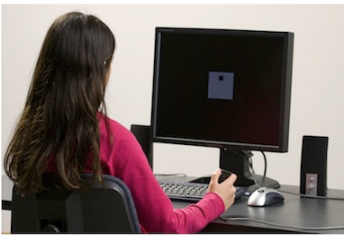


## The Test Of Variables of Attention (T.O.V.A.®)

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  $\pm 1$  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](mailto:info@tovatest.com) or call 800.PAY.ATTN (562.594.7700).

ID: **1** **Example Subject** (Jul 1, 1997)  
**Male - 19y 11m 0d**

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

### Session, Response, and Performance Validity

**CAUTION:** There are important performance validity issues that affect the interpretation of this test. Please see the Validity section of the Interpretation Notes page.

### 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.

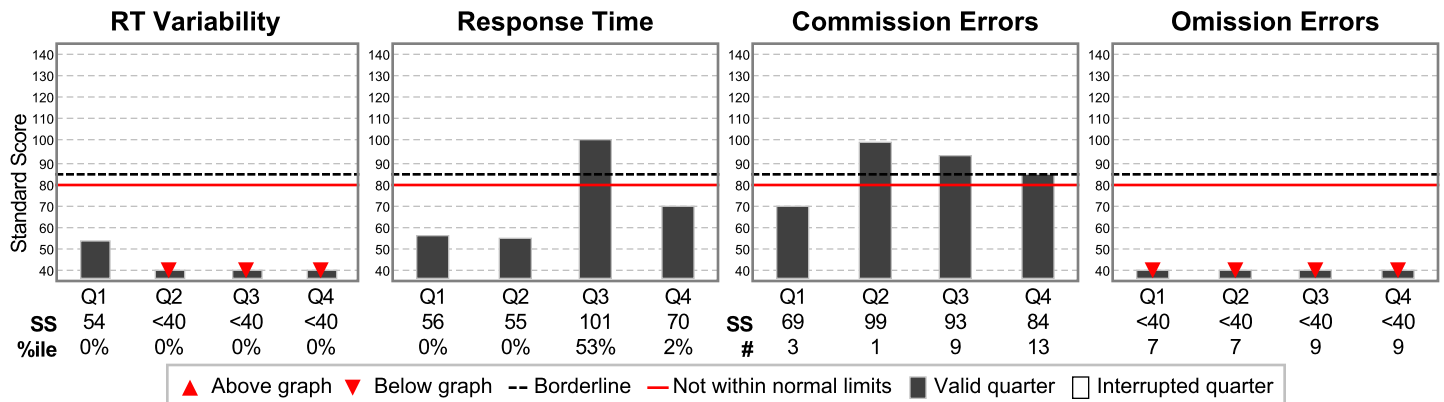
### Treatment

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".



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.

	Quarter				Half		Total
	1	2	3	4	1	2	
<b>RT Variability</b>	54	<40	<40	<40	<40	<40	<40
<b>Response Time</b>	56	55	101	70	56	83	77
<b>Commission Errors</b>	69	99	93	84	81	88	86
<b>Omission Errors</b>	<40	<40	<40	<40	<40	<40	<40

Key: Borderline, Not within normal limits, Invalid

ID: **1 Example Subject** (Jul 1, 1997)  
**Male - 19y 11m 0d**

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

## Session, Response, and Performance Validity

### Performance Validity

**CAUTION:** 2 of 4 performance validity rules have been flagged.

Performance Validity is flagged to alert clinicians when there is unusually poor performance on the T.O.V.A. Only a clinician can determine if the test performance is consistent with (1) ADHD, (2) attention deficits due to traumatic brain injury, substance use disorders, sleep disorders, or other causes, or (3) poor effort, or (4) malingering. Higher numbers of flags indicate increasingly unusual patterns of performance and warrant more caution interpreting test performance. Special caution should be taken when the possibility of secondary gain exists. Performance Validity is only applicable to ages 17 or older.

