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Normative Data for 144 Compound Remote Associate Problems

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### Abstract

We have developed and tested 144 compound remote associate problems. Across eight experiments, 289 participants were given four time limits (2 seconds, 7 seconds, 15 seconds, or 30 seconds) in which to solve each problem. This paper provides a brief overview of the problems and normative data regarding the percentage of participants solving, and mean time-to-solution for, each problem at each time limit. These normative data can be used to select problems based on difficulty or mean time necessary to reach a solution.

### Normative Data for 144 Compound Remote Associate Problems

We have developed 144 simple problems for use in our research on the experience of insight in problem solving. These problems were patterned after items in the Remote Associates Test (RAT) developed by Mednick (1962). Our goal with this paper is to make these problems available to other researchers along with normative information regarding the relative difficulty of each problem. These normative data can be used to select problems based on difficulty or mean time necessary to reach a solution.

Mednick (1962) developed the RAT as a measure of creative thought that would not require knowledge specific to any field. He constructed two college-level versions of the test, each consisting of 30 items (Mednick, 1968; Mednick & Mednick, 1967). The items in the RAT consist of three words that can be associated with the solution word in a number of ways (e.g., the three words SAME / TENNIS / HEAD are associated with the solution MATCH by synonymy (same = match), by formation of a compound word (matchhead), and by semantic association (tennis match). Thus, reaching a solution requires "creative thought" because the first, most-related, information retrieved in solution attempts is often not correct, and solvers must think of more distantly related information to connect the three words. Problem solvers' success on items from the original RAT reliably correlates with their success on classic insight problems (Dallob & Dominowski, 1993; Schooler & Melcher, 1995).

For the most part the RAT and RAT-like problems have been used to study problem solving and creative thinking (e.g., Ansburg, 2000; Beeman & Bowden, 2000; Bowden & Beeman, 1998, in press; Bowers, Regehr, Balthazard, & Parker, 1990; Dallob & Dominowski, 1993; Dorfman, Shames, & Kihlstrom, 1996; Schooler & Melcher, 1995; Shames, 1994; Smith & Blankenship, 1991). They have also been used in a variety of innovative ways including

studying psychopathologies (e.g., Fodor, 1999), affect (e.g., Mikulincer & Sheffi, 2000), success and failure experiences (e.g., Vohs & Heatherton, 2001), and as an alternative to illusory feedback (e.g., McFarlin & Blascovich, 1984). In addition, Hebrew, Japanese, and Jamaican versions have been implemented (Baba, 1982; Hamilton, 1982; Levin & Nevo, 1978).

Although RAT items are not as complex as classic insight problems, they exhibit the three properties of insight problems that distinguish insight solutions from non-insight solutions: (1) they misdirect (or fail to direct) retrieval processes. (2) Solvers often cannot report the processing that led to the solution (Ben-Zur, 1989). (3) Upon solving RAT items solvers often have the Aha! experience (Bowden & Beeman, in press). This third property is considered the central defining feature of insight problems. Thus, solving RAT-like items appears to involve the same component processes critical for, and the same phenomenological experience of, insight solutions to more complex problems.

In general, researchers have faced two difficulties when using classic insight problems. Typical (classic) insight problems are usually complex; therefore, participants are able to attempt few problems (occasionally only one) in an experimental session. The use of only a few problems greatly reduces the reliability of the data collected. Furthermore, the complexity of typical insight problems can lead to the confounding of variables. This hinders the clear decomposition of the component processes of problem solving. Compound remote associate problems have several advantages over classic insight problems: (1) They can be solved in a short time period, so that many can be attempted in a single experimental session of one hour or less. (2) They are simpler than classic insight problems allowing better control of possible confounding variables. (3) They have a single-word, unambiguous solution making scoring of responses easier. (4) They are physically compact, so that they can be presented in a small visual

space or short time span. These features allow for better control and measurement of timing variables (e.g., measuring the time between presentation of the problem and production of a solution, controlling timing of hint presentation or timing of solution presentation for solution judgment tasks, etc.), and display variables (e.g., position of the problem and/or solution on the screen). These features also allow for the use of various paradigms (e.g., priming, solution recognition, and hemispheric differences paradigms).

