

# Success to me is...

...getting  
invited  
to all of the  
birthday  
parties.

— Sarah, age 8

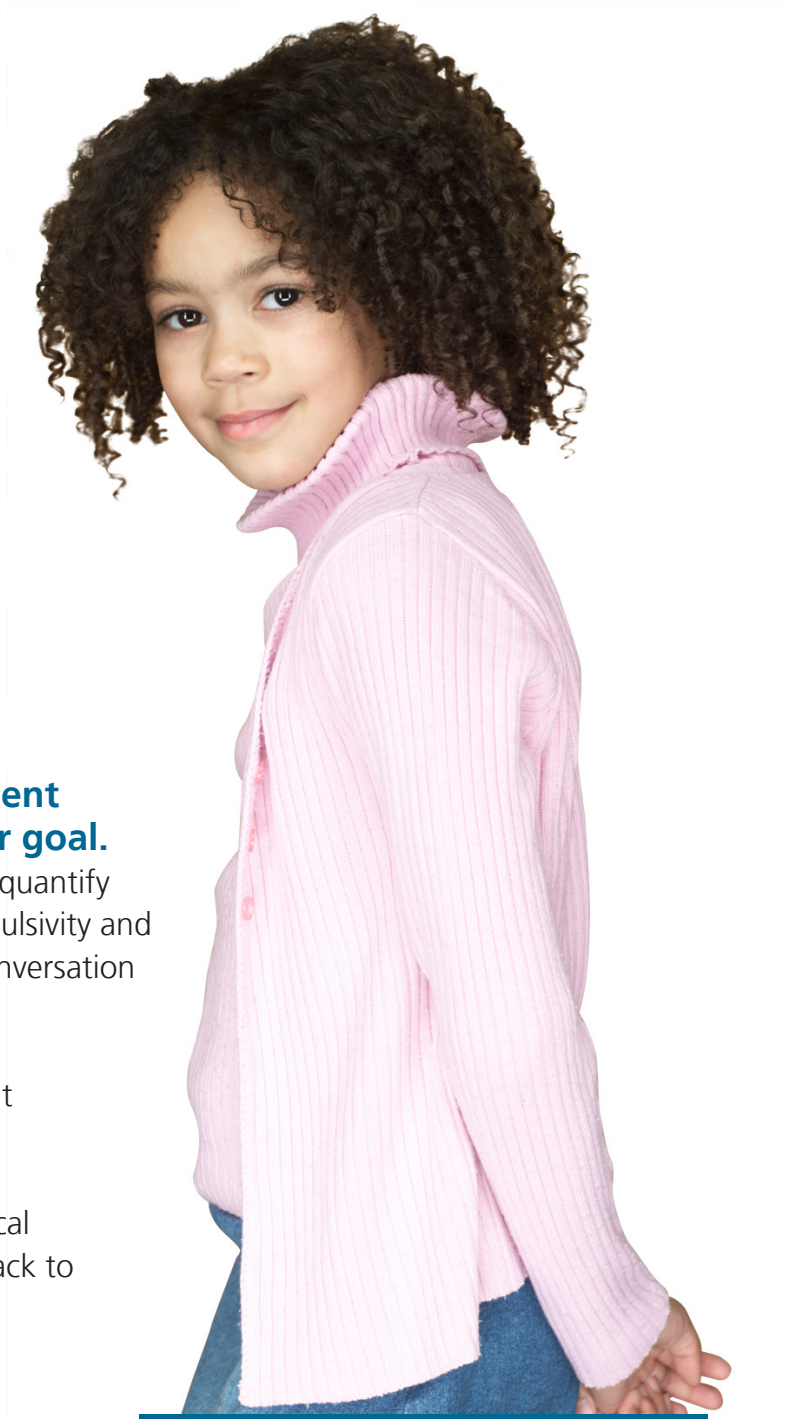
**Quotient**  
ADHD test

## Use objective data to help inform treatment decisions and help your patient reach her goal.

- Use the Quotient® ADHD Test at the initial visit to quantify the severity of deficits related to hyperactivity, impulsivity and inattention. Objective evidence streamlines the conversation with parents and patients.
- Re-assess new patients in 3-6 weeks to evaluate progress toward goals and to help guide treatment planning.
- Test established patients periodically at med check visits. The Quotient® ADHD Test supplements clinical information to assess whether the patient is on track to reach his potential as he grows.

