say '1, 3,' you say '3,1'). Digit span is a measure of working memory. To complete the task children need to hold and manipulate (reverse) a series of numbers in their minds. The memory demands increase by requiring children to repeat larger sets of numbers.

Base Reference/Primary Citation:

Wechsler, D. (2003). *Wechsler Intelligence Scale for Children—4th Edition (WISC-IV)*. San Antonio, TX: Harcourt Assessment.

Digit Span Task Script

Digit Span script and list of test items are not included in this manual since these were taken from the Wechsler Intelligence Scale for Children-4th Edition (WISC-IV). Please reference the WISC-IV Digit Span forward and backward subtest to obtain a copy of the administration script and items for this task.

Digit Span Record Form

Give both trials of each item, even if trial 1 is answered correctly. Only stop after child answers both trials in one row incorrectly. Actual test item patterns removed. See WISC-IV.

Practice 1:

	Practice 1	Response	Score
Trial 1			
Trial 2			

Practice 2:

	Practice 2	Response	Score
Trial 1			

Forward Test Items:

Trial 1	Response	Score	Trial 2	Response	Score
2 digit					
9 digits					

Backward:

Practice 1:

	Practice 1	Response	Score
Trial 1			
Trial 2			

Practice 2:

	Practice 2	Response	Score
Trial 1			
Trial 2			

Test Items:

Give both trials of each item, even if trial 1 is answered correctly. Only stop after child answers both trials incorrectly.

Trial 1	Response	Score	Trial 2	Response	Score
2 digits					
8 digits					

Digit Span Scoring

Each item is coded as follows:

- For each test item (forward and backward), the child gets 1 point for each number sequence recalled correctly. For example if a child was given the sequence 587 to recall backwards and said 875, he/she would get a score of 0 for that item. If he/she said 785, a score of 1 for that item would be given.

Final Score:

- The longest span correctly recalled across the test items (9 possible for forward and 8 possible for backward). Look for the highest test item with at least one trial that contains a score of "1" to locate the longest span recalled correctly. Obtain a final score for the forward and backward series separately.

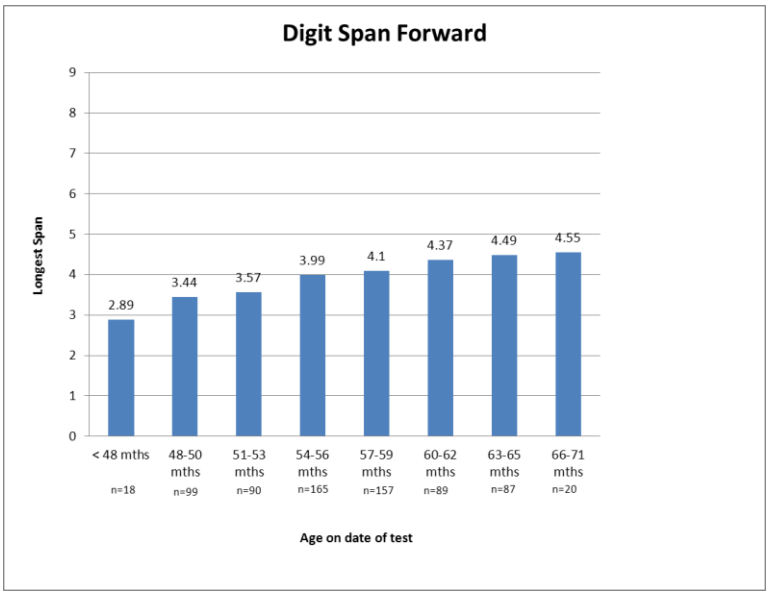
Psychometric Information (sample, reliability, validity)

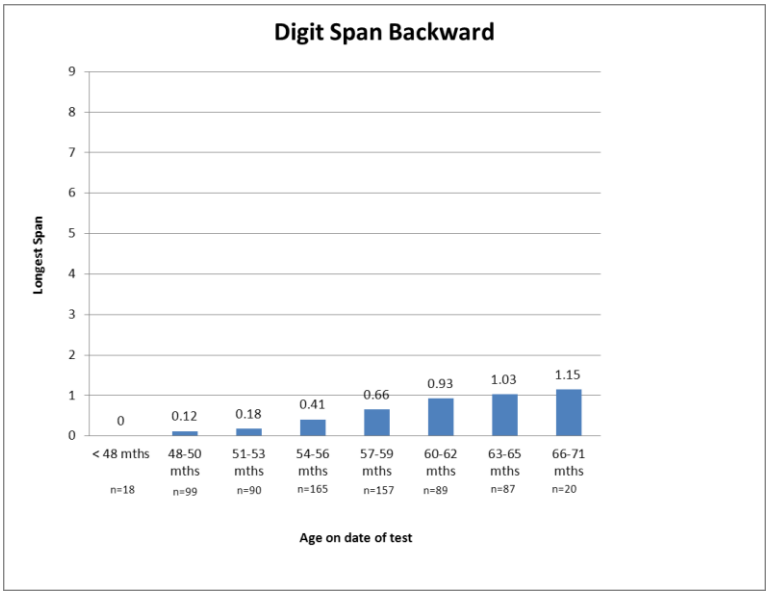
Peabody Research Institute (test-retest reliability & means by age)

Test/Retest Reliability Correlations

Measure	r
Digit Span	0.72

Mean Scores by Age (from Self Regulation Measurement Study Sample)





External Studies (sample, reliability, validity)

- **Carlson (2005):** The goal of the study was to provide age-related trends in performance on a series of measures of executive function, including backwards digit span (BDS), for early childhood (2 to 6 years of age). Data was aggregated across multiple studies conducted by the author. The samples were predominantly middle class and Caucasian. Raw scores for the task were not provided; instead performance on the task was converted to a pass/fail score where the probability of passing by chance was less than .05. For the BDS this was a score greater than or equal to 3. Percentage of children passing the BDS were as follows: Young 3 = 9%, Older 3 & Younger 4 = 17%, All 4s = 37%, and Older 4 and 5 = 69%.
- **Carlson, Moses, and Breton (2002):** The goal of the study was to examine the relations among inhibitory control, working memory, verbal ability, intelligence, and theory of mind in a sample of 47 typically developing preschoolers (mean age = 4 years 6 months). The sample was predominantly Caucasian from middle class families. Age-related performance on the BDS task was a follows: 3-year olds = 1.58 (0.79), 4-year olds = 1.95 (0.78), & 5-year olds = 2.88 (1.02). The author found a significant main effect of age. The BDS had perfect coder agreement.
- **Bierman, Nix, Greenberg, Blair, & Domitrovich (2008).** Used as measure of working memory in the Head Start Redi Intervention Study. Instead of numbers they used word span (children were asked to repeat a list of words in backward order). A child's score represented the highest number of words he/she repeated accurately. In the Fall of Pre-K the mean was 0.30 SD = 0.79, Range 0 to 4 and Spring of Pre-K mean was 0.78, SD = 1.08, Range = 0 to 4. The study found that the measure was significantly related to performance on Peg Tapping (.33 T1 and .35 T2), DCCS (.23 T1 and .28 T2), Walk-A-Line Slowly (.18 T1 and .15 T2), and Task Orientation (i.e., Assessor Ratings; .19 T1 and .29 T2).

COPY DESIGN

Description of the Instrument

- The Copy Design task instructs children to copy eight simple geometric designs. Children were allowed two attempts but no help from the assessor was allowed. The Copy Design task is a measure of persistence and sustained attention during a difficult task. This test has also been used previously to assess fine motor and visual control.

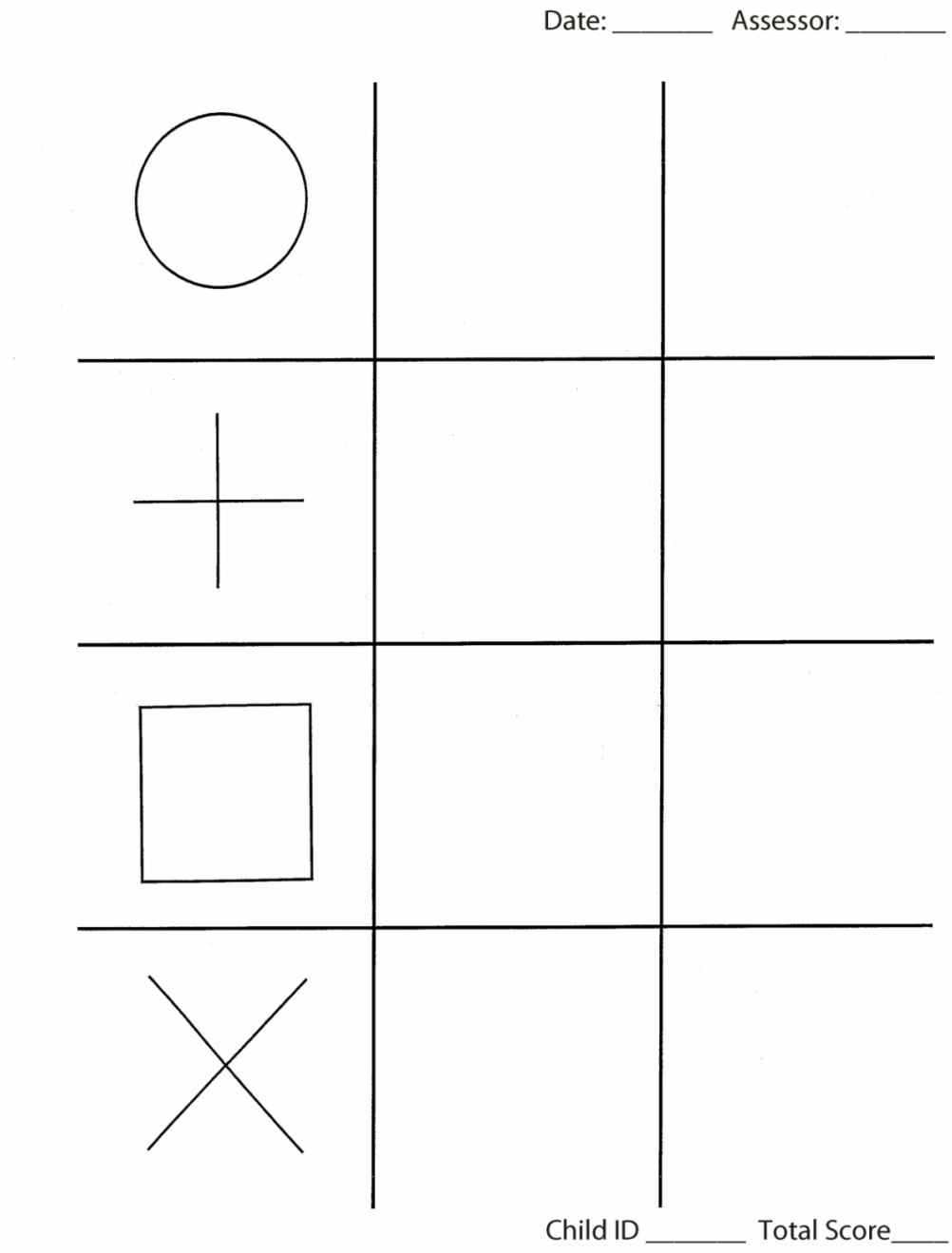
Base Reference/Primary Citation:

Davie, R., Butler, H., & Goldstein, H. (1972). *From birth to seven: The second report of the National Child Development Study* (1958 Cohort). London: Longman.

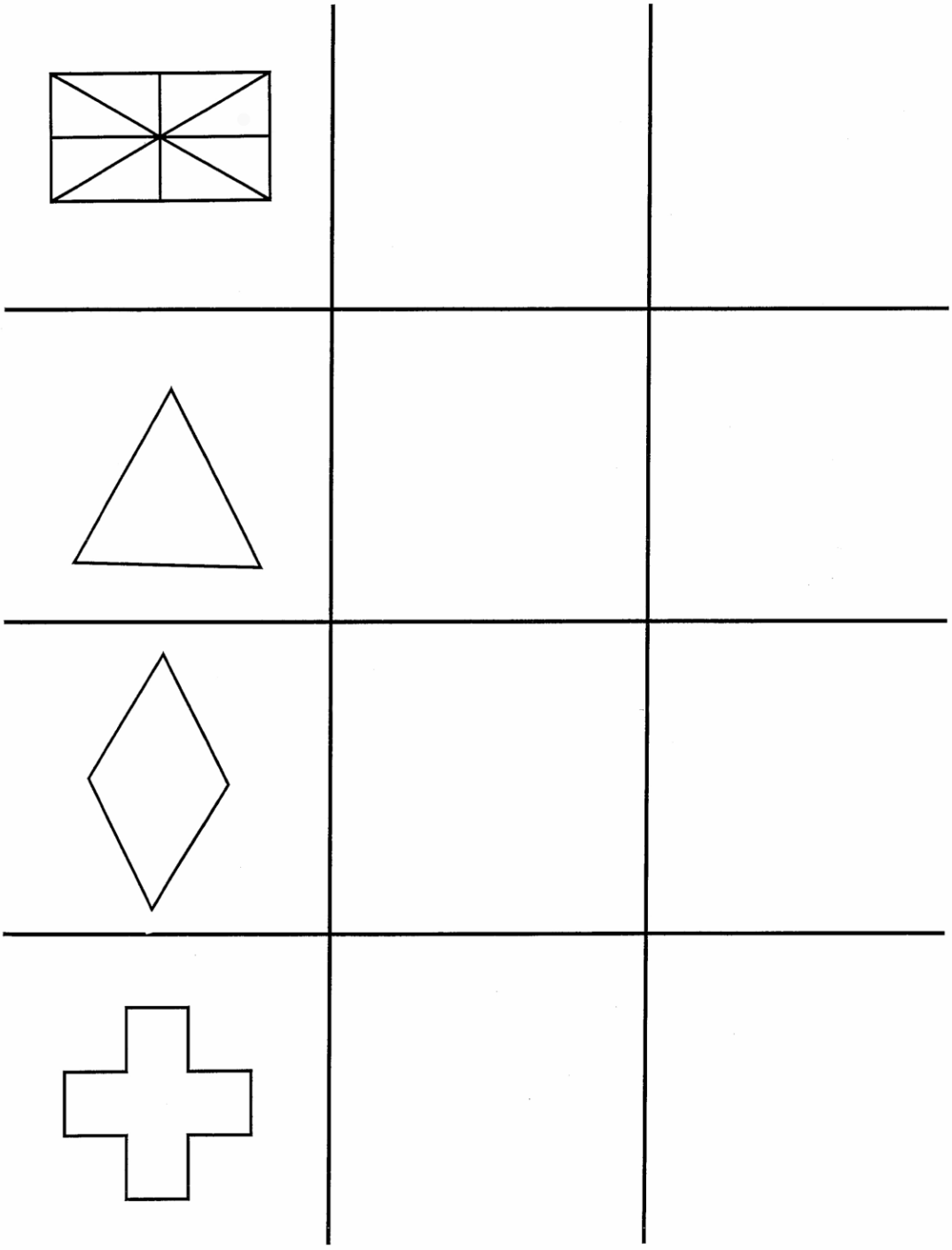
Osborne, A. F., Butler, N. R., & Morris, A. C. (1984). *The Social Life of Britain's Five Year Olds: A Report of the Child Health and Education Study*. London: Routledge and Kegan Paul.