### *Method*

#### *Participants*

Participants were 289 students from the University of Wisconsin-Parkside, the University of Illinois-Chicago, and the University of Pennsylvania.

#### *Materials*

Mednick's (1962) original versions of the RAT contained 30 items each and the solution word for each item was sometimes associated with the words in a triad in several different ways. We wanted a greater number of problems than were available in the original RAT. We also wanted to present participants with a more consistent task—that is, the solution would always be related to the triad words in the same way. To this end, we created our own set of problems, so that the solution word was associated with all three words of the triad by formation of a compound word (or phrase) (e.g., AGE / MILE / SAND form the compounds STONEAGE, MILESTONE, and SANDSTONE with the solution word STONE). Solution words were never repeated or used as problem words; problem words were sometimes repeated (e.g., *house* is repeated six times). The result was 144 compound remote associate problems. Below we provide normative data for the solvability of these items.

*Procedure*

Participants were tested individually. Participants were told that they would see three stimulus words and that they should attempt to generate a fourth word, that, when combined with each of the three stimulus words would result in word pairs that are a common compound word or phrase. They were given five practice problems prior to the experiment itself. Each trial began with participants fixating a cross that was positioned at the center of the screen. So that participants could see all three words with minimal eye movement, the problem words were then presented simultaneously in normal horizontal orientation above, at, and below the center of the screen. Participants tried to produce the solution word within a time limit. Six experiments used three different time limits (2, 7, and 15 seconds). Immediately following the production of a solution, or the end of the time limit, participants were shown a lateralized target word for 180 msec and were either to quickly read the word aloud or judge whether the word was the solution to the problem. Only data regarding problem solution within the time limit are presented in this paper, data regarding reading or judgments of the target words, and details of the procedure, are presented elsewhere (Beeman & Bowden, 2000; Bowden & Beeman, 1998). Problems were presented by a Macintosh computer in 24-point Times font, black on a white background.

In two other experiments (one using Event Related Potential [ERP] and one using functional Magnetic Resonance Imaging [fMRI] procedures) participants tried to produce the solution word within a 30-second time limit. In these two experiments each trial began with a central fixation cross, then the three problem words were presented simultaneously in normal horizontal orientation above, at, and below the center of the screen. The problem stayed on the screen until it was solved or the time limit expired. No target words were shown following the solution or time limit.

There were several potentially important differences between these two experiments and the previous six. Both ERP and fMRI procedures create less than optimal conditions for problem solving, so the results may underestimate participants' performance under better conditions. Because of the need for scalp electrode placement, and the use of 186 problems<sup>1</sup>, this ERP experiment involved very long sessions (up to four hours). To minimize eye movement, the problems were presented in a smaller font than in the previous experiments (14-point Arial font, yellow on a black background). In fMRI experiments, the scanner creates a noisy environment and participants' heads are held in position with cushions in an effort to eliminate head movement artifacts. In addition, participants in this fMRI experiment saw 124 of the 144 problems and did a line comparison task after each problem-solving trial.<sup>2</sup>

Despite these differences in procedures there was a high correlation for percentage of participants solving the problems in the ERP and fMRI experiments,  $r(124) = 0.80$ . Therefore, we combined the data from the ERP and fMRI experiments for the 30-second time limit.

### *Results and Discussion*

Participants who were excluded from previously published analyses (Beeman & Bowden, 2000; Bowden & Beeman, 1998) because they were left-handed or had solved too few problems, were included in these analyses to give an accurate picture of the difficulty of the items.

We calculated the percentage of participants solving each problem within each of the three time limits. We also calculated the mean time-to-solution for the 7-, 15-, and 30-second time limits.<sup>3</sup> These data are presented in the Appendix in descending order according to the percentage of participants producing a solution within the 15-second time limit.

