

## Preface

Over the last several decades, few topics in adult psychology, and especially in adult neuropsychology, have received as much attention as validity testing. The rationale for utilizing validity tests with adults has been clear for years now, and the evidentiary support behind such testing is impressively strong.

Yet, when I started practicing in the early 2000s, I, like many other pediatric neuropsychologists, child clinical psychologists, and school psychologists, had only a vague notion of what validity testing was. At that time, I evaluated several children clinically, and I was left wondering: Did these kids really try their best to do well on testing? Their performances were not egregiously suspicious, but their efforts seemed suspect. The problem was that I had no way to confidently determine whether their efforts were genuine or not. To this day, I still remember the uncertainty I felt. Was I supposed to confront the child during testing to talk about effort? Should I interpret the test data typically? What should I say to the parents and in my report about the data's validity?

My feelings of uncertainty then spurred me to look into objective validity tests that could be used reasonably with children. I've been using validity tests in my clinical assessment practice ever since, and our group at Children's Hospital Colorado has been conducting research on the topic for nearly 10 years. These experiences have left me convinced that validity testing adds value to ability-based assessments with school-age children and teens, even in nonforensic settings in which there is no obvious secondary gain apparent at the outset of the evaluation.

Although the literature on validity testing in children and teens is less well developed than the adult literature on the subject, the number of studies devoted to validity testing in child populations has increased steadily over the last decade, with exponential growth and wider clinical and mainstream recognition over the last few years. The current trend is

unmistakable and, from where I sit today, I could not be more confident that the future of child and adolescent assessment will include a much greater emphasis on objectively measuring validity during both testing and self-report than has been apparent historically.

With this in mind, the time seemed right for a volume that could provide a state-of-the-science synthesis of validity testing with children to guide practice and to set the stage for future research and test development. In order for the book to be worthwhile, I knew it needed a group of contributors who could not only summarize the literature but also appreciate the benefits and limitations of validity testing with children through work in their own practices. Fortunately, a veritable who's who of pre-eminent pediatric validity-testing clinicians and researchers and several authors renowned for their contributions to the adult literature agreed to contribute. The resulting volume thoroughly covers the "why" and "how" of validity testing in child and adolescent neuropsychological and psychoeducational assessment.

The intended audience for the book includes practitioners, researchers, and students in neuropsychology, clinical psychology, and school psychology. Educators, allied health providers, and policymakers may also find the book useful, as the chapters are written by leading experts who provide the latest scientific information about a topic that will undoubtedly grow in importance in the cognitive and psychoeducational assessment fields in the years ahead.

An edited volume is only as valuable as the individual chapters, so I first want to extend my sincere thanks to the chapter authors, who generously devoted time amid their hectic schedules to skillfully summarize the current literature and add an impressive amount of new scholarship to the field. I also want to thank my editor at The Guilford Press, Rochelle Serwator; without her gentle but persuasive nudging and continual support, this book would still be sitting in the "to-do" pile. Louise Farkas and the rest of the production team at Guilford were nothing short of superb, so I am indebted to them as well.

I additionally want to extend my appreciation to the many colleagues whose work and perspectives have shaped my thinking on the topic for the better, including Drs. David Baker, Kyle Brauer Boone, Brian Brooks, Dominic Carone, Michael Chafetz, Amy Connery, Jacobus Donders, Lloyd Flaro, Paul Green, Allyson Harrison, John Kirk, Glenn Larrabee, William MacAllister, Joel Morgan, Robin Peterson, Martin Rohling, Elisabeth Sherman, and Jerry Sweet. Last, but definitely not least, I want to thank my wife, Dr. Jennifer Janusz, who supported me while I worked on this project with her usual generous blend of tolerance, encouragement, and cheer.

# 1

## A Rationale for Performance Validity Testing in Child and Adolescent Assessment

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The importance of objective validity testing in adult neuropsychological and psychological assessment has long been recognized. Over the past 30 years, more than 1,000 scientific articles, 20 comprehensive reviews, a dozen meta-analytic studies, and a dozen textbooks have appeared in the adult literature (Caronè & Bush, 2013; Sweet & Guidotti Breting, 2013). Practice organizations, focusing primarily on adults, have also emphasized the importance of validity testing in both clinical and independent evaluations. The National Academy of Neuropsychology published a position paper on the topic in 2005 (Bush et al., 2005), and the American Academy of Clinical Neuropsychology (AACN) published a consensus statement in 2009 (Heilbronner, Sweet, Morgan, Larrabee, & Millis, 2009). Practice guidelines from both the AACN (American Academy of Clinical Neuropsychology Board of Directors, 2007) and the British Psychological Society (2009) also highlight the need to routinely include validity testing in assessments.