## Easy to integrate into a busy practice

- A trained paraprofessional can run the test.
- The Quotient® ADHD Test is covered by most insurance companies using existing CPT® codes.



**Case Study**  
**Sarah, age 8**



**BioBDx**

877.246.2397  
[www.BioBDx.com](http://www.BioBDx.com)

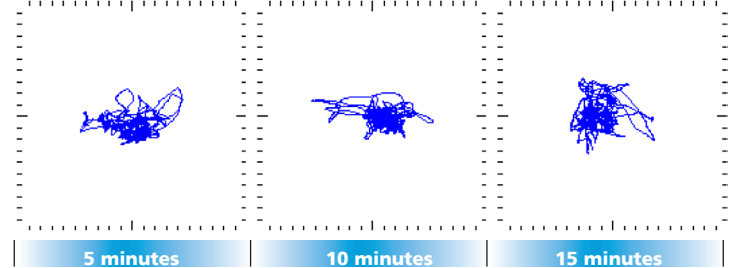
## Baseline Assessment

Sarah, age 8. No medication.

## Motion Analysis

	Baseline			Test #2	
	Ref. Range	Results	%ile	Results	%ile
Immobility Duration	71-196 ms	73 ms	18	74 ms	19
Movements	1467-4238	4149	17	4131	17
Displacement	1.89-6.76 m	6.12 m	21	6.09 m	21
Area	35-190 cm <sup>2</sup>	190 cm <sup>2</sup>	16 <sup>†</sup>	151 cm <sup>2</sup>	23
Spatial Complexity	1.056-1.162	1.050	11 <sup>†</sup>	1.055	14 <sup>†</sup>
Temporal Scaling	0.494-1.068	0.853	34	0.906	29

## Head Motion



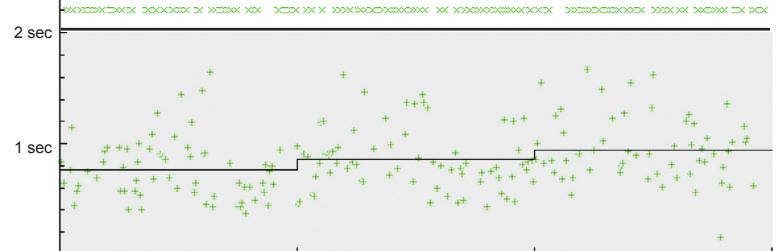
## Attention Analysis

	Baseline			Test #2	
	Ref. Range	Results	%ile	Results	%ile
Accuracy	73.4-95.4%	83.6%	36	95.5%	84
Omission errors	0.7 - 11.1%	13.3%	13 <sup>†</sup>	2.7%	54
Commission errors	7.0 - 43.6%	19.6%	50	6.2%	87
Latency	487 - 669 ms	851 ms	99	688 ms	90
Variability	1169-213 ms	281 ms	4 <sup>†</sup>	135 ms	67
COV	20.9 - 35.0	33	25	19	91