Copy Design Materials

The two images below are printed on 8.5" x 11" paper. This document also serves as the Copy Design coding sheet. The document may be printed two-sided, but this may be less than desirable since children will be able to see the back set of shapes through the paper while completing the first side. A printable version of this form is available upon request. Contact PRI by visiting https://my.vanderbilt.edu/cogselfregulation/contact/ for a list of study contacts.



Date: _____ Assessor: _____



Child ID: _____ Total Score: _____

Copy Design Task Script

You are going to copy some designs. I want you to copy the designs as carefully as possible.

Place the first page of the test book in front of the child. Point to each design one at a time, and say:

See if you can make one just like this-here. [Point to the empty space beside the design, repeat this prompt for each attempt at each design]

Two attempts should be made at each design.

Do not allow child to erase.

Please note on design sheet if child scribbles, draws outside of the correct box or does not respond (ex. write IDK if child's response is "I don't know" or NR if child does not respond).

DO NOT GIVE THE CHILD ANY MORE HELP THAN THESE INSTRUCTIONS ALLOW.

Copy Design Scoring

The scoring is -1, 0 or 1. (A range of -16 to 16 on the test)

-1= child does not make any mark on the test or refuses to attempt a design (dk-don't know, did not attempt)

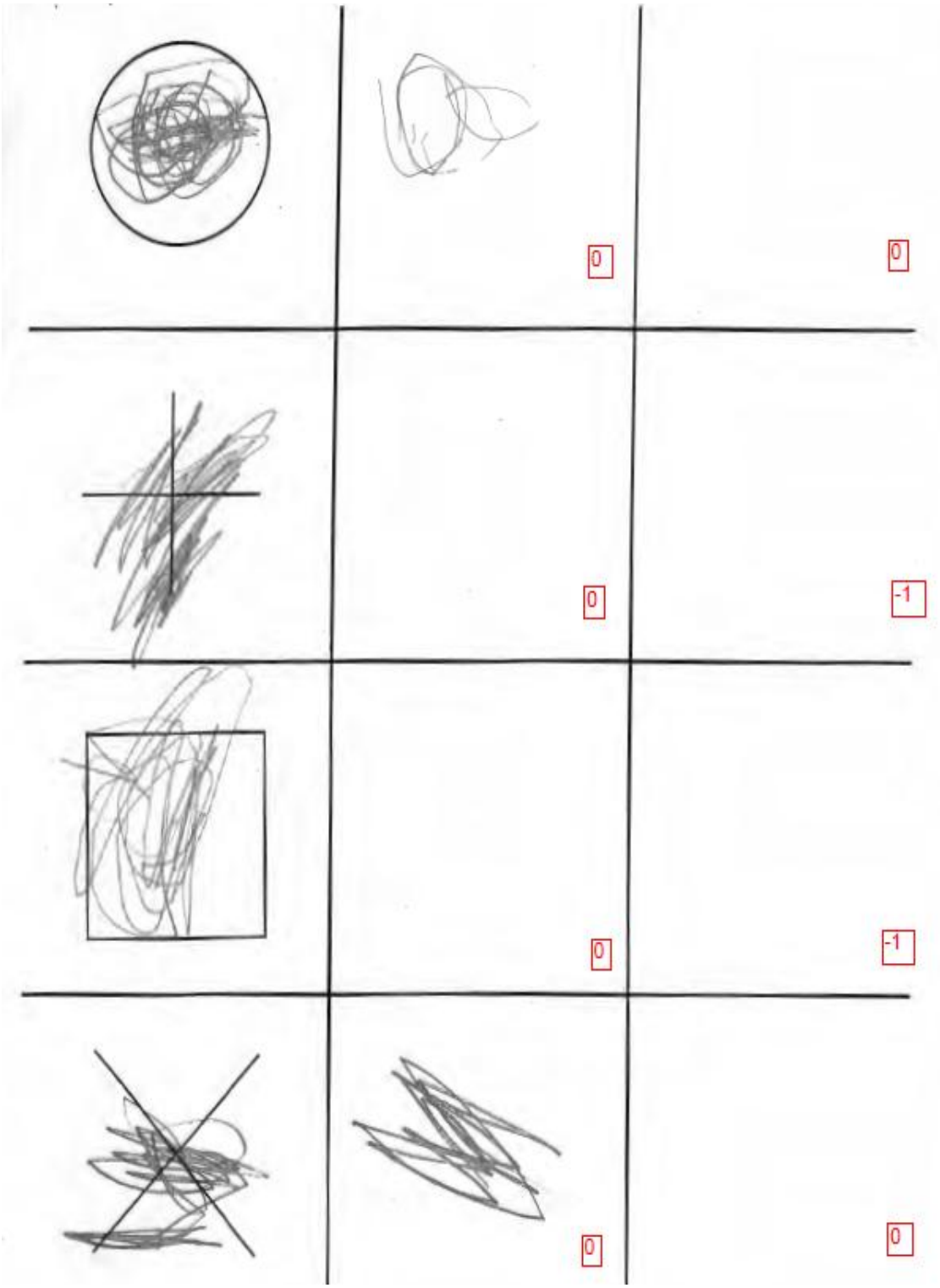
0 = child attempts to copy at least one design, but all attempts are judged to be poor copies

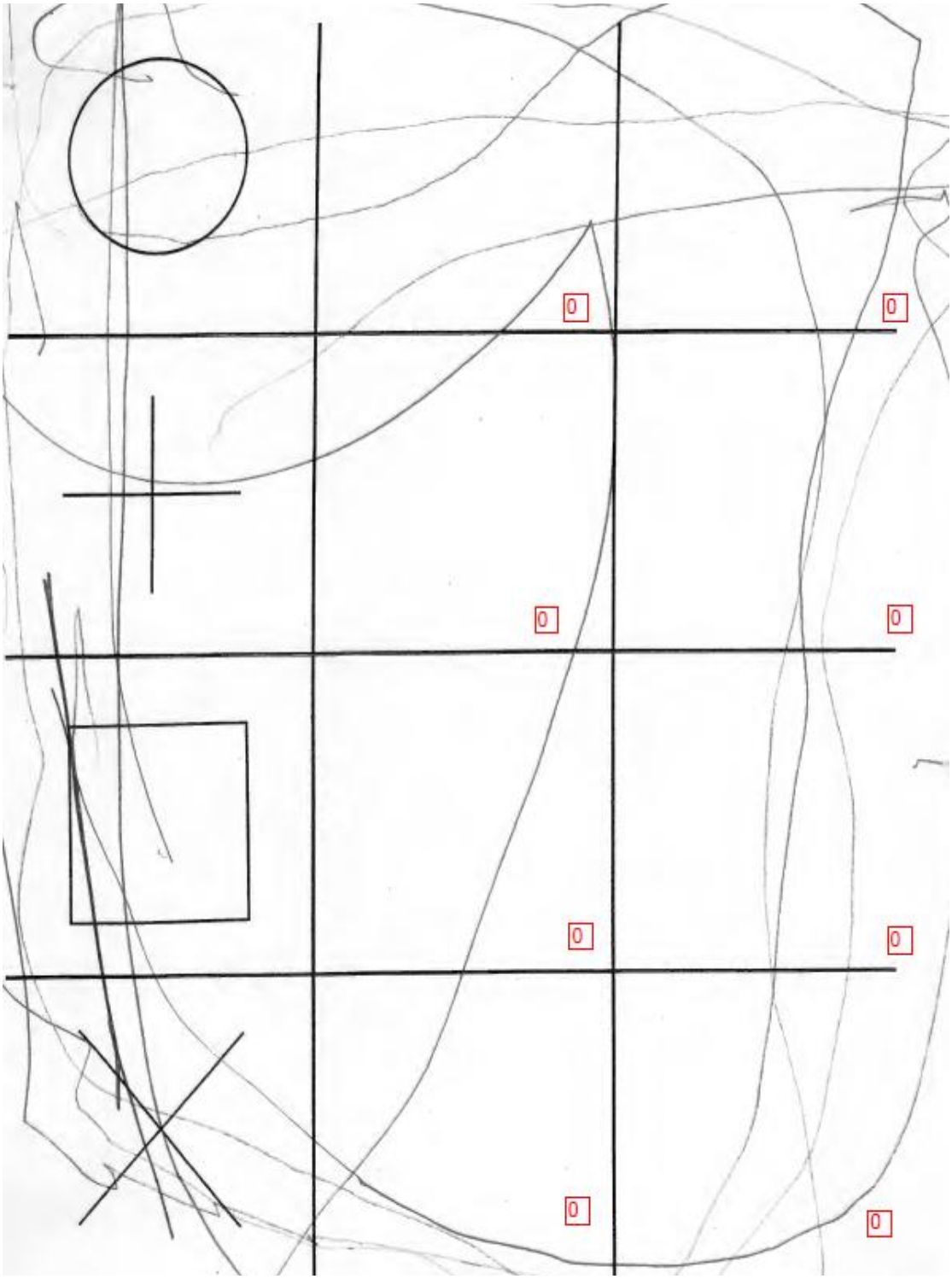
1 = given for each design that is judged a good copy by the following criteria:

- The drawing must have the right general shape and look like the shape it is supposed to be.
- It should be approximately symmetrical.
- Angles should not be rounded.
- The drawing should not be rotated, (e.g. the point of the triangle should be uppermost).
- Angles must be approximately opposite each other (except in the triangle).
- Slight bowing or irregularity of lines is allowed.
- As long as the other criteria are met, neatness is not important.
- Lines should meet approximately but as long as other criteria are met **small** gaps at junctions are acceptable.
- Slight crossing and overlapping of lines is permitted.
- Children should not erase or draw extra lines in a shape box. If there are eraser marks or stray lines, shape should be scored incorrect.
- Shapes should not have multiple small errors, (e.g. circles with slight overlap, gap, and one straight line).
- If scribble marks are made across more than one cell, count each distinct line as an incorrect attempt (0). Assign the score to the attempt/cell where the line originates or is in close approximation to. Score all other attempts as not attempted (-1).

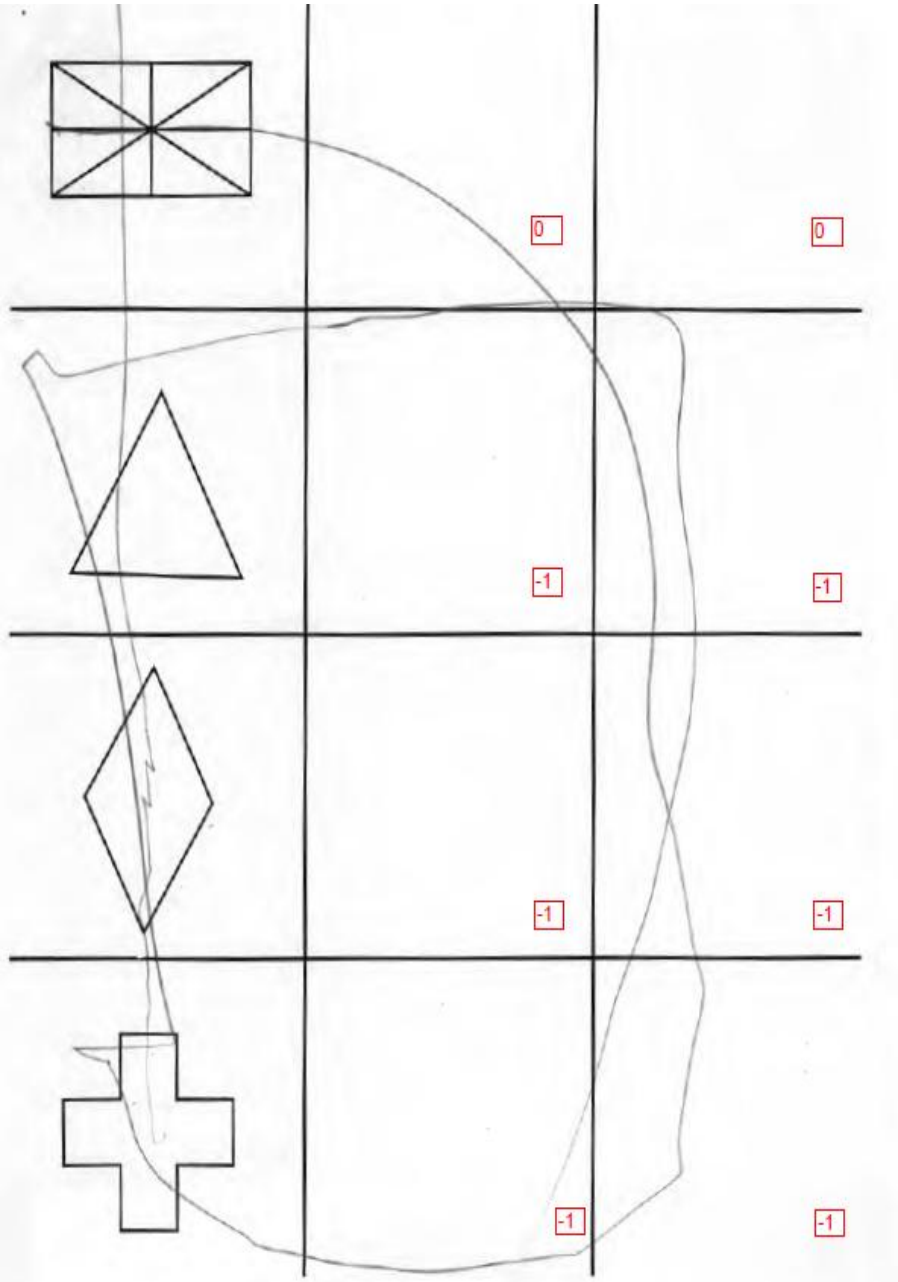
If the drawing is too close to call, give student credit for correct answer

*Following are specific rules and examples for each design.