Attention to validity testing in pediatric assessment pales in comparison. Select empirical work appeared in the 1980s, and a book on adolescent malingering was published in the 1990s (McCann, 1998), but serious interest was not shown until the 2000s. The first neuropsychological case report was published in 2002 (Lu & Boone, 2002), the first pediatric case series in 2003 (Constantinou & McCaffrey, 2003; Courtney, Dinkins, Allen, & Kuroski, 2003; Green & Flaro, 2003), and the first review from

a neuropsychological perspective in 2004 (Rohling, 2004). Over the last decade, dozens of articles have focused on validity testing in cognitive or neuropsychological assessment with children. Although no meta-analyses have been conducted, two reviews summarizing the child literature have appeared in the last few years (DeRight & Carone, 2013; Kirkwood, 2012).

Despite the growing interest in the topic, many pediatric neuropsychologists, child clinical psychologists, and school psychologists still view the use of validity tests during their evaluations as less necessary than do adult-focused practitioners. This chapter provides a rationale for including performance validity tests (PVTs) in neuropsychological and psychoeducational batteries with school-age children.

PVTs are objective measures intended to evaluate validity during performance-based tests (Larrabee, 2012a). They are designed to be relatively insensitive to ability-based problems and to instead detect noncredible effort. Most school-age children, even those with bona fide developmental and neurological conditions, can readily pass the most well-established PVTs (see Kirkwood, Chapter 5, this volume). Of note, evaluating the veracity of self-report data during an evaluation through the use of symptom validity tests (SVTs) is also important, but as discussed in Chapter 5 of this volume, pediatric practitioners do not yet have independently validated measures to use for this purpose, at least when attempting to detect feigned or exaggerated health-related and cognitive symptomatology.

### **NONCREDIBLE PRESENTATIONS HAPPEN IN CHILDREN**

The child literature has likely lagged so far behind the adult literature in part because many practitioners believed historically that children could not, or would not, feign or exaggerate in an assessment setting. However, as summarized by Peterson and Peterson (Chapter 3, this volume), a sizable developmental psychology literature has demonstrated that children are capable of deception by the preschool years and engage in deceptive acts quite frequently under the right circumstances. Increasingly sophisticated deceptive behavior occurs throughout childhood and into the adolescent years, secondary to the development of the underlying psychological abilities necessary for successful deception (e.g., theory of mind, working memory, inhibitory control).

Thus research documents that children and adolescents *can* deceive. A more important question in justifying the use of validity testing in children is whether or not they actually *do* deceive in health care and other assessment settings. Although deception by children is not a well-studied area in medicine, multiple case reports have appeared in the medical and psychiatric literature establishing that noncredible presentations occur, for both conscious and unconscious reasons and with and without parental

influence (Kirkwood, 2012). Children have been found to feign many types of physical and psychiatric difficulties, including motor disturbance, vision and other sensory problems, seizures, psychosis, fever, skin conditions, respiratory problems, gastrointestinal upset, and orthopedic injury (Enzenauer, Morris, O'Donnell, & Montrey, 2014; Feldman, Stout, & Inglis, 2002; Greenfield, 1987; Kozłowska et al., 2007; Libow, 2000; Peebles, Sabella, Franco, & Goldfarb, 2005; Reilly, Menlove, Fenton, & Das, 2013).

As covered in more detail in subsequent chapters, multiple lines of evidence now indicate that children also feign cognitive problems. Most of the evidence so far has been accumulated in clinical, not forensic, settings. Table 1.1 highlights some of the individual case reports that have appeared in the literature. These reports offer rich descriptions of individual children providing noncredible cognitive data, with presentations varying significantly in terms of symptomatology and the underlying reasons for the distortion.

