Validation and Utility Study of MindPrint Learning's Universal Screener for Special Education

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EXECUTIVE SUMMARY

In this descriptive psychometric study, we examined the utility, psychometric properties, and validity of the MindPrint Learning (MindPrint) assessment for identifying students who may require additional support through the MTSS or RTI process and/or a referral for a comprehensive educational evaluation. The primary focus of the report was reliability and validity evidence supporting the MindPrint assessment as a screener for student support or special education evaluation. This was done through estimates of Cronbach's alpha, descriptive analyses of MindPrint assessment scores for SPED and non-SPED students, and correlational analyses between MindPrint assessment scores and student achievement.

- The present study used a descriptive design, with data from students across three school districts constituting the analytic sample. There was no comparison group in this study, as we only had data from students who used the MindPrint assessment in the 2024-25 school year.
- The present study was situated in three districts in Massachusetts, Pennsylvania, and Arkansas. Each district sample contained students from unique combinations of grade levels, and the contexts of each school were considerably different ranging from high poverty urban to high income suburban. A total of 15,581 students across the three districts in Grades 4-12 in the general and special education populations constituted the analytic sample.
- Data sources included item-level MindPrint assessment scores, as well as progress monitoring and/or state standardized test scores from each district. Specific achievement measures included NWEA Measures of Academic Progress (MAP) Growth math and reading scores; Pennsylvania System of School Assessment (PSSA) math and ELA scores; and Arkansas Teaching, Learning & Assessment System (ATLAS) math, ELA, and science scores.
- Reliability analyses, as measured by Cronbach's alpha, showed acceptable-to-good levels of internal consistency reliability for MindPrint assessment scores, with Cronbach's alpha estimates of .73 to .90 in magnitude.
- Descriptive analyses of MindPrint item scores for SPED and non-SPED students showed significant differences in average scores on key MindPrint skills, with differences most commonly found on items from the following skills: Verbal Reasoning, Visual-Abstract Reasoning, Visual-Spatial Reasoning, Verbal Memory, and Flexible Thinking.
- Correlational analyses found moderate to strong associations between MindPrint items scores and student achievement. These associations were consistent across districts, content areas, and grade levels (excluding Grade 3). Stepwise regression analyses showed that similar sets of MindPrint items were consistently most predictive of student achievement, with only small differences observed between math and ELA/reading outcomes indicating that MindPrint can reliably predict both math and reading outcomes across the Grade 4-12 student population.

INTRODUCTION

Overview of MindPrint

As described by the provider, The MindPrint battery includes nine sub-tests that encompass the cognitive domains of Complex Reasoning, Executive Functions, Memory, and Speed. Each measure uses distinct puzzle-like tasks to assess the following neurocognitive skills: Attention, Flexible Thinking, Verbal Memory, Verbal Reasoning, Visual-Abstract Reasoning, Visual-Spatial Reasoning, Visual Motor Speed, Visual Memory, and Working Memory. To test for Attention, for example, vertical and horizontal lines in 7-segment displays appear on the screen, and the participant must press the spacebar when the lines are configured as complete numbers or complete letters. The task lasts approximately 3 minutes. Tasks vary in format and length. Each test provides measures of accuracy (number of correct responses), speed (median response time for correct items), and efficiency (a function of accuracy and speed). The Assessment was developed at the University of Pennsylvania's Brain Behavior Lab as the Penn Computerized Neurocognitive Battery or CNB (Moore, Reise, Gur, Hakonarson, & Gur, 2014).

Overview of the Evaluation

The Center for Research and Reform in Education (CRRE) contracted with MindPrint in December 2024 to conduct a comprehensive psychometric and validity study of the MindPrint assessment. Specifically, the present study assessed the utility, psychometric properties, and predictive validity of the MindPrint assessment for identifying students who may require referral for a comprehensive educational evaluation. The primary purpose of this evaluation report is to meet submission standards for NSF SBIR grant 2133397 awarded to MindPrint Learning, as well as to meet ESSA requirements for evidence at the Tier 4 level (the highest level possible for an assessment tool).

The present study used a descriptive and correlational quantitative design to examine these research questions:

1. Do scores from the MindPrint assessment show evidence of reliability and validity?
2. Does the MindPrint assessment accurately identify students who are eligible for special education services?
3. What are the associations between MindPrint assessment scores and student achievement scores?
    a. What combinations of MindPrint assessment scores are most predictive of student achievement by subject and grade level?
    b. Are there differences in associations in different populations, e.g., geography, race, socio-economic status?

METHOD

Research Design

The present study employed a descriptive quantitative design that examined MindPrint assessment scores across three different school districts. Basic psychometric analyses were conducted to examine evidence relating to reliability and validity of MindPrint scores. Comparative analyses were conducted to examine differences in MindPrint scores between students not identified as needing special education services and those for students who were identified with a learning disability. We also examined associations between MindPrint scores and math and reading achievement scores across all three districts.

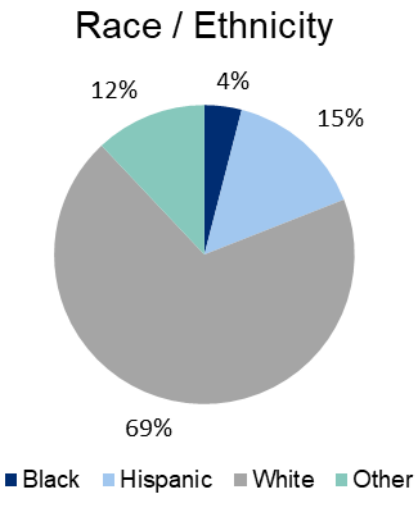
Participants

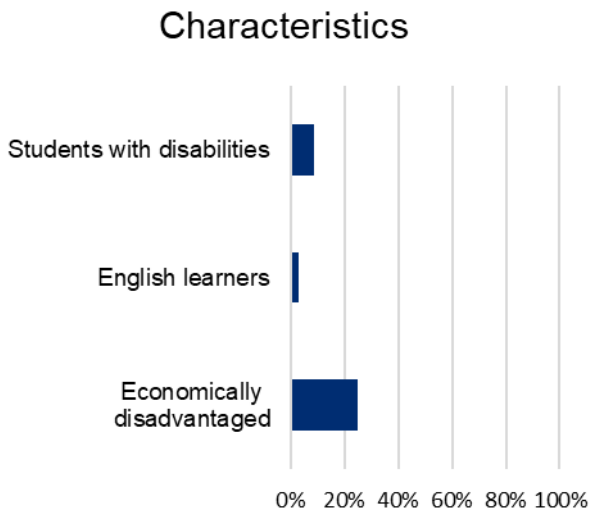
Details about study participants are presented below.

Massachusetts district	6 schools	428 Grades 3-9 students
Pennsylvania district	7 schools	393 Grade 4 students
Arkansas district	39 schools	14,760 Grades 3-12 students

The study took place in three school districts across three states. Demographics of the analytic sample are presented below.