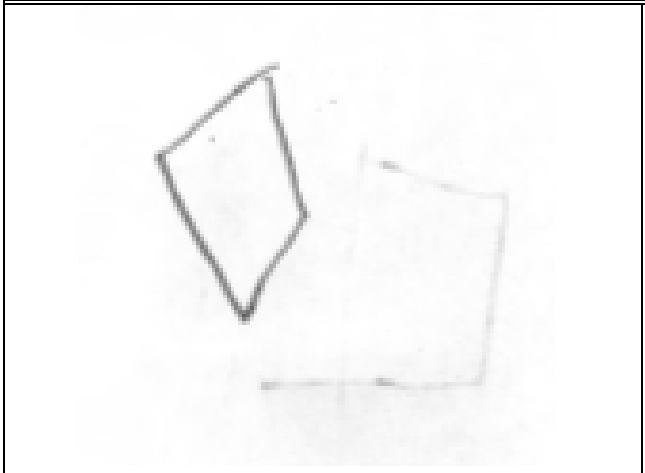
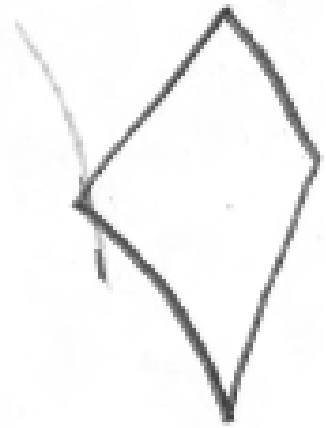
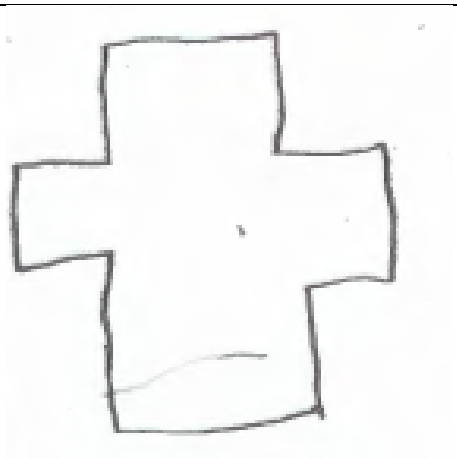
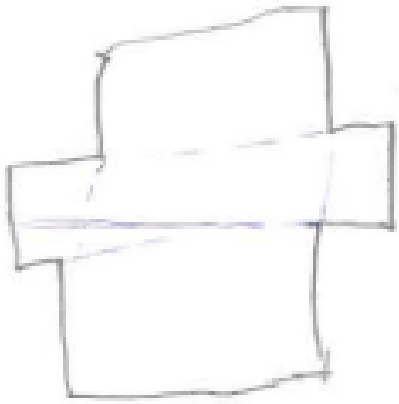
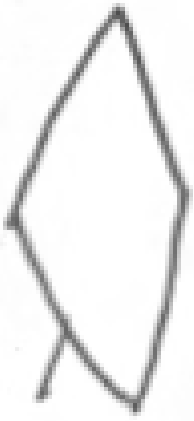
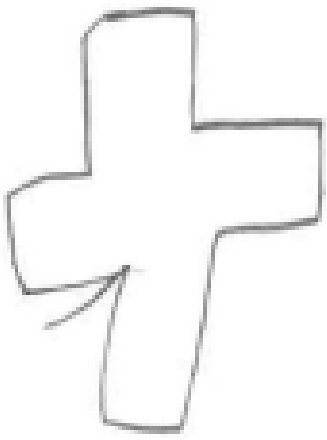




*Page 1: All designs are scored as incorrect (0)



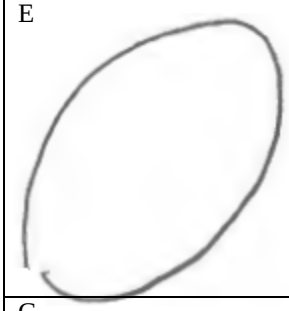
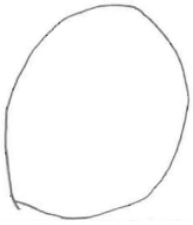
Page 2: Flag is scored as incorrect (0) and all other designs are scored as not attempted (-1)

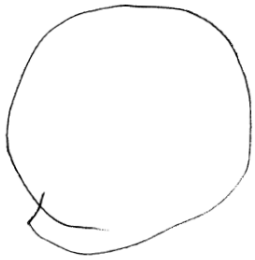
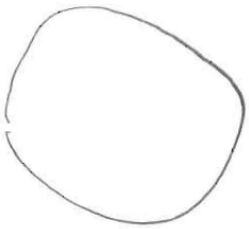
*Eraser marks or extra lines – Score (0)	
	
	
	

Examples of Scoring the Circle

The drawing must have the right general shape of a circle and look like a circle.

1. Circle should not have more than 1 flat or distinct side (straight lines).
2. Circle should be one continuous line that does not have a corner(s) (points).
   *Points at the junction are allowed.
3. Circle should not have a large gap or overlap at junction.

Score 1		Score 0	
A	B	A Error(s): multiple small errors	B Error(s): multiple small errors
C	D	C Error(s): 1 & doesn't meet general criteria	D Error(s): 1 & doesn't meet general criteria
E 	F	E Error(s): doesn't meet general criteria	F Error(s): 1 & 2
G	H 	G Error(s): 1 & 2	H Error(s): 1 & 2

Score 1		Score 0	
I 	J	I Error(s): 2	J Error(s): 1 & 2
K	L	K Error(s): 3	L Error(s): 1 & 2
M	N 	M Error(s): 1 & 2	N Error(s): 1
O	P	O Error(s): 1 & 3	P Error(s): 3

Score 1		Score 0	
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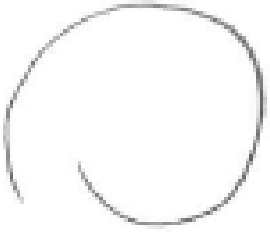
S	T	S Error(s): 3	T Error(s): 3
U	V	U Error(s): 3	V Error(s): 3
W	X	W  Error(s): 3	X Error(s): 3

Examples of Scoring the Plus

The drawing must have the right general shape of a plus and look like a plus and not an X.

1. Plus should be 2 intersecting lines.
   *Line added to extend leg is allowed (see correct example K)
2. All 4 legs should be no more than 2x as long as the shortest leg.
3. Horizontal line should be about parallel to short edge of paper and vertical line should be about parallel to long edge of paper (i.e., drawing should not be rotated).

Score 1		Score 0	
A	B	A Error(s): 1	B Error(s): 1
C	D	C Error(s): 2	D Error(s): 2
E	F	E Error(s): 2	F Error(s): 2
G	H	G Error(s): 2	H Error(s): 2 & 3

Score 1		Score 0	
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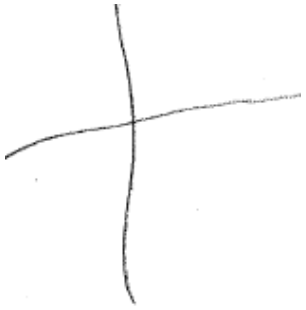
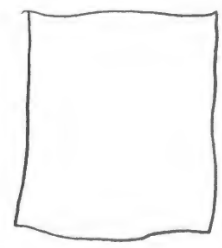
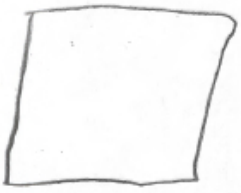
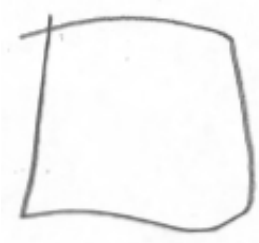
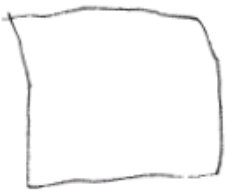
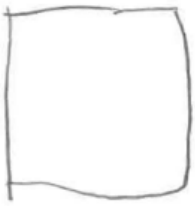
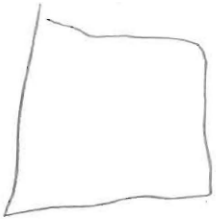
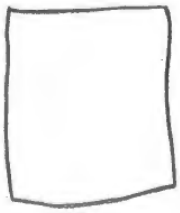
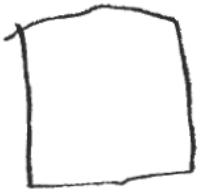
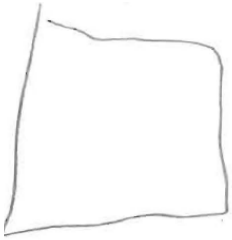
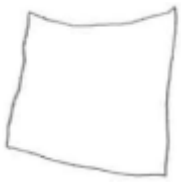
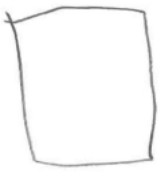
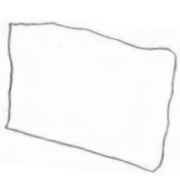
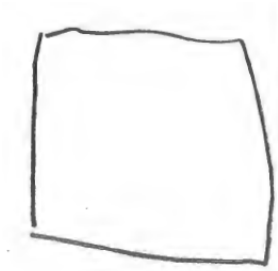
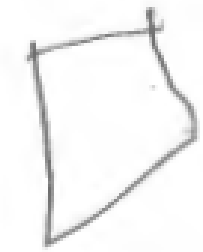
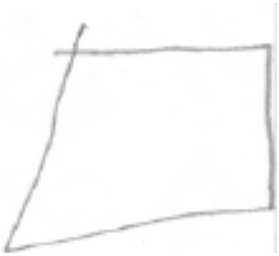
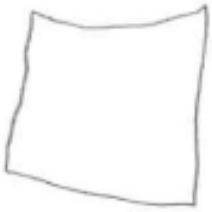
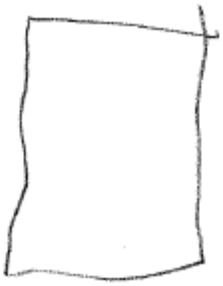
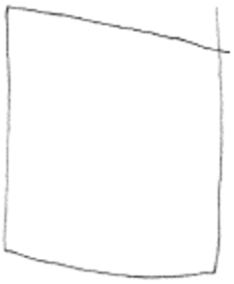
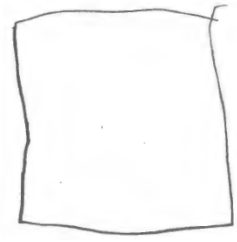
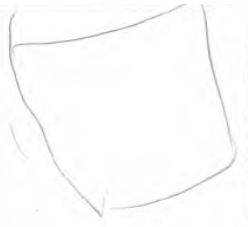
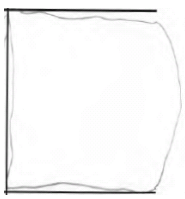
K	L	K Error(s): 3	L Error(s): 3
M	N 	M Error(s): 3	N Error(s): 3
O	P	O Error(s): 3	P Error(s): 3

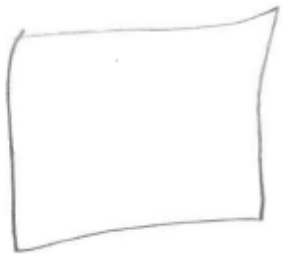
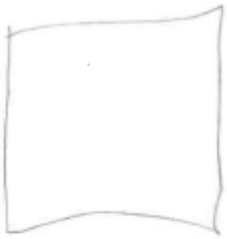
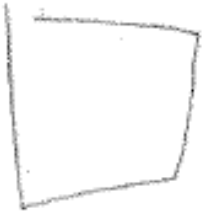
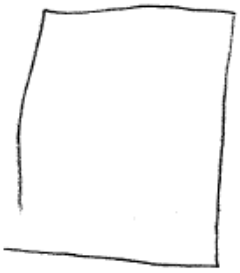
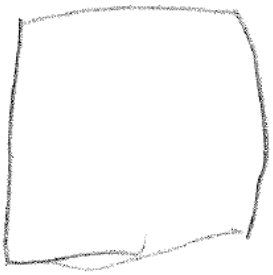
Examples of Scoring the Square

The drawing must have the right general shape and look like a square.

1. Shape should have 4 clearly defined sides without rounded corners.
2. Square should not be overly rotated (e.g., lines should be approximately parallel/perpendicular to edge of paper and shape should not be resting on a point).
3. Square should not be traced on 3 or 4 gridlines of the design sheet.
4. Lines should be of approximately equal length (e.g., the length of the shortest side, when measuring from point to point, should not be more than 2 times as long as longest side).
5. Shape should not have a large gap or overlap at junction.