As illustrated in Table 1.2, a number of larger case series have also documented how often children provide noncredible effort during cognitive or neuropsychological evaluations. In most outpatient clinical settings,

**TABLE 1.1. Individual Case Reports of Children Providing Noncredible Effort during Cognitive or Neuropsychological Evaluations**

Source	Reason for referral	Age (years)
Lu & Boone (2002)	Moderate TBI	9
Henry (2005)	Mild TBI	8
Flaro, Green, & Blaskewitz (2007)	Psychoeducational evaluation	8
	Criminal charges	12
	Learning disability	16
	Autism spectrum	7
Flaro & Boone (2009)	Mild TBI	16
McCaffrey & Lynch (2009)	TBI	13
Kirkwood, Kirk, Blaha, & Wilson (2010)	Mild TBI	16
	Mild TBI	8
	Mild TBI	15
	Mild TBI	13
	Medically unexplained symptoms	16
	Medically unexplained symptoms	11
Chafetz & Prentkowsky (2011)	Social Security Disability determination	9
Harrison, Green, & Flaro (2012)	Learning disability	17

*Note.* TBI, traumatic brain injury.

**TABLE 1.2. Case Series Estimating the Base Rate of Noncredible Performance during Cognitive Evaluations**

Source	Population	N	Age range (years)	Primary performance validity test	% of cases deemed noncredible
Donders (2005)	Mixed clinical	100	6–16	TOMM	2%
Chafetz, Abrahams, & Kohlmaier (2007); Chafetz (2008)	Social Security Disability claimants	123	6–16	TOMM MSVT	26–60%
Carone (2008)	Moderate to severe brain injury or dysfunction	38	(M age 11.8)	MSVT	5%
MacAllister, Nakhutina, Bender, Karantzoulis, & Carlson (2009)	Epilepsy	60	6–17	TOMM	3%
Kirkwood & Kirk (2010); Kirkwood, Hargrave, & Kirk (2011); Baker, Connery, Kirk, & Kirkwood (2014); Kirkwood, Connery, Kirk, & Baker (2014)	Mild (TBI)	~500 (independent patients)	8–17	MSVT	12–17%
Kirk, Harris, Hutaff-Lee, Koelmay, Dinkins, & Kirkwood (2011)	Mixed clinical	101	5–16	TOMM	4%
Larochette & Harrison (2012)	Learning disability	63	11–14	WMT	1%
Green, Flaro, Brockhaus, & Montijo (2012)	Mixed clinical	380	7–18	WMT	5%
Green, Flaro, Brockhaus, & Montijo (2012)	Mixed clinical	265	7–18	MSVT	3%
Green, Flaro, Brockhaus, & Montijo (2012)	Mixed clinical	217	7–18	NV-MSVT	4%
Ploetz, Mosiewicz, Kirkwood, Sherman, & Brooks (2014)	Mixed clinical	266	5–18	TOMM	3%

*Note.* All studies involved clinical samples except those from Chafetz. Includes only studies that provide clinical or actuarial means to estimate true positives for noncredible effort (e.g., study reported true vs. false positives or used more than one PVT). TOMM, Test of Memory Malingering; MSVT, Medical Symptom Validity Test; WMT, Word Memory Test; NV-MSVT, Nonverbal Medical Symptom Validity Test.

noncredible presentations do not occur frequently, but they do happen consistently, with at least a small percentage of children documented in every case series published to date. By comparison, 8% of adults in general medical/psychiatric clinical settings are estimated to feign or exaggerate symptomatology, with higher rates seen in forensic and other compensation-seeking contexts (Mittenberg, Patton, Canyock, & Condit, 2002).

Not unlike what is seen in adults, certain pediatric conditions and settings have been found to be associated with more frequent noncredible presentations. The clinical population found to date to display the highest rate of noncredible effort is children with persistent problems following mild head injury (for further discussion, see Brooks, Chapter 11, this volume). Noncredible presentations in this population have been documented to occur 12–20% of the time, considerably more often than other investigated clinical conditions, and have been determined in a case series described in multiple studies by our group at Children's Hospital Colorado (Baker, Connery, Kirk, & Kirkwood, 2014; Green, Kirk, Connery, Baker, & Kirkwood, 2014; Kirk, Hutaff-Lee, Connery, Baker, & Kirkwood, 2014; Kirkwood, Connery, Kirk, & Baker, 2014; Kirkwood, Hargrave, & Kirk, 2011; Kirkwood & Kirk, 2010; Kirkwood, Peterson, Connery, Baker, & Grubenhoff, 2014; Kirkwood, Yeates, Randolph, & Kirk, 2012) and also in a study by the neuropsychology group at Nationwide Children's Hospital in Ohio (Araujo et al., 2014).