## Incorrect responses



## Correct responses

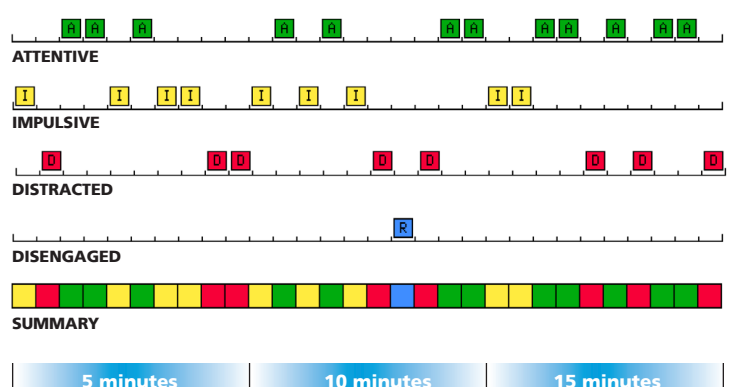


- Key: + designates a target. X designates a non-target.
- + Omission errors: incorrect passes (Measures inattention.)
  - X Commission errors: incorrect hits. (Measures impulsivity.)
  - X Correct passes
  - + Correct hits

## Attention State Summary

	Baseline			Test #2	
	Ref. Range	Results	%ile	Results	%ile
# Shifts	7-18	22	3 <sup>†</sup>	6	90
Attentive	13.3-83.3%	40.0%	42	90.0%	89
Impulsive	10.0-56.7%	30.0%	52	6.7%	90
Distracted	0-20%	26.7%	12 <sup>†</sup>	3.3%	73
Disengaged					
Random	0-20%	3.3%	49	0.0%	99
Minimal	0-3.3%	0.0%	99	0.0%	99
Contrary	0-0%	0.0%	99	0.0%	99

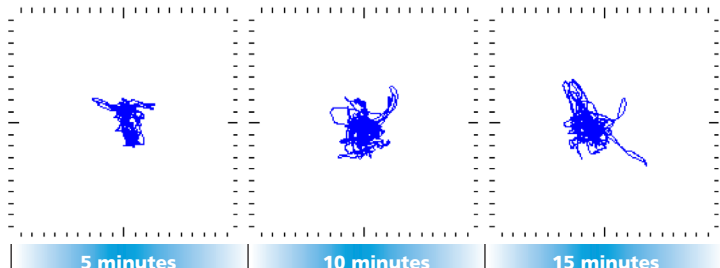
## Attention State Analysis for 30 Second Segments



## Post-Medication Assessment

20 mg Methylin. The Quotient® ADHD Test was administered, 6 weeks following initiation of therapy.

### Head Motion



### Baseline:

During the baseline test, Sarah sat still an average of 73 milliseconds, which is in the 18<sup>th</sup> percentile for her age cohort. She also had more movements with greater total path and area than her peers. Her spatial complexity and temporal scaling metrics are outside of the reference range. While area and spatial complexity are flagged as the less than or equal to the 16<sup>th</sup> percentile and significant, the rest of the motion metrics are at the lower end of the reference range.

### Test #2:

Sarah's motion metrics did not improve. Her area and spatial complexity metrics are outside of the reference range. While only area and spatial complexity are flagged as less than or equal to the 16<sup>th</sup> percentile and significant, the rest of the motion metrics are at the lower end of their reference ranges.

Motion Results

### Incorrect responses



### Baseline:

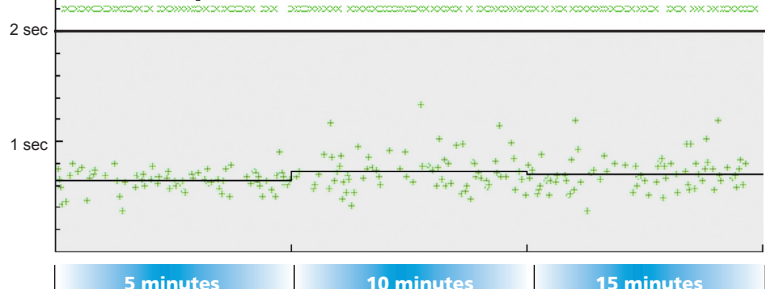
Accuracy of responses was 83.6% (376 correct responses out of 450 stimuli, 36<sup>th</sup> percentile), with 13.3% incorrect passes (omission errors, 13<sup>th</sup> percentile) and 19.6% incorrect hits (commission errors). The graphs show loose scatter, which is reflected in the variability (4<sup>th</sup> percentile) and normalized response time (25<sup>th</sup> percentile) in the table. Note that response time (latency) increases over the course of the test, as designated by the average time in each 5 minute block on the graph. Her response time is significantly slower than her peers (99<sup>th</sup> percentile).