Score 1		**Score 0**	
A 	B 	A Error(s): multiple small errors	B  Error(s): 1
C 	D 	C Error(s): 1	D  Error(s): 1
E 	F 	E Error(s): 1	F  Error(s): 1
G 	H 	G  Error(s): 1 & 2	H Error(s): 1 & 2

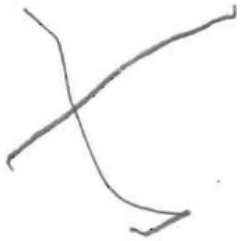
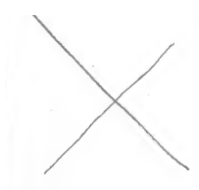
Score 1		Score 0	
I 	J	I  Error(s): 2	J  Error(s): 2
K 	L 	K Error(s): 2	L Error(s): 2 & 4
M	N 	M Error(s): 2 & 5	N Error(s): 2 & 4
O 	P	O  Error(s): 1, 2 & 5	P  Error(s): 3

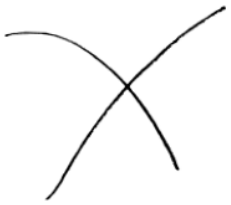
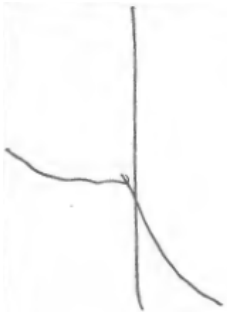
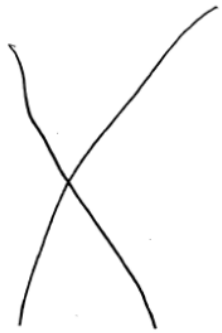
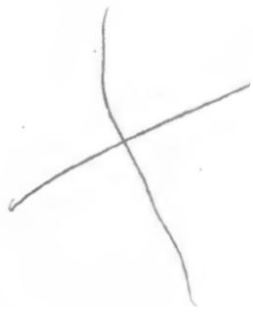
Score 1		Score 0	
Q 	R 	Q Error(s): 4	R Error(s): 4 & 5
S	T 	S  Error(s): 5	T  Error(s): 5

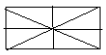
Examples of Scoring the X

The drawing must have the right general shape and look like an X.

1. Shape should be 2 intersecting lines.
   *Line added to extend leg is allowed (see correct examples A & B)
2. The longest leg should be no more than 2 times as long as the shortest leg.
3. Line should NOT be parallel to short edge of paper or long edge of paper (i.e., drawing should not be rotated).

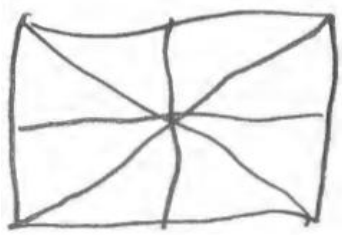
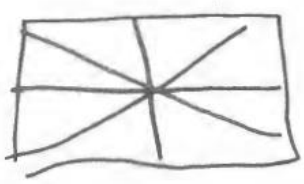
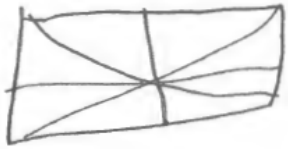
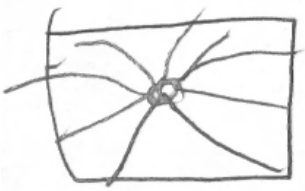
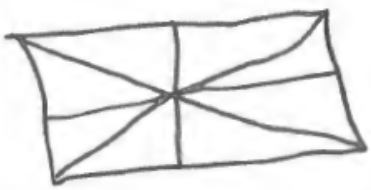
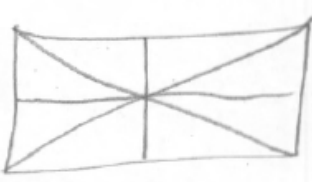
Score 1		Score 0	
A	B	A Error(s): 1	B Error(s): 1, 2, & 3
C	D	C Error(s): 1	D  Error(s): 2 & 3
E	F	E Error(s): 2	F Error(s): 2
G	H 	G Error(s): 2	H Error(s): 2

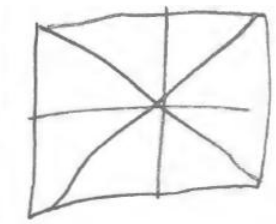
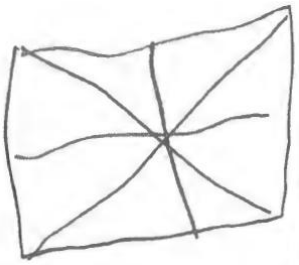
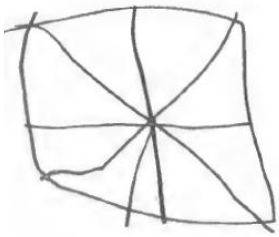
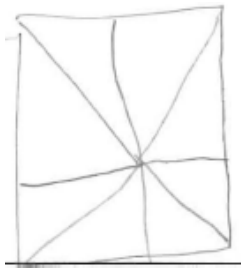
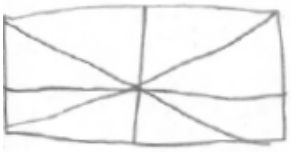
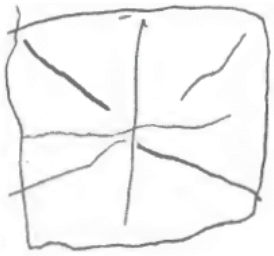
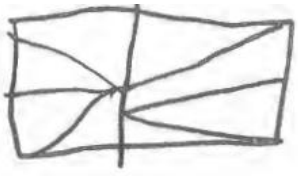
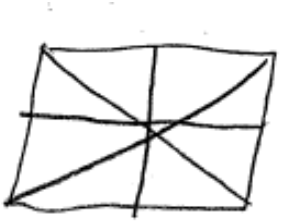
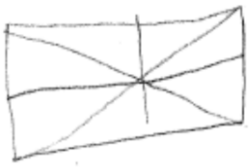
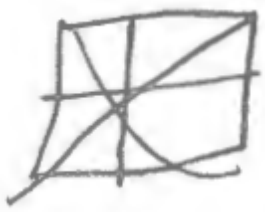
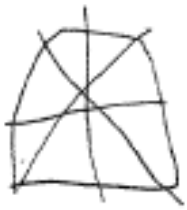
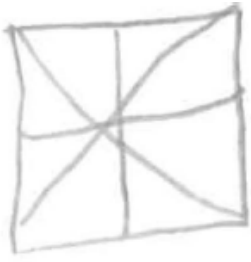
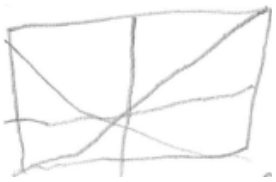
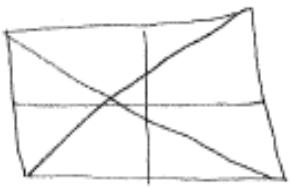
Score 1		Score 0	
I 	J	I Error(s): 3	J  Error(s): 3
K 	L	K Error(s): 3	L Error(s): 3
M 	N	M Error(s): 3	N Error(s): 2 & 3

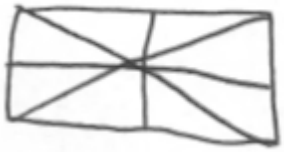
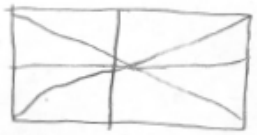
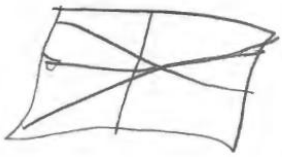
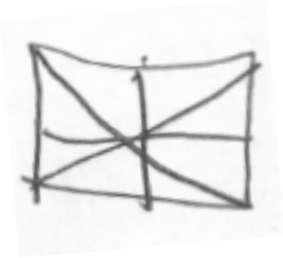
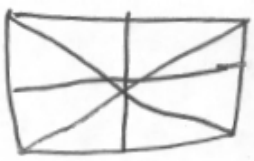
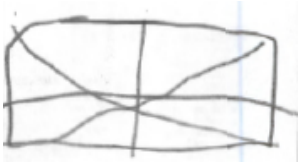
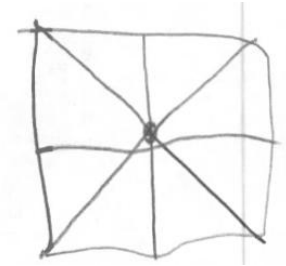
Examples of Scoring the 

The drawing must have the right general shape.

1. Within the rectangle, there are 4 intersecting lines.
2. Rectangle should not be overly rotated (e.g., lines should be approximately parallel/perpendicular to edge of paper).
3. Diagonal lines should approximately connect opposite corners (slight gaps allowed).
4. Shape should have 4 corners and corners should not be rounded.
5. Lines should intersect approximately at center of the rectangle; not drawn with a dot.
6. Shape should not have a large gap or overlap at junction.

Score 1	Score 0
A 	A  Error(s): multiple small errors
B 	B  Error(s): 1, 3, 5 & 6
C 	C Error(s): 3 & 5
D 	D Error(s): 3, 5, & 6

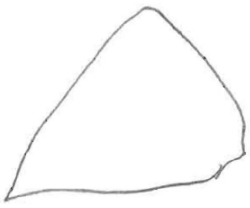
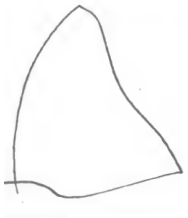
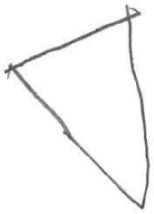
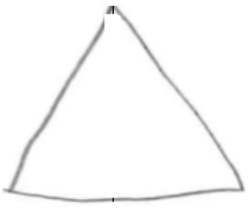
Score 1		Score 0	
E 	F 	E  Error(s): 1, 2 & 4	F  Error(s): 1 & 5
G 	H	G  Error(s): 1, 3, & 5	H  Error(s): 1 & 5
I 	J 	I  Error(s): 3, 5 & 6	J  Error(s): 4 & 6
K	L 	K  Error(s): 5	L  Error(s): 5

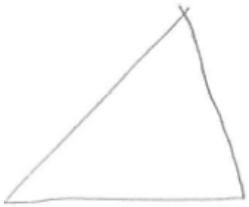
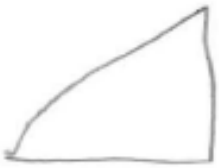
Score 1		Score 0	
M 	N 	M  Error(s): 1, 2 & 3	N Error(s): 2 & 4
O 	P 	O  Error(s): 4	P  Error(s): 4 & 5

Examples of Scoring the Triangle

The drawing must have the right general shape and look like a triangle.

1. Shape must have 3 clearly defined sides.
2. Triangle should not be rotated and should rest on a flat side (i.e., horizontal base is approximately parallel to short edge of the paper).
3. Triangle should not have a side that is parallel to long edge of the paper.
4. Angles should not be rounded.
5. Shape should not have a large gap or overlap at junction.

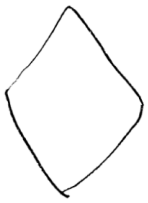
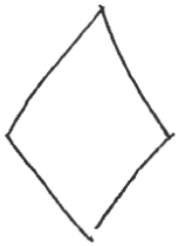
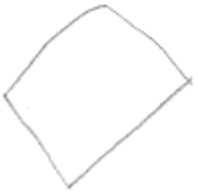
Score 1		**Score 0**	
A	B	A  Error(s): does not meet general scoring criteria	B  Error(s): does not meet general scoring criteria
C	D	C Error(s): 1	D Error(s): 1 & 4
E	F	E  Error(s): 2	F Error(s): 2
G	H 	G Error(s): 2	H Error(s): 2 & 3

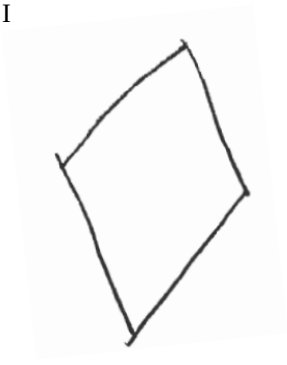
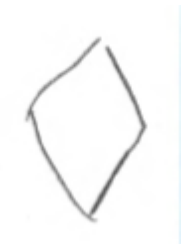
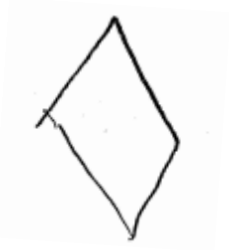
Score 1		Score 0	
I	J 	I Error(s): 2, 3 & 4	J Error(s): 2, 3 & 4
K	L	K Error(s): 2 & 5	L Error(s): 2 & 5
M	N	M  Error(s): 3	N Error(s): 3 & 5
O	P	O Error(s): 4	P Error(s): 5

Examples of Scoring the Rhombus

The drawing must have the right general shape and look like a rhombus.

1. Shape should have four corners and four distinct sides. Angles should not be rounded.
2. The rhombus should rest on the corner and not a side (i.e., shape should not be rotated).
3. The shape should be approximately symmetrical (e.g., not look like a kite).
4. Points of the rhombus should be across from each other.
5. Shape should not have a large gap or overlap at junction.

