

Journal of the Arkansas Academy of Science

Volume 5

Article 27

1952

Reaction Time in Word Association

Henry W. Sageser
College of the Ozarks

Follow this and additional works at: <http://scholarworks.uark.edu/jaas>

 Part of the [Community-Based Research Commons](#)

Recommended Citation

Sageser, Henry W. (1952) "Reaction Time in Word Association," *Journal of the Arkansas Academy of Science*: Vol. 5 , Article 27.
Available at: <http://scholarworks.uark.edu/jaas/vol5/iss1/27>

This article is available for use under the Creative Commons license: Attribution-NoDerivatives 4.0 International (CC BY-ND 4.0). Users are able to read, download, copy, print, distribute, search, link to the full texts of these articles, or use them for any other lawful purpose, without asking prior permission from the publisher or the author.

This Article is brought to you for free and open access by ScholarWorks@UARK. It has been accepted for inclusion in Journal of the Arkansas Academy of Science by an authorized editor of ScholarWorks@UARK. For more information, please contact scholar@uark.edu, cmiddle@uark.edu.

REACTION TIME IN WORD ASSOCIATION

HENRY W. SAGESER

The College of the Ozarks, Clarksville

Within a specifically limited sense, this experiment was a study of the effect of sophistication upon the data obtained from a lie detector. We refer to the reaction time of the subject's response to stimulus words, statements, or questions, which is a part of the polygraph record.

The problem proposed was to observe the reaction time of subjects in a word association exercise when they did not know that reaction time was being measured, and compare their performance with a repetition of the exercise when they knew that the reaction time was the most important part of the word association exercise.

The subjects were 50 college students of various ages and major fields of study. Because of the possibility that students with one or more courses in psychology might be aware of details in the lie detector technique, only five or six of our subjects had taken courses in psychology.

PROCEDURE

In order to control probable effects of other factors, several things were standardized: (1) the same experimenter read the stimulus words throughout the investigation; (2) the same person handled the stop watch and recorded all the data; (3) one list of stimulus words was used in the same order for each subject; (4) the same subjects were used for both the "naive" and the "sophisticated" situations.

The following information was given to the subject by the experimenter:

I am making a study of students' reactions to certain words. In this study I am using a list of fifty words, which will be read to you one at a time.

Each word will suggest or cause another word to occur to you. I want you to tell me immediately what that word is that comes into your mind. Do not hesitate to say it regardless of what it is, because your name will not appear anywhere in this study, and by tomorrow I myself will not be able to remember who made the responses I have noted.

Now, let us arrange our chairs so that you will have your back to me and will be facing a wall or corner of the room. This will assure that none of my movements will interrupt your thinking, and will reduce the number of objects in your line of vision that might themselves suggest responses.

Before we begin the list we are studying, let us try a couple of practice words. I will say the word and you give me the first word that comes into your mind.

"cat" _____
"rifle" _____
"button" _____

I see that you understand what we are doing. Let us now start our list of fifty words.

About a year prior to this study, several hundred words taken from a standard dictionary were submitted to about 300 college students with instructions that they indicate for each word their immediate emotional reaction. They wrote or indicated for each word whether it was pleasant, neutral, or unpleasant in psychological connotation. The words used in this study were those indicated as being neutral by more than 90 per cent of the students, and those indicated as pleasant or unpleasant by more than 90 per cent of the students. The fourteen words italicized were those having favorable or unfavorable emotional loading.

The following fifty words were read to the subject one at a time and the subject's response-word was recorded along with the time required to make the response: light, carpet, high, slow, salt, *sex*, black, lamp, green, *embrace*, scissors, *caress*, blossom, hat, *prostitute*, eagle, cottage, walk, *rape*, ocean, glass, *desire*, bitter, work, *ravish*, tobacco, *kiss*, sour, king, butter, garden, *fondle*, lion, worry, yellow, window, music, *moral*, river, *dream*, tree, *shame*, loud, thirsty, house, *body*, swift, *sin*, window, bread.

Before Trial 2, the following information and instructions were read to the subject:

Now I want to show you what I have been doing. I have written down your word responses and also the number of seconds you needed to voice the response.

The time element is the important thing, and that is the thing I am watching most carefully. Any delay in response on your part tells me that the stimulus word has embarrassing meanings or associations with *your own past life*. Such a word reminds you of something that is strongly emotional either "good" or "bad," "pleasant" or "unpleasant."

We are going to repeat the experiment just as we did a few minutes ago. This time I want you to be sure that you make the most immediate response possible. I want you to try to conceal the fact that any word has more than average emotional meaning for you by not hesitating to tell me the first word that comes into your mind when I say the words in our list.

The subject and chair were placed in the same position as was used for the first word association test, and the fifty words were repeated.

