# 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.
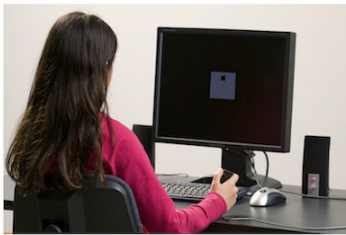
If you have questions about this report, please contact the person who provided it to you. For more information about attention and the T.O.V.A., please visit our website at https://www.tovatest.com/. To contact us please email info@tovatest.com or call 800.PAY.ATTN (562.594.7700).

TOVA

ID: **1**   **12y Male with ADHD DX Example Subject** (Jan 1, 2006)   **Visual T.O.V.A.** (v9.0-89 sn30000)
Male - 12y 0m 0d   Jan 1, 2018 at 9:00 AM

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.
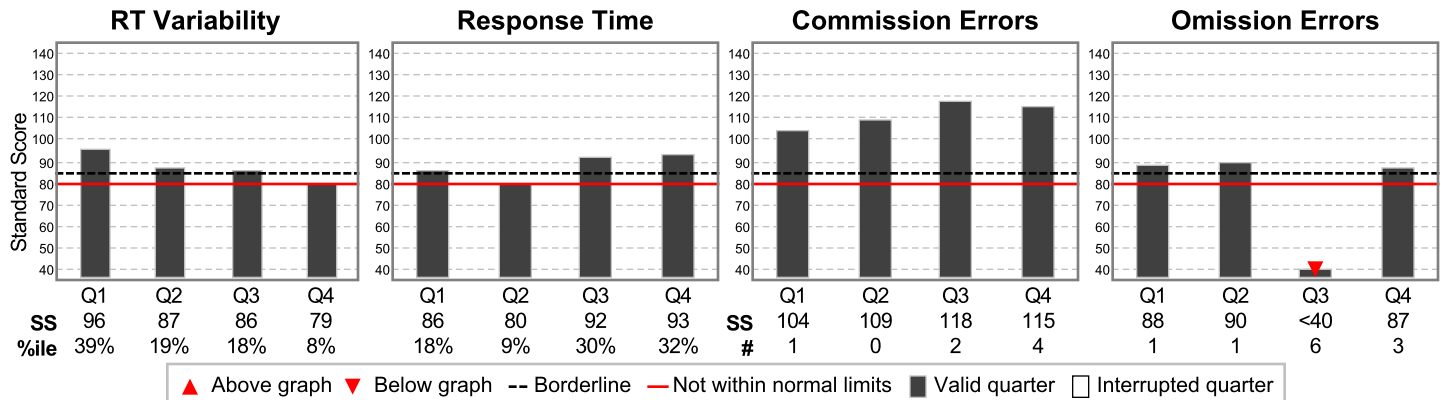
Treatment

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			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
SS	96	87	86	79	86	80	92	93	104	109	118	115	88	90	<40	87
%ile	39%	19%	18%	8%	18%	9%	30%	32%	1	0	2	4	1	1	6	3

▲ 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.

	Quarter				Half		Total
	1	**2**	**3**	**4**	**1**	**2**	
RT Variability	96	87	86	79	90	81	81
Response Time	86	80	92	93	82	92	90
Commission Errors	104	109	118	115	106	118	116
Omission Errors	88	90	<40	87	79	65	65
	Infrequent		Frequent				

Key: Borderline , Not within normal limits , Invalid

Session comments

12-year-old male independently diagnosed with ADHD.

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 borderline in Half 2 and Total, and not within normal limits in Quarter 4.**

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

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 Quarter 3, Half 1 and 2, and Total.**

Response Patterns

Only Quarter 1 is within normal limits. This may represent a limited span of attention (i.e., about 5 minutes).

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.

