Performance validity tests in pediatric neuropsychology: Not just for adults anymore

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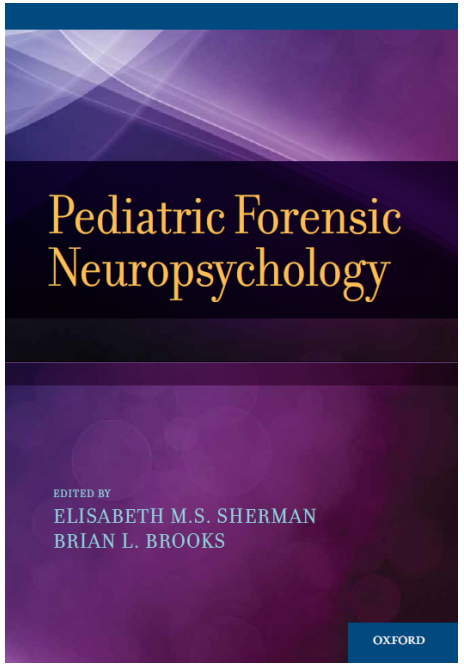
Disclosure

- Royalties from Oxford University Press for the edited book, *Pediatric Forensic Neuropsychology*
  - chapter by Dr. Michael Kirkwood provides a basis for this talk



- Funding from Psychological Assessment Resources, Inc., test publisher

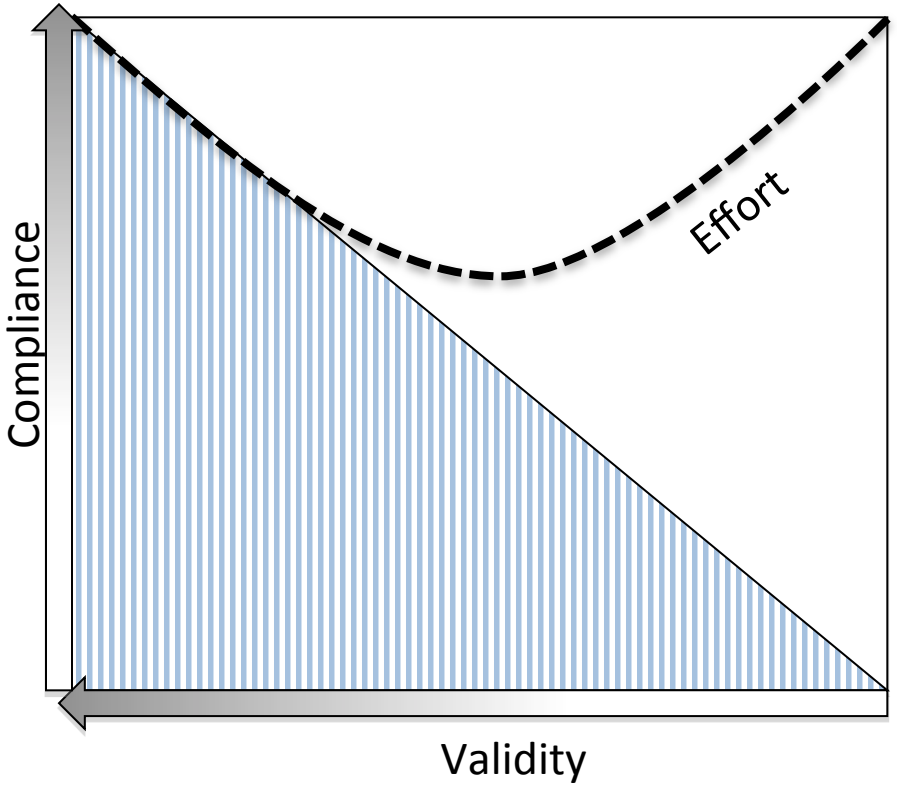
Objectives

1. Learn the research evidence for using performance validity tests in pediatric neuropsychological assessments.
2. Understand the importance of using performance validity tests with children and adolescents.
3. Recognize the limitations of performance validity tests in children and adolescents.

Performance Validity Test

- Any test, scale, or index (embedded within a test or stand-alone) used to *help* determine the validity of an obtained performance on objective and/or subjective measures
  - AKA: effort, symptom validity, malingering, exaggeration, negative response bias, compliance, sandbagging, etc.
- Used to supplement clinical judgment
- Best conceptualized on a continuum

Compliance or 'effort'? Continuum or binomial?



See Slick & Sherman, 2012 in the book *Pediatric Forensic Neuropsychology* for more discussion

Room survey

- How many clinicians routinely use performance validity tests in forensic neuropsychological evaluations with children and adolescents?

- How many clinicians routinely use performance validity tests in clinical neuropsychological evaluations with children and adolescents?

Survey of neuropsychologists

- Rabin, Barr, & Burton (2005)
- Survey of assessment practices in doctoral-level neuropsychologists in US and Canada
- 747 members of INS, NAN, and APA Div40
- Survey collected in winter/spring 2001

- Goal of study: "…comprehensive survey of neuropsychologists' assessment practices…" (p.39).

Survey of neuropsychologists

Table 10
Assessment of specific abilities during neuropsychological evaluations

Abilities	Percentage of respondents				Mean rank
	Never (1)	Rarely (2)	Occasionally (3)	Frequently (4)	
Attention	0.1	0.1	2.0	97.7	3.97
Verbal memory	0.1	0.0	3.8	96.1	3.96
Executive functions	0.1	0.5	3.0	96.3	3.95
Visuospatial skills	0.1	0.4	4.9	94.6	3.94
Nonverbal memory	0.3	1.8	10.2	87.8	3.86
Intelligence	0.5	1.9	8.2	89.4	3.86
Language	0.4	2.7	13.4	83.5	3.80
Construction	0.5	4.8	11.0	83.7	3.78
Motor skills	0.4	4.8	26.9	67.9	3.62
Achievement	2.6	10.9	31.6	54.9	3.39
Auditory perception	4.8	20.7	31.1	43.5	3.13
Tactile perception	5.6	34.6	32.7	27.2	2.81

Note. Ratings based on a 4-point scale: 1 = never, 2 = rarely, 3 = occasionally, and 4 = frequently. A higher mean rank represents a more frequently assessed ability.