As discussed by Chafetz (Chapter 14, this volume), children undergoing independent evaluation for Social Security Disability benefits display even higher rates of noncredible data. Remarkably, upward of 60% of children seen for psychological consultative examinations for Social Security Disability display some evidence of malingering, which is thought to be driven by the parents in most cases and so would be considered "malingering by proxy" (Chafetz, 2008; Chafetz, Abrahams, & Kohlmaier, 2007).

Other pediatric evaluation settings and/or conditions are also likely to be associated with elevated rates of invalid data. However, at this point, we do not yet know what these settings or conditions are, because they have not been investigated adequately. For example, little systematic examination has focused on how frequently noncredible presentations happen in child or adolescent psychoeducational settings, but, as reviewed by Harrison (Chapter 10, this volume), ample reason for concern exists given the secondary gain that is often present (e.g., accommodations for high-stakes testing; stimulant medication prescription). The concern here is significant enough that it has begun to receive mainstream recognition. For example, the College Board, which administers the SAT, has essentially taken the position that PVTs should be used during psychological–neuropsychological evaluations conducted for disability accommodations (College Board, 2014), a position that can be expected to be the norm in the not too distant future for all major national testing services.

Children with conditions that by definition involve increased rates of noncompliance (e.g., oppositional defiant disorder, conduct disorder) seem as though they might also be at higher risk for putting forth noncredible effort during assessments, and indeed there are some cases in which this happens (Carone, 2008; Chafetz, 2008; Donders, 2005); on the other hand, a study published with juvenile offenders did not actually find elevated PVT failure (Gast & Hart, 2010). Innumerable adult studies have found that the presence of external incentive for financial gain increases the chance of failed PVTs after mild head injury and other conditions (Boone, 2007; Carone & Bush, 2013; Larrabee, 2012b). In contrast, neither the pediatric group in Colorado (e.g., Kirkwood & Kirk, 2010), nor the group in Ohio (Araujo et al., 2014) has found PVT failure to be associated with family litigation in children seen clinically after a mild head injury, suggesting that the circumstances that elicit increased rates of PVT failure in children may differ to some extent from those in adults. Additional research will be required to more clearly elucidate which children under which conditions are most at risk of displaying noncredible presentations.

### **INADEQUACY OF SUBJECTIVE JUDGMENT IN DETECTING NONCREDIBLE DATA**

The research discussed previously is focused on children who are likely engaged in outright deception. In a pediatric assessment setting, noncredible effort can also be produced for a host of other reasons that anyone working with children likely naturally appreciates, including initial separation anxiety and state-dependent fatigue, hunger, or noncompliance (see Carone, Chapter 6, this volume). Identifying the underlying reasons for invalid effort is crucial in determining the most appropriate practitioner response (as discussed by Baker and Kirkwood, Chapter 7, and Connery & Suchy, Chapter 8, in this volume). Regardless of the underlying motivation, however, as a first step, invalid data need to be recognized as invalid. All practitioners conducting assessments use a process to make determinations about whether they think the examinee exerted sufficient effort to consider the data valid or not. Historically, in child assessments, practitioners have relied on subjective judgment to make such determinations.

Clinical judgment is obviously a crucial component of any psychological or neuropsychological assessment. Nevertheless, an extensive literature has documented the potential drawbacks of relying exclusively on subjective judgment (e.g., Garb, 1998; Hastie & Dawes, 2010; Kahneman, Slovic, & Tversky, 1982; Meehl, 1954). Aspects of this research are controversial, but few would argue with the fact that the literature demonstrates that clinician judgment can be frequently flawed. Errors occur for many reasons, including lack of direct feedback about the correctness of judgments, ignoring

base rates and normative data, and failure to properly assess covariation. A variety of cognitive heuristics (e.g., availability, affect, representativeness) and biases (e.g., confirmatory, hindsight) also negatively affect the accuracy of judgments. As such, objective instrumentation is widely recognized as having the potential to improve clinical decision making.

Guilmette (2013) summarized the studies that have examined how effective neuropsychologists are when making judgments about whether test data may have been feigned. A few of these studies have found support for the idea that neuropsychologists are adequate judges of malingering (e.g., Trueblood & Binder, 1997; Bruhn & Reed, 1975). However, these studies have some significant methodological problems, and a number of other studies have found considerably less support for the idea that non-credible data produced by adults can be identified effectively without validity test results (e.g., Heaton, Smith, Lehman, & Vogt, 1978; van Gorp et al., 1999).

