EFFECT OF ORDER OF PRESENTATION ON SIMULTANEOUS AND SEQUENTIAL MATCHING FAMILIAR FIGURES TESTS

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Summary.—48 third grade children were administered both the standard, simultaneous version of the Matching Familiar Figures and a sequential presentation version of the same test. Order of administration of the two formats was counterbalanced. Subjects who took the simultaneous version first committed fewer errors on the sequential version than did subjects who took the more difficult sequential version first. This same finding was reported in other research by the authors and suggests that performance on the easier task primes the subject for the later administration of the more difficult task. Implications for teaching problem-solving skills and the cognitive style literature were presented.

The Matching Familiar Figures test (Kagan, Rosman, Day, Albert, & Phillips, 1964) is the usual instrument employed to classify individuals as reflective or impulsive conceptual tempos. This is a match-to-sample task in which the subject has to find the one alternative from among six very similar alternatives identical to the standard. Typically, all the stimuli are simultaneously present while the subject is looking for the match. While we were pilot testing a sequential presentation version, we were led to question the possibility of an effect of order of presentation for the two formats of the task.

Pilot data from our sequential presentation version, which allowed us to obtain the subjects' scanning strategies, appeared to indicate fewer errors were made by our subjects than the normative data for the standard, simultaneous version would have led us to expect (Salkind, 1978). This finding was surprising as we anticipated that the sequential version of the task would be more difficult and lead to more errors. Was it possible that our sample of subjects was just better at a match-to-sample task or that the sequential version is in reality an easier task? It was found that those subjects who had performed well on the sequential version had previously been administered the standard, simultaneous version. Was it possible that the earlier administration of the standard version "primed" the subjects for the sequential version? A more systematic attempt to answer these questions was undertaken. A new sample of subjects was administered both versions of the Matching test while counterbalancing presentation order. Both errors and latencies to respond, the two typical dependent variables, were recorded.

METHOD

Forty-eight children, from two third-grade classes of a small middle-class suburb of a large midwestern city, served as subjects.

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Matching Familiar Figures, the Simultaneous Version, is the standard version of the match-to-sample task in which the subject had to choose the one of six alternatives that is identical to the standard (Kagan, 1965). The stimuli were line drawings of familiar figures presented in a notebook with the standard figure on a single page presented at right angles to the page containing the alternatives, in two rows of three figures each. The alternatives differed from the standard in minute detail. All the stimuli were present while the subject searched for the matching alternative. The latency to first guess and the total number of errors, with a maximum of six per trial, with 12 trials, were recorded.

Matching Familiar Figures, the Sequential Version, has employed the identical line-drawing stimuli of the standard Matching Familiar Figures although the stimuli could only be viewed one at a time. This was accomplished by reproducing the figures as transparencies and mounting the transparencies on posterboards with cutouts enabling them to be seen when illuminated from behind. A square 52.5-cm wooden box containing seven windows with rear-projected light sources housed the posterboards and included a large red Plexiglas screen to prevent subjects from viewing the non-illuminated figures. As the subject faced the apparatus, seven buttons positioned directly below each window were available for selection. The standard figure was behind the top single window; the six alternatives were positioned below the standard and arranged in two rows of three each. Any of the figures could be seen by pressing the button associated with a window. This figure remained illuminated until another choice was selected. Any button could be pressed, including the standard, in any order and as often as desired. The subject’s task was to find the one figure that matched the standard. Errors and latency to respond were again recorded. Scanning strategies were also recorded but will not be reported here.

Subjects were individually administered the simultaneous and sequential versions of the Matching test. One-half of the subjects took the standard version first followed by the sequential version. The other half of the subjects took the tests in the reverse order. At least 1 mo. separated the two administrations of the test.

RESULTS AND DISCUSSION

The Pearson correlation between errors and latencies on the standard Matching task was .56 while that on the sequential task was .49. Both values are significant ($p = .01$) and are in the range generally reported. The correlations between errors across the two tasks and latencies across the two tasks were both .33 ($p < .05$).