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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)	-1.21
D Prime (Half 2)	-0.73
Variability (Total)	-1.24
Calibration constant	1.80
Attention Comparison Score	-1.38

-1.38
▽

-10	ADHD Sample	0	Normative Sample	10

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	115	154	155	188	139	172	171
Response Time	ms	492	551	427	409	521	418	441
Post-commission responses	#	0	0	2	2	0	4	4
Response Time	ms	0	0	480	428	0	454	454
Variability	ms	0	0	7	73	0	58	58
Commission Errors	#	1/126	0/126	2/36	4/36	1/252	6/72	7/324
Percentage	%	0.8	0	5.6	11.1	0.4	8.3	2.2
Response Time	ms	644	0	252	327	644	302	351
Omission Errors	#	1/36	1/36	6/126	3/126	2/72	9/252	11/324
Percentage	%	2.8	2.8	4.8	2.4	2.8	3.6	3.4
D Prime		4.33	6.18	3.26	3.2	4.57	3.19	3.85
Standard Score		72	93	89	89	79	89	85
Beta		2.93	1425.08	0.88	0.3	5.43	0.51	1.46
Anticipatory	%	0	0	0	0.6	0	0.3	0.2
To Nontargets	#	0	0	0	1	0	1	1
To Targets	#	0	0	0	0	0	0	0
Multiple Responses	#	0	1	0	0	1	0	1
Total Correct	#	160/162	161/162	154/162	154/162	321/324	308/324	629/648
Percentage	%	98.8	99.4	95.1	95.1	99.1	95.1	97.1
Skew	ms	-14	115	78	51	88	59	83
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-subjects.tova (1 / 7)
Import Date:	Sep 21, 2023 11:23:43 AM
Errors/Warnings:	

Hardware information

Session mode:	PTE
USB device:	HW 5, BD 0, FW 1.1-219-gd36f0e2
Microswitch:	HW 3, BD 0, FW 9
Monitor calibration:	15000, 15000, 15000, 15000, 15000, 15000, 15000, 15000, 15000, 15000, 15000, 15000, 15000, 14000, 15000, 15000, 15000, 15000, 15000, 15000, 15000, 15000, 15000, 15000, 15000, 15000, 15000, 15000, 15000, 15000, 15000, 15000, 15000