Score 1		**Score 0**	
A 	B	A Error(s): Eraser marks	B Error(s): 1
C 	D 	C Error(s): 1	D Error(s): 1
F	F	E Error(s): 1, 2, & 4	F Error(s): 1 & 4
G	H		H Error(s): 1

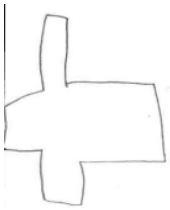
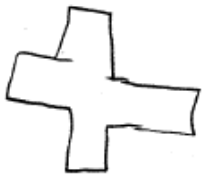
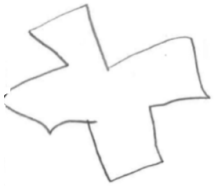
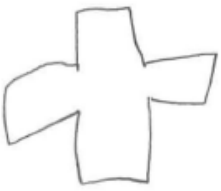
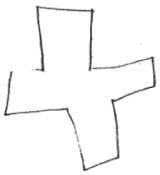
Score 1		Score 0	
I 	J 	I Error(s): 1	J Error(s): 1, 3 & 4
K	L	K Error(s): 1, 2 & 4	L Error(s): 1 & 5
M	N	M Error(s): 2	N Error(s): 2
O 	P	O Error(s): 2 & 4	P Error(s): 1 & 3

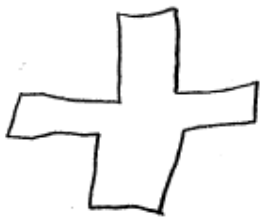
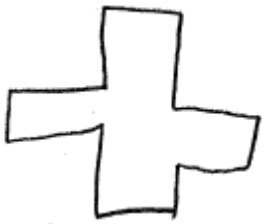
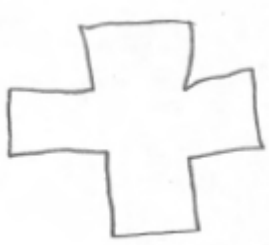
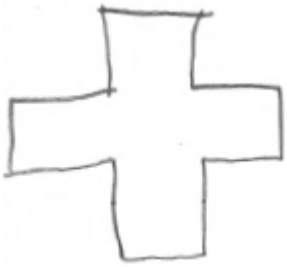
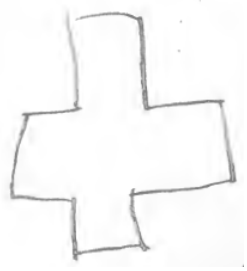
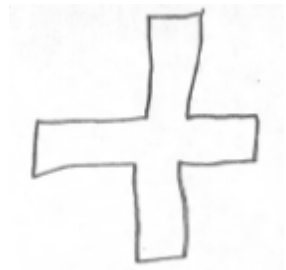
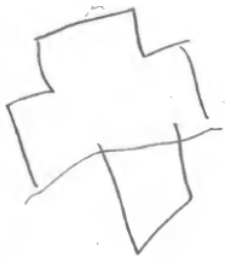
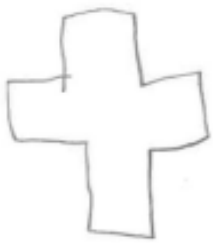
Score 1		Score 0	
Q	R	Q Error(s): 3	R Error(s): 3
S	T	S Error(s): 4	T Error(s): 4
U	V	U Error(s): 4	V Error(s): 4
W	X	W Error(s): 1 & 5	X Error(s): 5

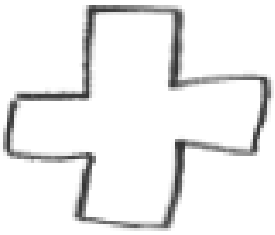
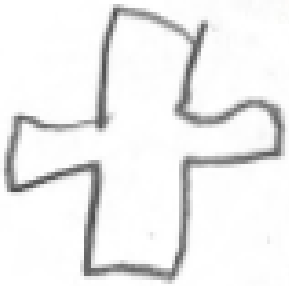
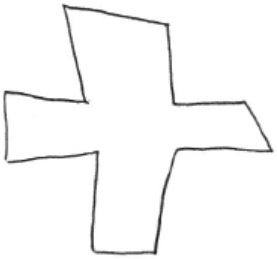
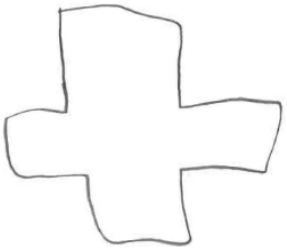
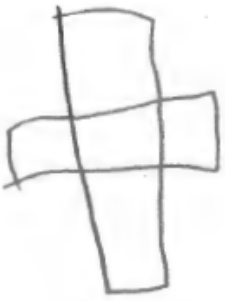
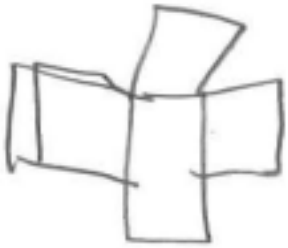
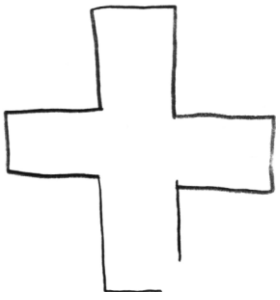
Examples of Scoring the

The drawing must have the right general shape.

1. Drawing should be comprised of lines approximately parallel and perpendicular to edges of the paper.
2. Drawing should be approximately symmetrical (e.g., continuations of lines across the center gap are closely in line with one another).
3. Angles should not be rounded.
4. Shape is comprised of 12 distinct lines.
5. Shape should not have a large gap or overlap at junction.

Score 1		**Score 0**	
A	B	A  Error(s): Does not meet general criteria	B Error(s): 1
C	D	C Error(s): 1	D  Error(s): 1 & 2
E	F	E  Error(s): 1 & 2	F Error(s): 1 & 2
G	H 	G Error(s): 2	H  Error(s): 2

Score 1		Score 0	
I	J 	I Error(s): 2	J  Error(s): 2
K 	L 	K Error(s): 2	L Error(s): 2
M 	N 	M Error(s): 2	N  Error(s): 1, 2, & 4
O 	P	O Error(s): 2 & 3	P Error(s): 2 & 3

Score 1		Score 0	
Q	R 	Q Error(s): 2 & 3	R  Error(s): 3
S 	T	S  Error(s): 3	T  Error(s): 4
U	V	U  Error(s): 1 & 4	V Error(s): 5
W		W  Error(s): 5	

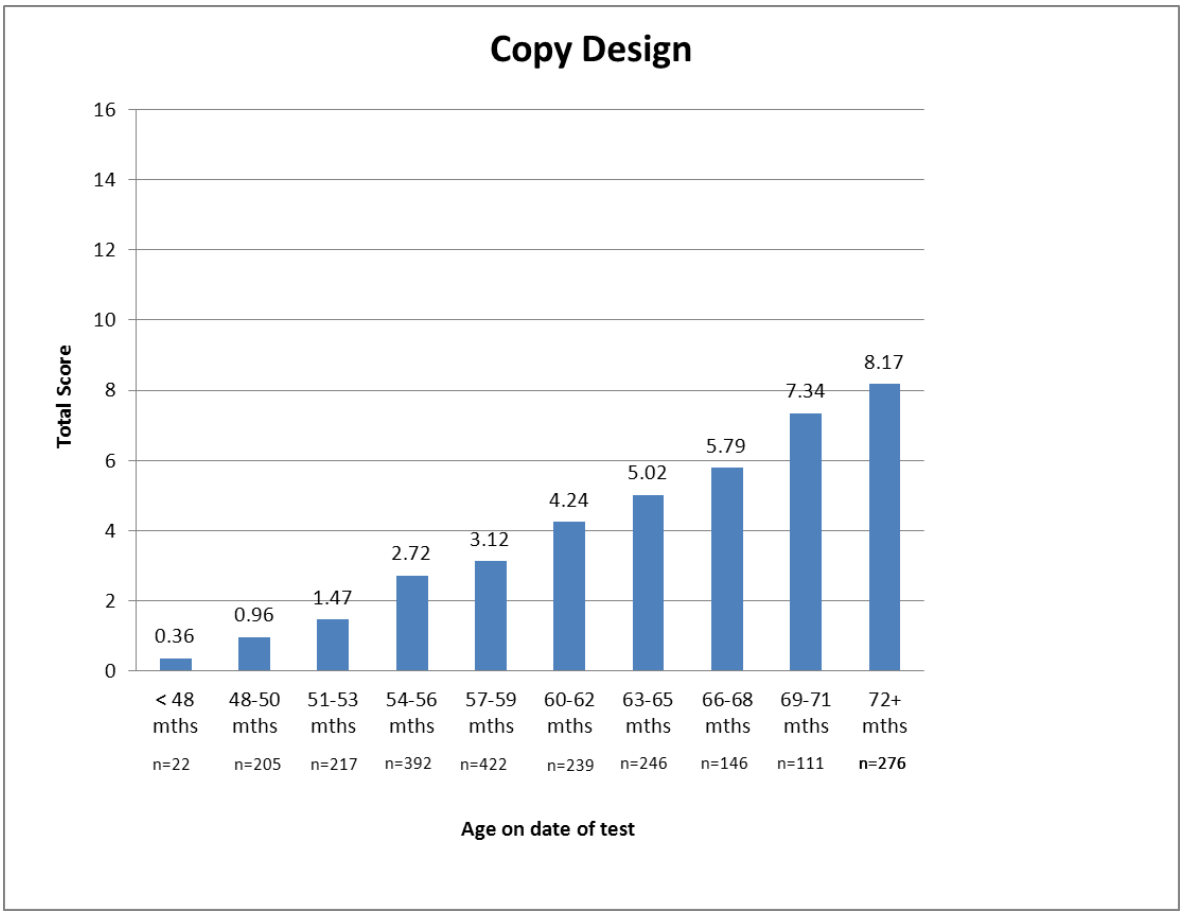
Psychometric Information (sample, reliability, validity)

Peabody Research Institute (test-retest reliability & means by age)

Test/Retest Reliability Correlations

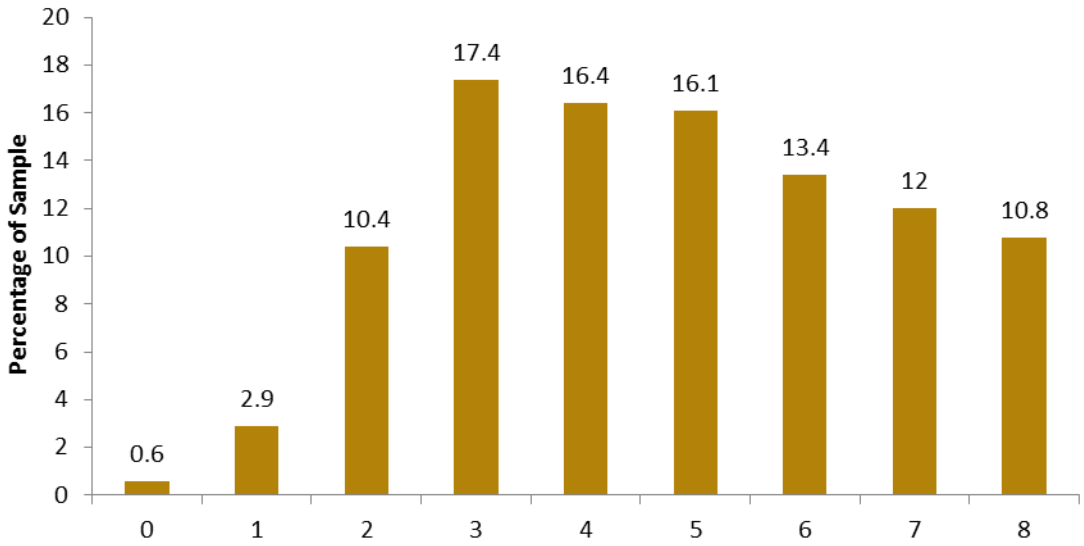
Measure	r
Copy Design	0.71

Mean Scores by Age (from Self Regulation Measurement Study Sample)



External Studies (sample, reliability, validity)

- **Osborn, Butler, & Morris (1984):** The Copy Design task was given to 13,028 5-year olds in Britain. The data was from the British Cohort Study (BCS70), a longitudinal study that is following children born in the week of April 5-11, 1970 through adulthood. Interrater reliability for scoring of individual designs was .96 and the agreement for the total score was .90. Performance in the Copy Design at age 5 was found to be related to both math (β = .26) and reading test performance at age 10 (β = .35). Distribution of total scores at age 5 was as follows:



- **Schoon, Bynner, Joshi, Parsons, Wiggins, & Sacker (2002), Ross, Schiin, Martin, Sacker (2009), Lacey, Cable, Stafford, Bartley & Pickhart (2010), and Grissmer, Grimm, Aiyer, Murrah, & Steele (2010)** have all used the copy design task from the BCS70 in recent publications.

- **Wechsler Preschool and Primary Scale of Intelligence – Revised (Wechsler, 1989).** The 1989 release of the WPPSI-R included a Geometric Design subtest that two distinct types of tasks. The first required that children match a pictured design from array of four designs (similar to KRISP) and the second required that children copy a geometric figure from a printed model (similar to copy design). The latest version of the WPPSI-III (2002) does not include the Geometric Design Subtest.

APPENDIX

Scoring Rubric

Examiner Name:_____ **Date Administered**:_____
Video ID (child name, video file name, etc): _____

- If examiner has errors totaling 7 or more points on a single measure within the battery, the examiner will not pass certification.
- If a score of 65 points or less is obtained on any video, examine on a case-by-case basis as to whether another attempt at certification should be given.

Total Points Awarded:
___/30 Script reading (5 points for each measure, partial point deduction allowed)

Measure	☐PT	☐HTKS	☐DCCS	☐KRISP	☐DS	☐CD
Points Deducted						

___/30 Scoring Accuracy (5 points each measure, no partial points)

Measure	☐PT	☐HTKS	☐DCCS	☐KRISP	☐DS	☐CD

___/5 Rapport (overall)
___/5 Transitions (overall)
___/12 Correct/Appropriate Prompting (2 points for each measure, partial points allowed)

Measure	☐PT	☐HTKS	☐DCCS	☐KRISP	☐DS	☐CD
Points Deducted						

___/5 Timing and Fluency (overall)
___/9 Material Placement and Management (overall)
___/4 Stop Rules Followed (1 point for each applicable measure: PT, HTKS, DCCS, DS only)

Measure	☐PT	☐HTKS	☐DCCS	☐DS

Total: _____/100 (passing score is 85)
General Comments/Questions/ Concerns

Comments for Individual Measures (notes and examples of errors present):

Peg Tapping:	Head Toes Knees Shoulders:
Dimensional Change Card Sort:	Kansas Reflection-Impulsivity Scale:
Digit Span:	Copy Design:

This rubric is designed to be completed while watching a video of the full assessment battery being administered. The purpose of this form is to establish that a sufficient level of competency and reliability has been achieved prior to actual data collection by any examiner administering these six self-regulation measures.

General instructions for rubric completion:

- If deducting points for a category that does not have "overall" written beside it, mark the checkbox for the measure(s) where errors were found. For categories allowing for partial credit, include the number of points (ex. -2) being deducted for each measure with a marked checkbox.
- The more detailed information you provide on the comments page for each measure the better. It is helpful to write out what the examiner said and underline incorrect words for script errors as well as noting the item number, score, and correct score for scoring errors, etc.