### Test #2:

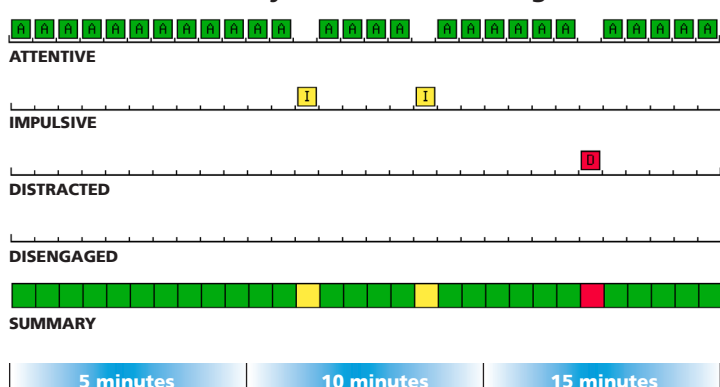
Attention results in the follow-up assessment indicate improved focus. Accuracy of responses improved to 95.5%, which is the 84<sup>th</sup> percentile. Omission errors were reduced to 2.7%, or the 54<sup>th</sup> percentile for her age group. Likewise, the variability score improved from the 4<sup>th</sup> percentile to the 67<sup>th</sup> percentile, well within the reference range. Her response time is faster than the baseline test, but is still significantly slower than her peer group (90<sup>th</sup> percentile).

Response Results

### Correct responses



### Attention State Analysis for 30 Second Segments



The Quotient® ADHD System analyzes 30 x 30-second blocks of data and summarizes the information on the attention state chart. The number of shifts and the percent of time in the Attentive attention state are consistent with patterns associated with test results of patients with ADHD.

### Baseline:

For the first 30 seconds, the test shows impulsive behavior, followed by 30 seconds of distraction, followed by 60 seconds on task, and so on. The table shows that she had 22 attention shifts overall, that she was on task for 12 of 30 (40% of the test), impulsive 30% and distracted 26.7% of the time.

### Test #2:

Attentive results were much improved for Sarah. There were only 6 attention state shifts, with only 2 30-second blocks of impulsive behavior and 1 30-second block of distraction.

Attention State Results

## Quotient® ADHD Composite Scores

	Baseline	Follow-up
<b>System Index</b>	<b>Probable</b>	<b>Unlikely</b>
<b>Scaled Scores</b>		
Motion Scaled Score	7.15	6.46
Attention Scaled Score	8.19	3.28
Global Scaled Score	7.67	4.87

The **System Index** integrates the motion, attention and impulsivity scores and assigns one of four probability ratings to the composite value. This rating is an estimate of the probability that upon full clinical assessment, the child will meet diagnostic criteria for ADHD. It is based on profiles in the BioBDx database of individuals of the same age and gender with ADHD and without ADHD. This estimate is reported as Unlikely, Possible, Probable or Likely. Sarah's System Index is 'Probable' at baseline. On medication, her System Index changes to Unlikely as she is no longer showing a pattern of results that is characteristic of ADHD.

The **Scaled Scores** are normalized calculations on a 10-point scale. The mean Scaled Scores for individuals with ADHD is approximately 7 and approximately 4 for people without ADHD. Higher Scaled Scores indicate deficit in control of motion and attention compared to age and gender matched subjects. Sarah's Motion Scaled Score did not improve much, but her Attention Scaled Score improved with medication. The Global Scaled Score is an average of the Motion and Attention Scaled Scores.