PVT measures not specifically surveyed in this study

Rabin et al., 2005

Table 13
Top 40 memory assessment instruments

Rank	Instrument	*n*	Percentage of responses	Percentage of respondents
1	WMS-R/WMS-III	488	12.1	70.8
2	CVLT/CVLT-II	374	9.3	54.3
3	ROCFT	312	7.7	45.3
4	Boston Naming Test	231	5.7	33.5
5	WAIS-R/WAIS-III	173	4.3	25.1
6	COWAT	150	3.7	21.8
7	RAVLT	147	3.6	21.3
8	WMS-R/WMS-III Logical Memory	140	3.5	20.3
9	WAIS-III/WMS-III Digit Span	76	1.9	11.0
10	WRMT	72	1.8	10.4
11	Clinical Interview	68	1.7	9.9
12	MMPI/MMPI-2	65	1.6	9.4
13	BSRT	53	1.3	7.7
14	Tactual Performance Test	51	1.3	7.4
14	WCST	51	1.3	7.4
16	Trail Making Test	50	1.2	7.3
16	WMS-R/WMS-III Visual Reproduction	50	1.2	7.3
18	BVRT/BVRT-R	46	1.1	6.7
19	MAS	44	1.1	6.4
19	RBMT	44	1.1	6.4
19	TOMM	44	1.1	6.4
22	MSE	37	0.9	5.4
23	Interview with Collaterals	34	0.8	4.9
24	WMS-R/WMS-III Verbal Paired Associates	33	0.8	4.8
25	PASAT	32	0.8	4.6
26	Facial Recognition Test	30	0.7	4.4
26	Halstead Category Test	30	0.7	4.4
26	HRNB	30	0.7	4.4
29	WMS-III Faces Subtest	29	0.7	4.2
30	Semantic Fluency/Animal Naming	28	0.7	4.1
31	Aphasia Screening Test	27	0.7	3.9
31	BDI/BDI-II	27	0.7	3.9
31	WAIS-R/WAIS-III Information	27	0.7	3.9
34	CPT/CPT-II	26	0.6	3.8
35	Stroop Test	24	0.6	3.5
35	WMS-R Visual Paired Associates	24	0.6	3.5
37	CVMT	23	0.6	3.3
38	Sentence Repetition Test	22	0.5	3.2
39	WJ-R/WJ-III	19	0.5	2.8
40	Rey 15 Item Memory Test	18	0.4	2.6

Rabin et al., 2005

Position Papers on PVTs

- National Academy of Neuropsychology Policy & Planning Committee (Bush et al., 2005)

  – "…the assessment of symptom validity is an essential part of a neuropsychological evaluation. The clinician should be prepared to justify a decision not to assess symptom validity as part of a neuropsychological evaluation" (p.421).

Position Papers on PVTs

- American Academy of Clinical Neuropsychology Consensus Conference Statement (Heilbronner, Sweet, et al., 2009)
  - A call for "gathering additional scientific knowledge" into the use of PVTs in pediatric neuropsychology when assessing abilities
  - "Effort measures and embedded validity indicators should be applied to pediatric samples" (p. 1107).

What is the evidence for PVT use in children and adolescents?

TABLE 7.3. Strength of Empirical Evidence Estimates for Stand-Alone Symptom Validity Tests Investigated in Pediatric Populations

	Strength of Evidence for Use in Children				Age Effects Minimal by
	Community Samples	Clinical Samples	Secondary Gain Samples	Simulation Samples	
Amsterdam Short-Term Memory Test (ASTM)	+	—	—	—	≥ 10 years
Computerized Assessment of Response Bias (CARB)	—	+	—	—	≥ 11 years
Dot Counting Test (DCT)	—	+	—	—	≥ 12 years
Fifteen-Item Test (FIT)	+	+	—	—	≥ 11 or 12 years
Medical Symptom Validity Test (MSVT)	+	++	+	++	≥ 8 years or ≥ third grade reading level
Nonverbal Medical Symptom Validity Test (NV-MSVT)	—	+	—	—	≥ 7 years
Test of Memory Malingering (TOMM)	++	++	+	+	≥ 5 or 6 years
21-Item Test	–	+	–	–	≥ 12 years
Word Memory Test (WMT)	+	++	–	+	≥ 11 years or ≥ 3rd grade reading level

NOTE: ++, adequate evidence base; +, modest evidence base; —, no or conflicting evidence.

Kirkwood, 2012

Selected PVTs studied in pediatrics

- Stand-alone PVTs
  - TOMM, WMT, MSVT, NV-MSVT, VSVT, AST
- Embedded PVTs
  - Reliable Digit Span
- Validity scales in questionnaires
  - BASC-2, BRIEF

Stand-alone PVTs

TOMM

- Tombaugh (1996)
- Visual recognition test
- Learning and recognition trials

TOMM

- Largest amount of research on PVTs in pediatric populations completed with the TOMM
  - Can healthy children pass the TOMM?
  - Can clinical populations pass the TOMM?
  - How do children with known secondary gain perform on the TOMM?

- Can healthy children pass the TOMM?

TABLE 7.4. Test of Memory Malingering (TOMM) Mean Scores, Standard Deviations, and Percentage Passing in Pediatric Studies

Source	Population	N	Age Range	Mean Age (SD)	Trial 1 Mean (SD)	Trial 2 Mean (SD)	% Passing
Constantinou & McCaffrey (2003)	Cyprus community	61	5–12	8.4 (2.1)	46.8 (3.4)	49.5 (1.7)	97%
Constantinou & McCaffrey (2003)	U.S. community	67	5–12	7.9 (2.0)	45.9 (3.7)	49.9 (0.3)	100%
Rienstra et al. (2010)	Netherlands community	48	7–12	9.9 (1.6)	—	50.0 (0.0)	100%
Nagle et al. (2006)	U.S. simulation controls	17	6–12	~8.6 (~2.9)	—	49.7 (0.8)	100%
Blaskewitz et al. (2008)	Germany simulation controls	51	6–11	8.9 (1.0)	—	49.8 (0.9)	100%
Gunn et al. (2010)	Australia simulation controls	50	6–11	~8.7 (~1.8)	46.6 (3.2)	49.2 (1.3)	98%

Kirkwood, 2012

- Can clinical populations pass the TOMM?