Massachusetts District

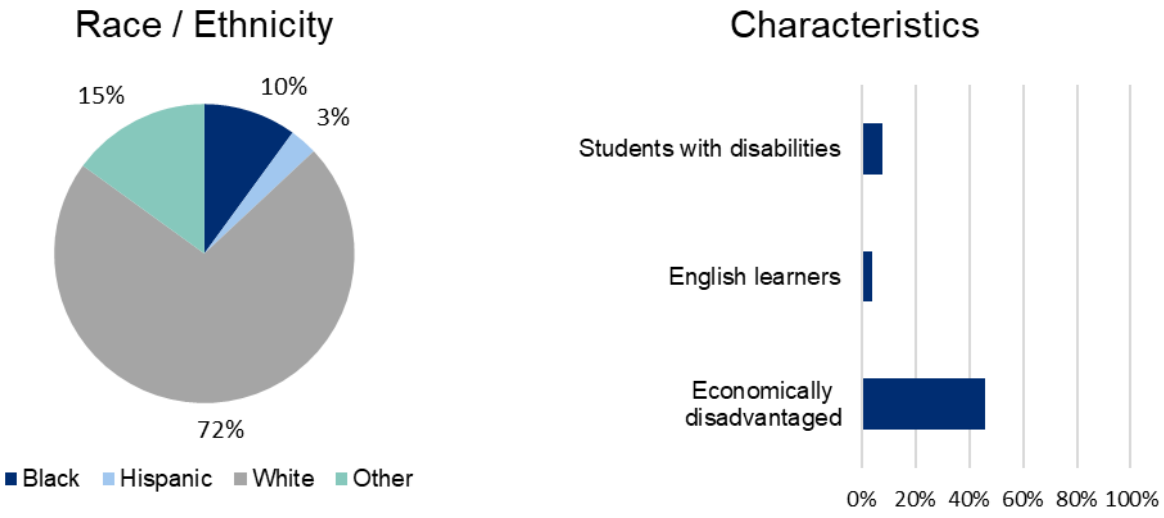




The Massachusetts district is a small suburban district that serves nearly 4,500 students across eight schools. The analytic sample consisted of students from Grades 3, 5, 8,

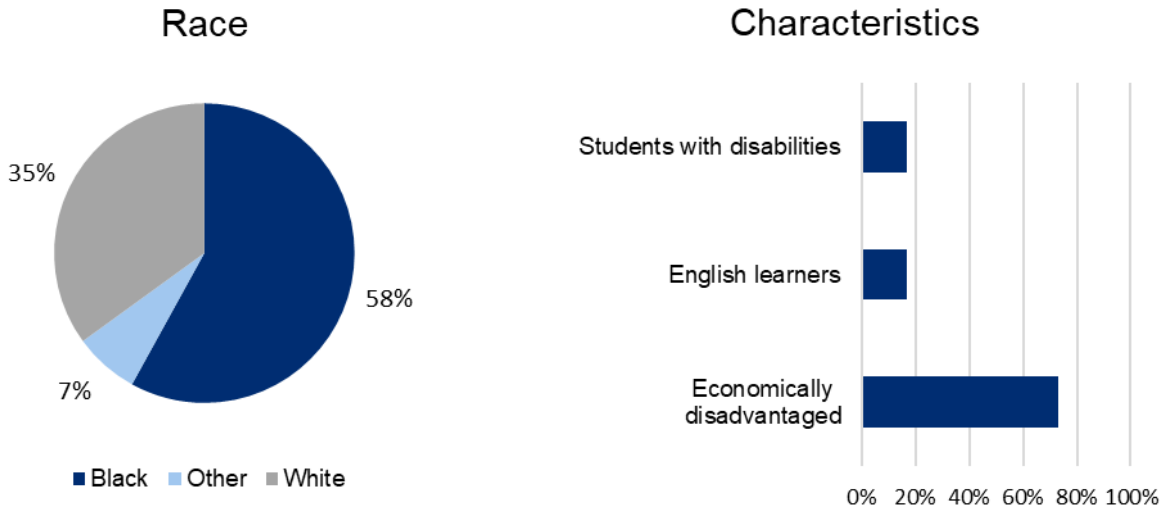
and 9, with nearly 90% of the sample coming from Grade 8 (63%) and Grade 3 (25%). A majority (nearly 70%) of students in the analytic sample were White, followed by Hispanic students (12%). Slightly more than 20% of students in this district are economically disadvantaged, while 9% were identified as having a disability and only 3% were identified as English learners.

Pennsylvania District



The Pennsylvania district is a medium-sized suburban district that serves nearly 6,000 students across nine schools. The analytic sample consisted of only Grade 4 students. A majority (72%) were White, with smaller percentages of Other Race and Black students. Just under half (46%) of students were identified as economically disadvantaged, while less than 10% were identified as having a disability, and less than 5% were identified as English learners.

Arkansas District



The Arkansas district is a large urban district that serves 21,000 students across 39 schools. The analytic sample consisted of 14,893 Grades 3-12 students, with students distributed relatively evenly across grade levels. The majority of students in this district are Black (58%), followed by White (35%) and Other Race (7%). It is important to note that Hispanic ethnicity status is reported separately from race status shown above; 18% of students in the analytic sample identified as being Hispanic or Latino. Most students (73%) are classified as economically disadvantaged, while 17% were identified as having a disability, and 17% were identified as being English learners. This district also provided an indicator for gifted education status; 17% of students in the analytic sample were so identified.

Measures

Data sources and measures for the current study included MindPrint assessment data, demographics, and achievement data, as described below.

MindPrint assessment. The MindPrint assessment is a computer-administered instrument designed to efficiently and accurately identify students who may require a referral for a comprehensive educational evaluation. The assessment takes approximately 1 hour to administer and is appropriate for Grades 3-12 students. Each district provided CRRE with student-level MindPrint assessment data from all tested students within each district. The assessment includes measures across four domains relating to Executive Function, Complex Reasoning, Memory, and Speed. Specific skills include Attention, Flexible Thinking, Verbal Memory, Verbal Reasoning, Visual-Abstract Reasoning, Visual-Spatial Reasoning, Visual Motor Speed, Visual Memory, and Working Memory. Measures of accuracy, efficiency, and speed were provided for each domain, resulting in a total of 24 item scores (eight skills by three measures for each skill). In addition, overall measures of processing speed and visual motor speed were included in data from each district, resulting in a total of 26 MindPrint items scores for each student. All item scores are reported in a standardized (*z*-score) format to enable interpretation across contexts and domains, as well as to aid in the interpretation of scores (Moore et al., 2014).

Demographics. Each district provided CRRE with student-level demographics including race/ethnicity, English-language status, economically-disadvantaged status, and special education status (whether or not a student has a 504 or IEP classification). The special education status variable was of special interest for this evaluation, as the identification of patterns of MindPrint scores for special education-identified students is a key component of this study. Two districts provided additional data relating to the specific type of special education need identified (i.e., autism or dyslexia); patterns of MindPrint scores were analyzed by type of special education accommodation, based on data availability and sample sizes. For the district that provided an indicator for gifted education status, we conducted a similar comparative analysis examining patterns of MindPrint scores for those students.

State assessment data. Each district provided CRRE with state and/or progress

monitoring math and reading/ELA assessment data. The Massachusetts district provided CRRE with NWEA MAP math and reading scores from the fall and spring of the 2025 school year, as well as DIBELS scores for Grade 3 students. Similarly, the Pennsylvania district provided CRRE with PSSA math and ELA scores from spring of the 2024-25 school year; and the Arkansas district provided ATLAS math, ELA, and science scores.

