

## PEG TAPPING TASK

### Description of the Instrument:

- The rules for the task were as follows: Immediately after the experimenter tapped once with a wooden dowel (6 inches long,  $\frac{1}{4}$  inch in diameter), the child was to tap twice with the dowel. Immediately after the experimenter tapped twice, the child was to tap once.
- The task was developed by Luria (1966) for his studies of study adult patients with frontal-lobe damage and first used in 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) comply 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

Psychometric Information (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 assess 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 are collapsed across condition. Reliability coefficients for the study were  $\alpha = .87$  with 4.5-year olds and  $\alpha = .84$  with 5-year olds.

## 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?**

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### 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 of testing. GO TO TRIAL 3.
- If child responds incorrectly or does not respond at all, follow rules below for Extended Practice.

Extended Practice: If the child responded incorrectly or not at all on either of the above trials, these trials are counted as practice. Remind the child of both rules, beginning with the first rule the child identified incorrectly. Then begin the pretest again. If the child is wrong on either of these two pretest trials, the instruction and pretest procedure can be repeated once more.

**NOTE: THE PRETEST TRIALS ARE TRIALS 1 AND 2 ON THE SCORE SHEET. Record the child's answers for the pretest trials 1 and 2 on the score sheet. If the child gets both trials 1 and 2 correct, proceed to testing and BEGIN WITH TRIAL 3.** If the child does not get both trials 1 and 2 correct after the third attempt of the pretest, proceed to Trial 3, but do NOT remind child of rules again.

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TESTING: Administer the tapping in the order listed on the score sheet and record responses in the table. If the child taps other than 1 or 2 times, record the number of taps on the "other" line.

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

## PEG TAPPING CODE SHEETS

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		

## 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.