

Bamber D. Reaction times and error rates for "same"- "different" judgments of multidimensional stimuli. *Percept. Psychophys.* 6:169-74, 1969.
[Stanford University, CA]

Subjects judged whether two letter strings were the same or different. A model assuming serial letter comparison that terminates upon finding a mismatch explained the reaction times of 'different' judgments. However, 'same' reaction times increased too little with string length to fit this model. [The *Social Sciences Citation Index*® (SSCI)® indicates that this paper has been cited in over 175 publications since 1969.]

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"Which should be quicker: determining that two stimuli are the same or determining that two stimuli are different? It is reasonable to expect judgments of sameness to be slower than judgments of difference. After all, to verify that two stimuli are the same, it is necessary to compare all their features. However, to verify that two stimuli are different, it often suffices to compare only some of their features. Surprisingly, the opposite is found empirically. Judgments of sameness are typically faster than judgments of difference.

"While a graduate student at Stanford University, I became intrigued by this phenomenon of fast 'same' judgments and decided to investigate it in my doctoral dissertation (which became the basis of this *Citation Clas-*

sic "). In my dissertation experiment, subjects viewed one row of letters followed by another and indicated whether the two rows were the same or different by pressing one of two response keys. The two rows contained equal numbers of from one to four letters and could either be the same or could differ at any possible combination of letter positions.

"I used the resulting reaction-time data to test a model in which subjects compare corresponding letters from the two rows one pair at a time. If a mismatching pair is found, the 'different' key is pressed. If all the pairs are found to match, the 'same' key is pressed. This model gave a good fit to the 'different' reaction times with the comparison time for a matching letter pair estimated at 60 msec. The 'same' reaction times were faster than the 'different' reaction times and did not fit the model at all. In particular, lengthening the two rows by one letter increased 'same' reaction times by only 25 msec instead of the expected 60 msec. To account for these results, I proposed a model in which a fast and a slow letter comparison process operate simultaneously and respectively generate the 'same' and 'different' judgments.

"I see two reasons why this paper has been frequently cited. First, it described intriguing results which, if anything, added to the mystery of fast 'same' judgments. Second, the two-process model is often discussed in papers on same-different judgment.

"Models of same-different judgment have become more sophisticated since the time of this paper. Loosely based upon Link's choice-reaction-time theory,¹ some models^{2,3} have attempted with moderate success to predict not only the means of reaction times but also their distributions together with the proportions of incorrect responses."

1. Link S W. The relative judgment theory of two choice response time. *J. Math. Psychol.* 12:114-35, 1975. (Cited 40 times.)
2. Krueger L E. A theory of perceptual matching. *Psychol. Rev.* 85:278-304, 1978. (Cited 95 times.)
3. Ratcliff R. A theory of order relations in perceptual matching. *Psychol. Rev.* 88:552-72, 1981.