Two studies from the late 1980s evaluated whether neuropsychologists were able to detect invalid data produced by children and adolescents asked to “fake bad” on a test battery (Faust, Hart, & Guilmette, 1988; Faust, Hart, Guilmette, & Arkes, 1988). The children and teens were instructed to perform less well than usual but not so badly that it would be obvious that they were faking. The data were then sent to neuropsychologists for review. The majority of the respondents viewed the results as abnormal. None of the respondents in either study identified noncredible responding as a possible explanation for the results, even though they were quite confident in the accuracy of their ratings. The studies have been criticized (Bigler, 1990), but even after 25 years they serve as a reminder that practitioners are apt to be less accurate than they think they are when attempting to subjectively identify invalid data.

Recognition of the many potential flaws in clinical judgment is one of the reasons most adult-focused neuropsychologists and practice organizations recommend so strongly that examiners incorporate objective validity tests into their evaluations. When examinees engage in more sophisticated deception (e.g., seemingly compliant with a plausible presentation), PVTs may be the only sign that invalid data were produced.

Adult practitioners seem to readily appreciate that PVTs, like any other tool in the testing toolbox, are not intended to replace clinical judgment. Rather, they are intended to supplement and improve it by allowing the objective measurement of a measurable behavior. In contrast, the adoption of objective validity testing in pediatric assessments has been much slower, with statements such as the following continuing to predominate in child clinical, school psychology, and some pediatric neuropsychological reports:

“Mary *appeared* to put forth her best effort on all tasks, so the results are judged to be reliable and valid.”

Imagine a similar statement being made about a child's intelligence without the use of any objective testing:

“Mary *appeared* to have below average intelligence so she was judged to be functioning in the intellectually disabled range.”

Psychologists long ago moved away from relying on such gross appearance and subjective judgment when measuring intelligence and just about every other performance-based domain we evaluate (e.g., language, memory, attention, executive functioning). Why have so many practitioners continued to rely solely on judgment to determine whether a child or teen exerted valid effort during an exam? Until fairly recently, the simple answer was that pediatric practitioners did not have access to any empirically supported objective tools to determine noncredible effort. However, as detailed by Kirkwood (Chapter 5, this volume), a growing number of PVTs now have adequate evidence to justify their inclusion in batteries with school-age children.

## VALIDITY TEST RESULTS MATTER

Child practitioners less familiar with PVTs often question the added value of such tests given their financial costs and administration time. Available research with children, as well as more extensive work with adults, indicates that PVT performance likely has not only substantial implications for how providers should interpret evaluation data but broader implications as well.

### Clinical Implications for Ability-Based Test Interpretation

Numerous studies in adults have demonstrated clearly that PVT failure is associated with significantly worse performance on a wide variety of neuropsychological tests. In essence, as performance on PVTs diminishes, examinee scores on neuropsychological tests decline dramatically as well (Green, Rohling, Lees-Haley, & Allen, 2001). Despite the fact that PVTs are relatively insensitive to ability-based deficits, PVT failure in adults accounts for approximately 50% of the variance on ability-based tests, far more than that explained by educational level, age, neurological condition, and neuroimaging results (e.g., Constantinou, Bauer, Ashendorf, Fisher, & McCaffrey, 2005; Green et al., 2001; Lange, Iverson, Brooks, & Rennison, 2010; Meyers, Volbrecht, Axelrod, & Reinsch-Boothby, 2011).

Only a few studies have investigated the relationship between PVT performance and ability-based tests in children. Nonetheless, available work suggests that similar relationships may exist, at least in pediatric samples

with relatively high rates of noncredible effort. In a sample of 123 child Social Security Disability claimants, Chafetz (2008) classified participants according to the likelihood of malingering based on their performance on a variety of PVTs. IQ scores differed significantly among the various groups in a linear fashion, such that the worse the child performed on the PVTs, the lower his or her IQ score was.