TABLE 7.4. Test of Memory Malingering (TOMM) Mean Scores, Standard Deviations, and Percentage Passing in Pediatric Studies

Source	Population	N	Age Range	Mean Age (SD)	Trial 1 Mean (SD)	Trial 2 Mean (SD)	% Passing
Donders (2005)	U.S. clinical mixed–cases passing TOMM	97	6–16	11.9 (3.4)	46.5 (4.2)	49.7 (0.72)	97%*
MacAllister et al. (2009)	U.S. clinical epilepsy	60	6–17	~13.0 (~3.5)	43.5 (6.6)	47.5 (4.8)	90%
Kirk et al. (2011)*	U.S. mixed clinical	101	5–16	10.6 (3.2)	46.7 (3.2)	49.6 (0.9)	96%
Brooks et al. (2012)*	Cdn. mixed neurological	227	5–18	13.0 (3.7)	46.9 (4.9)	47.3 (6.1)	95%
Loughan & Perna (2012)*	U.S. mixed clinical	86	6–18	11.6 (3.2)	45.3 (5.6)	48.2 (4.0)	91%

Kirkwood, 2012; *study not included in chapter; Brooks et al., 2012; Kirk et al., 2011; Loughan & Perna, 2012

- How do children with known secondary gain perform on the TOMM?

TABLE 7.4. Test of Memory Malingering (TOMM) Mean Scores, Standard Deviations, and Percentage Passing in Pediatric Studies

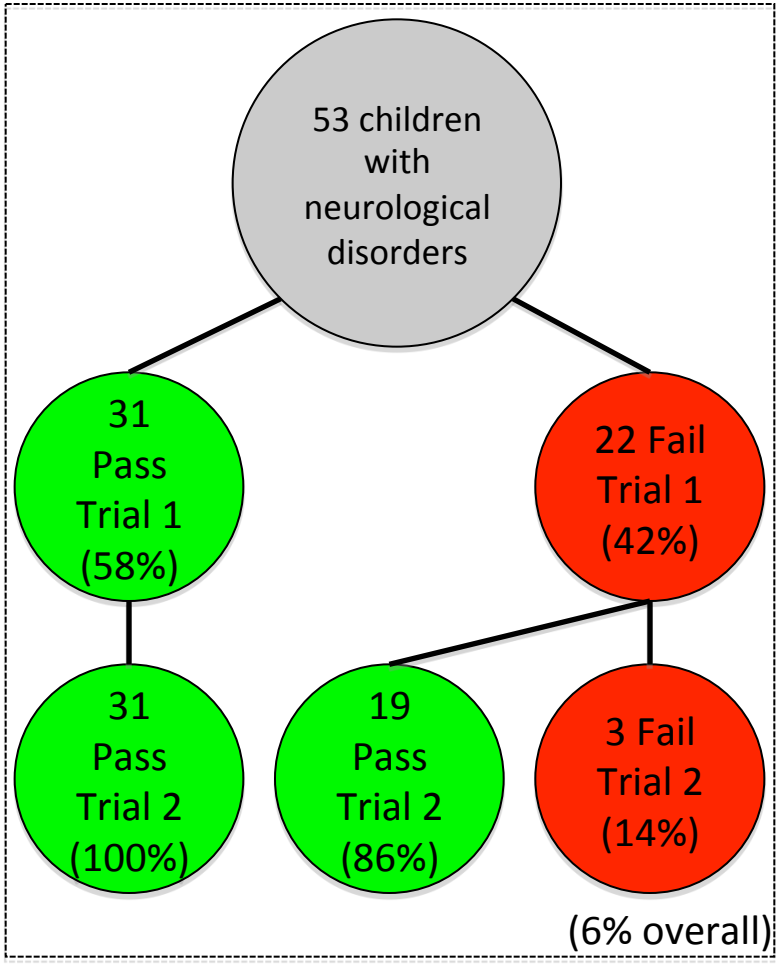
Source	Population	N	Age Range	Mean Age (SD)	Trial 1 Mean (SD)	Trial 2 Mean (SD)	% Passing
Chafetz (2008)	U.S. Social Security Disability applicants	80	6–16	10.8 (2.4)	38.2 (5.5)	40.6 (2.4)	72%**

Kirkwood, 2012

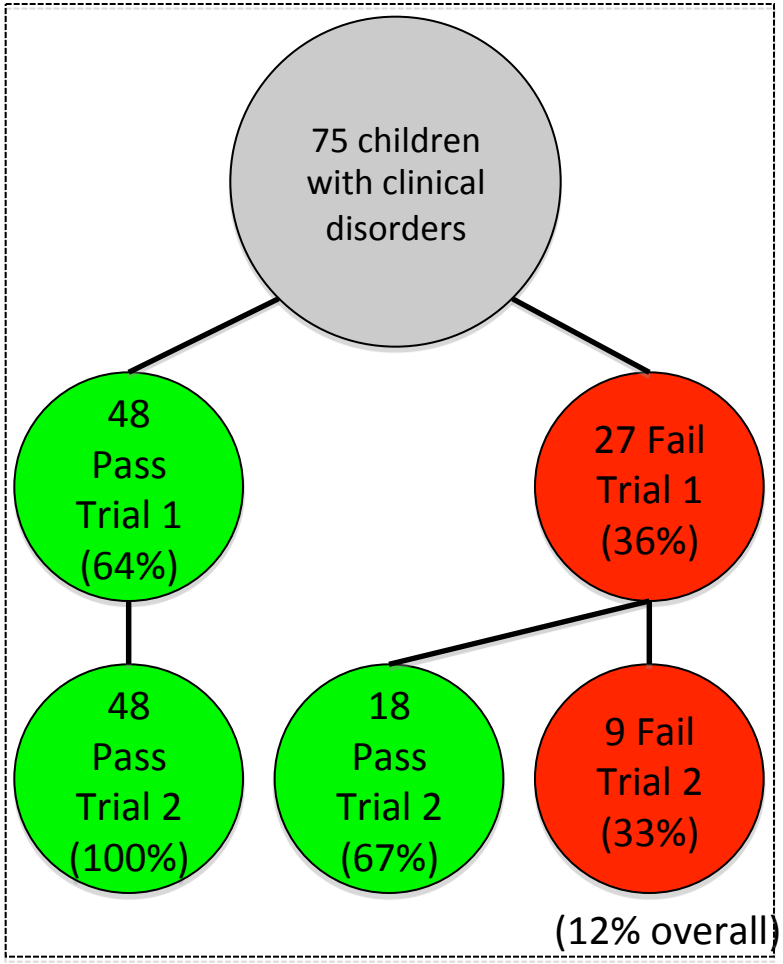
TOMM Trial 1

- Can Trial 1 provide an indicator of compliance in children and adolescents with neurological disorders?
  - Brooks, Sherman, & Krol (2012)
  - Perna & Loughan (in press)
- Situations where time is limited or a full TOMM could not be obtained
- Full TOMM is likely still best in a forensic evaluation