Rule	Results	Flagged
Total omission errors greater than 30	32	1
Half 1 commission errors (CE) greater than 10	4	0
Half 2 response time (RT) skew greater than +150 ms	+241 ms	1
Half 2 CE RT minus RT greater than +75 ms	-137 ms	0
Total rules flagged:		2

## 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 Quarters 1, 2, 3, and 4, 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 2, and not within normal limits in Quarters 1, 2, and 4, Half 1, and Total.**

**Commission Errors** occur when the subject incorrectly responds to a nontarget, and are a measure of inhibitory control. **Commission Errors were borderline in Quarter 4 and Half 1, and not within normal limits in Quarter 1.**

**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 Quarters 1, 2, 3, and 4, Half 1 and 2, and Total.**

## Other Notes

Consider administering an Auditory T.O.V.A. to this subject for a more comprehensive assessment of attention. This is important because an individual can have markedly different results on one test versus the other.

ID: **1** **Example Subject** (Jul 1, 1997)  
**Male - 19y 11m 0d**

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

### Treatment

No treatments entered.

### Attention Comparison Score

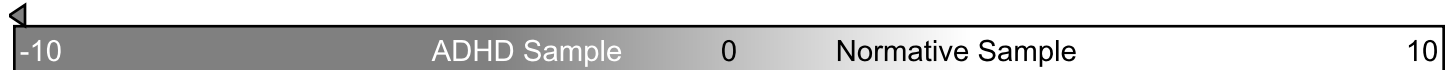
The Attention Comparison Score (ACS) is a subset of T.O.V.A. variables used to compare the subject's performance to a sample of individuals independently diagnosed with ADHD. Scores below 0 suggest a performance more similar to that of individuals with ADHD.

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)	-2.96
D Prime (Half 2)	-2.41
Variability (Total)	-7.05
Calibration constant	1.80
<b>Attention Comparison Score</b>	<b>-10.63</b>

-10.63



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**Male - 19y 11m 0d**

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

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

		Quarter				Half		Total
		1	2	3	4	1	2	
RT Variability	ms	147	186	188	258	171	234	231
Response Time	ms	555	616	373	489	585	434	466
Post-commission responses	#	2	0	9	10	2	19	21
Response Time	ms	567	0	339	437	567	390	407
Variability	ms	53	0	112	396	53	302	292
Commission Errors	#	3/126	1/126	9/36	13/36	4/252	22/72	26/324
Percentage	%	2.4	0.8	25	36.1	1.6	30.6	8
Response Time	ms	260	626	258	324	352	297	305
Omission Errors	#	7/36	7/36	9/126	9/126	14/72	18/252	32/324
Percentage	%	19.4	19.4	7.1	7.1	19.4	7.1	9.9
D Prime		2.84	3.27	2.14	1.82	3.01	1.97	2.69
Standard Score		56	54	63	64	59	64	64
Beta		4.91	12.64	0.43	0.36	6.92	0.39	1.17
Anticipatory	%	0	0	10.5	4.3	0	7.4	3.7
To Nontargets	#	0	0	4	3	0	7	7
To Targets	#	0	0	13	4	0	17	17
Multiple Responses	#	0	0	2	3	0	5	5
Total Correct	#	152/162	154/162	127/162	133/162	306/324	260/324	566/648
Percentage	%	93.8	95.1	78.4	82.1	94.4	80.2	87.3
Skew	ms	-90	13	210	165	-35	241	272
User Interrupts	#	0	0	0	0	0	0	0
Hardware errors	#	0	0	0	0	0	0	0

Infrequent

Frequent

**Session parameters**

Format: 1 (standard)  
 ISI: 2000 ms  
 Stimulus On Time: 200 ms  
 Stimulus Off Time: 300 ms  
 Anticipatory Cutoff: 150 ms