Definitions for each category:

1. Script Reading- Script reading for this item means reading the words highlighted in gold from the script exactly as written without adding, changing, or omitting words. A total of 30 points can be given for this category. Deduct a maximum of 5 points for each measure depending on the script errors present. Minor additions, changes, or omissions to the script, such as leaving out the word "the" or "and" (or other similar words that do not change the meaning of the directions) during the measure should result in the loss of 1 point. Omission or addition of an entire line of script or crucial piece of the instructions should result in the loss of all 5 points for a given measure.
2. Scoring-Scoring means recording the correct score in the correct blank on the record form according to the answer given by the child. A total of 30 points can be given for this category. Deduct 5 points for each measure if a scoring error(s) is present. There is no partial credit/deduction for this category. If even one scoring error is present, deduct 5 points for that measure. The individual completing this rubric should score the responses on a clean record form while watching the video and then compare to the examiner's completed record form for each measure. Any items with scoring discrepancies may need to be re-examined on the video to ensure accurate rubric completion.
3. Rapport-Rapport for this category refers to the interactions between the examiner and child during the administration. A total of 5 points can be given for this category. Look for a positive affect from the examiner. Examiner should refrain from using threats or forms of punishment during the assessment battery. Examiners can manage behavior by asking a child to sit, look at an item, etc. without losing points. The session should be a positive experience for the child. If a child begins to cry or becomes physically upset, the session should cease and be attempted at a later time/date.

4. Transitions-Transitions are the periods in between measures when the child is waiting for the next measure to begin. A total of 5 points can be given for this category. During this time, the examiner will move aside materials from the measure that has just been completed and bring out any materials needed for the next measure. It is helpful to have a something for the child to do during this short pause (ex. have a picture printed that a child can color or place stickers on, etc.). Transitions should be kept to a minimum. Keeping transitions short and the battery moving forward can also help improve rapport and lessen opportunities for behavior issues.
5. Correct/Appropriate Prompting-Prompting for this category refers to the prompts (listed in the script) given during each assessment measure in response to something the child does or says. They are lines of script that are not said for every child, but rather are used in response to a child's actions or the answer given. A total of 12 points can be given for this category. Deduct a maximum of 2 points for each measure depending on the prompting error(s) present. An example of a prompt would be the line of script, "Very good, that's right" given during DCCS after a correct response by the child to a rule check item. Errors on prompts are counted under this category and are not counted under the script reading category. Minor additions, omissions, or changes should result in the loss of 1 point on a given measure. Omissions or additions of entire prompts should result in the loss of 2 points. Sometimes when children do not respond as anticipated, examiners will add extra prompts or instructions that are not supplied in the script. These types of additions are counted in this category.
6. Timing and Fluency- Timing and Fluency during the administration of each measure are the focus of this category. A total of 5 points can be given for this category. Instructions should be read fluently and should have been practiced prior to videotaping. Timing of the script should be fast enough to keep the assessment moving, but not so fast that the child misses part of the instructions. What is considered optimal timing can vary depending on the child being assessed.
7. Material Placement and Management- Material placement and management refers to the position and management of the materials needed for each assessment by the examiner. A total of 9 points can be given for this category. Measures, such as DCCS, involve multiple materials (cards, boxes, script book, and record form) that all have to be positioned in such a way that the examiner can manipulate them and the child can interact with them. It is usually helpful to position yourself at the corner of a table or counter with the hand you write with on the same side as the table so you can record answers with that hand and manipulate materials with the other hand. Any materials needed for an upcoming measure should be kept out of the child's reach so as not to provide a distraction but should be readily accessible for the examiner to bring forward during a transition when needed. If using a small table or desk,

materials can often be placed on the floor within the examiner's reach. If a child seems distracted by a material not in use, move the material out of the child's sight until needed.

8. Stop Rules Followed-Stop rules refer to the points during a given measure in which the measure should be aborted or ceased, often depending on how many correct responses a child has given to that point. A total of 4 points can be given for this category. Deduct a maximum of 1 point for each measure depending on the stop rule error(s) present. If an examiner stops an assessment too soon, 1 point should be deducted. These types of errors often coexist with scoring errors since many stop rules are dependent upon a certain number of correct scores in order to continue/discontinue the assessment. If an examiner continues an assessment after the stop rule has been met, evaluate on a case by case basis. It is better to continue if ever in doubt about whether to stop an assessment when a child gives a questionable answer. Extra answers can always be removed, but cannot be created! Copy Design and KRISP do not have stop rules and the whole measure should be administered to each child regardless of performance.

Video Exemplars

Access to video clips showing the administration of each measure to a preschool age child is available upon request. Contact PRI by visiting https://my.vanderbilt.edu/cogselfregulation/contact/ to request a password to access these videos designed to showcase the flow of the script as well as overall material management and placement. As you watch the video clips, you can follow along with the script and also score the child's responses. A scoring key is included.

Peg Tapping

Please view the video labeled "Peg Tap".

Head Toes Knees Shoulders

Please view the video labeled "HTKS".

Dimensional Change Card Sort

Please view the video labeled "DCCS".

Kansas Reflection-Impulsivity Scale for Preschoolers

Please view the video labeled "KRISP".

