# The Test Of Variables of Attention (T.O.V.A.®)

The **Test of Variables of Attention (T.O.V.A.)** is an FDA-cleared, state-of-the-art continuous performance test that provides healthcare professionals with objective measurements of attention and inhibitory control. The T.O.V.A. aids in the assessment of, and evaluation of treatment for, attention deficits, including attention-deficit/hyperactivity disorder (ADHD). T.O.V.A. results are available for children and adults (ages 4 - 80+) and should only be interpreted by qualified professionals.

The T.O.V.A. continuously measures performance during a 10.8-minute task or a 21.6-minute task, depending on age. It records speed, accuracy, and consistency of responses to a series of squares (in the visual T.O.V.A. test) or tones (in the auditory T.O.V.A. test) that are presented in two-second intervals. These measurements (accurate to ±1 ms) are then compared by age and gender to a normative sample (a sample of people without attention problems). This comparison determines whether the test results are "within normal limits" or not. The T.O.V.A. also compares results to a group of people independently diagnosed with ADHD. The T.O.V.A. report is based on these two comparisons, as well as performance, session, and response validity measures.
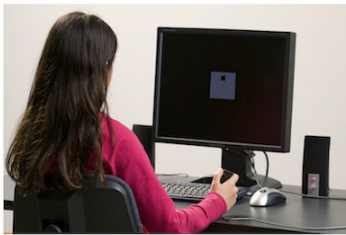
If you have questions about this report, please contact the person who provided it to you. For more information about attention and the T.O.V.A., please visit our website at https://www.tovatest.com/. To contact us please email info@tovatest.com or call 800.PAY.ATTN (562.594.7700).

ID: 1 **Example Subject** (Apr 1, 2012)
Female - 5y 2m 0d

Short Visual T.O.V.A. (v9.0-71 sn30000)
Jun 1, 2017 at 12:34 PM

Session, Response, and Performance Validity

This session meets session, response and performance validity criteria.

T.O.V.A. Interpretation

The results of this T.O.V.A. are not within normal limits, and may be suggestive of a possible attention deficit, including ADHD. Please see the Interpretation Notes page for additional information.
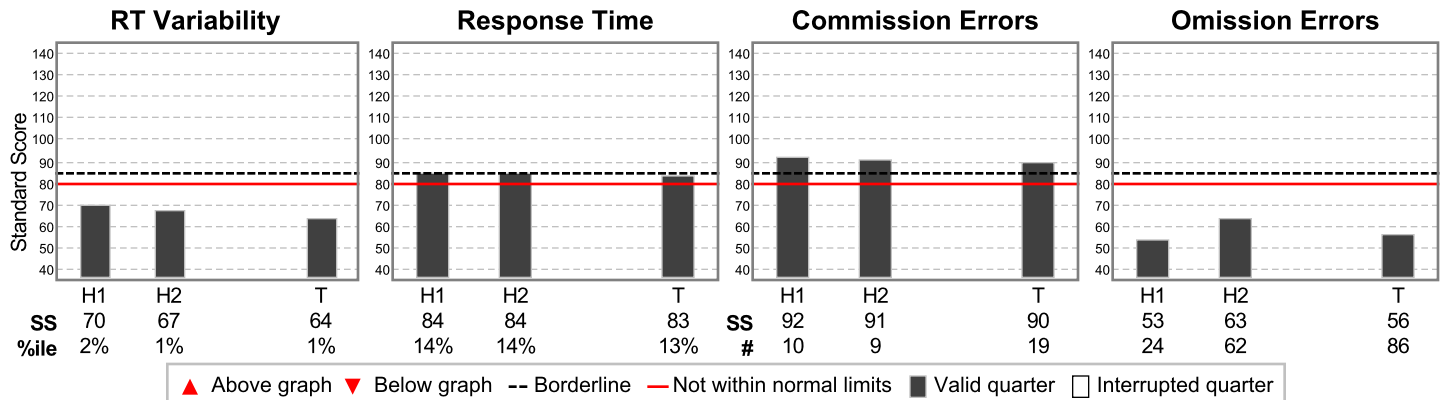
Treatment

No treatments entered.

Comparison to the Normative Sample

These scores compare this subject's performance to the performance of individuals of the same gender and age in the T.O.V.A. Normative Sample, a study of individuals who did not have attention problems.

Results are reported as standard scores (average standard = 100; standard deviation = 15). Standard scores above 85 are considered to be in the normal range, scores between 80 and 85 are considered borderline, and scores below 80 are considered not within normal limits. Scores less than 70 are considered significantly below normal range. Standard scores less than 40 are more than 4 standard deviations from normal, and are denoted as "<40".