ID: 1 **12y Male with ADHD DX Example Subject** (Jan 1, 2006)
Male - 12y 0m 0d

Visual T.O.V.A. (v9.0-89 sn30000)
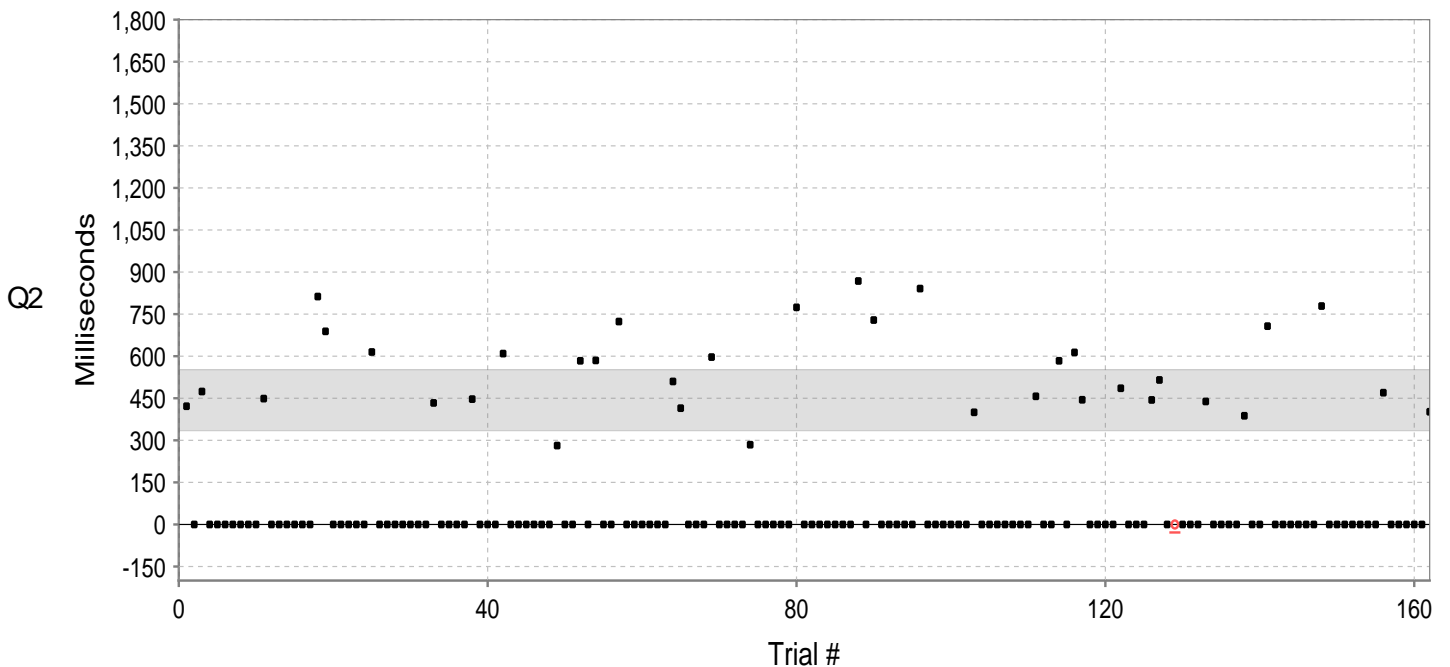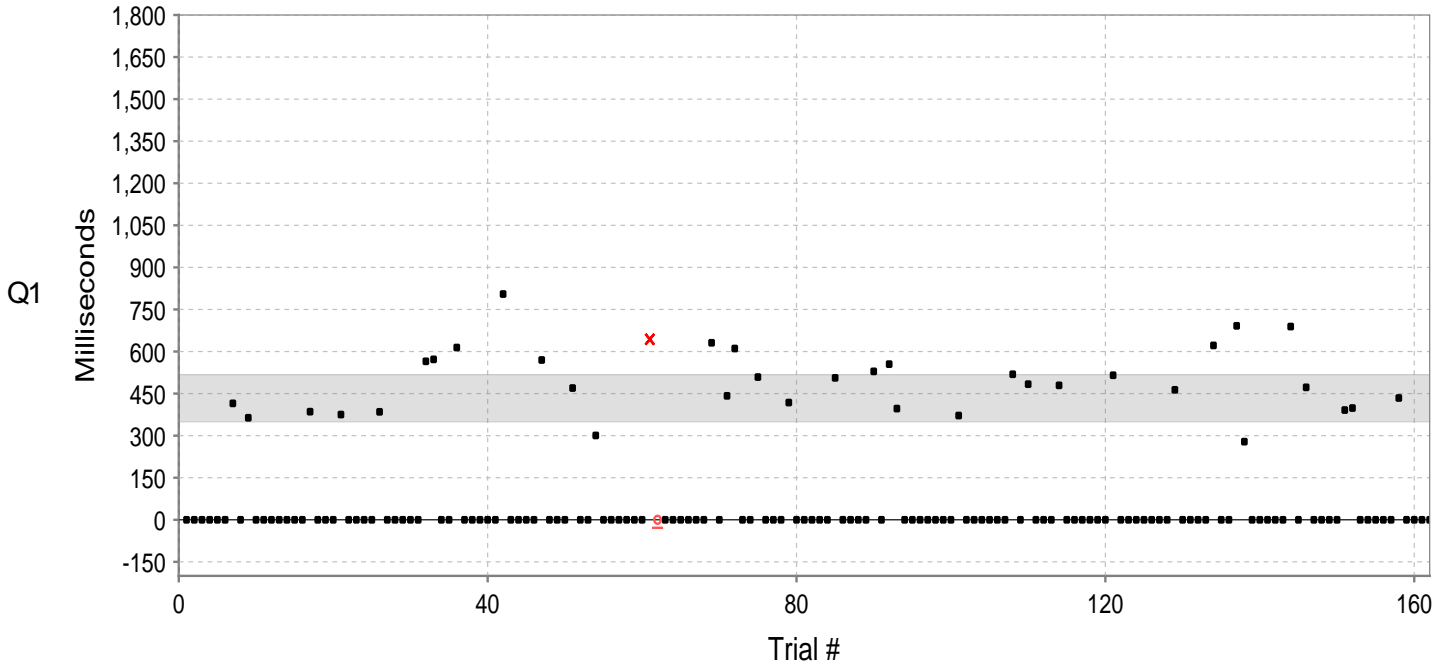Jan 1, 2018 at 9:00 AM