Correlations between time limits were calculated for the percentage of participants solving the problems. The correlation matrix is presented in Table 1.

The problems presented in this paper are uncomplicated in the sense that each one has a single-word, unambiguous solution that is related to the three words in the problem in a single consistent way (i.e., forms a compound word or phrase), they can be solved quickly, and are physically compact. These features increase the reliability of the data, reduce the confounding of variables aiding in the clear decomposition of the component processes of problem solving, make scoring of responses easier, allow for control and measurement of timing variables and display variables, and the use of various paradigms. Similar problems have been used to study problem solving and creative thinking, psychopathologies, affect, success and failure experiences, and as an alternative to illusory feedback. By providing solvability and time-to-solution data, we hope to encourage the further use of remote associate problems in these areas and in innovative new ways.

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Table 1

*Correlations for percentage of participants producing solutions within four solution time limits.*

	Time Available to Produce a Solution		
	2 seconds	7 seconds	15 seconds
2 seconds	-	-	-
7 seconds	0.93	-	
15 seconds	0.83	0.91	-
30 seconds	0.71	0.80	0.83

### Author Notes

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The data were collected while the authors were at the Department of Neurology, Cognitive Neuroscience Section, Rush Medical Center, Chicago, IL, and the Department of Psychology, University of Pennsylvania.

We would like to thank Sylvia Beyer for many helpful comments during the writing of this paper, Stella Liu for testing participants in the ERP experiment and collating the 30-second time limit data, and Kim Hassenfeld for help in developing the remote associates problems.

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## Footnotes

<sup>1</sup> Forty-two new problems were developed for the ERP experiment. Data from these new problems is not presented in this paper.

<sup>2</sup> In the line comparison task participants saw two sets of lines (eg., // \ and / \ /).

The task was to answer “yes” if both sets had the same number of left-leaning and right-leaning lines, or “no” if the sets had a different number of left-leaning and right-leaning lines. In this example, the answer is “yes”.

<sup>3</sup> Solution time data were not collected for the 2-second time limit.