	RT Variability			Response Time			Commission Errors			Omission Errors		
	H1	H2	T	H1	H2	T	H1	H2	T	H1	H2	T
SS	70	67	64	84	84	83	92	91	90	53	63	56
%ile	2%	1%	1%	14%	14%	13%	10	9	19	24	62	86

▲ Above graph ▼ Below graph -- Borderline — Not within normal limits ■ Valid quarter □ Interrupted quarter

Quarters, Halves and the Total are independently calculated and are not averages. Any Quarter, Half or Total that is Borderline or Not Within Normal Limits causes the Interpretation to be Borderline or Not Within Normal Limits. See the Interpretation Notes page for more information on these variables and on the subject's performance.

	Half		Total
	1	2	
RT Variability	70	67	64
Response Time	84	84	83
Commission Errors	92	91	90
Omission Errors	53	63	56
	Infrequent	Frequent	

Key: Borderline , Not within normal limits , Invalid

Session, Response, and Performance Validity

Performance Validity

Performance Validity is applicable only to ages 17 or above.

Notes on the Comparison to the Normative Sample

Variability is a precise measure of variations in correct response times, and measures the consistency of response times. **Variability was not within normal limits in Half 1 and 2, and Total.**

Response Time is the average speed of correct responses to targets, and is a measure of information processing speed. **Response Time was borderline in Half 1 and 2, and Total.**

Commission Errors occur when the subject incorrectly responds to a nontarget, and are a measure of inhibitory control. **Commission Errors were within normal limits.**

Omission Errors occur when the subject does not respond to a target, and are a measure of sustained attention. **Omission Errors were not within normal limits in Half 1 and 2, and Total.**

Treatment

No treatments entered.

Attention Comparison Score

The Attention Comparison Score (ACS) is a subset of T.O.V.A. variables used to compare the subject's performance to a sample of individuals independently diagnosed with ADHD. Scores below 0 suggest a performance more similar to that of individuals with ADHD.

Note that the ACS does not include important variables from the Comparison to the Normative Sample. In order to understand the overall test results, the ACS should always be used with the Comparison to the Normative Sample, found on the Summary page. In particular, when the ACS is above zero and the Comparison to the Normative Sample is not within normal limits, the results should be considered not within normal limits.

The ACS is calculated by summing the following Z scores:

Response Time (Half 1)	-1.08
D Prime (Half 2)	-1.62
Variability (Total)	-2.41
Calibration constant	1.80
Attention Comparison Score	-3.32

-3.32
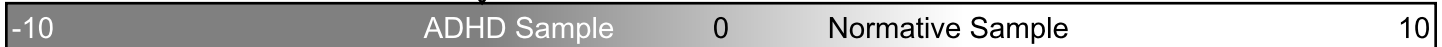
-10	ADHD Sample	0	Normative Sample	10

ID: **1** **Example Subject** (Apr 1, 2012) **Short Visual T.O.V.A.** (v9.0-71 sn30000)
Female - 5y 2m 0d Jun 1, 2017 at 12:34 PM

This page contains tabulated raw data and documents T.O.V.A. session parameters.

		Half 1	Half 2	Total
RT Variability	ms	356	401	395
Response Time	ms	981	892	907
Post-commission responses	#	0	6	6
Response Time	ms	0	949	949
Variability	ms	0	353	353
Commission Errors	#	10/126	9/36	19/162
Percentage	%	7.9	25	11.7
Response Time	ms	951	784	872
Omission Errors	#	24/36	62/126	86/162
Percentage	%	66.7	49.2	53.1
D Prime		0.98	0.69	1.11
Standard Score		75	76	72
Beta		2.46	1.26	2.02
Anticipatory	%	2.5	9.3	5.9
To Nontargets	#	3	4	7
To Targets	#	1	11	12
Multiple Responses	#	0	0	0
Total Correct	#	124/162	76/162	200/324
Percentage	%	76.5	46.9	61.7
Skew	ms	275	121	182
User Interrupts	#	0	0	0
Hardware errors	#	0	0	0
		Infrequent	Frequent	