A change was made in the procedure for the last 22 subjects in that additional data were recorded. A list of indicators other than reaction time was placed before the recorder. Whenever the subject exhibited such an additional indicator in his or her response, the recorder noted it. The extra indicators were as follows:

1. Stuttering in giving the response word
2. Repeating the stimulus word
3. Naming an object within the subject's view
4. Using another stimulus word for response
5. Repeating a response word although not apparently applicable.

ANALYSIS OF RESULTS

The first step in the analysis of the data was to determine the average reaction time in Trial 1 (subject *not* knowing that the reaction time was important) for the non-loaded words. The words given above that are italicized are those that were considered as having emotional loading above the average of the other words for most people. The standard deviation was also determined for each subject.

Each subject's average reaction time (on non-loaded words) plus three of his standard deviations was considered as the delay in response which was large enough to be meaningful statistically. The number of loaded stimulus words with meaningfully delayed reaction time was counted in Trials 1 and 2, and their differences likewise tabulated in Table I. This same examination was made for the non-loaded words, as is shown in Table II.

Each of the fifty subjects reduced both the average reaction time and the standard deviation in the second trial, for both the loaded and the non-loaded words.

Symptoms of unusual reaction to stimulus words (other than the reaction time) were exhibited by 17 of the 22 subjects observed, during the first trial. All but three completely eliminated these unusual symptoms during the second trial. Two of the three reduced the symptoms by 50 per cent, the third had the same number of symptoms in both trials.

CONCLUSIONS

The first conclusion was that sophistication (knowledge that reaction time is important in a word association test) may enable a subject to defeat the lie

REACTION TIME IN WORD ASSOCIATION

141

detection apparatus insofar as reaction time is concerned.

The second conclusion was that the observed symptoms other than reaction time tend to disappear when the subject made an effort to control his reaction time.

It is recommended that further research be made to estimate the learning effect or practice effect -- if any -- that takes place between trial one and two. This might be done by allowing a few minutes rest and then just repeating the list of stimulus words without any additional information or instruction as was given in this investigation.

Another measure of practice might be the use of a control group receiving complete instruction with regard to the importance of the reaction time factor before undergoing Trials 1 and 2 successively. It might be profitable to pursue the question of effect of sophistication upon the subject's response to the lie detector technique in the areas of physiological actions controlled by the autonomic nervous system. It may be that concentration upon control of one factor might seriously influence the normal or expected response if within the functioning of the autonomic nervous system.

TABLE I
NUMBER OF LOADED WORDS WITH
MEANINGFULLY DELAYED RESPONSES

Subject	Trial 1	Trial 2	Difference	Subject	Trial 1	Trial 2	Difference
1	1	0	-1	26	5	0	-5
2	9	1	-8	27	4	0	-4
3	5	2	-3	28	3	0	-3
4	6	0	-6	29	3	0	-3
5	5	3	-2	30	2	0	-2
6	3	1	-2	31	12	2	-10
7	5	2	-3	32	4	0	-4
8	7	2	-5	33	6	2	-4
9	1	0	-1	34	0	0	0
10	2	1	-1	35	5	1	-4
11	7	0	-7	36	6	0	-6
12	3	1	-2	37	2	0	-2
13	4	0	-4	38	3	1	-2
14	2	0	-2	39	4	0	-4
15	4	0	-4	40	4	3	-1
16	3	0	-3	41	3	0	-3
17	5	0	-5	42	3	0	-3
18	7	0	-7	43	7	1	-6
19	4	1	-3	44	6	0	-6
20	5	1	-4	45	3	0	-3
21	5	1	-4	46	0	0	0
22	1	0	-1	47	0	0	0
23	2	0	-2	48	6	0	-6
24	9	1	-8	49	5	1	-4
25	2	2	0	50	6	2	-4

TABLE II
 NUMBER OF NON-LOADED WORDS WITH
 MEANINGFULLY DELAYED RESPONSES

Subject	Trial 1	Trial 2	Difference	Subject	Trial 1	Trial 2	Difference
1	0	0	0	26	1	0	-1
2	0	1	1	27	1	1	0
3	2	1	-1	28	4	0	-4
4	0	1	1	29	4	1	-3
5	1	0	-1	30	0	0	0
6	0	0	0	31	2	1	-1
7	2	0	-2	32	2	1	-1
8	6	1	-5	33	1	0	-1
9	1	0	-1	34	2	0	-2
10	0	1	1	35	2	0	-2
11	3	0	-3	36	1	0	-1
12	1	0	-1	37	2	0	-2
13	1	0	-1	38	1	0	-1
14	5	0	-5	39	1	0	-1
15	3	0	-3	40	1	0	-1
16	0	0	0	41	2	2	0
17	1	0	-1	42	0	0	0
18	2	1	-1	43	1	0	-1
19	2	2	0	44	0	1	1
20	2	0	-2	45	2	0	2
21	7	2	-5	46	3	0	-3
22	0	0	0	47	3	0	-3
23	0	0	0	48	2	0	-2
24	5	0	-5	49	0	1	1
25	2	2	0	50	3	0	-3