**Session information**

Tester:  
 Import Filename: example-pv-19m.tova  
 Import Date: Jun 12, 2017 12:00:00 AM  
 Errors/Warnings:

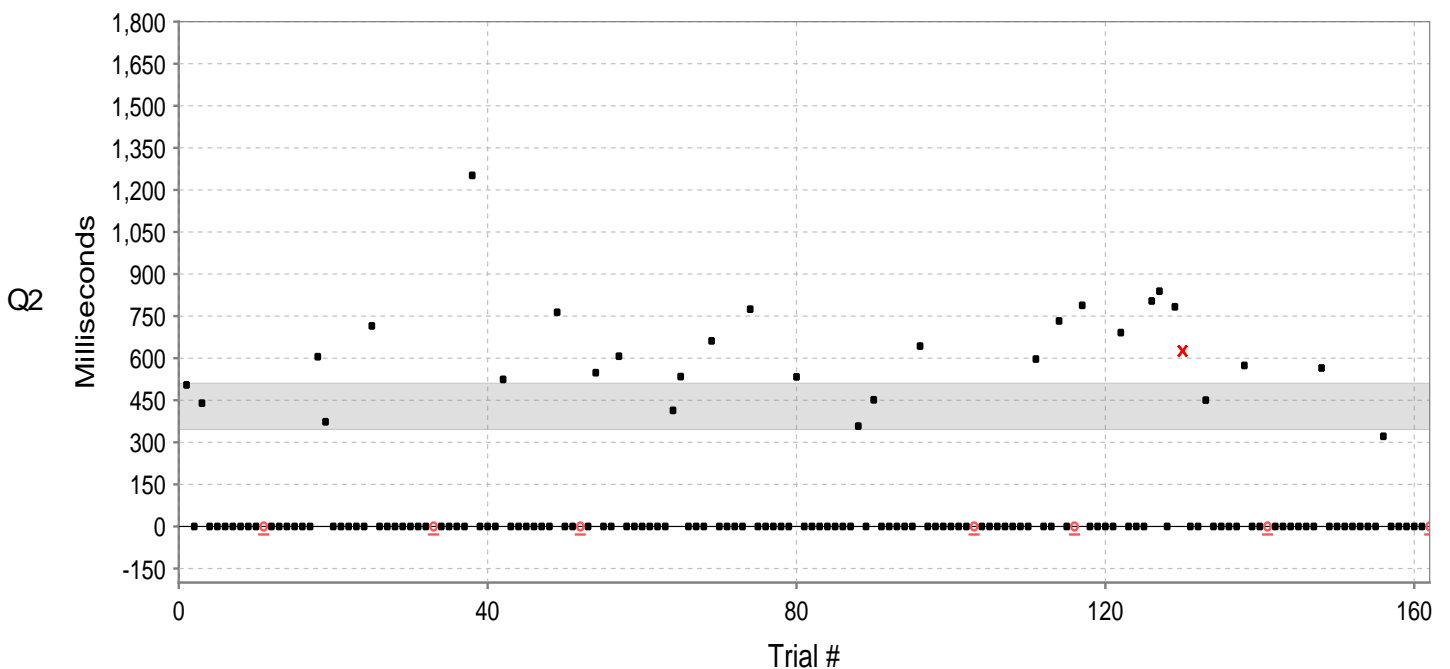
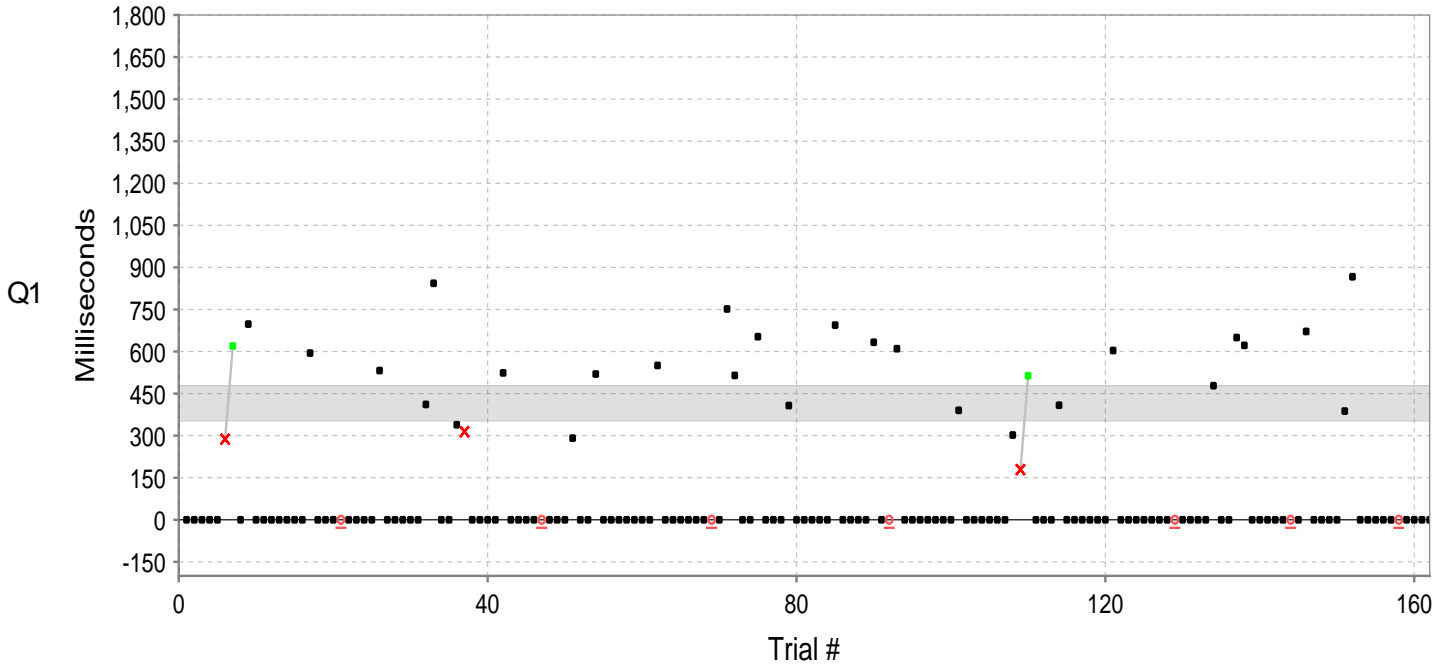
**Hardware information**