Session parameters

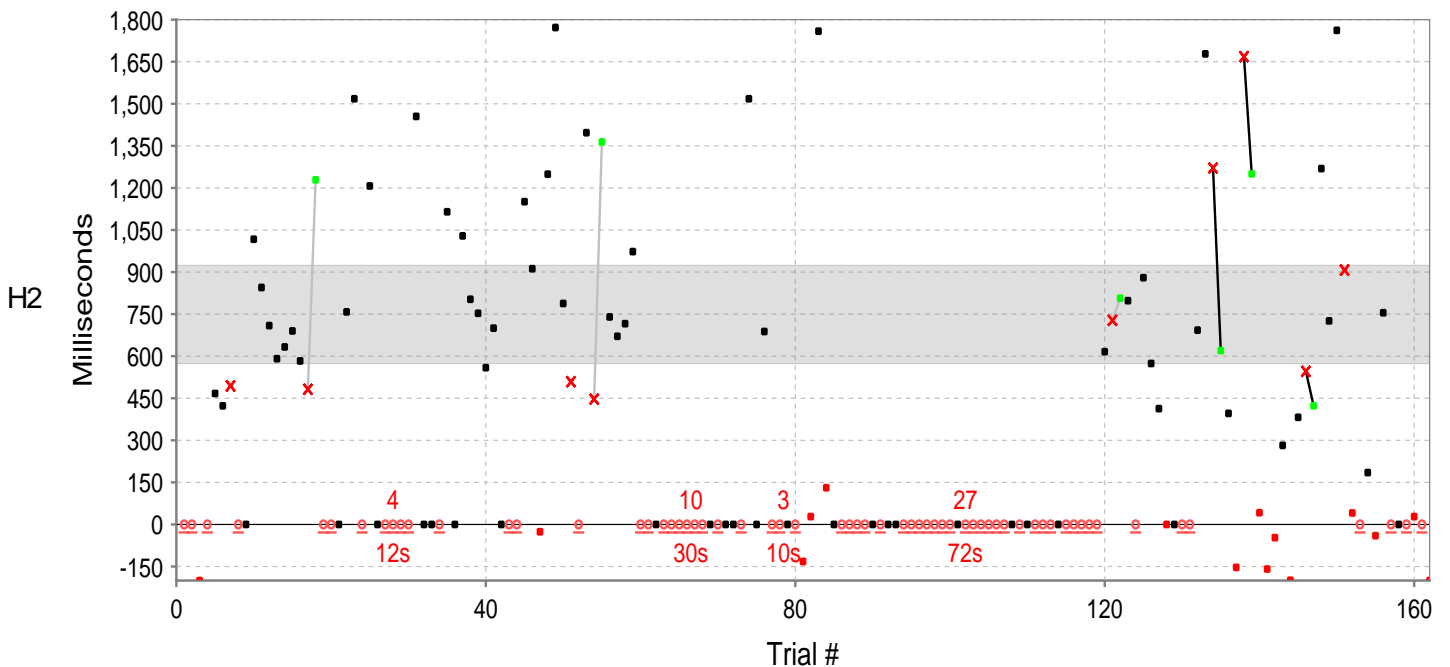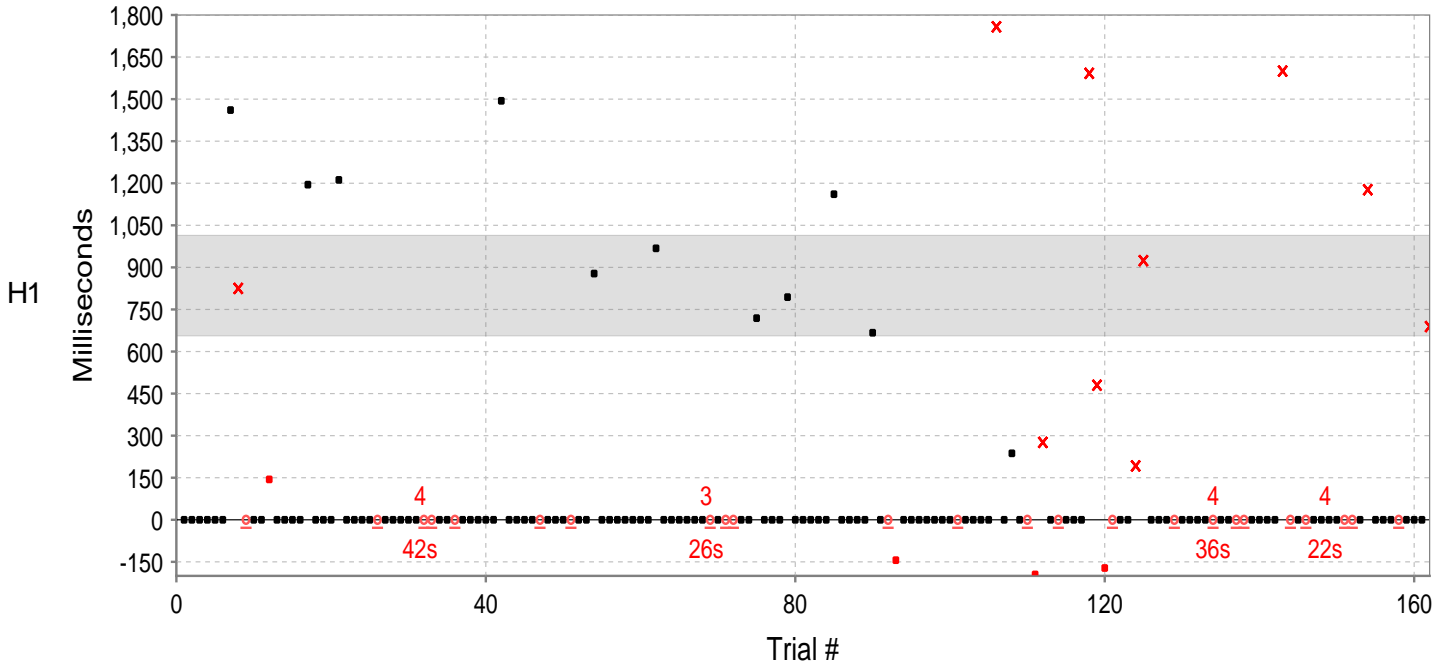|	
Format:	6 (short)
ISI:	2000 ms
Stimulus On Time:	200 ms
Stimulus Off Time:	300 ms
Anticipatory Cutoff	150 ms