Analytical Approach

MindPrint assessment data were analyzed descriptively to examine trends among different (namely, SPED vs. non-SPED) student groups. Independent *t*-tests were used to examine whether differences between SPED and non-SPED scores were significantly different. Score patterns were broken down further by disability type (where data were available) to further identify specific patterns of MindPrint scores associated with specific disabilities. Patterns of MindPrint scores were compared across districts to examine consistency in MindPrint scores for students with different types of diagnosed learning disabilities. To obtain psychometric evidence, we conducted reliability analyses by computing Cronbach's alpha for scores across the entire MindPrint assessment, as well as for each domain. Pearson correlations were computed to examine associations between specific MindPrint domain scores and student achievement. Stepwise multiple linear regression was used to create optimally predictive models of student achievement, using individual MindPrint assessment item scores as potential predictors of student achievement scores.

RESULTS

This section of the report begins with findings relating to the psychometric properties of the MindPrint assessment. This is followed by descriptive analyses examining patterns of MindPrint scores for various special education subgroups of students. We conclude by examining the results of correlational and regression analyses describing the associations between MindPrint domain scores and student achievement.

MindPrint Reliability Analyses

RQ 1. Do scores from the MindPrint assessment show evidence of reliability and validity?

Key Findings

- Across all three school districts, overall reliability estimates show values of Cronbach's alpha ranging between .73 and .90 in magnitude, giving evidence of moderate to strong evidence of internal consistency reliability of the measure.
- Reliability estimates were highest on Accuracy items, with Cronbach's alpha estimates ranging from .73 to .82 across districts.

We start with an overview of psychometric analyses of MindPrint assessment scores from each of the participating districts. Cronbach's alpha was computed for the entire MindPrint assessment scale, as well as for all items across domains including tests of accuracy, efficiency, and speed. Cronbach's alpha was not computed for each domain, as each domain only consisted of three scores (accuracy, efficiency, and speed), which is too small a number of items to obtain stable alpha estimates. Table 1 shows reliability estimates, by subscale and school district.

Table 1
MindPrint Reliability Estimates (Cronbach's Alpha) Across all Items by Scale and District

Sample	Overall	Accuracy	Efficiency	Speed
MA district (*n* = 435)	.73	.73	.59	.70
PA district (*n* = 314)	.90	.74	.70	.60
AR district (*n* = 9,537)	.77	.80	.60	.40

Estimates of Cronbach's alpha for the overall assessment ranged from .73 to .90 in magnitude, indicative of acceptable to strong levels of internal consistency reliability for the MindPrint assessment. The largest reliability estimate was found in the Pennsylvania district, which is not surprising, as this district administered the assessment to only Grade 4 students, indicating the sample was likely to have been more homogeneous than those in Massachusetts and Arkansas, in which multiple grade levels were tested. Note that for the Arkansas district, we excluded Grade 3 scores, the lowest grade assessed from our reliability analysis, as Grade 3 scores were much more variable than were scores in Grades 4-12. Specifically, reliability estimates for Grades 4-12 ranged from .73 to .82, while the Grade 3 estimate was only .57 in magnitude. This finding may suggest that the MindPrint assessment might be slightly too difficult for some Grade 3 students to complete in one sitting. The district's relatively low literacy rate also could have been a factor, as the assessment instructions suggest that students should be reading at a minimum second grade level. Importantly, the higher reliability estimates in the remaining grades provide evidence that the MindPrint assessment is appropriate for administering to diverse populations of Grades 4-12 students.

When considering reliability estimates by type of item, Accuracy items showed the highest levels of reliability, with Cronbach's alpha estimates of .73 to .80 across each of the districts. These levels of reliability are indicative of acceptable to good levels of internal consistency on Accuracy items. Efficiency items showed the next higher levels of reliability, with Cronbach's alpha estimates of .59 to .70 across districts. Speed items showed the lowest levels of reliability, but interpretation of Speed items by themselves is not advised by MindPrint as the rate at which a student responds without consideration of accuracy provides little insight into a student's capabilities. In summary, the Overall, Accuracy, and Efficiency reliability estimates give strong evidence supporting the internal consistency and reliability of the MindPrint assessment.

Profiles

RQ 2. Does the MindPrint assessment accurately identify students who are eligible for special education services?

Key Findings

- Independent *t*-tests showed significant differences in MindPrint Accuracy and Efficiency scores across the following skills: Verbal Reasoning, Visual-Abstract Reasoning, Visual-Spatial Reasoning, Verbal Memory, and Flexible Thinking. These differences were consistent across districts and sub-populations.
- Accuracy scores generally showed the greatest level of discrimination among all MindPrint assessment scores. This finding was consistent across districts.

In this section, we present the results of comparative analyses comparing MindPrint assessment scores for students who were and were not identified as needing special education services in each district. We follow this by examining item discrimination values for individual items, which allows for the identification of items that show the greatest utility in sorting higher performers from lower performers on the MindPrint assessment. We also briefly discuss patterns of MindPrint assessment scores by specific disability diagnosis.

We display average MindPrint scores for SPED and non-SPED students by district. As a reminder, MindPrint scores are reported as *z*-scores, with a mean of 0 and standard deviation of 1. Thus, a value of 0 would indicate "average" performance on a measure. Independent *t*-tests were also conducted within each district to examine whether differences in MindPrint scores for SPED and non-SPED students were statistically significant. Table 2 shows average MindPrint scores by classification across all three districts.

Table 2
Average MindPrint Scores, by SPED Classification and District

Item	Massachusetts		Pennsylvania		Arkansas	
	Non-SPED	SPED	Non-SPED	SPED	Non-SPED	SPED
Verbal Reasoning Accuracy	.12	-.51*	-.04	-.52*	-.62	-.1.56*
Verbal Reasoning Efficiency	.14	-.36*	-.10	-.45*	-.44	-.91*
Visual-Abstract Reasoning Accuracy	.31	-.22*	-.10	-.42*	-.12	-.84*
Visual-Abstract Reasoning Efficiency	.15	-.05*	-.09	-.17*	-.14	-.29*

Visual-Spatial Reasoning Accuracy	.33	-.46*	-.20	-.60*	-.24	-.84*
Visual-Spatial Reasoning Efficiency	.28	-.17*	-.25	-.64*	-.14	-.52*
Verbal Memory Accuracy	-.87	-1.92*	-.75	-1.40*	-1.63	-2.85*
Verbal Memory Efficiency	-.13	-.69*	-.68	-1.25*	-.42	-.98*
Visual Memory Accuracy	-.47	-.92*	-.60	-1.40*	-.66	-1.23*
Visual Memory Efficiency	-.42	-.53	-.66	-1.08*	-.35	-.51*
Attention Accuracy	-.20	-.92*	-.27	-.50	-.62	-1.13*
Attention Efficiency	.22	.08	-.06	.02	.20	-.37*
Attention Speed	.65	1.07*	.08	.41*	1.00	1.84*
Working Memory Accuracy	.01	-.63*	-.44	-.61	-.69	-1.34*
Working Memory Efficiency	.19	-.28*	-.50	-.65	-.29	-.54*
Flexible Thinking Accuracy	-.22	-1.11*	-.51	-.82*	-.95	-1.68*
Flexible Thinking Efficiency	.26	-.08*	-.29	-.53*	-.26	-.53*
N	329	99	230	84	9,391	1,509

Notes. 1. * $p < .05$. 2. Tests conducted separately within each district.