Session mode: EAV  
 USB device: HW 5, BD 0, FW 1.1-89-g664fc9a  
 Microswitch: HW 2, BD 0, FW 2  
 Monitor calibration: 14208, 13439, 13024, 13791, 13567, 13759, 13216, 12608, 13183, 13279, 13472, 12927, 13632, 13600, 13472, 13055, 13311, 13407, 13407, 13504, 13824, 13600, 13632, 13695, 13472, 13600, 13376, 13183, 13407, 13600

ID: 1 **Example Subject** (Jul 1, 1997)  
**Male - 19y 11m 0d**

**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.

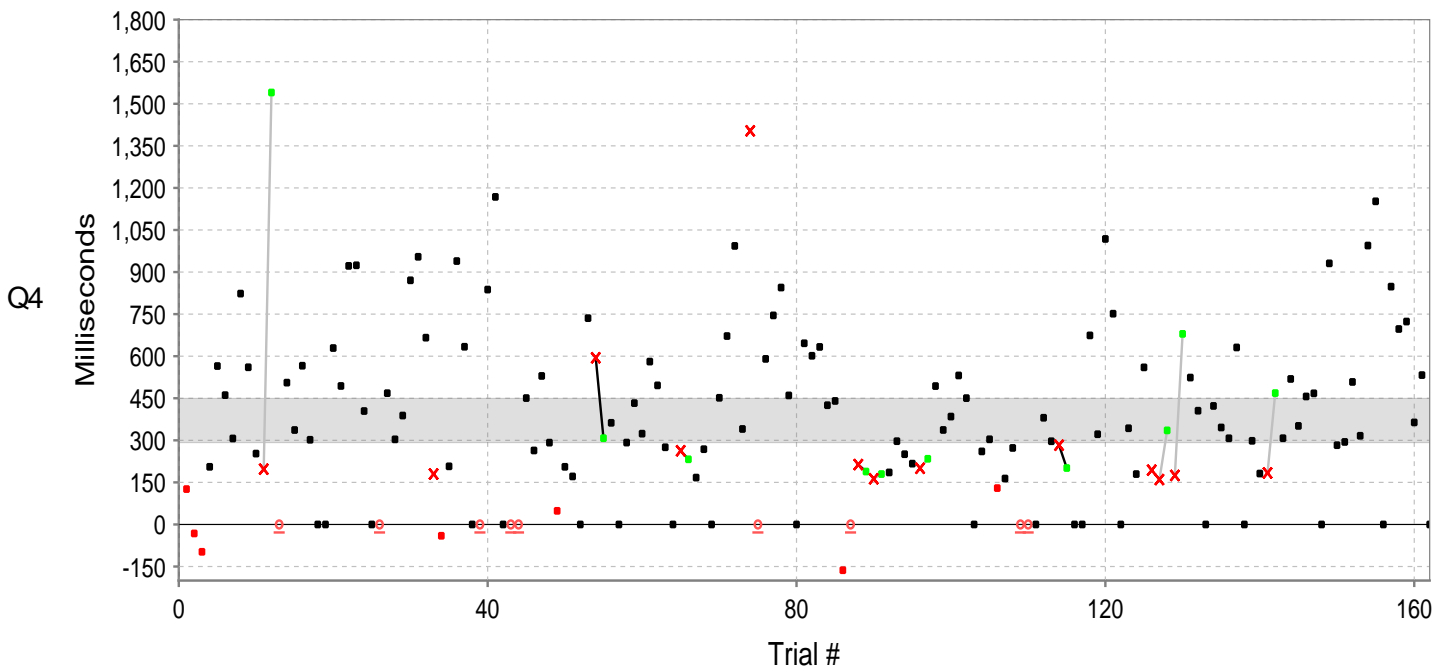
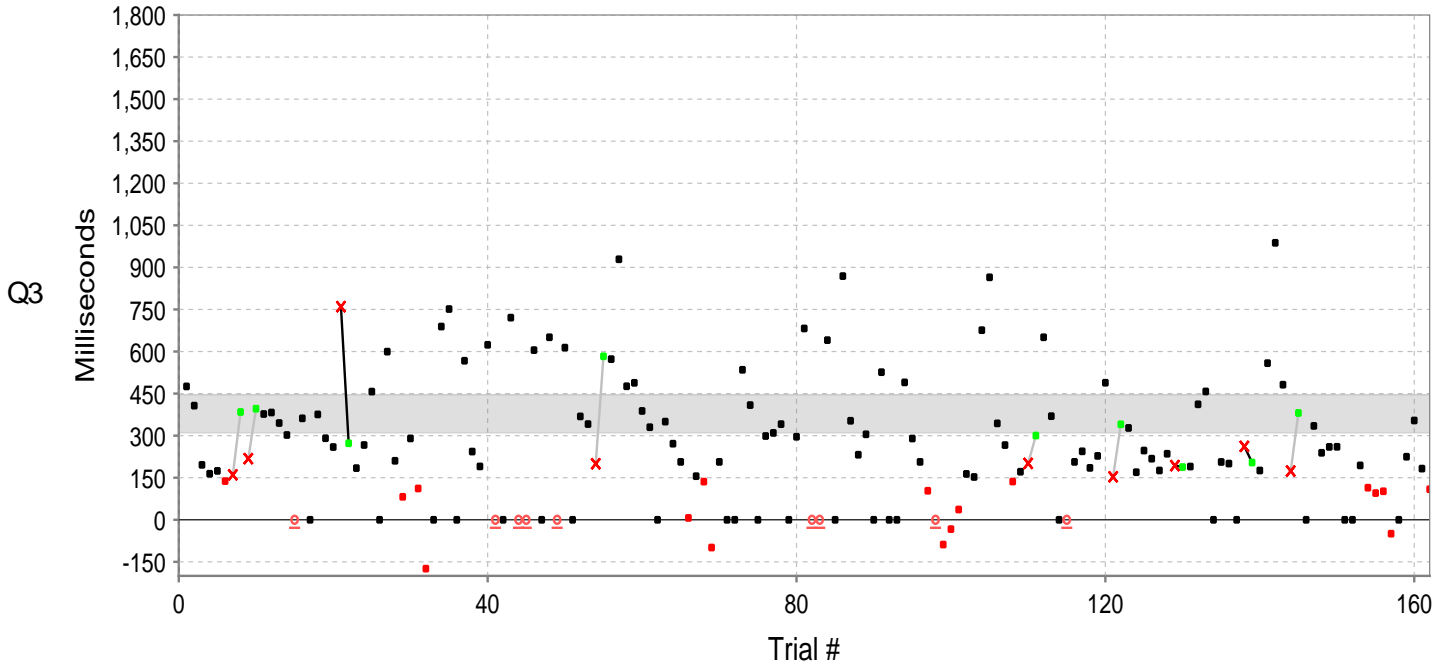