Two studies have also focused on the relationship between PVT performance and ability-based tests in samples of children with lingering problems after mild traumatic brain injury (mild TBI). In a group of 276 school-age children referred clinically to the Children's Hospital Colorado Concussion Program, we found that performance on the Medical Symptom Validity Test (MSVT; see Kirkwood, Chapter 5, this volume, for a description) correlated significantly with performance on all ability-based tests and explained more than a third (38%) of the variance across ability tests (Kirkwood et al., 2012). Even after controlling for premorbid and injury factors that could have influenced test performance (e.g., age, history of ADHD/learning disability/special education, injury severity, time since injury), MSVT performance remained a robust unique predictor of ability-based test performance. Participants failing the MSVT also performed significantly worse on nearly all neuropsychological tests, with large effect sizes seen across most standardized tests (see Table 1.3). In comparison with children who passed the MSVT, those who failed were also at least twice as likely to perform poorly across ability-based tests (Table 1.4). The group at Nationwide Children's Hospital also recently found a similar relationship between PVT performance and the Trail Making Test in 382 children referred clinically after mild TBI (Araujo et al., 2014).

In brief, available studies indicate that noncredible effort can have a dramatic effect across most cognitive domains, not only in adult but also in child evaluations. Given the size of the effects, interpreting data without accounting for invalid effort could lead to gross interpretive errors, inaccurate diagnostic and etiological conclusions, ineffective treatment recommendations, and inappropriate health care, educational, and governmental resource utilization. Any of these errors could result in iatrogenic harm to the child and raise serious questions about a provider's competence.

### **Clinical Implications for Interpreting Self-Reported Data**

In adults, a voluminous literature has documented that PVTs relate strongly to validity indices on personality scales, as well as to self-reported emotional, cognitive, and health-related complaints (Gervais, Wygant, Sellbom, & Ben-Porath, 2011; Greiffenstein, 2010; Jones, Ingram, & Ben-Porath, 2012; Tarescavage, Wygant, Gervais, & Ben-Porath, 2013). In child samples, minimal work has examined the relationship between PVT

**TABLE 1.3. Descriptive Statistics and Comparisons between MSVT Pass and MSVT Fail Groups on Ability-Based Tests in the Kirkwood, Yeates, Randolph, and Kirk (2012) Study**

	MSVT Pass			MSVT Fail			<i>p</i>	Effect size (Cohen's <i>d</i> )
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>		
<b>WASI</b>								
Estimated IQ	215	105.5	11.6	48	94.5	13.4	< .001*	0.9
Vocabulary T-score	215	53.6	8.6	48	50.7	10.9	.045	0.3
Matrix Reasoning T-score	215	52.4	7.2	50	41.0	10.6	< .001*	1.4
<b>CVLT-C</b>								
Total Learning Trials 1–5 T-score	186	53.0	8.4	40	46.6	11.4	.002*	0.7
Long Delay Free Recall <i>z</i> -score	186	0.34	0.8	40	-0.48	1.3	< .001*	0.9
Recognition Discriminability <i>z</i> -score	186	0.18	0.6	40	-1.29	1.8	< .001*	1.6
<b>WISC-IV</b>								
Digit Span scaled score	224	9.7	2.9	51	6.4	3.2	< .001*	1.2
Coding scaled score	207	9.7	5.3	45	6.4	3.1	< .001*	0.6
<b>Grooved Pegboard</b>								
Dominant hand <i>z</i> -score	213	-0.25	1.4	45	-1.7	2.5	.001*	0.9
Nondominant hand <i>z</i> -score	215	-0.41	1.5	45	-1.6	2.2	.001*	0.7
<b>Woodcock–Johnson III</b>								
Letter–Word ID standard score	191	100.2	9.7	45	97.0	22.0	.347	0.3
<b>Automatized Sequencing (time in seconds)</b>								
Alphabet	216	5.6	6.1	50	11.4	10.9	.001*	0.8
Counting 1 to 20	172	4.7	1.4	44	9.6	12.5	.013	0.9
Days of week	209	2.5	1.2	47	5.4	5.1	< .001*	1.2
Months of year	214	6.1	4.4	47	12.0	6.8	< .001*	1.2

*Note.* MSVT, Medical Symptom Validity Test; WASI, Wechsler Abbreviated Scale of Intelligence; CVLT-C, California Verbal Learning Test—Children's Version; WISC-IV, Wechsler Intelligence Scale for Children—Fourth Edition. From Kirkwood, Yeates, Randolph, and Kirk (2012). Copyright 2012 by the American Psychological Association. Reprinted by permission.