A total of 78 comparisons (26 scores across three districts) were conducted. A total of 59 of these comparisons (76%) were statistically significant. By district, 73% of comparisons were statistically significant in the Massachusetts district, compared to 62% in the Pennsylvania district and 92% in the Arkansas district. The large percentage of significant comparisons in the Arkansas district is due in part to the large sample size. As MindPrint scores are already standardized, effect sizes between SPED and non-SPED students can be calculated by simply finding the difference between average scores for each item for SPED and non-SPED students.

Average MindPrint scores were significantly lower for SPED students than for non-SPED students on nearly all MindPrint assessment items. These results held across all three districts, even as overall distributions of MindPrint items scores varied by district. The most consistent differences were found on Accuracy and Efficiency components of the Verbal Reasoning, Visual-Abstract Reasoning, Visual-Spatial Reasoning, Verbal Memory, and Flexible Thinking domains. In general, less differentiation was found on Speed measures than on Accuracy and Efficiency measures, with the only significant differences found across all three districts on Attention Speed, with SPED students consistently scoring significantly higher than non-SPED students on this measure. This is not surprising, as Speed on the Attention task is associated with impulsivity and a

subset of an Attention difficulty diagnosis.

The Arkansas district also provided an indicator for a student being identified as gifted; comparisons between gifted and non-gifted students in this district can be found in Table 3.

Table 3
Average MindPrint Scores, by Gifted Classification

Item	Non-Gifted	Gifted
Verbal Reasoning Accuracy	-.62	.16
Verbal Reasoning Efficiency	-.44	.11
Verbal Reasoning Speed	-.26	.06
Visual-Abstract Reasoning Accuracy	-.12	.60
Visual-Abstract Reasoning Efficiency	-.14	.01
Visual-Abstract Reasoning Speed	-.19	-.59
Visual-Spatial Reasoning Accuracy	-.24	.38
Visual-Spatial Reasoning Efficiency	-.14	.24
Visual-Spatial Reasoning Speed	-.12	.07
Verbal Memory Perception Accuracy	-1.63	-.64
Verbal Memory Efficiency	-.42	-.01
Verbal Memory Speed	.73	.62
Visual Memory Accuracy	-.66	-.11
Visual Memory Efficiency	-.35	-.17
Visual Memory Speed	-.05	-.23
Attention Accuracy	-.62	-.06
Attention Efficiency	.20	.21
Attention Speed	1.00	.47
Working Memory Accuracy	-.69	-.03
Working Memory Efficiency	-.29	.05
Working Memory Speed	.03	.09
Flexible Thinking Accuracy	-.95	-.30
Flexible Thinking Efficiency	-.26	.07
Flexible Thinking Speed	.43	.44
Processing Speed	.34	.62
Visual Motor Speed	-.09	.13
N	9,391	2,073

Similar patterns of MindPrint scores can be found when comparing non-Gifted to Gifted MindPrint assessment scores, with Gifted students generally having higher scores than non-Gifted students on most Accuracy and Efficiency measures, while Speed measures are more equivocal, with non-Gifted students sometimes having higher Speed scores than Gifted students. In all, these results show that SPED students (and Gifted students) generally have different patterns of MindPrint scores than non-SPED and non-Gifted students.

In the next set of analyses, we examined discrimination indices across all 26 MindPrint scores. Discrimination indices indicate the extent to which a single item or score distinguishes between (or discriminates) between examinees who generally score higher and those that generally score lower across all MindPrint scores. Item-total correlations, which are correlations between individual item scores and overall total assessment scores, are a commonly used discrimination index and are used in this set of analyses. Item-total correlations of magnitude .4 or above are indicative of good item discrimination. Table 4 shows item-total correlations for each MindPrint score for each sample.

Table 4
Item-Total Correlations by Item and District

Item	Massachusetts	Pennsylvania	Arkansas
Verbal Reasoning Accuracy	+.59	+.55	+.59
Verbal Reasoning Efficiency	+.65	+.58	+.48
Verbal Reasoning Speed	+.36	+.39	+.26
Visual-Abstract Reasoning Accuracy	+.58	+.54	+.59
Visual-Abstract Reasoning Efficiency	+.40	+.36	+.25
Visual-Abstract Reasoning Speed	-.19	-.06	-.26
Visual-Spatial Reasoning Accuracy	+.57	+.54	+.53
Visual-Spatial Reasoning Efficiency	+.57	+.62	+.58
Visual-Spatial Reasoning Speed	+.14	+.49	+.49
Verbal Memory Accuracy	+.54	+.61	+.62
Verbal Memory Efficiency	+.60	+.70	+.35
Verbal Memory Speed	+.12	+.54	-.23
Visual Memory Accuracy	+.47	+.54	+.53
Visual Memory Efficiency	+.25	+.55	+.15
Visual Memory Speed	-.09	+.24	-.21
Attention Accuracy	+.42	+.38	+.47
Attention Efficiency	+.19	+.33	+.07
Attention Speed	-.15	+.17	-.31
Working Memory Accuracy	+.54	+.52	+.54
Working Memory Efficiency	+.60	+.52	+.48
Working Memory Speed	+.40	+.37	+.16
Flexible Thinking Accuracy	+.57	+.47	+.50
Flexible Thinking Efficiency	+.52	+.53	+.42
Flexible Thinking Speed	+.07	+.31	+.09
Processing Speed	+.13	+.46	-.24
Visual Motor Speed	+.29	+.47	+.31
N	435	314	10,954

Note. Items with discrimination indices > .40 across all districts are in bold.

Accuracy items across all skills except Attention consistently showed good discrimination indices, meaning that they effectively distinguish between generally

higher and lower scores on the MindPrint assessments. Further, Efficiency scores for Verbal Reasoning, Visual-Spatial Reasoning, Verbal Memory, Working Memory, and Flexible Thinking also showed high levels of discrimination. This is not a surprising finding, as efficiency scores are a function of accuracy and speed. Speed scores generally did not show high levels of discrimination. The results of these analyses show that Accuracy domain scores are most effective at differentiating between generally higher and lower performers on the entire MindPrint assessment.

We also examined patterns of MindPrint scores for students with specific learning disability diagnoses. We were only able to obtain specific diagnosis information from the Massachusetts and Pennsylvania districts; Arkansas only provided us with indicators of SPED identification, so their data are not included in these analyses. It is important to note that disability diagnosis data were not very detailed; only a diagnosis (i.e., "autism," "developmental delay," etc.) was provided, with no additional notes. Additionally, some of the sample sizes of these subgroups are very small (less than 10 students). Thus, the results of these analyses can be found in Appendix A, and the results of these analyses should be interpreted cautiously. Full tables of average MindPrint scores by disability diagnosis can also be found in Appendix A.

Associations Between MindPrint Scores and Achievement

RQ 3. What are the associations between MindPrint assessment scores and student assessment scores?

