A comment on the Yaremko, Blair, and Leckart report: "The orienting reflex to changes in a conceptual stimulus dimension"

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Yaremko, Blair, & Leckart (1970) reported that a number presented out of order at the end of a list of serially presented numbers produced an orienting response (OR). ORs were found to be roughly proportional to the difference between the out-of-order number and that number to appear next in the ordered series. These results were interpreted as supporting Sokolov's (1963) expectancy model.

According to their interpretation, the presentation of the ordered list set up an expectancy that the next item to appear would be one greater than the last. The presentation of a number which was not one larger than the last elicited an orienting response.

An alternative hypothesis is proposed. Here, it is suggested that presentation of a list of numbers, either in serial order or in random sequence, will specify a range of values to which ORs become attenuated through habituation. Greatest OR attenuation is hypothesized to be somewhere in the middle of the range of values. Attenuation of the OR is hypothesized to be generalized around this value.

In the experiment reported by Yaremko et al (1970), the numbers 10 through 19 were presented serially. The numbers 9, 19, 21, and 31 were test stimuli. According to the stimulus

generalization analogy, and making upward adjustments for recency effects, that value which would be hypothesized to have greatest OR attenuation is the number 15. The discrepancies of the four test stimuli from this value could be rank ordered as follows: 19, 9, 21, 31 (9 and 21 are tied for rank). It would be predicted that this is the order of OR magnitudes. Mean GSRs for this order are: 7.8, 13.2, 19.7, and 25.4, respectively. It seems that the results can be as adequately accounted for by assuming that the point of greatest OR attenuation is near the middle of the range of ordered stimuli as by assuming that the point of greatest OR attenuation is at the number to appear next in the ordered series.

This post hoc interpretation is, of course, inconclusive. It is suggested that in subsequent experiments test stimuli be selected which will better localize the point of greatest OR attenuation. It would also seem advisable to employ routinely a control group similar to that of Zimny, Pawlick, & Saur (1969) in which the same series of numbers are presented in a random order.

REFERENCES

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*The views expressed here are those of the author and do not necessarily represent those of the California Department of Mental Hygiene or Porterville State Hospital.

Reply to Ely

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Sokolov's (1963) neuronal model of orienting reflex (OR) habituation maintains that magnitude of the OR to a novel stimulus is simply a function of the amount of discrepancy between an "expected" stimulus and the

stimulus actually delivered to the organism. For example, if S receives a series of 1,000-Hz tones, OR magnitude to a test tone, different in frequency, will be commensurate with the amount of change in frequency

irrespective of the direction of that change. This relationship is, of course, subject to modification by the intrusion of dynamogenic factors which contaminate manipulations of stimulus novelty. The technique of presenting a progression of numbers followed by an out-of-sequence test stimulus (TS), first reported by Unger (1964), seems at once to allow novelty manipulations, without bothersome dynamogenic effects and to permit study of the principles of habituation to more or less "conceptual" stimuli.

In the Yaremko, Blair, & Leckart (1970) study, we predicted that an out-of-sequence TS (9, 19, 21, or 31) would evoke ORs as a function of the absolute difference between the expected stimulus (20) and the observed TS. Although we found OR magnitudes to be a function primarily of the amount of discrepancy between 20 and the TS, there was a tendency for negative change TSs (9 and 19) to evoke smaller ORs. The fact that 19 evoked the smallest ORs was not surprising, since this stimulus was presented on the preceding trial, and although unexpected, was still physically familiar. As Ely suggests, however, the smaller ORs to 9 could be explained by the fact that this stimulus lies in closer proximity to the stimulus series that S was already habituated to, and thus, should have attached to it more generalized inhibition than 31.

While it may be a step away from parsimony to postulate generalization gradients in this kind of conceptual dimension, the possibility is worth further study. Some data¹ recently collected in our laboratory bear directly on the issue. We replicated the earlier procedure using the series 10-22 in steps of two numbers. Where 24 was expected, S received the TS 9, 21, 27, or 39 (± 3 or ± 15 units' change). This procedure allowed us to interpolate a TS (21) without using a physically familiar number. According to Ely's position, there should be less responding to 21 than to 27, since generalized inhibition should be near maximum in this vicinity of the dimension. Even when ORs were compared with a base level of responding obtained by averaging responses to 18, 20, and 22, no differences were uncovered within the small- and large-change conditions. As in the earlier study, OR magnitude to the TSs was a function of amount of change only. On balance, these findings seem best explained by the expectancy-disparity approach or a generalization of inhibition approach with the "expected" stimulus as the reference.

REFERENCES

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