## Appendix

## Maximum time allowed to produce a solution

Compound Remote Associate Problems	Solutions □	2 seconds N=89		7 seconds N=85		15 seconds N=76			30 seconds N=39		
		% of participants	% of participants	mean	standard	% of participants	mean	standard	% of participants	mean	standard
		solving item	solving item	solution time	deviation	solving item	solution time	deviation	solving item	solution time	deviation
cottage/swiss/cake	<i>cheese</i>	52%	84%	3283	1251	96%	3965	2372	64%*	10847	7037
cream/skate/water	<i>ice</i>	34%	76%	3425	1159	92%	4040	1870	90%	4117	3579
loser/throat/spot	<i>sore</i>	22%	61%	4185	1490	86%	5385	3023	82%	6315	4062
show/life/row	<i>boat</i>	31%	72%	4424	1438	82%	5665	2336	79%	10300	7224
night/wrist/stop	<i>watch</i>	38%	65%	4331	1311	82%	6003	3003	97%	6266	5826
duck/fold/dollar	<i>bill</i>	31%	69%	4329	1246	80%	6048	2819	92%	6582	4280
rocking/wheel/high	<i>chair</i>	37%	73%	3978	1429	80%	4982	2555	87%	5840	5364
dew/comb/bee	<i>honey</i>	30%	66%	4243	1501	80%	5630	3150	100%	4115	2142
fountain/baking/pop	<i>soda</i>	34%	71%	4254	1233	78%	6012	2691	92%	5496	3296
preserve/ranger/tropical	<i>forest</i>	18%	59%	3995	1340	76%	5759	2979	85%	9733	6075
aid/rubber/wagon	<i>band</i>	22%	56%	4212	1495	75%	5408	2146	69%	6510	4620
flake/mobile/cone	<i>snow</i>	9%	47%	4202	1610	71%	6720	3103	79%	8684	7020
cracker/fly/fighter	<i>fire</i>	17%	45%	4952	1538	68%	5914	2538	85%	6115	3868
safety/cushion/point	<i>pin</i>	24%	51%	3911	1583	66%	5826	2776	74%	5001	2839
cane/daddy/plum	<i>sugar</i>	19%	60%	4426	1531	66%	6139	3108	97%	5449	4917
dream/break/light	<i>day</i>	24%	56%	4356	1489	64%	5347	2559	56%	7906	6722
fish/mine/rush	<i>gold</i>	17%	46%	4274	1086	63%	6475	3316	74%	9072	6830
political/surprise/line	<i>party</i>	7%	26%	5059	1286	61%	7835	3428	90%	8787	5200
measure/worm/video	<i>tape</i>	10%	45%	4739	1586	58%	6117	2897	87%	8364	5236
high/district/house	<i>school</i>	18%	42%	4364	1343	55%	5588	2450	74%	8896	7748
sense/courtesy/place	<i>common</i>	8%	33%	4668	1291	54%	6282	2891	67%	9245	8108
worm/shelf/end	<i>book</i>	17%	49%	4310	1381	53%	5879	2897	85%	6759	6252
piece/mind/dating	<i>game</i>	6%	19%	5613	1222	53%	7829	2413	46%	15341	7777
flower/friend/scout	<i>girl</i>	9%	22%	5262	1468	51%	8062	2937	67%	11427	7702
river/note/account	<i>bank</i>	2%	29%	5641	991	50%	7985	2810	79%	10532	5878
print/berry/bird	<i>blue</i>	10%	38%	4914	1468	49%	7180	3767	77%	13236	7940
pie/luck/belly	<i>pot</i>	15%	38%	4346	931	49%	5313	2034	44%	8684	4355
date/alley/fold	<i>blind</i>	13%	40%	4512	1217	47%	6985	3329	85%	7059	5420
opera/hand/dish	<i>soap</i>	16%	33%	5256	1411	47%	6544	3114	62%	7920	6450
cadet/capsule/ship	<i>space</i>	18%	34%	4135	1492	47%	5529	2776	74%	5459	3956
fur/rack/tail	<i>coat</i>	2%	16%	5425	1348	46%	7890	3492	79%	7996	6760
stick/maker/point	<i>match</i>	1%	4%	5424	1230	46%	6648	3457	21%	12195	8152
hound/pressure/shot	<i>blood</i>	4%	32%	4505	1431	42%	6482	3936	72%	6975	5319
fox/man/peep	<i>hole</i>	16%	41%	4234	1318	42%	5696	2605	64%	7059	4796
sleeping/bean/trash	<i>bag</i>	27%	68%	4024	1588	41%	5942	3114	82%	6801	6360
dust/cereal/fish	<i>bowl</i>	11%	24%	4434	1782	41%	6389	3294	49%	9531	6645
light/birthday/stick	<i>candle</i>	8%	36%	5136	1654	41%	7969	3021	46%	9736	6833
food/forward/break	<i>fast</i>	4%	24%	4751	1576	41%	7543	3243	82%	7731	5770
shine/beam/struck	<i>moon</i>	3%	22%	4549	1803	41%	6079	2620	62%	6167	4932
peach/arm/tar	<i>pit</i>	15%	39%	3863	1269	41%	4997	2390	67%	10014	7967
water/mine/shaker	<i>salt</i>	12%	28%	4934	1429	41%	7455	2852	85%	7852	3371
palm/shoe/house	<i>tree</i>	12%	25%	4837	1716	41%	7792	3188	51%	13895	7899
basket/eight/snow	<i>ball</i>	7%	25%	5265	1143	39%	9566	3573	72%	10866	7176
wheel/hand/shopping	<i>cart</i>	16%	31%	5077	1365	39%	7963	3334	49%	10647	6196
right/cat/carbon	<i>copy</i>	6%	25%	4840	1781	39%	7452	3139	46%	11879	7427
home/sea/bed	<i>sick</i>	3%	16%	5029	1557	38%	7627	2478	10%**	5833	2765
nuclear/feud/album	<i>family</i>	3%	16%	4704	1490	37%	8291	3216	85%	9476	5468