Session information

Tester:	
Import Filename:	file.tova
Import Date:	Jun 12, 2017 12:00:00 AM
Errors/Warnings:	Anticipatory time mismatch, file used 200 ms, using 150 ms
	Response 323: time -211 not in [-209, 1809]
	Microswitch message flooding (27)

ID: 1   **Example Subject** (Apr 1, 2012)
Female - 5y 2m 0d

Short Visual T.O.V.A. (v9.0-71 sn30000)
Jun 1, 2017 at 12:34 PM

This page graphically displays the subject's responses. Black squares mark correct responses and correct nonresponses. Red 'X's mark commission errors, red squares mark anticipatory responses, and underlined red circles mark omission errors. The light gray region represents the normative range of responses. Commission errors followed by a correct response are linked by a line: an upward slope (light gray) indicates slowing down following an error (typical), and a downward slope (black) indicates speeding up after making an error (unusual). Red numbers above the zero line indicate the number of missed targets (if three or more in a row), and the red number below the zero line indicates the number of seconds elapsed between correct target responses.

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Short Visual T.O.V.A. (v9.0-71 sn30000)
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This page shows a trial-by-trial view of T.O.V.A. test data. Each entry in the table indicates the stimulus type (target or nontarget) and the subject's response to that stimulus. Error responses are shown in red, and response times are in milliseconds. A negative response time indicates a response that was made before the stimulus was presented.

1-27	28-54	55-81	82-108	109-135	136-162
N	N	N	N	N	N
N	N	N	N	O	O
N	N	N	N	NA -195	O
N	N	N	T 1161	C 276	N
N	O	N	N	N	N
N	O	N	N	O	N
T 1461	N	N	N	N	N
C 825	N	T 968	N	N	C 1600
O	O	N	T 667	N	O
N	N	N	N	C 1592	N
N	N	N	O	C 480	O
NA 144	N	N	TA -144	NA -172	N
N	N	N	N	O	N
N	N	N	N	N	N
N	T 1494	O	N	N	N
N	N	N	N	C 192	O
T 1195	N	O	N	C 924	O
N	N	O	N	N	N
N	N	N	N	N	C 1177
N	O	N	O	N	N
T 1212	N	T 719	N	O	N
N	N	N	N	N	N
N	N	N	N	N	O
N	O	N	N	N	N
N	N	T 794	C 1758	N	N
O	N	N	N	O	N
N	T 878	N	T 237	N	C 689

163-189	190-216	217-243	244-270	271-297	298-324
O	O	T 1364	TA 28	O	T 396
O	O	T 740	T 1759	N	NA -153
TA -200	O	T 671	TA 131	O	C 1668
O	T 1455	T 716	N	O	T 1250
T 467	N	T 973	O	O	TA 42
T 423	N	O	O	N	TA -159
C 494	O	O	O	O	TA -47
O	T 1115	N	O	O	T 282
N	N	O	N	O	NA -199
T 1017	T 1029	O	O	O	T 382
T 845	T 803	O	N	O	C 546
T 709	T 753	O	N	T 616	T 423
T 591	T 559	O	O	C 728	T 1269
T 633	T 700	O	O	T 807	T 726
T 690	N	N	O	T 798	T 1762
T 583	O	O	O	O	C 907
C 482	O	N	O	T 880	NA 41
T 1229	T 1151	N	O	T 574	O
O	T 912	O	O	T 413	T 185
O	NA -26	T 1518	N	TA 0	TA -40
N	T 1249	N	O	N	T 755
T 758	T 1772	T 688	O	O	O
T 1518	T 788	O	O	O	N
O	C 509	O	O	T 693	O
T 1207	O	N	O	T 1678	TA 28
N	T 1397	O	O	C 1271	O
O	C 447	TA -132	N	T 620	TA -200

T = Correct response to target   **O** = Omission error   **A** = Anticipatory response

N = Correct nonresponse to nontarget   **C** = Commission error   **M** = Multiple response

Green = Post-Commission-error correct response   **U** = User interrupt   **H** = Hardware interrupt

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