Brooks, Sherman, & Krol (2012)

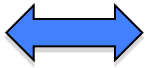


Perna & Loughan (in press)



Trial 1 ≥45: Sensitivity=1.0; Specificity=0.62

Trial 1 ≥39: Sensitivity=1.0; Specificity=0.92



Trial 1 ≥45: Sensitivity=1.0; Specificity=0.72

Trial 1 ≥41: Sensitivity=0.78; Specificity=0.92

WMT

- Green (1995, 1996, 2003, 2005)
- Oral or computerized
- Contains both compliance indicators and memory subtests

WMT

TABLE 7.5. Mean Word Memory Test (WMT) Effort Scores, Standard Deviations, and Percentage Passing in Pediatric Studies

Source	Population	N	Age Range	Mean Age (SD)	IR % Mean (SD)	DR % Mean (SD)	CNS %	% Passing
Green et al. (in press)	Canada clinical mixed ≥ third grade reading level	380	—	13.4 (2.7)	95.9 (5.7)	95.9 (7.0)	93.8 (7.7)	89%
Courtney et al. (2003)	U.S. clinical mixed–younger group	55	6–9	8.5 (1.2)	Average effort scores 74.2 (18.8)			—
Courtney et al. (2003)	U.S. clinical mixed–older group	56	10–17	13.4 (2.0)	Average effort scores 93.4 (10.4)			—
Gunn et al. (2010)*	Australia simulation controls	50	6–11	~8.7 (~1.8)	90.6 (7.6)	95.3 (6.1)	—	98%

NOTE: *Oral version used.

Kirkwood, 2012

MSVT

- Green (2004)
- Shortened version of the WMT
- Computerized
- Contains both compliance indicators and memory subtests

MSVT

TABLE 7.6. Mean Medical Symptom Validity Test (MSVT) Effort Scores, Standard Deviations, and Percentage Passing in Pediatric Studies

Source	Population	N	Age Range	Mean Age (SD)	IR % Mean (SD)	DR % Mean (SD)	CNS % Mean (SD)	% Passing
Green et al. (2009)	Canada community	56	7–11	9.2 (1.7)	98.6 (3.8)	98.6 (3.0)	97.6 (5.4)	96%
Green et al. (2009)	Brazil community young	36	6–10	8.7 (1.4)	95 (5)	99 (3)	94 (8)	98%
Green et al. (2009)	Brazil community old	34	11–15	12.4 (1.3)	96 (4)	100 (2)	96 (4)	
Green et al. (in press)	Canada clinical mixed ≥ third grade reading level	265	—	13.6 (2.9)	98.8 (3.7)	98.0 (4.3)	97.3 (5.8)	95%
Carone (2008)	U.S. clinical mixed	38	—	11.8 (3.1)	98.6 (3.7)	97.6 (6.3)	96.7 (9.0)	95%
Kirkwood & Kirk (2010)	U.S. clinical mild TBI	193	8–17	14.5 (2.4)	95.5 (5.3)	93.6 (5.4)	93.9 (4.8)	83%
Chafetz (2008)	U.S. Social Security Disability applicants	25	6–16	11.36 (2.6)	86.4 (8.0)	84.2 (9.9)	87.8 (9.1)	63%*
Blaskewitz et al. (2008)	Germany simulation controls	51	6–11	8.9 (1.0)	98.6 (2.5)	99.6 (1.2)	98.2 (3.6)	98%

NOTE: *Based on the entire sample of 27 children administered the MSVT reported in Chafetz et al. (2007). TBI = traumatic brain injury.

Kirkwood, 2012

NV-MSVT

- Green (2008)
- Nonverbal version of the MSVT

- Green, Flaro, Brockhaus, & Montijo (2012)
  - 217 pediatric patients in Canada (medical, psychiatric, and developmental diagnoses)
  - 91% passed NV-MSVT compliance subtests
  - 4% were deemed true positives for poor compliance

VSVT

- Slick, Hopp, Strauss, & Thompson (1997)
- Computerized

- Primary interpretation of performance based upon binomial probability

VSVT interpretation	Probability level (p value)	Description
“valid”	p>.95	Above chance
“questionable”	p=.06-.94	At chance
“invalid”	p<.05	Below chance

VSVT

- Brooks (2012)
  - 100 consecutively-referred children from tertiary care neurology and neurosurgery clinics

Table 1. Demographics for pediatric neurology patients

Demographics	Mean	*SD*	Range
Age (years)	14.0	3.1	6.2–19.1
Parent Education (years)			
Mom	13.2	2.3	6–18
Dad	13.7	2.4	9–20
Sex	Percentage		
Male	50		
Female	50		
Race			
Caucasian	84		
Asian	13		
First Nation/Native American	3		
Diagnosis			
Traumatic Brain Injury	44		
Stroke	14		
Epilepsy	12		
Hydrocephalus	9		
Other	21		

VSVT

Table 2. VSVT performance for pediatric neurology patients

VSVT classification descriptors	"Valid"	"Questionable"	"Invalid"
Easy Items (frequency of sample)	97	2	1
Difficult Items (frequency of sample)	84	16	0
Total Items (frequency of sample)	95	5	0

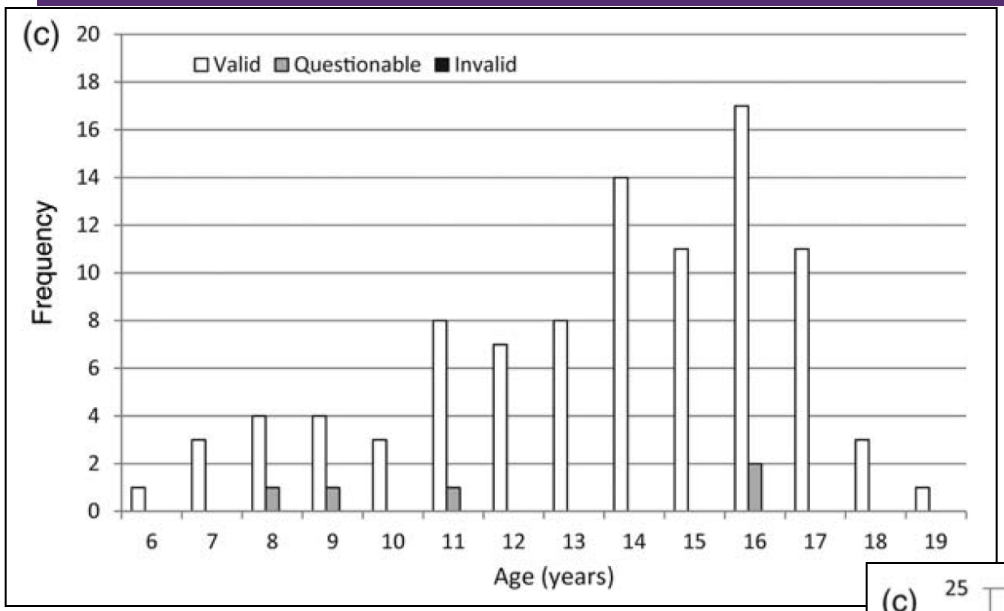
Table 3. Cognitive abilities in pediatric neurology patients administered the VSVT