Key Findings

- Pearson correlations between MindPrint assessment items and student achievement were strongest for Verbal Reasoning Accuracy and Efficiency, Visual-Abstract Reasoning Accuracy, Visual-Spatial Reasoning Accuracy and Efficiency, Verbal Memory Accuracy and Efficiency, and Flexible Thinking Accuracy.
- Magnitude and direction of these correlations was consistent across districts and subjects, with Accuracy items showing stronger correlations than Efficiency items in the Arkansas district, which had the largest sample size.
- Regression analyses showed consistency in the predictive validity of MindPrint items in relation to student ELA and math achievement across school contexts.

In this section, we present the results of analyses showing the associations between MindPrint scores and academic assessment. We present Pearson correlations between MindPrint scores and academic assessment measures by district. We also examine the predictive validity of MindPrint scores by examining the MindPrint scores that are most predictive of student academic achievement.

Pearson correlations between MindPrint items scores and achievement can be found in Tables 5-7. We start with associations from the Massachusetts achievement measure,

followed by similar results from Pennsylvania and Arkansas.

Table 5
Associations Between MindPrint Scores and Achievement, Massachusetts

Item	MAP Reading	MAP Math	DIBELS Composite
Verbal Reasoning			
Accuracy	+.55	+.53	+.42
Efficiency	+.53	+.46	+.47
Speed	+.22	+.14	+.26
Visual-Abstract Reasoning			
Accuracy	+.43	+.50	+.19
Efficiency	+.24	+.32	+.17
Speed	-.20	-.19	-.04
Visual-Spatial Reasoning			
Accuracy	+.33	+.45	+.23
Efficiency	+.32	+.45	+.31
Speed	+.04	+.09	+.18
Verbal Memory			
Accuracy	+.36	+.34	+.18
Efficiency	+.38	+.35	+.37
Speed	+.06	+.04	+.30
Visual Memory			
Accuracy	+.26	+.25	+.10
Efficiency	+.11	+.11	+.18
Speed	-.08	-.07	+.15
Attention			
Accuracy	+.19	+.21	+.13
Efficiency	-.07	-.06	-.03
Speed	-.25	-.26	-.15
Working Memory			
Accuracy	+.20	+.31	+.01
Efficiency	+.18	+.33	+.05
Speed	+.07	+.18	+.04
Flexible Thinking			
Accuracy	+.32	+.42	+.27
Efficiency	+.17	+.28	+.25
Speed	-.12	-.08	+.03
Processing Speed	-.08	-.06	+.19
Visual Motor Speed	+.22	+.23	+.30
N	386	385	130

In Massachusetts, the strongest correlations were observed for Verbal Reasoning and Visual-Abstract Reasoning Accuracy and Efficiency scores, followed closely by corresponding scores on Spatial Reasoning and Flexible Thinking items. The

magnitudes of these correlations ranged from .27 to .53 in magnitude, indicating small-to-moderate associations between MindPrint scores and MAP scores. By contrast, correlations were generally weaker in magnitude between MindPrint scores on Attention, Working Memory, and Visual Memory and MAP reading and math scores.

Table 6

Associations Between MindPrint Scores and Achievement, Pennsylvania

Item	PSSA ELA	PSSA Math
Verbal Reasoning	+.49	+.49
Accuracy	+.49	+.49
Efficiency	+.44	+.43
Speed	+.26	+.25
Visual-Abstract Reasoning		
Accuracy	+.42	+.45
Efficiency	+.24	+.19
Speed	-.07	-.10
Visual-Spatial Reasoning		
Accuracy	+.28	+.35
Efficiency	+.24	+.28
Speed	+.31	+.38
Verbal Memory		
Accuracy	+.33	+.35
Efficiency	+.32	+.33
Speed	+.16	+.18
Visual Memory		
Accuracy	+.29	+.30
Efficiency	+.24	+.18
Speed	+.05	-.06
Attention		
Accuracy	+.19	+.17
Efficiency	+.02	-.02
Speed	-.09	-.13
Working Memory		
Accuracy	+.30	+.39
Efficiency	+.30	+.37
Speed	+.23	+.25
Flexible Thinking		
Accuracy	+.33	+.38
Efficiency	+.26	+.28
Speed	+.04	+.03
Processing Speed	+.07	+.02
Visual Motor Speed	+.11	+.08
N	292	292

Results of correlational analyses from the Pennsylvania district were remarkably similar

to those from the Massachusetts district, with the largest positive correlations again being found on Accuracy and Efficiency measures of Verbal Reasoning, Visual-Abstract Reasoning, and Verbal Memory, as well as for Flexible Thinking Accuracy. Magnitudes of correlations were generally slightly smaller in the Pennsylvania district, and correlations were generally slightly larger between MindPrint scores and PSSA math scores, in relation to PSSA ELA scores.

Table 7

Associations Between MindPrint Scores and Achievement, Arkansas

Item	ELA	Math	Science
Verbal Reasoning			
Accuracy	+.64	+.58	+.60
Efficiency	+.33	+.27	+.28
Speed	+.06	+.03	+.04
Visual-Abstract Reasoning			
Accuracy	+.54	+.58	+.57
Efficiency	+.25	+.28	+.26
Speed	-.23	-.22	-.24
Visual-Spatial Reasoning			
Accuracy	+.47	+.48	+.50
Efficiency	+.10	+.11	+.10
Speed	+.02	+.03	+.02
Verbal Memory			
Accuracy	+.47	+.43	+.44
Efficiency	+.32	+.27	.27
Speed	-.11	-.12	-.11
Visual Memory			
Accuracy	+.37	+.37	+.40
Efficiency	+.09	+.08	+.10
Speed	-.17	-.18	-.17
Attention			
Accuracy	+.31	+.29	+.27
Efficiency	-.06	-.05	-.07
Speed	-.32	-.29	-.29
Working Memory			
Accuracy	+.35	+.34	+.33
Efficiency	+.26	.26	+.26
Speed	+.00	+.01	+.02
Flexible Thinking			
Accuracy	+.42	+.47	+.44
Efficiency	+.24	+.28	+.26
Speed	-.06	-.04	-.05
Processing Speed	-.20	-.21	-.20
Visual Motor Speed	+.26	+.25	+.23
N	9,087	8,799	8,228

While the same general trends are found in the Arkansas data that were previously found in the other two districts, a distinction of the Arkansas data is that Accuracy measures correlated more strongly with achievement than did Efficiency scores. Similar domains (Verbal Reasoning, Visual-Abstract Reasoning, Visual-Spatial Reasoning, Verbal Memory, and Flexible Thinking) were most strongly correlated with achievement, though in all cases, the Accuracy score was more strongly associated with achievement than was the Efficiency score. Directions and magnitudes of correlations were very stable across each of the three state assessment content areas. Taken together, the results of these analyses provide strong evidence supporting the predictive validity of the MindPrint assessment in relation to student achievement.

To build on these results, the next set of analyses examined the predictive utility of MindPrint assessment scores in relation to student achievement. As the MindPrint assessment consists of 24 individual items scores across eight domains, as well as two composite speed variables, we used stepwise regression to identify the most parsimonious models that used MindPrint items that were the strongest predictors of student achievement outcomes. Forward stepwise regression was used with all 26 MindPrint items initially entered into the model, with an inclusion criterion of $p < .10$ for each predictor variable. This means that only MindPrint scores that are predictive of an achievement outcome (i.e., $p < .10$ for the regression coefficient associated with a MindPrint score) are retained in the model. The results give us a smaller set of MindPrint scores that are maximally predictive of student achievement for each outcome. We show the final results of each forward stepwise regression model across all students for each district in Tables 8-10.