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.
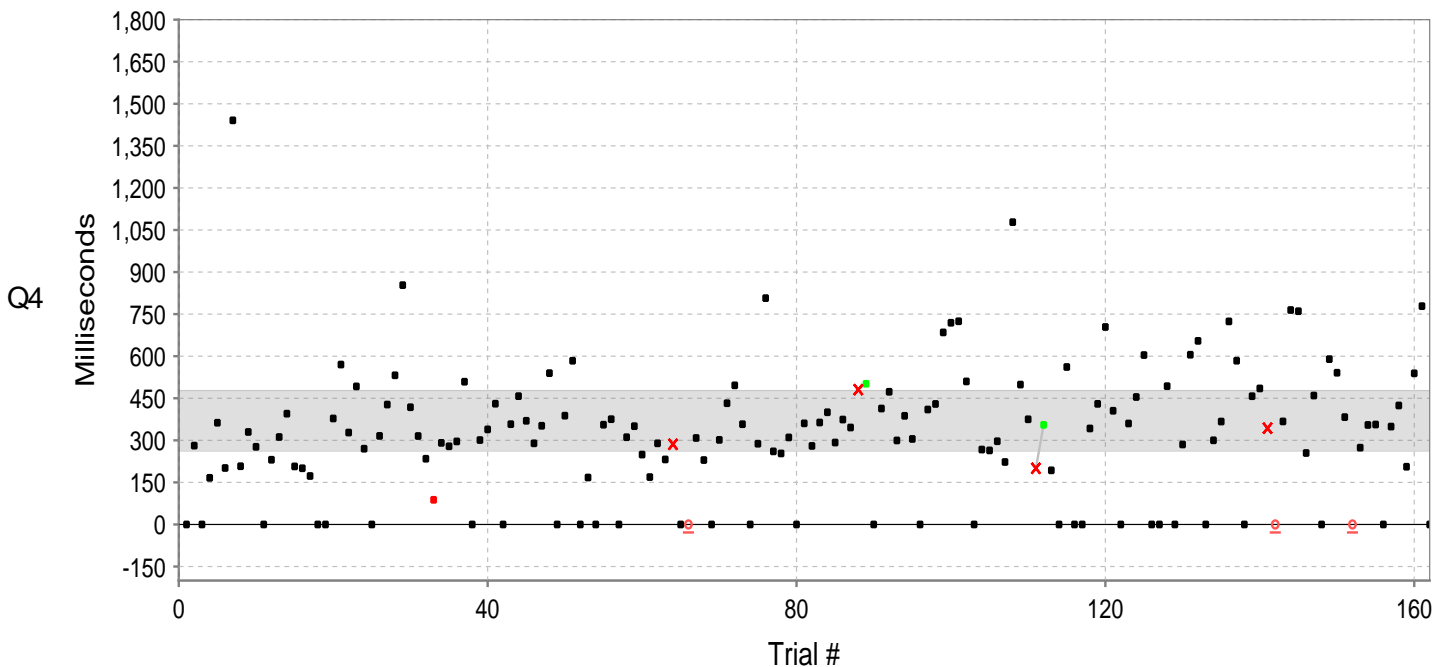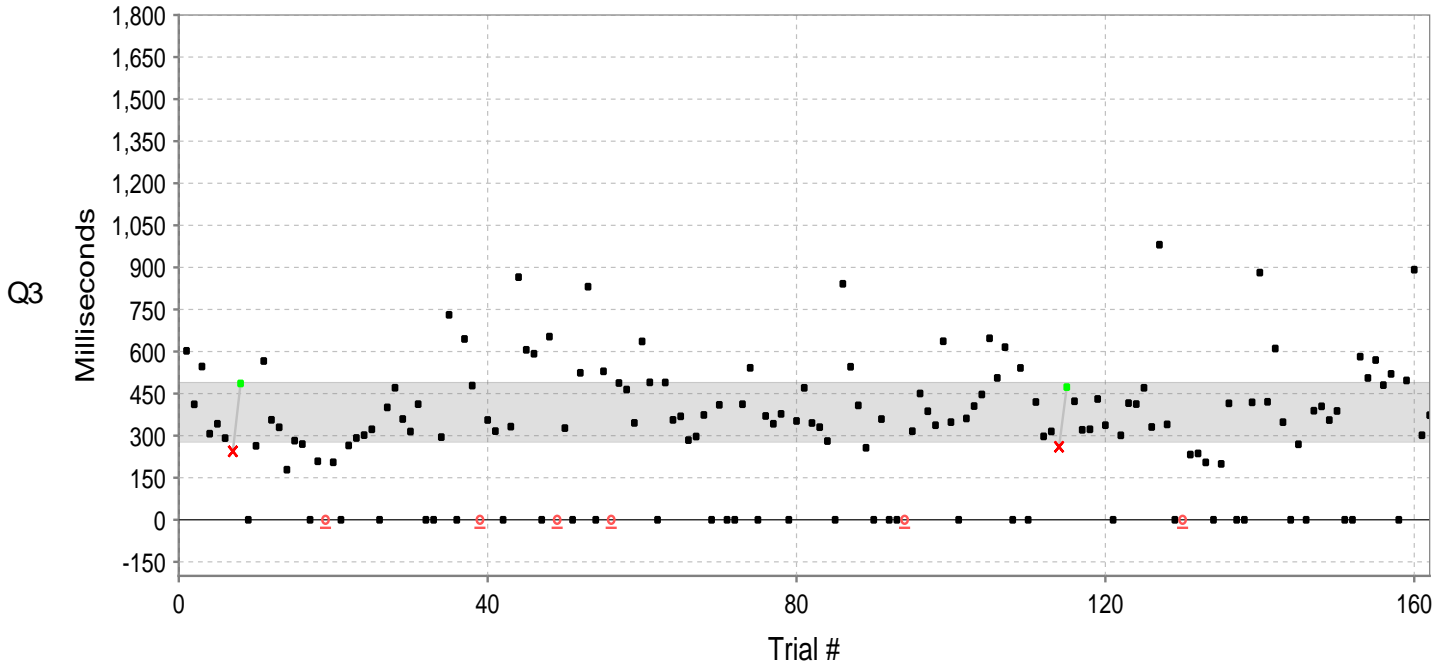