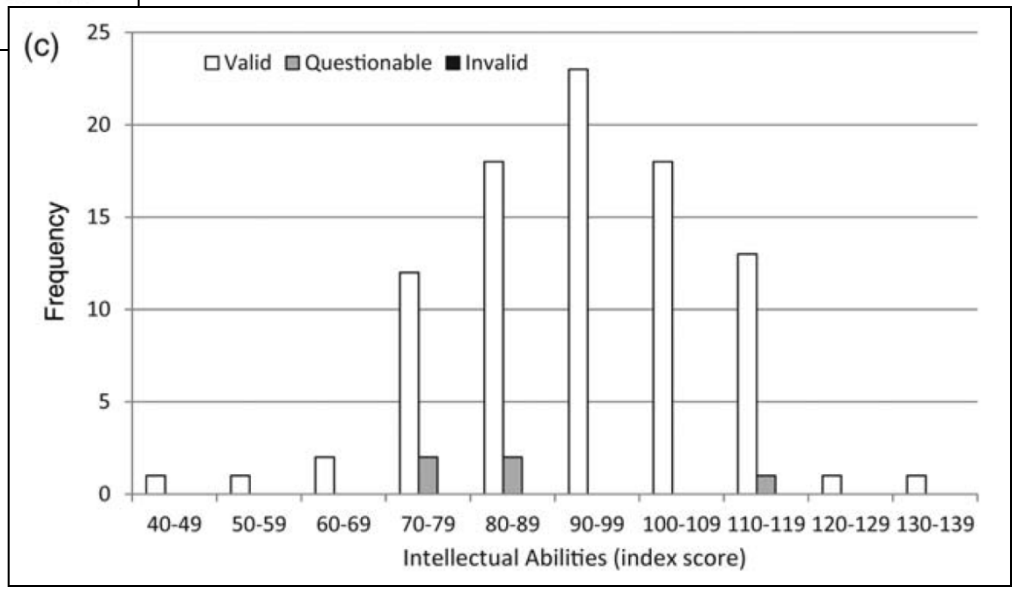
Cognitive domains	*n*	Mean	*SD*	Range	% Impaired
Overall Intelligence (index score)	95	93.3	15.7	49–135	6.3
Sustained Attention (percentile)	55	18.0	25.2	1–99	49.1
Attention, Parent Rating (percentile)†	89	66.8	31.4	1–99	20.2
Processing Speed (index score)	88	88.0	12.8	53–135	6.8
Verbal Memory, Word List (*z* score)	67	−0.3	1.1	−4 to 2	19.4
Verbal Memory, Story (scaled score)	89	10.9	2.9	1–17	1.1
Visual Memory, Faces (scaled score)	71	9.7	3.1	1–18	5.6
Executive Functioning, Parent Rating (*t* score)†	96	59.3	13.9	32–92	27.1
Adaptive Functioning, Parent Rating (index score)	74	98.1	30.1	15–145	17.6

Notes: SD = standard deviation. "Impaired" is defined as being at or below the 2nd percentile (e.g., 2 *SD* below the mean). Index scores have a mean = 100 and *SD* = 15. Percentile scores have a mean = 50 and range from 1 to 99. *T* scores have a mean = 50 and *SD* = 10. *Z* scores have a mean = 0 and *SD* = 1. Scaled scores have a mean = 10 and *SD* = 3. Items marked with a "dagger" indicate that higher scores are reflective of lower functioning (or more problems).

Brooks, 2012

VSVT





Brooks, 2012

AST

- Automatized Sequences Task (AST)
- Kirkwood, Connery, Kirk, & Baker (in press)
- <5 minutes to administer

AST

- 8-17 years, referred for concerns from mTBI
- Mean of 10 weeks (range:1-52) after injury (66% sports)

Table 2 Background and Injury Characteristics of Participants.

Total Participants	$N = 452$
Age	$M = 14.7$, $SD = 2.2$
Grade	$M = 8.8$, $SD = 2.2$
Male	$n = 273$ (60%)
Caucasian	$n = 366$ (81%)
Estimated Full-Scale IQ	$M = 102.2$, $SD = 11.9$
Maternal years of education	$M = 15.0$, $SD = 2.4$
Paternal years of education	$M = 15.0$, $SD = 3.1$
Premorbid history of attention deficit/hyperactivity disorder	$n = 86$ (19%)
Premorbid history of diagnosed learning disability	$n = 61$ (14%)
Premorbid history of special education services	$n = 65$ (14%)
Weeks since injury (range 1 to 52 weeks)	$M = 10.1$, $SD = 9.5$, $Mdn = 7.0$
Loss of consciousness	$n = 76$ (17%)
Neuroimaging conducted	$n = 323$ (71%)
Intracranial findings identified by CT or MRI when conducted	$n = 31$ (10%)
Families in or planning litigation	$n = 30$ (7%)
Families seeking disability compensation	$n = 0$ (0%)
Participants charged with a crime	$n = 2$ (< 1%)

Kirkwood et al., in press

AST

- Invalid performance=below cutoffs on MSVT plus TOMM and/or Reliable Digit Span.
- 13.3% of sample deemed to be invalid

Table 3 Automatized Sequences Performance in the Valid and Invalid Performance Groups.