Table 8
MindPrint Scores Predicting Spring 2025 MAP Proficiency Levels, by Subject, Massachusetts

Item	Estimate	*SE*	*p value*
Reading (*n* = 371)			
Verbal Reasoning Accuracy	9.451	1.389	<.001
Verbal Reasoning Speed	6.206	1.241	<.001
Visual-Abstract Reasoning Accuracy	5.952	1.208	<.001
Verbal Memory Efficiency	5.993	1.062	<.001
Attention Speed	-2.589	0.765	.001
Working Memory Accuracy	-1.891	.985	.056
Flexible Thinking Speed	-2.214	1.028	.032
Visual Motor Speed	4.152	1.499	.066
Constant	59.157	1.427	<.001
Adjusted *R*-squared	.452		
Math (*n* = 371)			
Verbal Reasoning Accuracy	5.421	1.228	<.001
Visual-Abstract Reasoning Accuracy	5.952	1.208	<.001
Visual-Spatial Reasoning Efficiency	7.355	1.756	<.001
Verbal Memory Efficiency	4.676	0.930	<.001

Attention Speed	-2.230	0.678	.001
Working Memory Speed	1.980	0.944	.037
Flexible Thinking Accuracy	2.819	0.874	.001
Visual Motor Speed	2.885	1.326	.030
Constant	74.102	1.169	<.001
Adjusted *R*-squared	.465		

Note. Shared predictors are in bold.

Across both measures in the Massachusetts district, the final regression models showed considerable overlap in terms of the variables included. It is interesting to note the subtle differences between the models which also are consistent with historical studies; for example, Spatial Reasoning Efficiency is significant in the math model but is not significant in the reading model. Adjusted *R*-squared values are around .46 for each model, indicating that 46% of the variation in MAP math or reading score is explained by variation in the MindPrint items included in each model. This result gives evidence that similar MindPrint scores have predictive utility for both MAP math and reading scores, while also showing that there are subtle differences in the exact MindPrint scores that are most predictive of each subject.

Table 9

MindPrint Scores Predicting Spring 2025 PSSA Scores, by Subject, Pennsylvania

Item	Estimate	*SE*	*p value*
ELA (*n* = 292)			
Verbal Reasoning Accuracy	26.931	5.235	<.001
Verbal Reasoning Speed	10.080	4.335	.021
Visual-Abstract Reasoning Accuracy	18.977	5.066	<.001
Visual Memory Efficiency	14.704	5.171	.005
Attention Speed	-14.349	5.619	.011
Attention Efficiency	15.747	8.402	.062
Working Memory Efficiency	13.349	4.935	.007
Flexible Thinking Accuracy	9.080	4.347	.038
Constant	1046.750	6.415	<.001
Adjusted *R*-squared	.366		
Math (*n* = 292)			
Verbal Reasoning Accuracy	26.752	5.695	<.001
Verbal Reasoning Speed	9.977	4.722	.036
Visual-Abstract Reasoning Accuracy	20.046	5.620	<.001
Visual-Spatial Reasoning Efficiency	8.863	4.154	.047
Visual Memory Accuracy	8.863	4.154	.034
Attention Speed	-7.057	3.170	.027
Working Memory Accuracy	16.216	4.767	.001
Flexible Thinking Accuracy	14.476	4.700	.002
Constant	1041.113	5.872	<.001
Adjusted *R*-squared	.422		

Note. Shared predictors are in bold.

As in the Massachusetts district, regression analyses for MindPrint scores predicting student achievement were generally stable across content areas, with several items such as Verbal Reasoning Accuracy, Visual-Abstract Reasoning Accuracy, Flexible Thinking Accuracy, and Attention Speed all being retained in both models. Similarly, both models included measures of Working Memory and Visual Memory, while Visual-Spatial Reasoning is only found in the model predicting PSSA math scores. Adjusted *R*-squared values indicate that the set of MindPrint scores included in each model explain 37% and 42% of the variation in PSSA ELA and math scores, respectively. Overall, though, these results continue to support the predictive validity of MindPrint assessment items in relation to student achievement scores.

Table 10

MindPrint Scores Predicting Spring 2025 ATLAS Scores, by Subject[1], Arkansas

Item	Estimate	*SE*	*p value*
ELA (*n* = 7,351)			
Verbal Reasoning Accuracy	5.431	.155	<.001
Verbal Reasoning Speed	.556	.056	<.001
Visual-Abstract Reasoning Accuracy	2.009	.184	<.001
Visual-Abstract Reasoning Efficiency	.990	.274	<.001
Visual-Spatial Reasoning Accuracy	2.126	.165	<.001
Verbal Memory Accuracy	.962	.080	<.001
Verbal Memory Speed	.491	.082	<.001
Visual Memory Speed	-.266	.093	.004
Attention Efficiency	1.040	.191	<.001
Attention Speed	-1.249	.119	<.001
Working Memory Accuracy	.207	.096	.031
Flexible Thinking Accuracy	.514	.108	<.001
Visual Motor Speed	1.275	.159	<.001
Constant	1058.885	.212	<.001
Adjusted *R*-squared	.513		
Mathematics (*n* = 7,124)			
Verbal Reasoning Accuracy	4.052	.191	<.001
Verbal Reasoning Speed	0.351	.686	<.001
Visual-Abstract Reasoning Accuracy	3.714	.230	<.001
Visual-Abstract Reasoning Efficiency	2.442	.345	<.001
Visual-Spatial Reasoning Accuracy	2.225	.206	<.001
Verbal Memory Accuracy	.726	.106	<.001
Verbal Memory Speed	0.314	.101	.002
Visual Memory Efficiency	0.905	.325	.005
Visual Memory Speed	-0.896	.193	<.001
Attention Speed	-1.100	.148	<.001

[1] Similar analyses for science scores can be found in Appendix B.

Working Memory Accuracy	0.514	.119	<.001
Flexible Thinking Accuracy	0.791	.172	<.001
Flexible Thinking Efficiency	1.183	.238	<.001
Visual Motor Speed	1.319	.198	<.001
Constant	1055.912	.267	<.001
Adjusted *R*-squared	.454		

Note. Shared predictors are in bold.

As with the previous two districts, stability in predictive models was evidenced across math and ELA scores in terms of the predictive validity of MindPrint assessment scores. More variables were retained in this set of analyses as compared to the prior two sets of analyses from the other districts, due mainly to the considerably larger sample size in this district and thus increased power in this set of regression analyses. Similarly, there was more overlap in variables included across models, with every variable from the ELA score model also included in the math score model.

Across all regression models in all districts, and across subject levels, adjusted *R*-squared values ranged between .37 to .55, meaning that 37-55% of the variation in student achievement scores was explained by the MindPrint score. This finding, and the consistency of this finding across subjects and contexts, provides additional strong evidence supporting the predictive validity of MindPrint assessment scores on student achievement across age ranges and sub-population.

