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Spence, Donald P., and Bressler, Joanna. "Subliminal activation of conceptual associates: a study of 'rational' preconscious thinking." J. of Personality, 1962, 30:1, 89-105.

Varendonck in The Psychology of Daydreams (1921) was among the first to experiment with preconscious thinking. Through self-observation, he discovered that "when conscious and preconscious thought happen to share a common theme, a preconscious process could disrupt a conscious thought stream" (90).

In a prior study, the senior author (1961) tested this hypothesis and found that "a stimulus out of awareness had a disruptive effect on words in awareness which were associatively linked to the subliminal stimulus" (90). When Ss were presented a pair of words subliminally, followed either by a pair of related associates or by unrelated words, that were presented above threshold, but badly blurred, it was found that reaction time for guessing the second pair was significantly longer for the stimulus-related words than for unrelated words. The author's interpretation was that the subliminal stimulus had added new meaning to the related words, and since the response word now had two connotations, the S was indecisive over his guess, and hence gave a longer reaction time. "In other words, a process outside of awareness had interfered with conscious behavior paralleling Varendonck's observation, and produced a disruption in recognition time." (90).

In the present study, two other factors which might have contributed to the disruption are examined. These are a) that the stimulus word chosen was related to a "drive theme" not accessible to awareness, and thus the disruption was produced by the content of the stimulus rather than its subliminal status; or b) that the response words were only weakly associated with the subliminal stimulus, and thus reaction time was delayed because of a weak activation of response words.

Therefore, the present experiment reduced the "drive theme" possibility by utilizing the neutral stimulus, HOUSE, and varied the associative strength of the response words, according to the Minnesota table of Norms (1954). Thus, the relation between subliminal activation, reaction time, and associative frequency could be studied. Also, they manipulated the level of awareness by utilizing three conditions of stimulus presentation: 1) subliminal, well below threshold; 2) near liminal (i.e., near the threshold); and 3) supraliminal presentations. Based upon Rappaport's contention (1957) that level of awareness can be characterized by varying degrees of "cognitive enrichment" i.e., more connotations in the cognitive activity of dreams than in conscious thought, it was hypothesized that a "stimulus well below threshold should activate more associates than a stimulus near threshold, or above threshold.

Briefly, the method was to present the stimulus HOUSE in the three experimental conditions (at 10 msec. for the subliminal condition, at 10 msec. for the near-liminal condition, following 8 minutes of dark adaptation to lower the threshold, and at .33 sec in the supraliminal condition;) followed immediately by a circular array of blurred nonsense words which could not be accurately discriminated. These were presented well above threshold. Then the S was read a list of words and asked to guess whether any of them had appeared on the field he had just been observing. (in reality none of them had). Ss reaction time and verbal report (yes-no) were measured. The list consisted of 12 HOUSE associates of varying strength as deter-



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mined by the Minnesota Norms, and 8 control words. (ie., most frequent associate to HOUSE was HOME: least frequent associate was TALL.) In addition a fourth group of Ss were presented the nonsense array without prior exposure to HOUSE, and their RT's were measured. This condition was called 'blank'. Thresholds were then determined for the subliminal and near-liminal conditions.

Results:

1) Blank condition: "...RT's for the HOUSE associates do not show any systematic pattern" (96) in this condition. This random pattern suggests that if a significant deviation in RT is found in the other conditions, it is probably due to the addition of stimulus-HOUSE.

2) Subliminal condition: "...we find that words not associatively related to the subliminal stimulus did not lead to a deviant reaction time, while words which are strongly associated with the stimulus led to faster reaction times and words which are weakly associated led to slower reaction times than the control words." (97)

3) Near liminal: No systematic effect on RT was observed in this condition. Therefore, some other factor besides level of awareness must be ^{operative} ~~responsible~~. It was concluded that since the group tended to give shorter responses to all words as the experiment progressed, ie., the position of the word on the presentation list correlated negatively with RT., that either a sampling difference or the eight minute wait in the dark was responsible.

4) Supraliminal condition: RT's in this condition are not dependent upon the associative strength of the response words. There seems to be little relation between the responses in the subliminal and the supraliminal condition.

5) Effects on Verbal Response: It was found that in the supraliminal condition only, verbal report was a better indicator than RT. ie., the more common the associate to HOUSE, the more likely the person was to respond 'yes' (that it had been on the nonsense-word list.) However, when Ss were not aware of the stimulus as in the subliminal and near-liminal conditions, the RT was a better measure of Ss response.

Discussion:

"Our findings suggest that the effects of a subliminal stimulus on reaction time are, under certain conditions, highly correlated with associative frequency." (101) In the subliminal condition, with no previous dark adaptation, or prolonged contact between E and S., it was seen that low strength associates produced a delayed recognition time, and high strength associates produced a shorter RT. Therefore, "associative frequency is an important determinant of response latency in the subliminal condition, and needs to be explained" (101). The author's explanation proceeds as follows: The higher the associative strength of a word, the fewer alternatives, in terms of the hierarchy of responses predicted by the norms. Conversely, the lower the associative strength, the more alternatives. ie., HOME is associated with HOUSE at the apex, with 25% frequency; then there are 7 associates of intermediate frequency; 15 associates of low frequency; and finally, 120 of frequency less than 1%. It is supposed, therefore, that the associative strength predicts the intensity of activation.

When we ask S whether he saw BARN, he searches for its corresponding memory trace. It may be reasonably clear and intense, suggesting that the word had been exposed, but so are a number of other traces of the same associative frequency. S is uncertain whether BARN had actually



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been shown and his verbal report may just as likely be Yes as No, but his reaction time, since it varies with a number of alternatives, is going to be a function of association strength. BARN, a 4 % associate, has fewer alternatives than CHILDREN, a .37% associate, and will give rise to a shorter RT but not necessarily to more Yes responses. (102)

In the supraliminal condition, verbal response was the main determinant of effect, whereas RT showed no systematic pattern. This is interpreted as follows.

Bringing a stimulus into awareness seems to focus attention on it; because attention, according to the psychoanalytic theory of thinking, exists only in a limited quantity, if it is heavily concentrated on one stimulus it must be withdrawn from peripheral and incidental stimuli. This focusing of attention facilitates the solution of a current task by excluding anything not immediately relevant, but it is not a necessary state of affairs, as shown by our subliminal data. When a stimulus is presented without S's awareness, his attention-focusing mechanism does not come into play and a broader range of associates are activated. This is another way of saying that a subliminal stimulus has been enriched in its connotations. (103)

In the third condition studied, the near liminal situation, results were not clear cut, and were contrary to the hypothesis, as no correlation was found between RT and associative strength. The authors suggest that an extraneous variable was operating: "What about the prolonged contact between S and E? Continued association between two people in a dark room, particularly when the E was often a young woman and the Ss were always men, would be likely to arouse a host of wishes, some in awareness and some not.... Because different Ss could be expected to have different fantasies, the over-all response for the group would necessarily be unsystematic and not correlated with the norms." (104) Thus, the prolonged wait in the dark is deemed responsible for inducing both general and specific changes in Reaction Time.