sandwich/house/golf	<i>club</i>	4%	16%	5312	1291	36%	7011	2955	82%	9098	4955
cross/rain/tie	<i>bow</i>	3%	18%	5538	1239	34%	8557	3253	46%	13754	8386
sage/paint/hair	<i>brush</i>	8%	28%	5301	1352	34%	7036	2719	69%	9879	6869
french/car/shoe	<i>horn</i>	9%	29%	4904	1487	34%	6876	2574	69%	12583	8708
boot/summer/ground	<i>camp</i>	17%	41%	3938	1215	33%	4666	2108	54%	4458	2322
chamber/mask/natural	<i>gas</i>	7%	26%	3928	1131	33%	5858	2252	44%	5266	4900
mill/tooth/dust	<i>saw</i>	10%	25%	4178	1292	33%	6584	3707	51%	7135	5453
main/sweeper/light	<i>street</i>	12%	32%	4699	1347	33%	5729	2817	64%	7696	5648
pike/coat/signal	<i>turn</i>	4%	16%	4611	1705	33%	6801	3576	64%	12552	9680
office/mail/hat	<i>box</i>	2%	14%	6034	830	32%	8257	3742	21%	17232	7603
fly/clip/wall	<i>paper</i>	9%	34%	5089	1529	32%	7290	3212	49%	11021	7493
age/mile/sand	<i>stone</i>	11%	27%	5017	1255	32%	8347	2826	44%	16607	8672
catcher/food/hot	<i>dog</i>	3%	14%	4618	1390	30%	8043	3259	46%	10221	5540
wagon/break/radio	<i>station</i>	13%	19%	5361	1197	30%	7879	3314	51%	14568	8773
tank/hill/secret	<i>top</i>	2%	15%	5813	595	30%	10126	3101	38%	11196	5820
health/taker/less	<i>care</i>	2%	12%	5042	2083	29%	7764	3107	44%	10580	7264
lift/card/mask	<i>face</i>	7%	21%	5172	1248	29%	7546	3313	33%	12794	7717
dress/dial/flower	<i>sun</i>	4%	15%	4448	1616	29%	5790	2735	51%	7778	5720
force/line/mail	<i>air</i>	10%	27%	3938	1254	28%	7517	4064	28%	13903	7763
guy/rain/down	<i>fall</i>	3%	12%	5025	1728	28%	9423	3515	41%	13299	8123
eight/skate/stick	<i>figure</i>	4%	16%	4661	1220	28%	5785	2645	59%	5550	4175
down/question/check	<i>mark</i>	9%	21%	4859	1525	28%	7916	3373	54%	11351	7099
animal/back/rat	<i>pack</i>	7%	26%	5061	1172	28%	8860	3794	49%	10716	7081
officer/cash/larceny	<i>petty</i>	4%	18%	4690	1349	28%	5803	2769	44%	9491	7437
pine/crab/sauce	<i>apple</i>	6%	16%	4575	1240	26%	7233	3114	33%	14967	8409
house/thumb/pepper	<i>green</i>	7%	20%	4447	1431	26%	7707	3238	49%	12588	7598
carpet/alert/ink	<i>red</i>	4%	32%	4661	1604	26%	6398	2833	59%	11022	8142