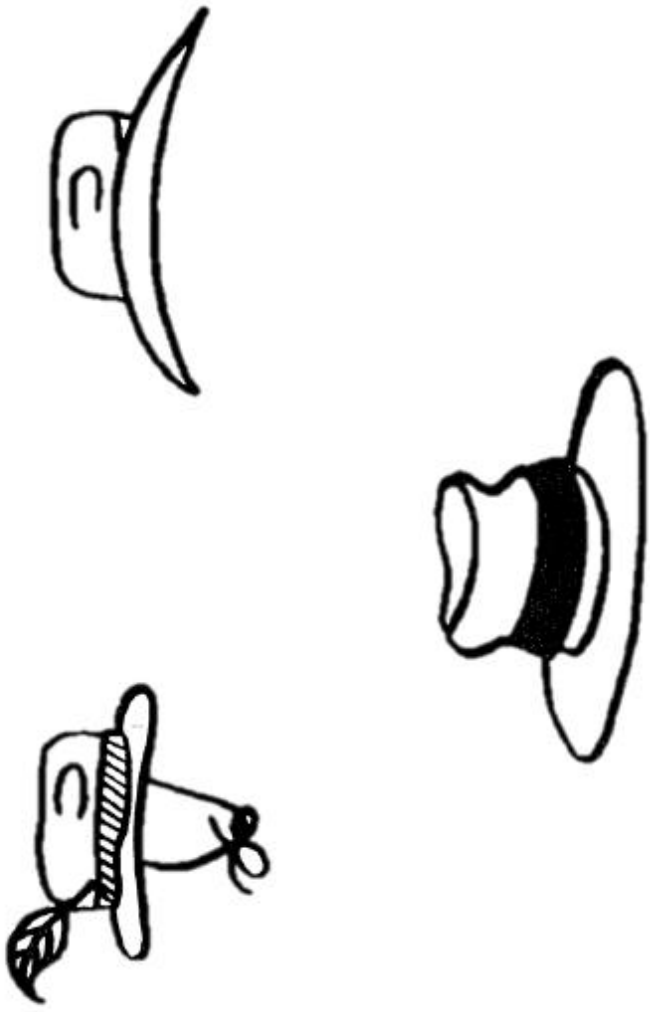
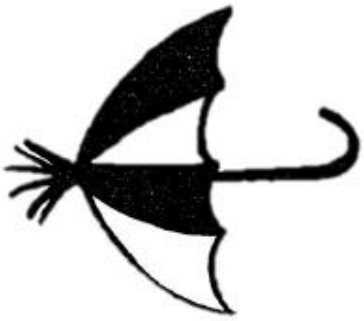
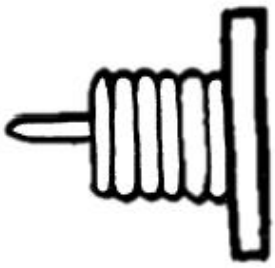
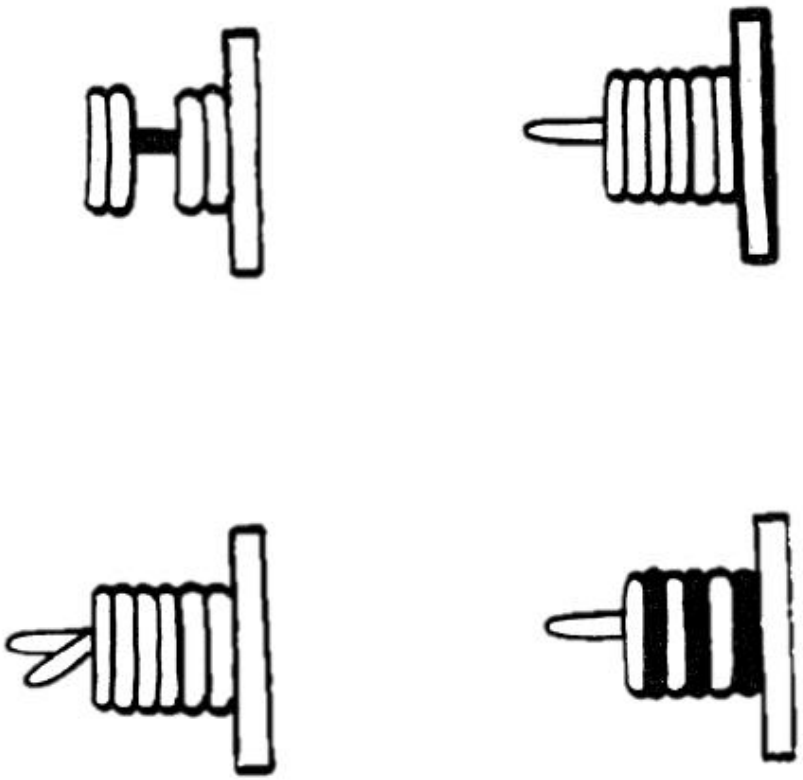
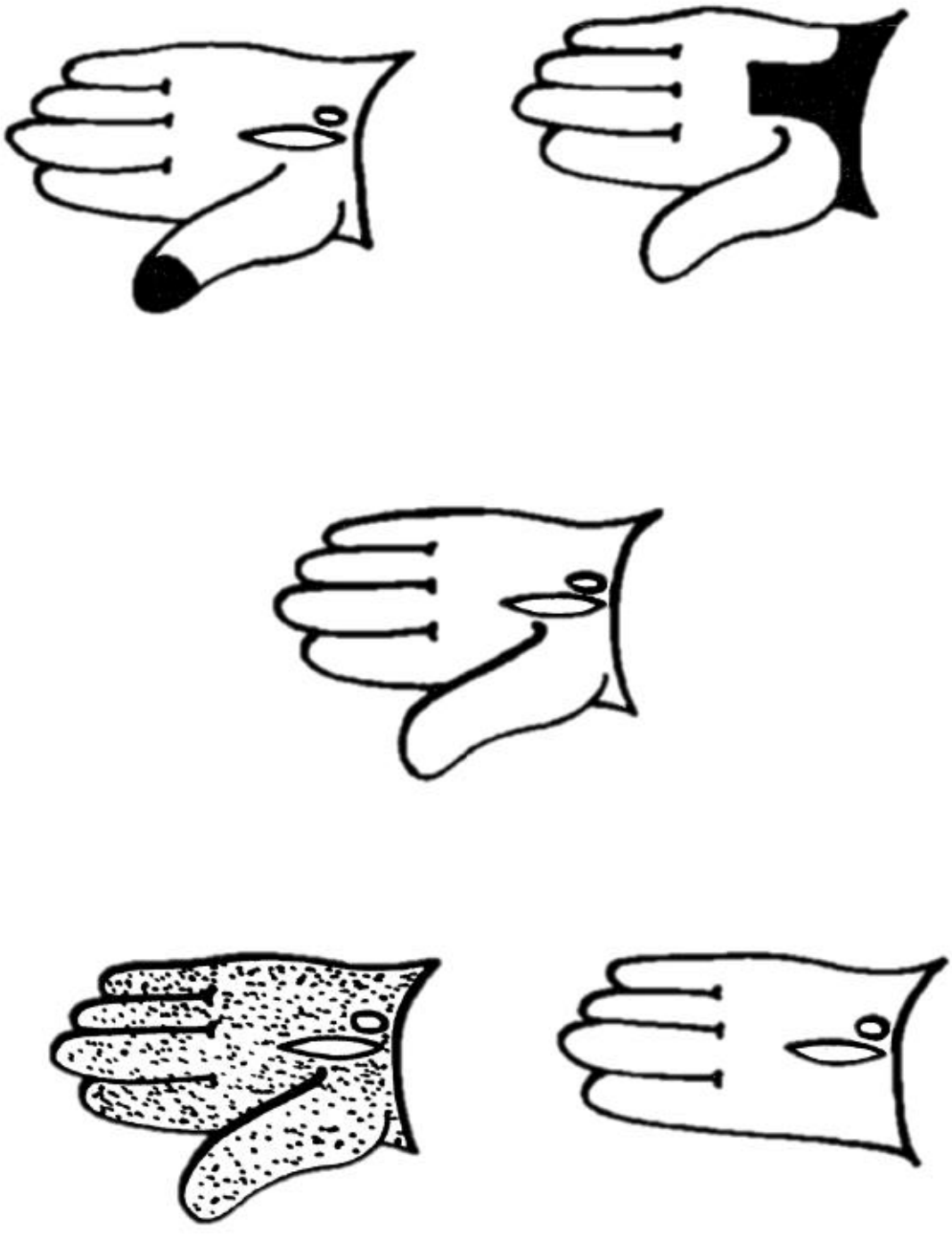
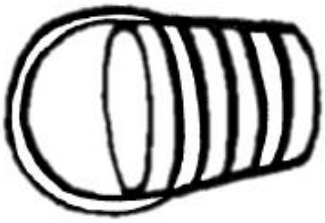
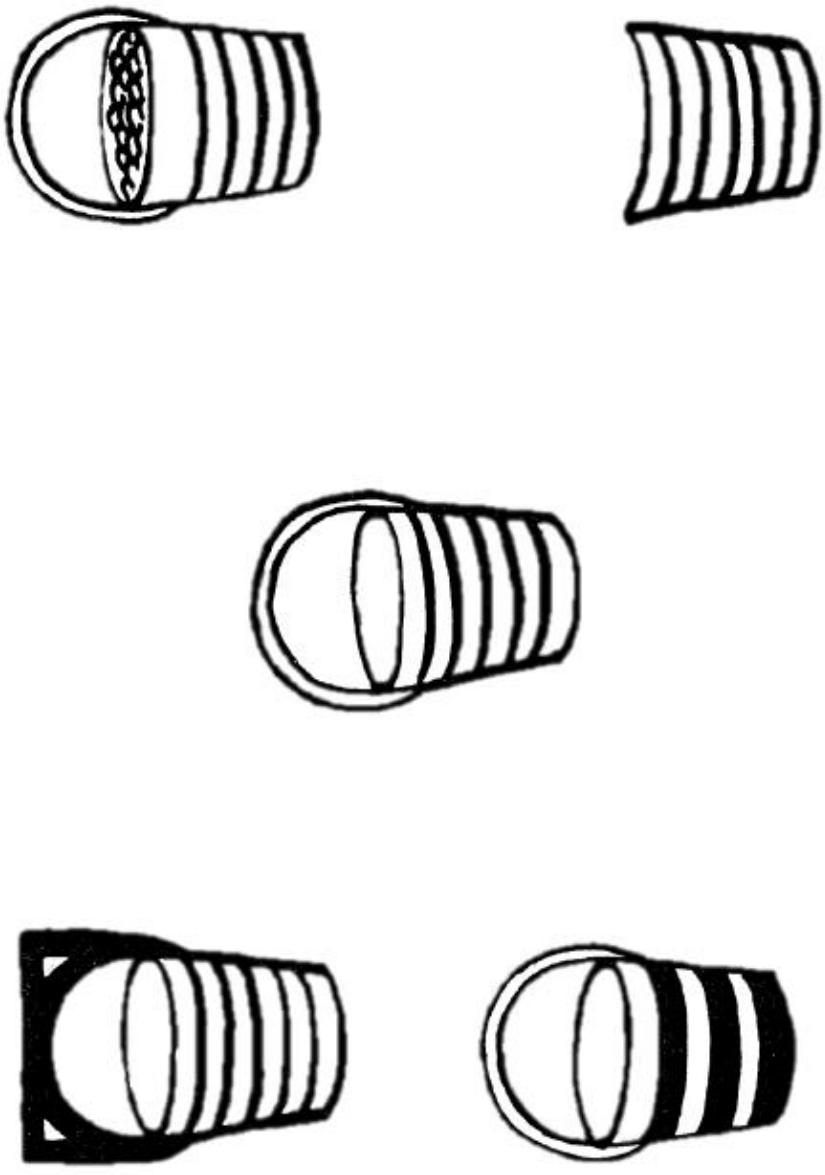
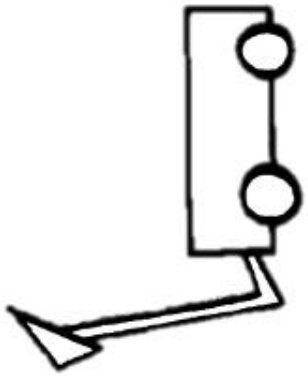
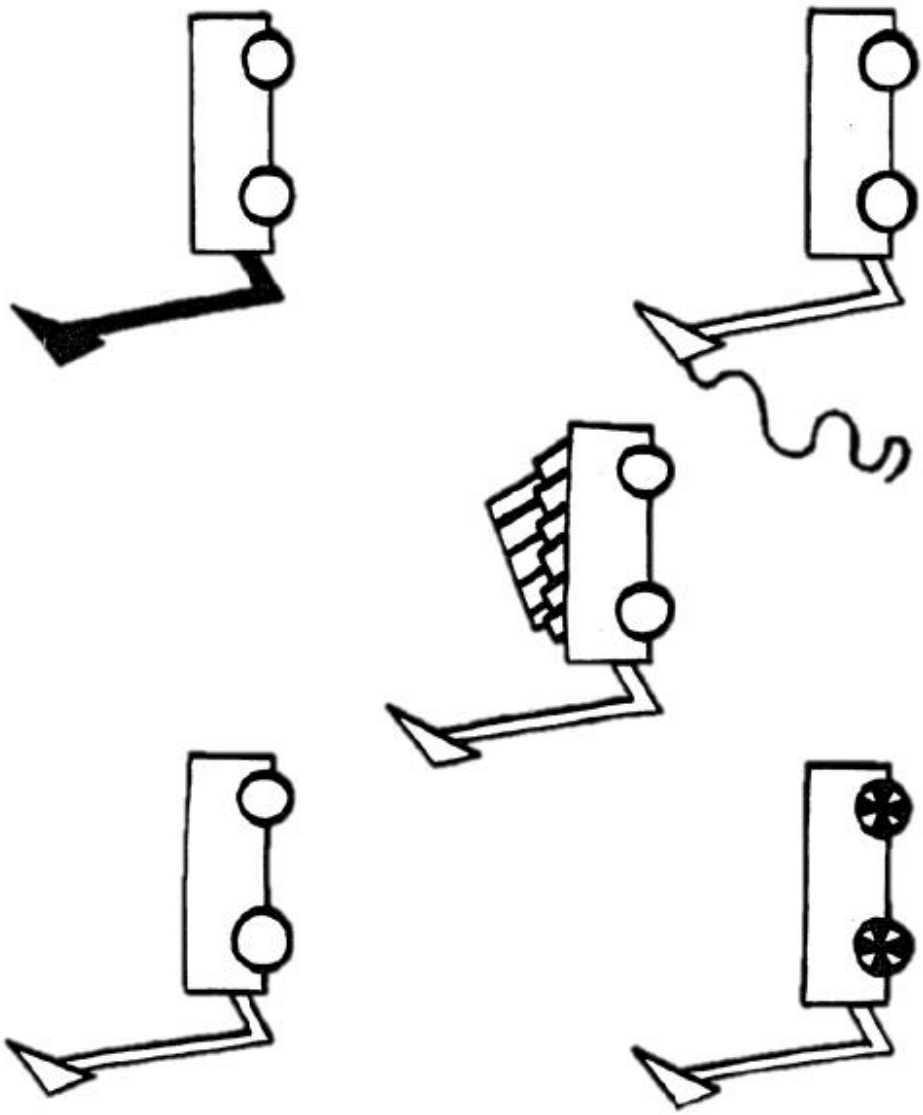
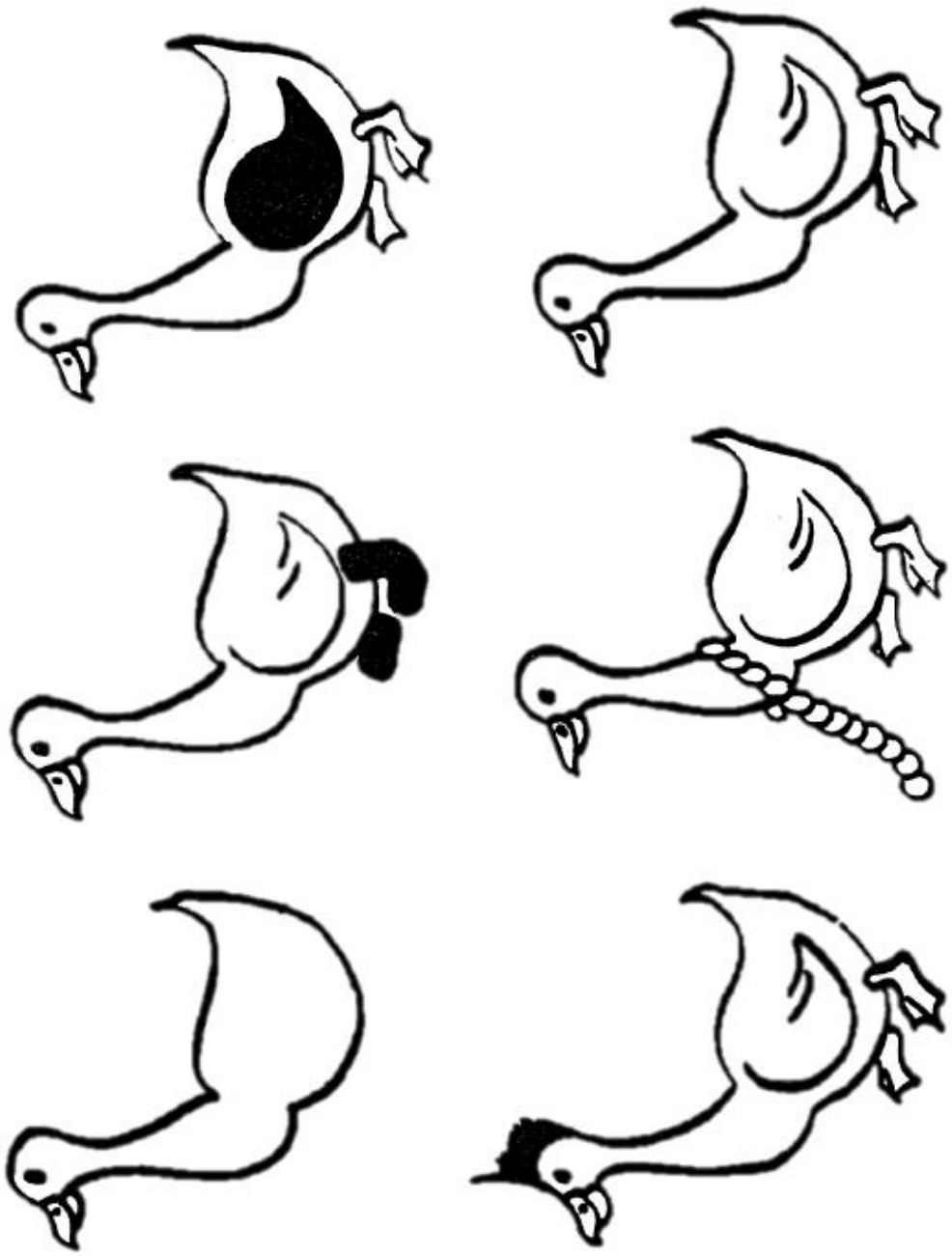
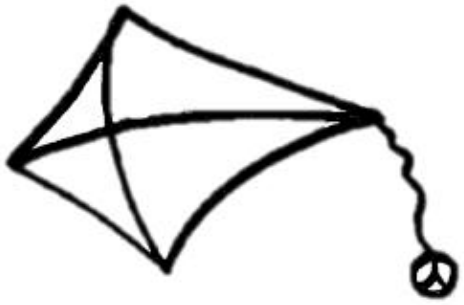
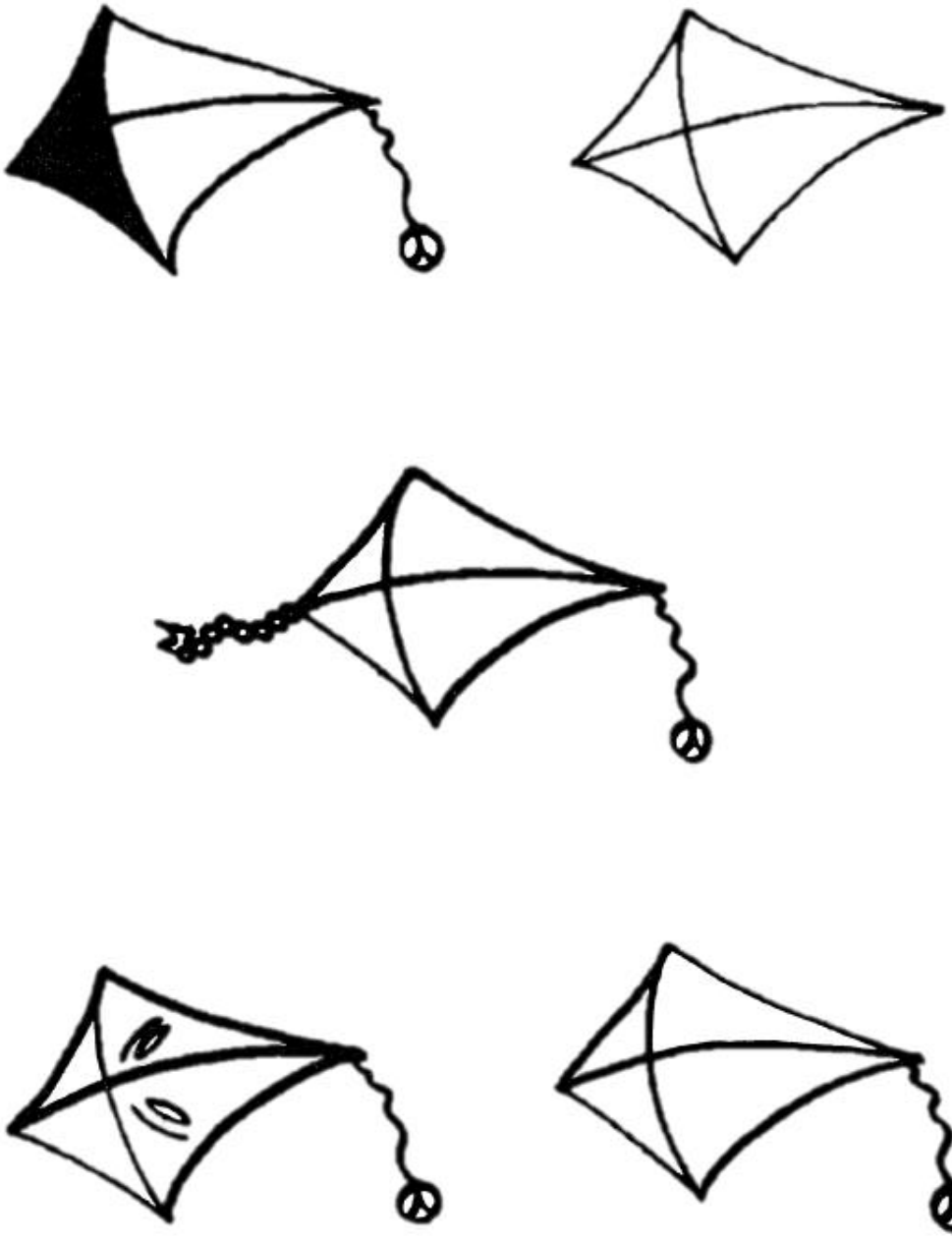
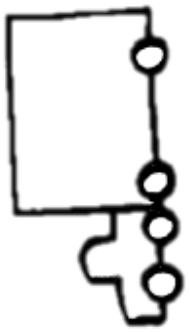
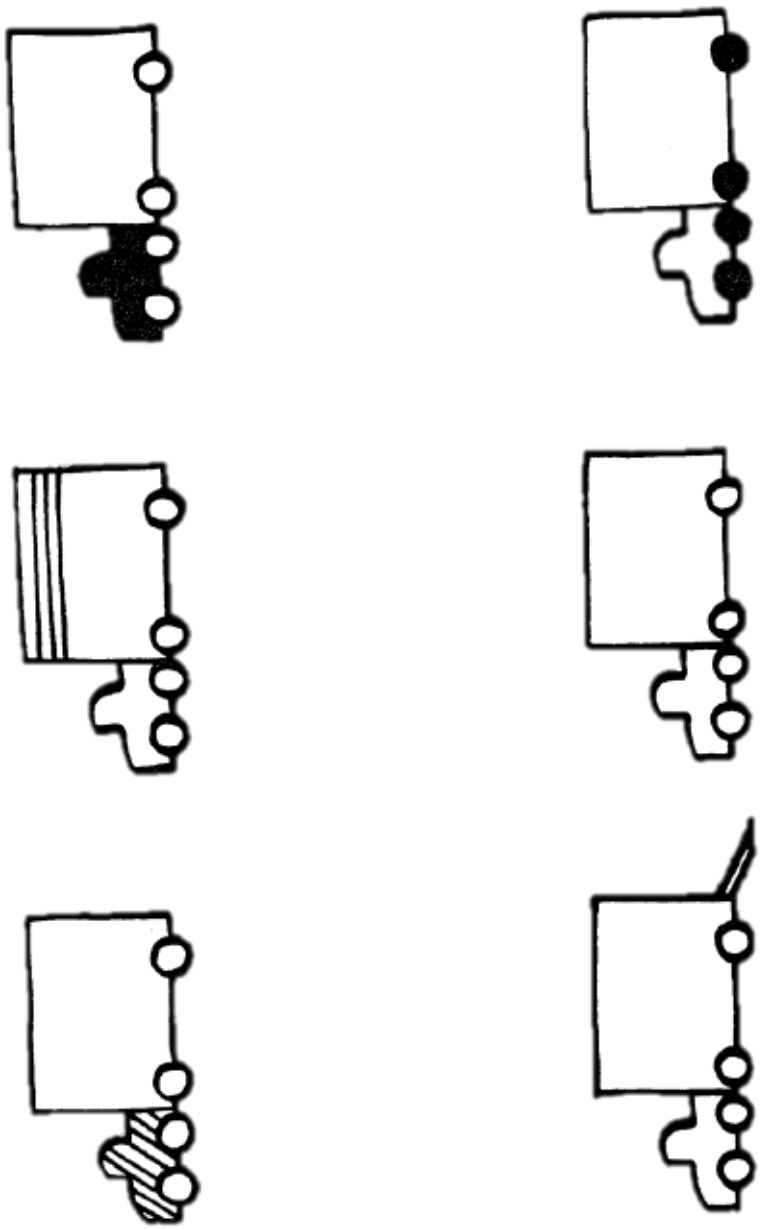
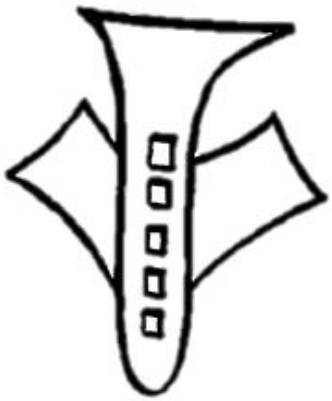
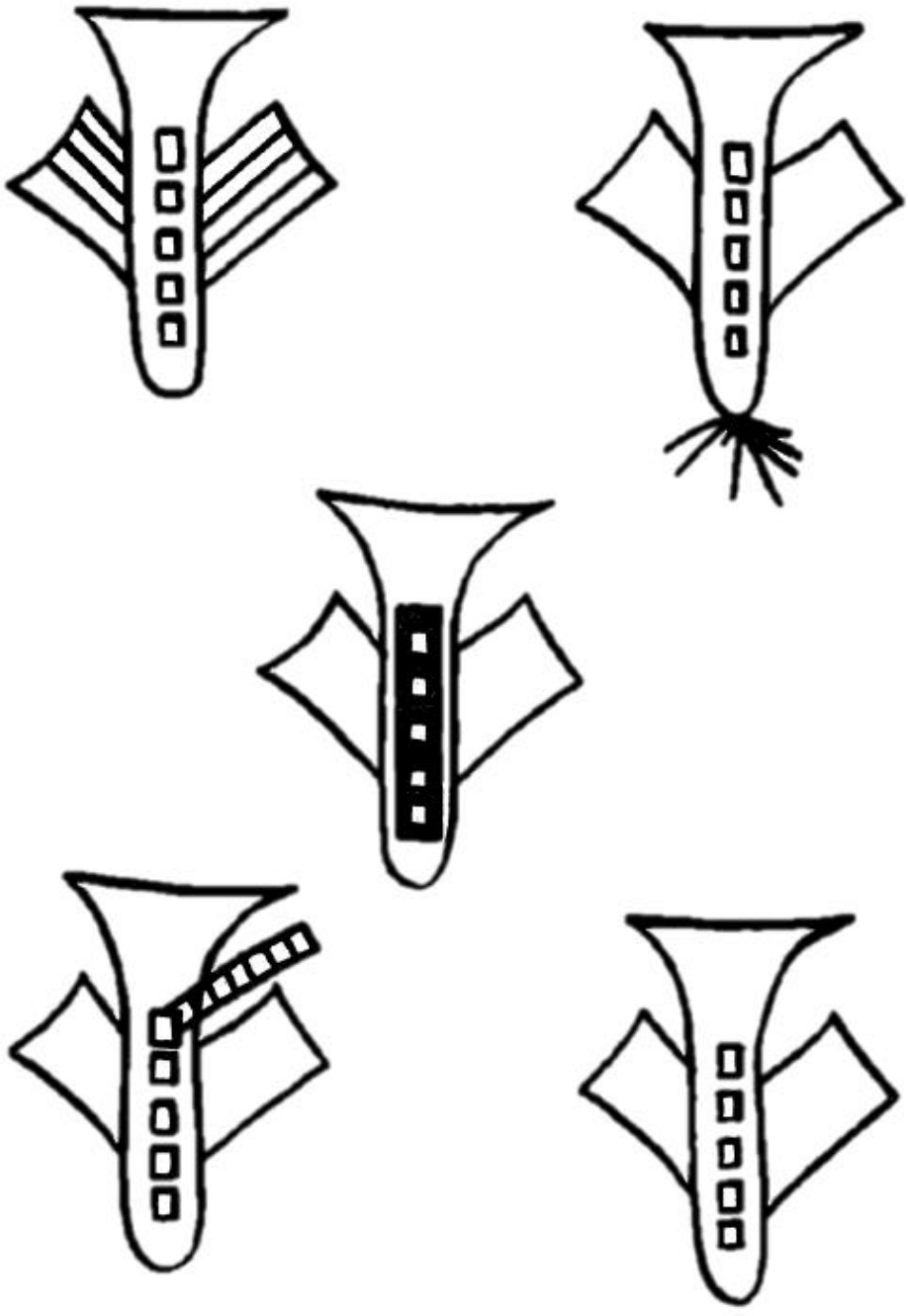
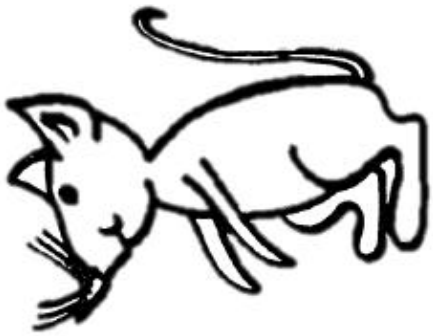
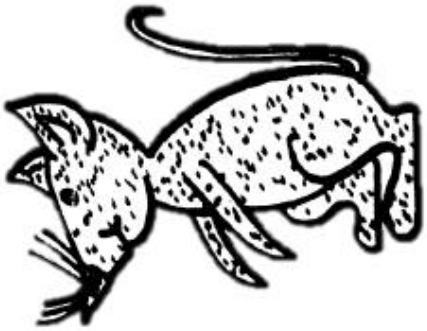