\* significant at  $p < .003$  (Bonferroni corrected value)

**TABLE 1.4. Percentage of Participants in MSVT Pass and MSVT Fail Groups Performing below 1 Standard Deviation of the Normative Mean on Ability-Based Tests and Associated Odds Ratios in the Kirkwood, Yeates, Randolph, & Kirk (2012) Study**

	MSVT Pass	MSVT Fail	Odds ratio (95% CI)
<b>WASI</b>			
Estimated IQ	5%	23%	5.5 (2.2–13.6)
Vocabulary T-score	5%	10%	2.4 (0.8–7.3)
Matrix Reasoning T-score	6%	44%	13.3 (5.9–29.8)
<b>CVLT-C</b>			
Total Learning Trials 1–5 T-score	5%	25%	6.6 (2.5–17.5)
Long Delay Free Recall z-score	3%	28%	11.4 (3.9–33.2)
Recognition Discriminability z-score	2%	40%	40.7 (11.0–149.9)
<b>WISC-IV</b>			
Digit Span scaled score	11%	59%	11.9 (5.9–24.0)
Coding scaled score	16%	49%	5.2 (2.6–10.5)
<b>Grooved Pegboard</b>			
Preferred hand	16%	58%	7.5 (3.7–15.0)
Nonpreferred hand	25%	44%	2.4 (1.2–4.6)
<b>Woodcock–Johnson III</b>			
Letter–Word Identification standard score	4%	9%	2.2 (0.6–7.8)

*Note.* MSVT, Medical Symptom Validity Test; WASI, Wechsler Abbreviated Scale of Intelligence; CVLT-C, California Verbal Learning Test—Children’s Version; WISC-IV, Wechsler Intelligence Scale for Children—Fourth Edition; CI, confidence interval. From Kirkwood, Yeates, Randolph, and Kirk (2012). Copyright 2012 by the American Psychological Association. Reprinted by permission.

performance and self-reported data. However, two studies suggest that there is likely to be a strong relationship between PVTs and the number of health-related complaints reported, at least in the context of mild TBI. Not unlike what is seen in adult populations with mild TBI (Iverson, Lange, Brooks, & Rennison, 2010; Lange, Iverson, Brooks, & Rennison, 2010; Tsanadis et al., 2008), both our group at Children’s Hospital Colorado (Kirkwood, Peterson, et al., 2014) and the group at Children’s Nationwide (Araujo et al., 2014) found that patients who failed PVTs endorsed significantly more postconcussive symptoms than those who passed, even after controlling for other factors that influenced symptom reporting in the clinical samples (e.g., preinjury symptoms, female gender, premorbid anxiety/depression, time since injury).

PVT failure in adults raises suspicions about the veracity of all collected

data, not just data from performance-based tests. Further work in children will be required to definitively understand the relationship between PVT performance and subjectively reported data, but existing work is consistent with the idea that those children who fail PVTs are apt to be engaging in misrepresentation during self-report as well.

### **Clinical Implications Case Example**

The studies discussed here illustrate the potential clinical implications of PVT failure at a group level. The following case example provides an illustration of what PVT use, or lack thereof, can mean at the level of the individual child.

Joe was a 15-year-old male who suffered a concussion in a football game. He was seen soon after injury through an emergency department, where he had a normal neurological exam and normal head computerized tomography (CT) scan. In the first days after injury, he was managed through the primary care office. Because of persistent symptomatology, he was seen at 2 weeks postinjury by a clinical psychologist, who administered a 20-minute computerized cognitive test battery and a postconcussive symptom scale. The psychologist documented “severe deficits in memory and response speed” and “an alarming number of postconcussive symptoms.” Recommendations included that the teen stop going to school and “rest” his brain. He was seen again 1 week later and another time 3 weeks after that, with no change in the test results or recommendations. No validity testing was included during any of the three evaluations.

Joe was then seen for neuropsychological consultation at 13 weeks postinjury, at which time he was still not back in school. He failed multiple PVTs and presented as clinically depressed. A combination of factors was thought to be contributing to the noncredible data (e.g., dislike of football and school, family dysfunction). Regardless, the lack of PVT use during the previous evaluations and the failure to detect invalid data when it was likely present almost certainly contributed to substantial errors in test interpretation and inappropriate clinical management. A number of iatrogenic effects resulted, including an exacerbation of the teen’s mood due to being away from friends, school, and family routines; academic stress due to missing more than 3 months of school; and unnecessary parental alarm about what they understood to be a “severe” brain injury.