Legend:
- ■ Correct response
- ■-■ Correct non-response
- ✕ Commission error
- o̲ Omission error
- ■ Anticipatory response
- ■ Post-commission error correct response
- ╱ Slower post-commission RT
- ╲ Faster post-commission RT
- ▲△ Off-scale resp./error
- Normative range
- **|** Interruption
- 3 10s Response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

ID: 1 **12y Male with ADHD DX Example Subject** (Jan 1, 2006) **Visual T.O.V.A.** (v9.0-89 sn30000)
Male - 12y 0m 0d Jan 1, 2018 at 9:00 AM

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	ọ 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** **12y Male with ADHD DX Example Subject** (Jan 1, 2006) **Male - 12y 0m 0d**

Visual T.O.V.A. (v9.0-89 sn30000)
Jan 1, 2018 at 9:00 AM

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	T 483	T 691
N	N	N	N	N	T 278
N	N	N	T 506	N	N
N	T 565	N	N	N	N
N	T 572	N	N	T 479	N
T 415	N	C 643	N	N	N
N	N	O	N	N	N
T 363	T 614	N	T 529	N	T 689
N	N	N	N	N	N
N	N	N	T 554	N	T 472
N	N	N	T 396	N	N
N	N	N	N	T 515	N
N	N	N	N	N	N
N	T 804	T 631	N	N	N
N	N	N	N	N	T 391
T 385	N	T 441	N	N	T 398
N	N	T 610	N	N	N
N	N	N	N	N	N
N	T 569	N	T 371	N	N
T 375	N	T 508	N	T 463	N
N	N	N	N	N	N
N	N	N	N	N	T 434
N	T 469	N	N	N	N
N	N	T 418	N	N	N
T 384	N	N	N	T 621	N
N	T 300	N	T 518	N	N