DISCUSSION

The purpose of the present study was to examine reliability and validity evidence of MindPrint assessment and its appropriate use in screening for students for special education, giftedness, and overall academic achievement. We examined data from three districts in three different states. Each district had a unique context and served different grade levels of students. Outcome variables in this study included student item-level MindPrint assessment scores, as well as math, ELA/reading, and science achievement scores from each district. Psychometric analyses were conducted to obtain internal consistency reliability evidence. Descriptive analyses and independent *t*-tests were conducted to show how SPED and non-SPED students scored differently on MindPrint items; these differences provide evidence that the MindPrint assessment effectively differentiates between students who may or may not need SPED referrals. Correlational and stepwise regression analyses provided predictive validity evidence for the MindPrint assessment in predicting student academic achievement on standardized summative assessments.

Psychometric Analyses

Psychometric analyses showed that internal consistency estimates of reliability for the MindPrint assessment, as measured by Cronbach's alpha, ranged between .73 to .90 in magnitude, which gives evidence of acceptable-to-strong internal consistency for scores for the entire assessment. Across the types of MindPrint items (Accuracy, Efficiency,

and Speed), Accuracy items were shown to have the greatest levels of reliability, with Cronbach's alpha estimates of .73 to .82 on these items. This finding indicates that Accuracy item scores are the most reliable types of item scores derived from the MindPrint assessment followed by efficiency scores and that the MindPrint assessment is a valid and reliable assessment tool of individual students' cognitive capabilities.

MindPrint Identification

Descriptive analyses of individual MindPrint assessment item scores showed that SPED and non-SPED students scored differently on most skills. Independent *t*-tests confirmed these findings, with the most significant differences in the Complex Reasoning domain (i.e., Verbal Reasoning, Visual-Abstract Reasoning, Visual-Spatial Reasoning), as well as Verbal Memory, and Flexible Thinking. Differences were more common on Accuracy and Efficiency items than on Speed items, for which differences between SPED and non-SPED students were generally equivocal. These findings were consistent across all school districts and grade levels. The findings of these analyses provide validity evidence for using the MindPrint assessment to identify SPED and non-SPED students given the significant differentiation in score patterns on most MindPrint assessment items. While the consistency of these findings provides evidence that the MindPrint assessment can be used to identify and differentiate between SPED and non-SPED students in a variety of educational contexts, there is not enough data to determine how well MindPrint can predict specific diagnoses, and it is suggested that MindPrint could be used as an effective screening tool to identify students for SPED, but specific diagnoses should continue to be made using traditional methods. Similarly, the MindPrint assessment differentiated between Gifted and non-Gifted students, with Gifted students showing significantly higher scores on most skills, most notably in the Complex Reasoning domain.

Predictive Validity Evidence

Correlational analyses showed that MindPrint assessment items scores were significantly positively associated with math, ELA, and science student achievement scores. The MindPrint items that were most strongly associated with student achievement were also the items for which the most differentiation was found between SPED and non-SPED students in prior analyses (i.e., Verbal Reasoning, Visual-Abstract Reasoning, etc.). The magnitudes and direction of these correlations were consistent across districts, although the magnitudes of the correlations were stronger for Accuracy items than for Efficiency items, especially in the Arkansas district. Stepwise regression analyses showed that similar groups of MindPrint items scores were predictive of student achievement scores, with 37% to 55% of variation in student outcomes explained by MindPrint scores, depending on outcome and sample. The group of items that were predictive of student achievement were generally consistent across subjects and districts, with small differences in the items included based on the subject content of the outcome (i.e., Visual-Spatial Reasoning was predictive of math achievement scores, but not ELA achievement scores). The results of these analyses provide strong evidence for the predictive validity of MindPrint items scores in relation to student achievement.

Conclusion

Results of this evaluation provide strong evidence supporting the reliability and validity of MindPrint assessment to identify cognitive strengths and needs for both general and special education students. Estimates of Cronbach's alpha show that MindPrint assessment items scores have high levels of internal consistency reliability, while descriptive and correlational analyses provide evidence supporting face validity, concurrent validity, and predictive validity of MindPrint assessment scores. Results were consistent across districts, supporting the use of the MindPrint assessment across a variety of school contexts (geography, socio-economic status, race/ethnicity) and grade levels in identifying cognitive capacities, predicting academic achievement (math, reading, science), and identifying students for student support (gifted and special education). It is important to note that one of the primary objectives of this evaluation was to meet submission standards for MindPrint Learning's NSF SBIR grant, which in part requires ESSA Tier 4 evidence. ESSA Tier 4 criteria, while most explicitly designed for "intervention" programs (e.g., math or reading curricula or instructional supplements), require that an educational product demonstrate theoretical grounding (literature support and a logic model) with an accompanying plan for an efficacy study to be conducted the following year. MindPrint has such a research plan documented, which will compare student achievement outcomes in schools that use the MindPrint assessment and supplemental intervention program to those in schools not using the supplemental intervention program. The combination of this plan with the supportive results from the present psychometric validation study and MindPrint's logic model and foundational research would clearly appear to satisfy ESSA Tier 4 criteria[2].

[2] ESSA Tiers 1 to 3 (Strong, Moderate, and Promising evidence) are designed for evaluating outcomes of experimental-type designs that compare appropriately similar intervention and control groups.

References

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APPENDIX A: Average MindPrint Scores by Disability

Table A1
MindPrint Assessment Scores by Disability Diagnosis, Massachusetts

Item	Autism	Communication	Developmental Delay	Emotional	Health	Neurological	SLD	Non-SPED
Verbal Reasoning Accuracy	-0.62	-0.09	-1.06	-0.11	-0.26	-0.93	-0.61	0.12
Verbal Reasoning Efficiency	-0.06	-0.20	-0.23	-0.07	-0.32	-0.96	-0.42	0.14
Verbal Reasoning Speed	0.50	-0.31	0.61	-0.04	-0.37	-.00	-0.24	0.16
Visual-Abstract Reasoning Accuracy	-0.31	-0.10	-1.17	-0.34	-0.51	-0.52	-0.21	0.31
Visual-Abstract Reasoning Efficiency	0.18	-0.02	-0.09	0.06	-0.16	-0.16	-0.06	0.15
Visual-Abstract Reasoning Speed	0.67	0.05	0.98	0.43	-0.03	0.21	0.03	-0.02
Visual-Spatial Reasoning Accuracy	-0.45	-0.27	-0.72	-0.51	-0.11	-0.94	-0.52	0.33
Visual-Spatial Reasoning Efficiency	0.06	-0.15	-0.26	-0.12	-0.16	-0.60	-0.16	0.28
Visual-Spatial Reasoning Speed	0.11	-0.03	0.19	0.27	-0.24	-0.26	0.10	0.18
Verbal Memory Accuracy	-1.94	-1.64	-1.48	-1.46	-1.31	-1.83	-2.22	-0.87
Verbal Memory Efficiency	-0.28	-0.62	-0.27	-0.16	-0.73	-1.22	-0.82	-0.13
Verbal Memory Speed	1.38	0.39	0.95	1.13	-0.16	-0.60	0.59	0.61