	Valid ($n = 379$)			Invalid ($n = 58$)				
	M	*SD*	*Mdn*	*M*	*SD*	*Mdn*	*p*	*r*
Age	14.6	2.3	15.2	14.8	1.9	15.0	.652	
Grade	8.7	2.3	9.0	9.0	1.9	9.0	.392	
WJ-III Letter-Word Reading Grade Level	9.2	3.2	8.9	8.5	2.9	8.9	.072	
Alphabet time (seconds)	5.5	2.7	5	9.6	6.5	8.5	<.001	.276
Counting to 20 time (seconds)	4.8	1.3	4	7.6	4.3	6.5	<.001	.308
Days of week time (seconds)	2.7	1.5	2	4.7	3.5	3.0	<.001	.342
Months of year time (seconds)	6.3	4.5	5	10.5	6.3	8.0	<.001	.314
Total time (seconds)	19.4	7.2	17	32.3	16.5	29.0	<.001	.357

Kirkwood et al., in press

Table 4 Sensitivity and Specificity for Automatized Sequences Conditions at Various Cutoffs.

Time in Seconds	Sensitivity %	Specificity %
Alphabet		
≥ 7	53	87
≥ 8	50	91
≥ 9	40	95
≥ 10	33	97
≥ 11	26	97
≥ 12	21	98
≥ 13	17	98
≥ 14	16	99
Counting to 20		
≥ 6	50	92
≥ 7	40	97
≥ 8	31	98
≥ 9	22	99
Days of Week		
≥ 3	48	88
≥ 4	31	96
≥ 5	21	98
≥ 6	17	99
Months of Year		
≥ 8	47	85
≥ 9	41	87
≥ 10	36	90
≥ 11	33	91
≥ 12	31	93
≥ 13	29	94
≥ 14	24	95
≥ 17	14	96
≥ 21	7	98
≥ 24	3	99
Total time across conditions		
≥ 24	66	86
≥ 25	62	87
≥ 26	59	89
≥ 27	55	90
≥ 28	52	91
≥ 29	43	93
≥ 31	35	95
≥ 32	33	96
≥ 36	28	97
≥ 42	19	98
≥ 45	17	99

Kirkwood et al., in press

Embedded PVTs

Embedded PVTs

- Reliable Digit Span (RDS)
- In adults, RDS≤7 is suggested as cutoff
- Limited evidence for use in children

Embedded PVTs

- Blaskewitz et al. (2008)
  - RDS≤7, 90% of pediatric simulated malingerers identified, but so were 59% of matched controls
- Kirkwood & Kirk (2010)
  - RDS≤6 had sensitivity=51% and specificity=92% in mild TBI patients (8-17 years)

Embedded PVTs

- Welsh, Bender, Whitman, Vasserman, & MacAllister (2012)
  - RDS≤6 had low pass rate (65%) in 6-17 year-olds with epilepsy
  - Suggested RDS≤3 for compromised samples

- Loughan, Perna, & Hertza (2012)
  - RDS≤4 had sensitivity=43% and specificity=91% in mixed clinical/neurological sample

Validity scales in questionnaires

BASC-2 Validity Scales

- Behavior Assessment System for Children, Second Edition (Reynolds & Kamphaus, 2004)
- Subjective ratings of psychosocial functioning
- Embedded validity indices:
  - F index (*infrequently endorsed items*)
  - Response Pattern Index (*detect patterns*)
  - Consistency Index (*consistency of responses*)

BASC-2 Validity Scales

- Kirk, Kirkwood, & Hutaff-Lee, 2010 [published abstract]
- 274 patients with mild TBI
- Ages 8-17 years
- 2.5% fell within “caution” or “extreme caution” ranges on F index
- Of the 50 patients who failed MSVT, 3 also had elevated F index on BASC-2

BRIEF Validity Scales

- Behavior Rating Inventory of Executive Function, BRIEF (Gioia, Isquith, Guy, & Kenworthy, 2000)
- Questionnaire for subjective ratings of daily executive functioning
- Embedded validity scales:
  - Negativity (*over-endorsement of negative items*)
  - Inconsistency (*level of consistent responding*)

BRIEF Validity Scales

- Brooks, Mazur-Mosiewicz, & Sherman, 2012 [published abstract]
- Pediatric neurology patients with parent report (n=389) and teacher report (n=302)
- Age 5-18 years (mean=11.6yrs)
- Patients with neurological disorders had similar endorsement levels as manual

BRIEF Validity Scales

Figure 1. BRIEF Negativity Scale: Parent Report.

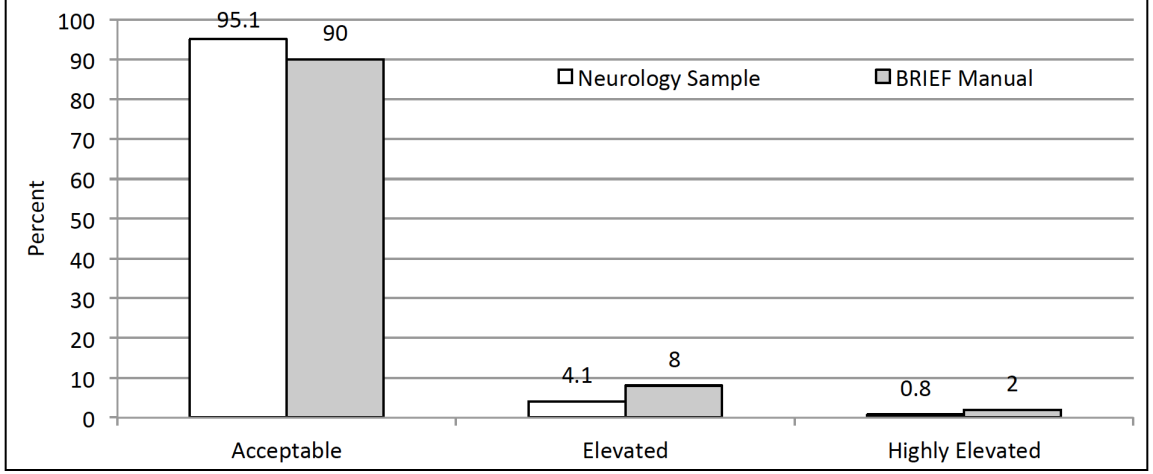
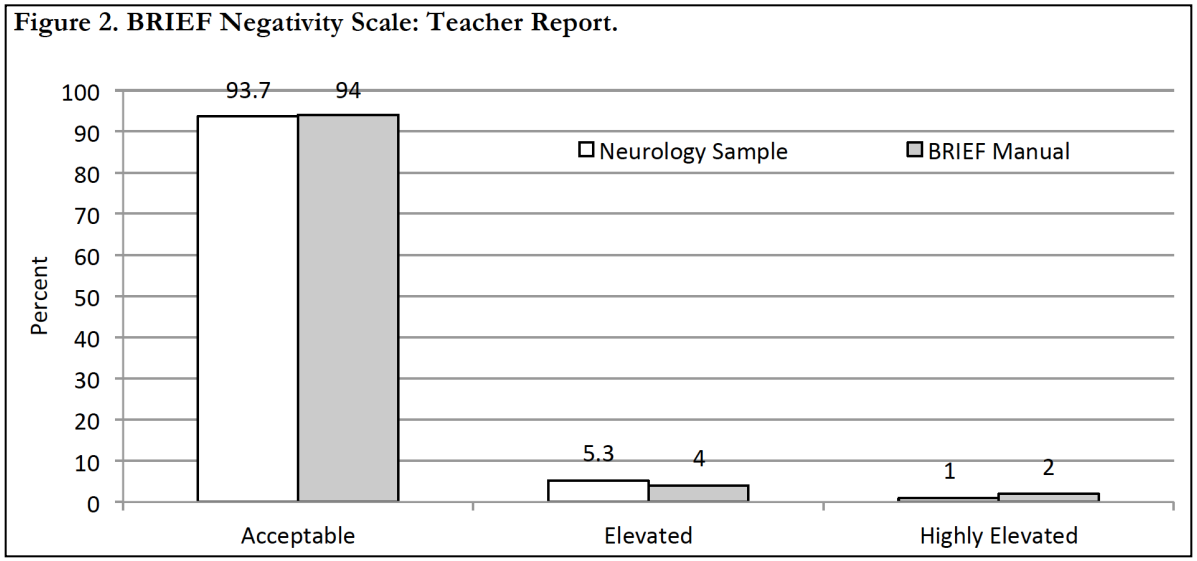