- Correct response    ■ Correct non-response    ✕ Commission error    ○ Omission error    ■ Anticipatory response
- Post-commission error correct response    / Slower post-commission RT    \ Faster post-commission RT
- ▲△ Off-scale resp./error    ■ Normative range    | Interruption    3 10s Response gap (# Targets and Sec)

ID: 1 **Example Subject** (Jul 1, 1997)  
**Male - 19y 11m 0d**

**Visual T.O.V.A.** (v9.0-71 sn30000)  
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- Correct response    ■ Correct non-response    × Commission error    ○ Omission error    ■ Anticipatory response
- Post-commission error correct response    / Slower post-commission RT    \ Faster post-commission RT
- ▲△ Off-scale resp./error    ■ Normative range    | Interruption    3 10s Response gap (# Targets and Sec)

ID: **1** **Example Subject** (Jul 1, 1997)  
**Male - 19y 11m 0d**

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

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	C 178	N
N	N	N	N	T 513	T 649
N	N	N	N	N	T 622
N	N	N	T 694	N	N
N	T 411	N	N	N	N
C 287	T 843	N	N	T 408	N
T 619	N	N	N	N	N
N	N	T 550	N	N	N
T 697	T 338	N	T 633	N	O
N	C 314	N	N	N	N
N	N	N	O	N	T 671
N	N	N	T 610	N	N
N	N	N	N	T 603	N
N	N	N	N	N	N
N	T 523	O	N	N	N
N	N	N	N	N	T 387
T 594	N	T 751	N	N	T 866
N	N	T 514	N	N	N
N	N	N	N	N	N
N	O	N	T 390	N	N
O	N	T 653	N	O	N
N	N	N	N	N	O
N	T 291	N	N	N	N
N	N	T 407	N	N	N
T 532	N	N	N	T 478	N
N	T 519	N	T 302	N	N