Visual Memory Accuracy	-1.15	-0.93	-0.66	-0.77	-1.63	-0.89	-0.73	-0.47
Visual Memory Efficiency	-0.11	-0.51	-0.08	-0.09	-1.28	-0.90	-0.53	-0.42
Visual Memory Speed	0.93	-0.10	0.51	0.60	-0.93	-0.92	-0.34	-0.37
Attention Accuracy	-1.07	-0.53	-0.82	-1.55	-1.31	-0.47	-0.78	-0.20
Attention Efficiency	0.20	-0.24	0.69	-0.32	0.51	0.31	0.07	0.22
Attention Speed	1.47	0.05	2.19	0.92	2.38	1.10	0.92	0.65
Working Memory Accuracy	-2.00	-0.02	0.50	-0.64	-0.82	-0.95	-0.83	0.01
Working Memory Efficiency	0.38	-0.06	0.52	-0.24	-0.57	-0.53	-0.38	0.19
Working Memory Speed	0.79	-.10	0.54	0.16	-0.31	-0.12	-0.15	0.35
Flexible Thinking Accuracy	-0.74	-1.16	-1.57	-1.26	-1.07	-1.05	-1.05	-0.22
Flexible Thinking Efficiency	0.28	-0.13	0.18	-0.34	0.05	-0.45	-0.06	0.26
Flexible Thinking Speed	1.31	0.89	1.96	0.58	1.16	0.14	0.94	0.74
Processing Speed	0.93	-0.25	0.97	0.68	0.07	-0.14	0.25	0.24
Visual Motor Speed	0.01	-0.61	-0.22	-0.25	-0.51	-0.42	-0.17	0.03
N	8	13	4	12	12	7	46	329

Table A2
MindPrint Assessment Scores by Disability Diagnosis, Pennsylvania

Item	Autism	Emotional Disturbance	SLD	S/L Impairment	Non-SPED
Verbal Reasoning Accuracy	-0.84	-0.64	-0.79	-0.05	-0.04
Verbal Reasoning Efficiency	-0.87	-0.14	-0.73	-0.05	-0.10
Verbal Reasoning Speed	-0.73	0.36	-0.53	-0.02	-0.16
Visual-Abstract Reasoning Accuracy	-0.08	-0.29	-0.70	-0.16	-0.10
Visual-Abstract Reasoning Efficiency	-0.31	0.16	-0.37	0.01	-0.09
Visual-Abstract Reasoning Speed	-0.42	0.62	0.09	0.20	-0.01
Visual-Spatial Reasoning Accuracy	0.45	-0.69	-0.97	-0.39	-0.20
Visual-Spatial Reasoning Efficiency	0.18	-0.67	-1.02	-0.31	-0.25
Visual-Spatial Reasoning Speed	-0.81	-0.65	-1.06	-0.24	-0.31
Verbal Memory Accuracy	-1.34	-0.15	-1.82	-0.91	-0.75
Verbal Memory Efficiency	-1.27	-1.06	-1.59	-0.87	-0.68
Verbal Memory Speed	-1.20	-0.97	-1.22	-0.78	-0.58
Visual Memory Accuracy	-1.16	-1.26	-1.33	-0.70	-0.60
Visual Memory Efficiency	-1.54	-0.88	-1.09	-0.98	-0.66
Visual Memory Speed	-1.57	-0.50	-0.84	-1.13	-0.69
Attention Accuracy	-1.06	-0.46	-0.53	-0.44	-0.27
Attention Efficiency	-0.53	0.61	0.14	-0.21	-0.06
Attention Speed	0.00	1.66	0.59	-0.02	0.08
Working Memory Accuracy	0.02	-0.59	-0.96	-0.25	-0.44
Working Memory Efficiency	-0.31	-0.69	-0.89	-0.40	-0.50

Working Memory Speed	-0.65	-0.79	-0.78	-0.53	-0.56
Flexible Thinking Accuracy	-1.26	-1.23	-1.17	-0.20	-0.51
Flexible Thinking Efficiency	-0.85	-0.81	-0.77	-0.11	-0.29
Flexible Thinking Speed	-0.45	-0.37	-0.36	0.03	-0.06
Processing Speed	-0.61	0.31	-0.50	-0.49	-0.27
Visual Motor Speed	-1.76	-1.66	-1.97	-1.68	-1.59
N	6	7	38	31	230

Table A3

MindPrint Assessment Profiles by Disability Diagnosis, Massachusetts

Item	Autism	Communication	Developmental Delay	Emotional	Health	Neurological	SLD
Verbal Reasoning Accuracy			Skill to support				
Verbal Reasoning Speed						Skill to support	
Visual-Abstract Reasoning Accuracy			Skill to support				
Verbal Memory Accuracy	Need Support	Skill to support	Skill to support	Skill to support	Skill to support	Need Support	Need Support
Verbal Memory Efficiency						Skill to Support	
Verbal Memory Speed	Strength			Strength			
Visual Memory Accuracy	Skill to Support				Skill to Support		
Visual Memory Efficiency					Skill to Support		
Attention Accuracy	Skill to Support			Skill to Support	Skill to Support		
Attention Speed	Strength		Superior		Superior	Strength	

Working Memory Accuracy	Need Support						
Flexible Thinking Accuracy		Skill to Support	Skill to Support	Skill to Support	Skill to Support	Skill to Support	Skill to Support
Flexible Thinking Speed	Strength		Superior		Strength		
N	8	13	4	12	12	7	46

Table A4

MindPrint Assessment Profiles by Disability Diagnosis, Pennsylvania

Item	Autism	Emotional Disturbance	SLD	S/L Impairment
Visual-Spatial Reasoning Efficiency			Skill to Support	
Visual-Spatial Reasoning Speed			Skill to Support	
Verbal Memory Accuracy	Skill to Support	Skill to Support	Need Support	
Verbal Memory Efficiency	Skill to Support	Skill to Support	Skill to Support	
Verbal Memory Speed	Skill to Support		Skill to Support	
Visual Memory Accuracy	Skill to Support	Skill to Support	Skill to Support	
Visual Memory Efficiency	Skill to Support		Skill to Support	
Visual Memory Speed	Skill to Support			Skill to Support
Attention Accuracy	Skill to Support			
Attention Speed		Strength		
Flexible Thinking Accuracy	Skill to Support	Skill to Support	Skill to Support	
Visual Motor Speed	Need Support	Need Support	Need Support	Need Support
N	6	7	38	31

APPENDIX B: Supplementary Regression Results

Table B1

MindPrint Scores Predicting Spring 2025 ATLAS Science Scores

Item	Estimate	*SE*	*p value*
Science (*n* = 6,573)			
Verbal Reasoning Accuracy	4.085	0.157	<.001
Spatial Perception Accuracy	3.094	0.171	<.001
Visual-Abstract Reasoning Accuracy	3.172	0.188	<.001
Verbal Memory Accuracy	0.606	0.088	<.001
Flexible Thinking Efficiency	1.028	0.156	<.001
Visual Memory Accuracy	0.856	0.134	<.001
Verbal Reasoning Speed	0.343	0.055	<.001
Attention Speed	-0.918	0.122	<.001
Visual Motor Speed	0.761	0.165	<.001
Working Memory Efficiency	0.487	0.145	.001
Attention Efficiency	0.584	0.200	.004
Verbal Memory Speed	0.207	0.080	.009
Constant	1059.060	0.207	<.001
Adjusted *R*-squared	.512		