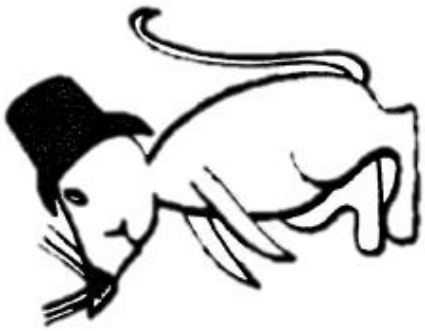
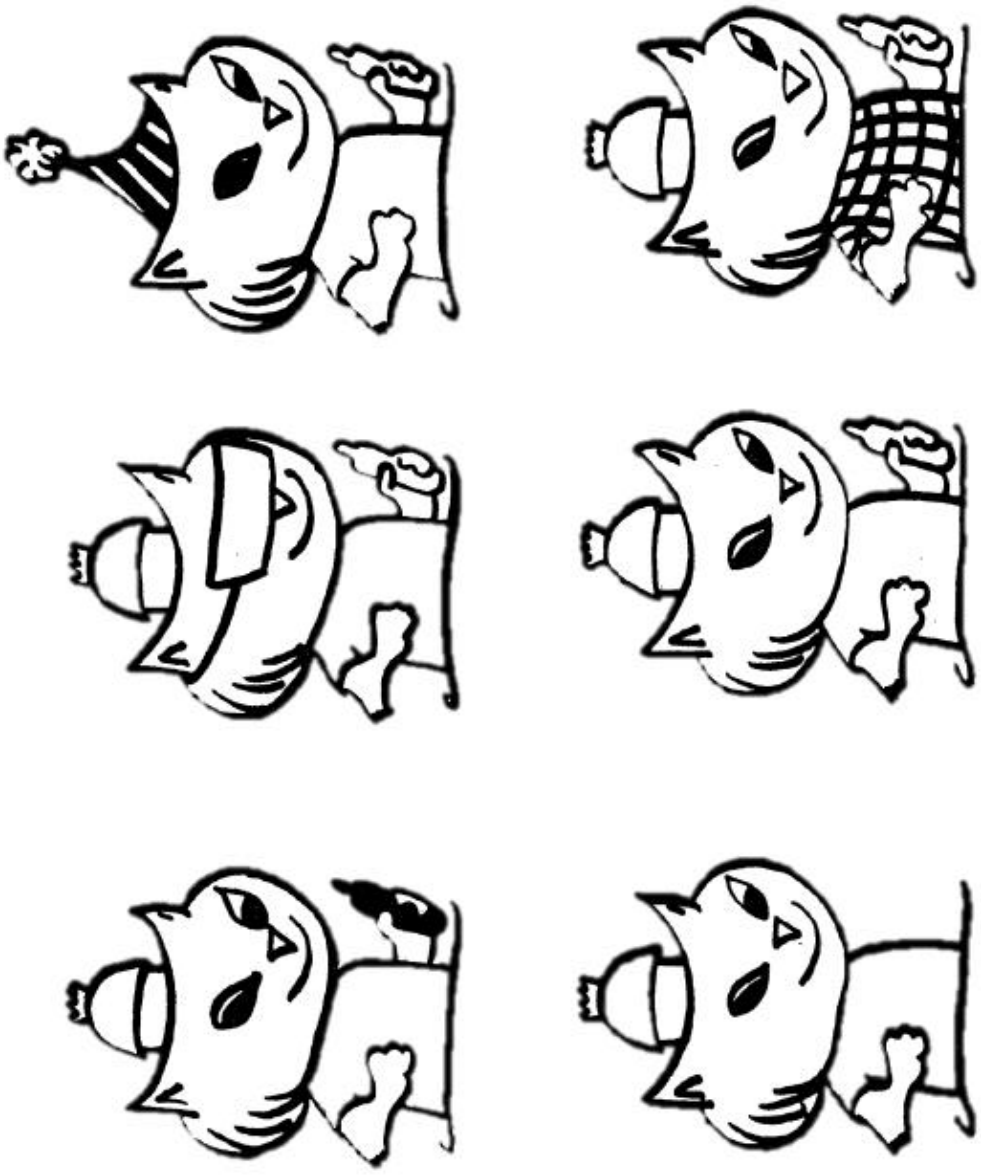
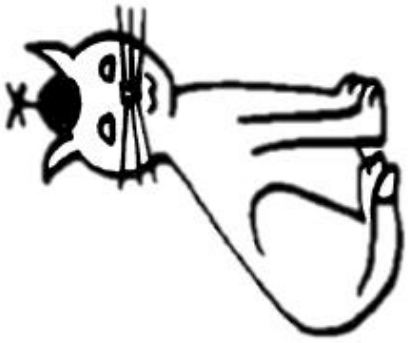
Digit Span

Please view the video labeled "Digit Span".

Copy Design

Please view the video labeled "Copy Design". There is no scoring key for this video as copy design is not scored in real time. For practice scoring copy design items, please see the practice and master sets of completed copy design forms. You can check your scoring against the scoring key for both of these sets (included on the website with the video exemplars)

Video Scoring Rubric

Please view the link labeled "Completed SR Battery Administration Rubric" to see a sample of a completed rubric form.

Full set of KRISP pictures to print