163-189	190-216	217-243	244-270	271-297	298-324
T 504	N	N	N	N	N
N	N	N	N	N	N
T 439	N	T 607	N	T 597	T 574
N	N	N	N	N	N
N	N	N	N	N	N
N	O	N	N	T 732	O
N	N	N	T 357	N	N
N	N	N	N	O	N
N	N	N	T 451	T 788	N
N	N	T 413	N	N	N
O	T 1251	T 534	N	N	N
N	N	N	N	N	N
N	N	N	N	N	T 565
N	N	N	N	T 691	N
N	T 524	T 661	T 643	N	N
N	N	N	N	N	N
N	N	N	N	N	N
T 605	N	N	N	T 804	N
T 373	N	N	N	T 838	N
N	N	T 774	N	N	N
N	N	N	N	T 783	T 321
N	T 763	N	O	C 625	N
N	N	N	N	N	N
N	N	N	N	N	N
T 715	O	N	N	T 450	N
N	N	T 533	N	N	N
N	T 548	N	N	N	O

325-351	352-378	379-405	406-432	433-459	460-486
T 475	T 210	T 582	O	T 171	T 200
T 407	TA 81	T 572	O	C 201	N
T 195	T 290	T 928	T 640	T 300	C 261
T 164	TA 111	T 476	N	T 650	T 204
T 174	NA -174	T 488	T 869	T 369	T 175
TA 138	N	T 388	T 353	N	T 558
C 160	T 689	T 330	T 232	O	T 987
T 384	T 751	N	T 304	T 206	T 481
C 218	N	T 350	N	T 244	C 173
T 396	T 567	T 271	T 526	T 185	T 380
T 377	T 243	T 206	N	T 227	N
T 382	T 190	TA 6	N	T 488	T 334
T 345	T 623	T 155	T 489	C 153	T 238
T 302	O	TA 136	T 289	T 340	T 259
O	N	NA -98	T 206	T 327	T 260
T 361	T 720	T 206	TA 103M	T 169	N
N	O	N	O	T 247	N
T 375	O	N	TA -88	T 217	T 193
T 290	T 605	T 534	TA -33	T 175	TA 114
T 259	N	T 409	NA 36	T 235	TA 95
C 760	T 650	N	T 163	C 193	TA 101
T 272	O	T 298	T 152	T 188	TA -49M
T 184	T 613	T 309	T 676	T 189	N
T 266	N	T 341	T 864	T 411	T 224
T 457	T 368	N	T 343	T 457	T 354
N	T 341	T 296	T 266	N	T 182
T 599	C 199	T 682	NA 136	T 206	TA 108

487-513	514-540	541-567	568-594	595-621	622-648
NA 126	T 303	T 307	T 601	O	T 307
TA -32	T 388	T 362	T 633	O	T 631
NA -97	T 870	N	T 425	N	N
T 205	T 954	T 292	T 440	T 380	T 298
T 564	T 666	T 432	TA -163M	T 296	T 181
T 461	C 179	T 323	O	C 282	C 183
T 306	TA -40	T 580	C 213	T 201	T 468
T 823	T 207	T 495	T 188	N	T 307
T 560	T 939	T 275	C 162	N	T 518
T 252	T 633	N	T 179	T 674	T 351
C 197M	N	C 262	T 185	T 321	T 456
T 1540	O	T 232	T 296	T 1018	T 467
O	T 837	T 167	T 250	T 751	N
T 505	T 1168	T 268	T 216	N	T 931
T 336	N	N	C 200	T 343	T 282
T 566	O	T 451	T 234	T 179	T 294
T 301	O	T 671	T 493	T 560	T 508
N	T 450	T 993	T 336	C 193	T 316
N	T 263	T 340M	T 384	C 160	T 994
T 629	T 529	C 1403	T 531	T 335	T 1152
T 493	T 291	O	T 450	C 174	N
T 922	NA 48	T 590	N	T 679	T 848
T 924	T 205	T 745	T 260	T 523	T 696
T 404	T 171	T 844	T 303	T 405	T 723
N	N	T 460	TA 129	N	T 363
O	T 735	N	T 163	T 422	T 532
T 468	C 594	T 646	T 272	T 345	N

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