## Simple Test Procedure

### Child Test: 1 target, 1 non-target

### Adolescent/Adult Test: 3 targets, 1 non-target



**Test Time: 15 minutes** ages 6-13  
**20 minutes** ages 14-55

## Composite Scores

### Quotient ADHD System

Clinician Name: Paton Collipp  
Patient Name: icelin copeland  
Test Date: Aug 29 2008 11:46 am  
Date of Birth: Nov 26 2000  
Gender: F Age: 7.7

**QUOTIENT™ ADHD SYSTEM INDEX**  
The Quotient™ ADHD System Index includes 19 indices, 6 for motion and 13 for attention. The resulting index is the degree of agreement between the Quotient™ ADHD Test results of this patient and patients with ADHD.

Very Low Low Medium High

**QUOTIENT™ ADHD SYSTEM SCALED SCORES**  
The Quotient™ ADHD System Scaled Score consists of:  
• Motion Scaled Score – a composite of how this patient's motion compares to the community sample.  
• Attention Scaled Score – a composite of how this patient's attention compares to the community sample.  
• Global Scaled Score – demonstrates the combination of indices for this patient as compared to the community sample.

High scaled scores are associated with the scores that patients with ADHD receive.

High Motion	Inattention	Global Scaled Score
7.15	8.19	7.67

**Related Definitions**  
• Patients with ADHD – Individuals who have met the DSM-IV criteria for the diagnosis of ADHD in a clinical or research setting and received a Quotient assessment.  
• Community Sample – Individuals representing a cross-sectional sample of the general community (irrespective of diagnostic status) and who received a Quotient assessment.

**DISCLAIMER**  
The test interpretation should be used as part of a comprehensive diagnostic process and not as a substitute for the diagnostic process itself.

## Motion Analysis

### Quotient ADHD system Patient Test Results

Clinician Name: Paton Collipp  
Patient Name: icelin copeland  
Test Date: Aug 29 2008 11:46 am  
Date of Birth: Nov 26 2000  
Gender: F Age: 7.76 Grade: 1

**MOTION ANALYSIS**  
Motion Capture by Corresponding Reflector Location

**Metrics**

Metric	Reflector Location
Response	Head
Response Duration (milliseconds)	Head
Response Rate (per second)	Head
Displacement (meters)	Head
Area (centimeters squared)	Head
Spatial Complexity (score)	Head
Response Scaling (scale score)	Head

## Attention Task

### Quotient ADHD system Patient Test Results

Clinician Name: Paton Collipp  
Patient Name: icelin copeland  
Test Date: Aug 29 2008 11:46 am  
Date of Birth: Nov 26 2000  
Gender: F Age: 7.76 Grade: 1

**ATTENTION ANALYSES**  
Patient's Response to Targets and Non-Targets

**Patient's Response Results**

Metric	Results	Reference Range (16-84 Percentile)
Accuracy (percent)	83.6	73.4
Commission Errors (percent)	13.3	0.0
Omission Errors (percent)	19.6	7
Latency (milliseconds)	851	490.5
Variability (milliseconds)	281	118
C.V.V. (percent)	33	21

## Attention State Analysis

### Quotient ADHD system Patient Test Results

Clinician Name: Paton Collipp  
Patient Name: icelin copeland  
Test Date: Aug 29 2008 11:46 am  
Date of Birth: Nov 26 2000  
Gender: F Age: 7.76 Grade: 1

**ATTENTION ANALYSES CONTINUED**  
Patient's Attention States During Testing

**Attention State Results**

Metric	Results	Reference Range (16-84 Percentile)	Age Percentile (n = 28 Age Percentiles)
Number of Shifts (number)	22	9 - 18	1
On-Task (percent)	40	33.3 - 83.3	42
Inattentive (percent)	30	10 - 56.7	52
Distracted (percent)	26.7	0 - 20	12
R.R.C. (percent)	3.3	0 - 20	49
H. (percent)	0	0 - 3.3	99
C. (percent)	0	0 - 0	99

## Generate the report in minutes

- Upload the raw data from the Quotient® ADHD System via the secure internet portal.
- Download the report from any computer connected to the internet.
- Discuss the results with the parent or patient. Concrete data makes the conversation more efficient.

Find us on Facebook  
"Objective ADHD Test"

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