master/toss/finger	<i>ring</i>	4%	26%	4850	1846	26%	7835	2726	51%	14676	7167
hammer/gear/hunter	<i>head</i>	1%	14%	4672	1446	25%	8346	3396	56%	8132	5185
knife/light/pal	<i>pen</i>	8%	16%	5021	1405	25%	6556	3429	62%	9187	7141
foul/ground/mate	<i>play</i>	2%	6%	4808	1262	25%	8122	2866	46%	9332	6849
change/curcuit/cake	<i>short</i>	8%	26%	4109	1617	25%	5897	3029	41%	10068	9382
way/board/sleep	<i>walk</i>	11%	25%	5148	1249	25%	7849	3501	64%	11450	8435
blank/list/mate	<i>check</i>	7%	19%	5098	1469	24%	7426	2649	51%	6115	2572
tail/water/flood	<i>gate</i>	8%	16%	4752	1662	24%	7480	2522	36%	10228	7470
marshal/child/piano	<i>grand</i>	8%	26%	4725	1215	24%	6578	2279	38%	8405	6223
cover/arm/wear	<i>under</i>	2%	19%	4741	1492	24%	7525	3437	36%	13706	5899
rain/test/stomach	<i>acid</i>	1%	12%	5848	915	22%	8651	3565	31%	13645	7702
time/blown/nelson	<i>full</i>	7%	18%	5457	1237	22%	7064	2575	44%	10687	6501
pile/market/room	<i>stock</i>	7%	20%	4517	1515	22%	6156	3033	44%	7424	4844
mouse/bear/sand	<i>trap</i>	3%	28%	5153	1205	22%	7167	3460	72%	7626	6270
cat/number/phone	<i>call</i>	1%	14%	5766	1137	21%	9452	2825	54%	11736	7004
keg/puff/room	<i>powder</i>	9%	16%	4846	1975	21%	8269	3946	62%	6436	4326
trip/house/goal	<i>field</i>	1%	13%	5154	1118	18%	7007	2788	13%	8016	3565
fork/dark/man	<i>pitch</i>	1%	9%	5760	1212	18%	7913	2952	18%	16587	7327
fence/card/master	<i>post</i>	1%	12%	4977	1442	18%	6329	2660	13%	18689	11210
test/runner/map	<i>road</i>	2%	6%	5818	823	18%	8984	4196	44%	10983	7760
dive/light/rocket	<i>sky</i>	2%	8%	4923	1800	18%	7192	3015	21%	8873	5603
man/glue/star	<i>super</i>	0%	9%	4804	1568	18%	6651	3485	41%	9828	7184
tooth/potato/heart	<i>sweet</i>	1%	12%	3708	853	18%	6380	3739	28%	11772	7730
illness/bus/computer	<i>terminal</i>	1%	5%	5984	768	18%	7419	1739	18%	11429	5817
type/ghost/screen	<i>writer</i>	1%	18%	5204	1199	18%	8017	2577	54%	9372	7084
mail/board/lung	<i>black</i>	0%	5%	5277	942	17%	7468	3694	18%	14666	9218
teeth/arrest/start	<i>false</i>	6%	12%	5337	1365	17%	6874	3950	44%	11463	7672