Figure 2. BRIEF Negativity Scale: Teacher Report.



BRIEF Validity Scales

Figure 3. BRIEF Inconsistency Scale: Parent Report.

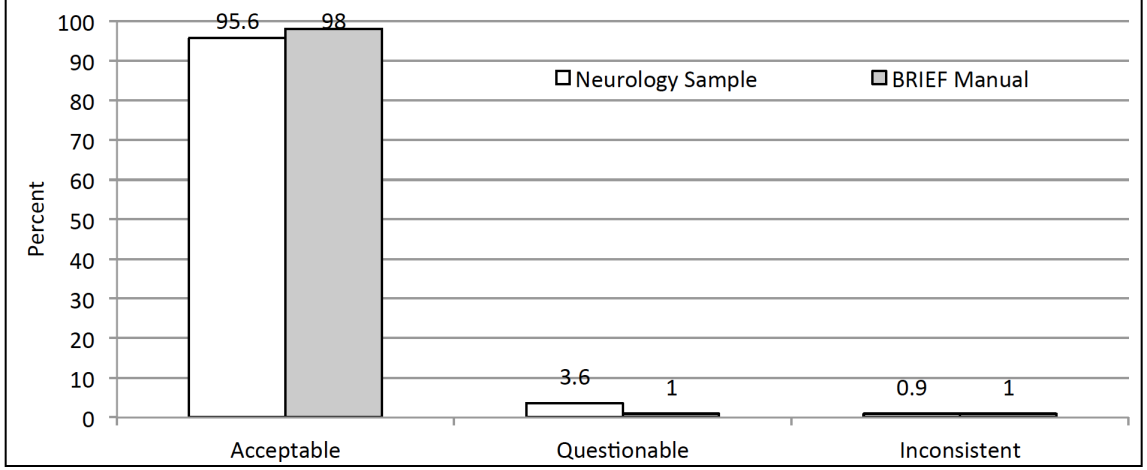
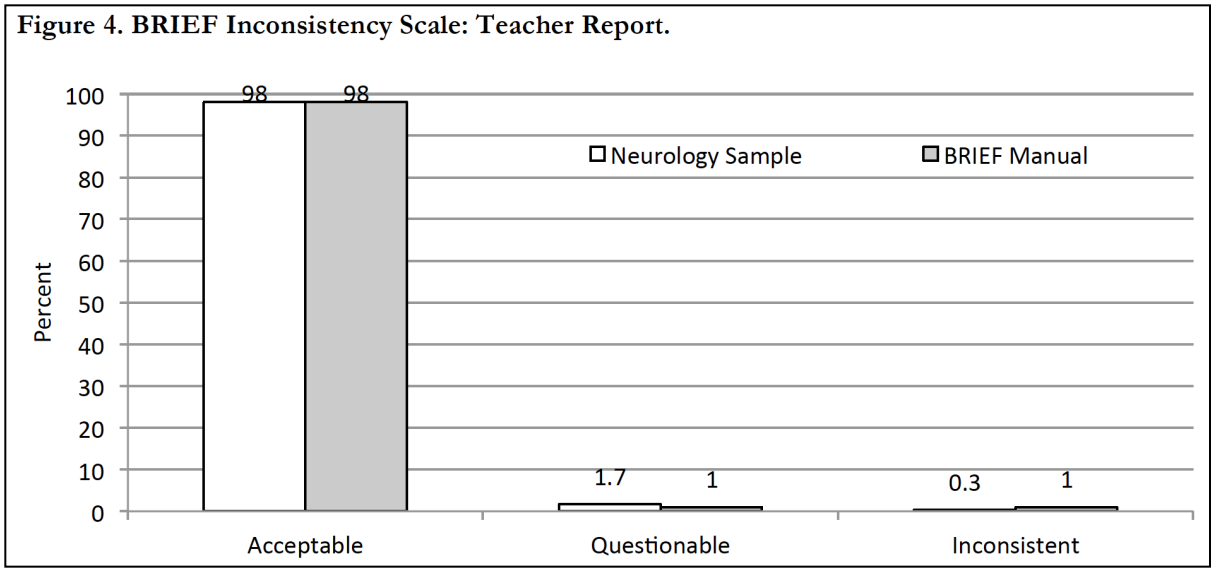


Figure 4. BRIEF Inconsistency Scale: Teacher Report.