Separate 2 (order) $\times$ 2 (task format) analyses of variance with repeated measures were performed on the mean errors and latencies. Table 1
TABLE 1
MEANS AND STANDARD DEVIATIONS OF ERRORS AND LATENCIES ON SIMULTANEOUS AND SEQUENTIAL MATCHING FAMILIAR FIGURES TESTS AS A FUNCTION OF ORDER

<table>
<thead>
<tr>
<th>Test</th>
<th>Order</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Simultaneous/Sequential</td>
<td>Sequential/Simultaneous</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simultaneous Matching</td>
<td>$M$</td>
<td>$SD$</td>
<td>$M$</td>
<td>$SD$</td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>5.33</td>
<td>4.20</td>
<td>6.58</td>
<td>5.31</td>
<td></td>
</tr>
<tr>
<td>Latency</td>
<td>20.57</td>
<td>8.30</td>
<td>19.24</td>
<td>9.61</td>
<td></td>
</tr>
<tr>
<td>Sequential Matching</td>
<td>$M$</td>
<td>$SD$</td>
<td>$M$</td>
<td>$SD$</td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>7.54</td>
<td>5.20</td>
<td>11.42</td>
<td>5.25</td>
<td></td>
</tr>
<tr>
<td>Latency</td>
<td>34.78</td>
<td>15.14</td>
<td>26.46</td>
<td>10.48</td>
<td></td>
</tr>
</tbody>
</table>

presents the data for both these measures. Analysis of the errors indicates significant effects for both order ($F_{1,48} = 4.62, p < .05$), and task ($F_{1,40} = 16.24, p < .001$). Fewer over-all errors are made when the simultaneous task is first followed by the sequential version ($M = 6.44$) than when the sequential version precedes the simultaneous task ($M = 9.00$). The task effect is the result of the greater difficulty of the sequential presentation version ($M = 9.48$) than the simultaneous version ($M = 5.96$). The interaction of task $\times$ order is not significant.

Mean latencies are also presented in Table 1. Analysis of these data demonstrates only an effect of task format ($F_{1,46} = 32.34, p < .001$), with the sequential presentation-format producing longer latencies ($M = 30.62$) than the simultaneous format ($M = 19.91$). No effect of order was found for latencies although the simultaneous followed by sequential order was slower than the reverse order.

The errors support an effect of order of presentation of the two formats for the Matching task. When the less difficult task was presented first, a reduced error rate was found on the more difficult task. When the standard version of Matching Familiar Figures was initially presented, a lowered error rate was found on the more difficult, sequential presentation format even though that task was taken 1 mo. later. When the more difficult sequential version was administered prior to the standard version, the error rate was higher.

It appears that the initial presentation of a simpler task primes or readies the subject for the later presentation of a more difficult, but similar task. One possible explanation for this finding of positive transfer is that the subject learns a problem-solving strategy on the easier task and builds up confidence in the employment of this strategy which can then be transferred over to the more difficult task. When the more difficult task is first presented, this problem-solving strategy is not learned as well. The data indicate even a slightly
higher error rate on the standard task when it is administered second than when it is taken first (negative transfer from the more difficult sequential version).

A second possible explanation for the effect of order might be that the group receiving the sequential test followed by the standard one might in general not be as good on these problem-solving tasks. Data from our previous research, however, does not support this explanation. In this study (Bellows, 1974) the same pattern of results as in the present investigation occurred. Fourth-grade subjects were administered an auditory analogue of the Matching task and the sequential version of the visual Matching task. One-half of the subjects received one task first followed by the second approximately 10 days later. Those subjects who received the less difficult task first (the auditory task) made fewer errors on the more difficult sequential visual Matching task than those subjects who took the sequential version first. In this study also, the group receiving the harder sequential task first had higher error scores on the sequential task as well as the easier auditory task. It appears that the effect of order is not a spurious finding, as it has been replicated in two studies, and has been found on the same task as well as cross-modally.

The present findings may also have implications for interpretation of the literature on cognitive style. Siegelman (1969), for example, first administered the Matching Familiar Figures test and then followed this by the administration of a sequential version of the test. The present findings suggest that the performance on the sequential Matching task may have been better than had this task been administered alone or first. The criticism is a general one in that the usual procedure is to classify subjects on the basis of performance on the Matching Familiar Figures test and then administer other response measures. Performance on the other measures may be influenced by the earlier administration of the classifying task.

REFERENCES


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