### **Broader Systemic Implications**

Not only does PVT performance have the potential to alter the understanding and care of individual examinees, but such performance also likely has broader implications. From a research perspective, virtually no pediatric

outcome studies have included validity testing as part of the test battery, which raises interpretive questions for studies focused on conditions with relatively high rates of noncredible presentations.

At a more fundamental level, the idea that all children participating in research-based cognitive testing exert adequate effort needs to be questioned. Researchers have traditionally assumed that performance-based tests primarily measure ability. The fact that performance may also reflect different levels of effort during testing has been nearly completely ignored. In a thought-provoking study by Duckworth and colleagues (Duckworth, Quinn, Lynam, Loeber, & Stouthamer-Loeber, 2011), this assumption was critically examined for intelligence testing. The researchers conducted a meta-analysis of random-assignment experiments looking at the effect of material incentives on IQ test performance in a total of 2,008 children. Incentives increased IQ scores by an average of 0.64 of a standard deviation (~10 IQ points), with larger effects apparent for individuals with lower baseline IQ scores. These results suggest that it may be as important to objectively measure effort during research settings as it is during clinical settings. If effort is not examined and controlled for explicitly, it may significantly confound the association between test results and whatever outcome is being evaluated, perhaps particularly among children who may not have the inherent motivation to perform well in a low-stakes research environment (e.g., children who are lower functioning or those with conditions that undermine motivation).

Inadequate effort may also have public health implications. This was illustrated in a recent study with adults by Horner, VanKirk, Dismuke, Turner, and Muzzy (2014), who found that PVT failure was associated with increased emergency department visits and more inpatient service use in a Veterans Affairs sample. No pediatric study has yet examined the relationship between PVT performance and health care utilization. Clinically, though, we not infrequently see cases like the one of Joe, described earlier, in which children providing noncredible data are not properly identified, in turn resulting in the inappropriate utilization of health care and educational resources.

Finally, noncredible effort during childhood assessments is also likely to be associated with an unnecessary cost to society. Chafetz and Underhill (2013) estimated the financial costs of malingered mental disorders in adult Social Security Disability evaluations to be \$20.02 billion during a single year, 2011. Chafetz (Chapter 14, this volume) reports that malingered disability in youth during 2011 cost the Social Security Administration more than \$2.13 billion. These amounts seem staggeringly high, but given that most pediatric practitioners do not systematically examine performance validity, they actually likely underestimate the ultimate costs to governmental, legal, school, and health care systems of children and adolescents providing noncredible data during evaluations.

## CONCLUSION

Psychological and neuropsychological test interpretation rests on the assumption that the examinee responded in a credible fashion during the exam. If a child provides noncredible effort, the resulting data will represent an inaccurate representation of the child's true abilities and/or difficulties. Reliance on such data can lead to a host of problems, including errors in diagnosis, conceptualization, and management, any of which could result in potential harm to the child and questions about an examiner's competence.

Childhood noncredible presentations likely happen consistently, if not commonly, in both practice and research assessment settings, whether recognized or not. Subjective judgment alone is unlikely to be optimally effective in detecting many of these presentations. Given that several PVTs have been well validated in school-age children, the decision to *not* include PVTs now needs to be justified by the child practitioner. Some reasonable justifications for such decisions still exist. The two clearest are that the evaluation is of a preschool or younger child (for whom there has been a paucity of research) or that the evaluation is of a child who is extremely impaired (for which more work still needs to be done to confidently interpret PVTs). Nevertheless, the historic reasons that many child practitioners have provided to justify not using PVTs in their batteries (e.g., "I don't have time to include them"; "My clinical judgment is good enough") have become much less defensible. Investing a few dollars and some minutes on PVTs to help ensure that a large financial investment and data from hours of testing are interpreted accurately certainly seems worth it. A case can even be made that child or pediatric examiners choosing to not include PVTs during assessments may be acting unethically (see MacAllister & Vasserman, Chapter 9, this volume).

Pediatric specialists have decades of work ahead of them to amass a literature that even begins to approach that available right now to practitioners working with adults (see Larrabee, Chapter 4, this volume). Even so, the rationale for PVT use is convincing enough, and the extant evidence base strong enough, to justify the incorporation of PVTs in the vast majority of school-age evaluations, be they clinical, psychoeducational, forensic, or research oriented. Therefore, the default position in a pediatric or child test battery needs to move away from justifying when to include PVTs to including them routinely during evaluations, unless there is very strong justification to do otherwise.

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