Limitations to using PVTs in children

- Potential for increased false positives in:
  - Lower functioning
  - Youngest age groups
  - Some diagnostic groups
- Stand-alone PVTs are generally developed in adults and applied to pediatrics (except AST)
- Continued research is needed

Limitations to using PVTs in children

Brooks, 2012

Table 4. Correlations between age, cognitive domains, and effort testing for pediatric neurology patients

Demographic and Cognitive Domains	*n*	VSVT correct responses			VSVT response latency			TOMM Trial 1
		Easy	Difficult	Total	Easy	Difficult	Total	
Age (years)	100	**.42****	**.48****	**.49****	**−.61****	**−.61****	**−.66****	.10
Overall Intelligence	95	**.29****	**.43****	**.40****	**−.29****	**−.28****	**−.31****	**.38****
Sustained Attention	55	−.06	−.06	−.08	.08	.18	.14	.06
Attention, Parent Rating†	89	**−.27***	**−.30****	**−.30****	.18	.15	.18	**−.33***
Processing Speed	88	.19	**.36****	**.34****	**−.22***	**−.25***	**−.26***	.03
Verbal Memory, Word List	67	−.01	.11	.11	−.08	−.07	−.08	**.33***
Verbal Memory, Story	89	.02	.04	.05	.05	.02	.04	.13
Visual Memory, Faces	71	.19	.17	.17	−.13	−.17	−.17	.19
Executive Functions, Parent Rating†	96	−.13	**−.25***	**−.25***	.14	.09	.12	**−.34****
Adaptive Functioning, Parent Rating	74	.21	**.24***	**.25***	−.15	−.22	−.20	.09

Notes: VSVT = Victoria Symptom Validity Test; TOMM = Test of Memory Malingering; On items marked with a dagger, higher scores represent more problems. Due to the ceiling effects with VSVT and TOMM scores, Spearman's ρ correlations were used for correlations with correct responses. Pearson's r correlations were used for response latencies on the VSVT.
Bold values indicate as either $^{*}P < .05$ or $^{**}P < .01$.

Brooks, Mazur-Mosiewicz, Kirkwood, & Sherman, 2012

Table 3. Correlations between age, cognitive domains, and effort testing for pediatric neurology patients.

Demographic and Cognitive Domains	*TOMM Performance*					
	n	**Trial 1**	*n*	**Trial 2**	*n*	**Retention**
Age (years)	*227*	**0.21****	*77*	0.19	*53*	0.10
Overall Intelligence	*217*	**0.27****	*73*	0.18	*49*	0.25
Attention, Parent Rating†	*209*	**-0.17***	*68*	-0.10	*46*	-0.18
Processing Speed	*212*	**0.18****	*73*	**0.25***	*51*	0.17
Verbal Memory, Word List	*193*	**0.32****	*58*	0.19	*41*	0.24
Verbal Memory, Story	*105*	**0.29****	*44*	0.17	*30*	0.10
Visual Memory, Faces	*111*	**0.19***	*46*	**0.33***	*32*	0.03
Executive Functions, Parent Rating†	*209*	**-0.17***	*71*	-0.14	*50*	-0.16
Adaptive Functioning, Parent Rating	*161*	**0.21****	*58*	0.15	*38*	0.03

Table note: On items marked with a †, higher scores represent more problems.
Due to the ceiling effects with TOMM scores, Spearman's rho correlations were used for correlations with correct responses. *p<.05. **p<.01.

Limitations to using PVTs in children

Loughan & Perna, 2012

TABLE 2
Demographics by Diagnostic Group

	N	*Age*	*Gender (M/F)*	*FSIQ*	*TOMM Trial 1*	*TOMM Trial 2*	*TOMM Trial 3*	*Specificity Rate*	*# Below Cutoff*
Conduct	22	11.0 (3.0)	14/8	89.3 (18.8)	44.5 (6.1)	47.5 (3.8)	47.1 (5.0)	85%*	4
Affective	44	11.9 (3.2)	24/20	91.8 (18.6)	45.9 (4.8)	48.0 (4.9)	47.9 (4.9)	92%*	4
TBI	19	11.8 (3.6)	12/7	88.9 (15.9)	45.6 (5.3)	47.2 (6.0)	47.6 (5.2)	83%*	4
ADHD	55	11.5 (3.2)	36/19	90.8 (17.2)	45.2 (5.3)	48.7 (2.7)	47.6 (5.2)	93%*	4
Learning Disability	20	12.3 (3.4)	13/7	86.1 (12.3)	45.1 (4.5)	49.4 (1.2)	49.6 (0.7)	100%	0
Intellectual Disability	16	11.9 (3.3)	9/8	64.1 (10.4)	42.0 (8.8)	46.7 (5.1)	45.5 (7.1)	76%*	5
PDD	7	10.0 (2.5)	6/1	83.6 (19.2)	44.8 (3.9)	48.8 (2.4)	49.3 (0.6)	88%*	1

*Fell below the recommended specificity rate of 95% (Tombaugh, 1996, 1997).

Brooks, Mazur-Mosiewicz, Kirkwood, & Sherman, 2012

Table 4. Performance on TOMM by age group and intelligence level.

	Number of Subjects	% Below Cutoff on Trial 1	% Below Cutoff on Trial 2	% Below Cutoff on Retention	Overall Fail Rate*
Performance by Age Group					All age Groups: 4.8%
Ages 5 to 7	*n=27*	44.4	7.4	3.7	7.4%
Ages 8 to 10	*n=42*	11.9	4.8	2.4	4.8%
Ages 11 to 13	*n=49*	12.2	2	0	2%
Ages 14 to 18	*n=109*	14.7	5.5	5.5	5.5%
Performance by Level of IQ					All IQ Groups: 4.8%
Overall IQ less than 70	*n=41*	29.3	9.8	7.3	12.2
Overall IQ 70 to 84	*n=52*	23.1	5.8	3.9	5.8
Overall IQ 85 or above	*n=124*	10.5	1.6	0.8	1.6

Table note: *Failure was coded pass or fail based on the TOMM manual and/or cut off scores suggested by Brooks, Sherman, & Krol, (2012).

Conclusions

- Evidence for using PVTs in neuropsychological assessments with children has increased
- PVTs are recommended in pediatric neuropsychological assessments (NAN, AACN)
- Children and adolescents with medical, neurological, and psychiatric disorders can pass PVTs
- Multiple methods for evaluating validity should be employed in an assessment

Acknowledgements

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  - Dr. Michael Kirkwood

- Primary reference:

Kirkwood, M.W. (2012). Overview of tests and techniques to detect negative response bias in children. In E.M.S. Sherman and B.L. Brooks (Eds.), *Pediatric Forensic Neuropsychology* (pp. 136-161). New York: Oxford University Press.