iron/shovel/engine	<i>steam</i>	6%	16%	4272	1427	17%	6983	1990	49%	9218	6284
wet/law/business	<i>suit</i>	10%	16%	4670	1248	17%	8265	3430	59%	11240	8457
rope/truck/line	<i>tow</i>	4%	16%	4665	1506	17%	7560	2964	21%	14577	6940
off/military/first	<i>base</i>	1%	12%	4805	1684	16%	8127	3882	31%	11362	8718
spoon/cloth/card	<i>table</i>	1%	6%	4629	1596	16%	8837	3221	26%	13797	10548
cut/cream/war	<i>cold</i>	1%	12%	3847	1305	14%	7845	4046	31%	13944	9316
note/chain/master	<i>key</i>	0%	6%	5894	571	14%	8085	4394	26%	12678	5296
shock/shave/taste	<i>after</i>	1%	7%	4121	1542	13%	7601	3420	31%	10842	7932
wise/work/tower	<i>clock</i>	3%	11%	4845	1412	13%	9040	3916	13%	13322	7855
grass/king/meat	<i>crab</i>	3%	9%	5162	1209	13%	6787	2286	23%	14199	6805
baby/spring/cap	<i>shower</i>	7%	16%	4618	1447	13%	7994	3332	28%	7576	5555
break/bean/cake	<i>coffee</i>	6%	18%	4917	1879	12%	8305	4086	33%	14045	6904
cry/front/ship	<i>battle</i>	2%	9%	4695	1592	11%	8197	2871	18%	13694	9781
hold/print/stool	<i>foot</i>	3%	15%	4483	1341	11%	8511	4200	41%	8625	4330
roll/bean/fish	<i>jelly</i>	0%	11%	4393	1507	11%	4031	1420	26%	13241	6162
horse/human/drag	<i>race</i>	8%	32%	5026	1367	11%	7386	2012	56%	12136	6672
oil/bar/tuna	<i>salad</i>	1%	7%	6117	1013	11%	9627	2882	41%	17051	7199
bottom/curve/hop	<i>bell</i>	2%	1%	4164	-	9%	6249	2082	46%	7727	6804
tomato/bomb/picker	<i>cherry</i>	6%	14%	5445	1011	9%	10276	4074	46%	7002	4235
pea/shell/chest	<i>nut</i>	2%	9%	4537	1608	9%	5780	1405	23%	14078	9124
line/fruit/drank	<i>punch</i>	1%	4%	5057	268	9%	6914	2201	10%**	16245	3374
bump/egg/step	<i>goose</i>	4%	4%	6019	826	8%	7676	4572	†	-	-
fight/control/machine	<i>gun</i>	0%	9%	5926	937	8%	8701	3087	28%	13922	6282
home/arm/room	<i>rest</i>	0%	5%	5108	2085	8%	9902	2317	21%	13478	7099
child/scan/wash	<i>brain</i>	0%	1%	6999	-	7%	8435	3914	14%**	12181	4678
nose/stone/bear	<i>brown</i>	1%	2%	6831	238	7%	9363	2793	26%	16110	9116
end/line/lock	<i>dead</i>	1%	5%	4975	1401	7%	10061	3178	†	-	-
control/place/rate	<i>birth</i>	0%	1%	6352	-	5%	6090	2584	14%**	10252	13001
lounge/hour/napkin	<i>cocktail</i>	0%	5%	5050	1445	5%	12553	1856	10%**	7823	2956
artist/hatch/route	<i>escape</i>	2%	2%	3496	260	5%	9218	4419	15%**	9422	7828
pet/bottom/garden	<i>rock</i>	7%	6%	5555	798	5%	10945	3158	19%**	8955	6817
mate/shoes/total	<i>running</i>	0%	4%	6112	1537	5%	5790	3469	10%**	23466	5169
self/attorney/spending	<i>defense</i>	1%	4%	3999	2015	4%	8415	4831	10%**	13277	3739
board/blade/back	<i>switch</i>	1%	6%	5740	1462	4%	10800	3242	29%**	16141	9448
land/hand/house	<i>farm</i>	0%	1%	5607	-	3%	8199	543	0%	-	-
hungry/order/belt	<i>money</i>	0%	0%	-	-	3%	11560	450	0%	-	-
forward/flush/razor	<i>straight</i>	1%	2%	4794	2000	3%	11454	3138	5%	3887	-
shadow/chart/drop	<i>eye</i>	0%	1%	5341	-	1%	557	-	15%**	12029	4128
way/ground/weather	<i>fair</i>	0%	5%	5532	1387	1%	3109	-	10%	17043	5484
cast/side/jump	<i>broad</i>	0%	1%	3556	-	0%	-	-	5%	10807	-
back/step/screen	<i>door</i>	0%	2%	5465	526	0%	-	-	33%**	7728	2573
reading/service/stick	<i>lip</i>	1%	1%	6108	-	0%	-	-	10%	9569	8000
over/plant/horse	<i>power</i>	0%	1%	5453	-	0%	-	-	10%	18297	5257

\*The problem was changed from "cottage/swiss/cake" to "cottage/brick/cake".

\*\*Reflects the performance of only participants in the ERP experiment.

†The problem was not used with a 30-second time limit.