163-189	190-216	217-243	244-270	271-297	298-324
T 421	N	N	N	N	N
N	N	N	N	N	N
T 474	N	T 723	N	T 456	T 387
N	N	N	N	N	N
N	N	N	N	N	N
N	T 433	N	N	T 583	T 707
N	N	N	T 868	N	N
N	N	N	N	T 613	N
N	N	N	T 728	T 444	N
N	N	T 509	N	N	N
T 448	T 446	T 414	N	N	N
N	N	N	N	N	N
N	N	N	N	N	T 778
N	N	N	N	T 485	N
N	T 609	T 596	T 841	N	N
N	N	N	N	N	N
T 812	N	N	N	T 444	N
T 688	N	N	N	T 515	N
N	N	T 284	N	N	N
N	N	N	N	O	T 469
N	T 281	N	T 399	N	N
N	N	N	N	N	N
N	N	N	N	N	N
T 615	T 583M	N	N	T 438	N
N	N	T 774	N	N	N
N	T 584	N	N	N	T 401

325-351	352-378	379-405	406-432	433-459	460-486
T 602	T 470	T 529	T 345	T 541	T 415
T 411	T 359	O	T 330	N	N
T 546	T 314	T 487	T 280	T 420	N
T 307	T 412	T 464	N	T 297	T 418
T 342	N	T 345	T 841	T 315	T 881
T 291	N	T 635	T 545	C 260	T 420
C 244	T 294	T 490	T 408	T 473	T 610
T 486	T 730	N	T 256	T 422	T 348
N	N	T 489	N	T 320	N
T 263	T 644	T 356	T 359	T 322	T 269
T 566	T 478	T 368	N	T 430	N
T 356	O	T 284	N	T 337	T 388
T 329	T 355	T 296	O	N	T 404
T 178	T 316	T 373	T 315	T 301	T 355
T 282	N	N	T 450	T 416	T 388
T 270	T 332	T 409	T 387	T 412	N
N	T 865	N	T 337	T 470	N
T 208	T 606	N	T 636	T 330	T 581
O	T 592	T 412	T 348	T 980	T 505
T 205	N	T 541	N	T 340	T 569
N	T 653	N	T 361	N	T 480
T 265	O	T 370	T 405	O	T 520
T 291	T 326	T 342	T 446	T 232	N
T 301	N	T 377	T 647	T 236	T 496
T 322	T 524	N	T 505	T 204	T 891
N	T 831	T 352	T 615	N	T 301
T 400	N	T 470	N	T 199	T 373

487-513	514-540	541-567	568-594	595-621	622-648
N	T 531	T 355	T 279	T 498	T 724
T 281	T 853	T 375	T 363	T 374	T 583
N	T 417	N	T 400	C 200	N
T 166	T 315	T 311	T 292	T 355	T 457
T 362	T 234	T 350	T 374	T 192	T 485
T 201	NA 87	T 249	T 345	N	C 343
T 1441	T 290	T 168	C 480	T 561	O
T 207	T 278	T 289	T 501	N	T 367
T 329	T 296	T 231	N	N	T 764
T 276	T 509	C 285	T 413	T 342	T 760
N	N	N	T 473	T 430	T 254
T 230	T 301	O	T 299	T 704	T 459
T 311	T 338	T 308	T 387	T 405	N
T 395	T 430	T 229	T 304	N	T 589
T 206	N	N	N	T 360	T 540
T 200	T 357	T 301	T 409	T 454	T 382
T 172	T 457	T 432	T 429	T 604	O
N	T 369	T 496	T 684	N	T 273
N	T 289	T 357	T 719	N	T 354
T 377	T 351	N	T 724	T 493	T 356
T 570	T 539	T 287	T 509	N	N
T 327	N	T 807	N	T 285	T 349
T 492	T 387	T 260	T 267	T 605	T 424
T 270	T 583	T 253	T 263	T 654	T 205
N	N	T 310	T 296	N	T 538
T 315	T 167	N	T 222	T 300	T 778
T 427	N	T 360	T 1078	T 366	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

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