

Multiple Goal Facilitation in a Rule Discovery Task

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The present study sought to expand previous research on Wason's 2-4-6 task by exploring the limits of the multiple goal facilitation effect. In the original task subjects were given an initial triple (set of three numbers), 2-4-6, and told to generate their own sets of triples to aid them in finding the experimenter's rule, "any ascending sequence." While the task seems simple, on a first announcement only about 20% of subjects found the correct rule.

Paradoxically, instructions requiring subjects to find two rules ("ascending sequence" = "DAX", "anything else" = "MED") resulted in a dramatic increase in success rate; 60% of the subjects solved the rule on a first announcement (Tweney, Doherty, Worner, Pliske, Mynatt, Gross, & Arrkelin, 1980). Gale and Ball (2002) reviewed two possible explanations; first, that the increase in success rate could be attributed to the mutually exclusive relation between the two rules, or, second, that the modified task helps avoid "positivity-bias" in that subjects focus on the positive label of the second rule rather than on the negative label "does not fit".

Gale and Ball tested the contrasting explanations and found that while feedback labeling had little or no effect on the likelihood of success, presence of multiple goals helped as in the original "DAX-MED" findings. The results supported the "goal-complementarity" explanation.

The initial finding, that success rates increase with the addition of a second labeled rule, is seemingly paradoxical because increasing task load seems to facilitate performance. Shouldn't the greater complexity of a multiple goal task cause a decline in performance? To test this, we conducted three experiments in which subjects had to seek three goals. We expected to find a decline in performance when a third rule, "ZIF", was introduced.

Experiment One

Participants (N=34) were randomly assigned to one of three conditions; DAX/MED, DAX/MED/Neither DAX nor MED, DAX/MED/ZIF. Surprisingly, overall solution rates were high and roughly equivalent to previous DAX-MED studies. There were no significant differences between groups in success rate.

Experiment Two

Before proceeding further, we decided to replicate Gale & Ball's (2002) finding that facilitation in the 2-4-6 task could be obtained without labeling in a dual goal task. We asked participants (N=30) to find either one rule (as in Wason's original task) or to find two rules, the one governing triples

that fit and the one governing triples that did not fit. As did Gale & Ball, we found large differences -- success rate increased from 33% to 80% with dual goal instructions.

Experiment Three

A 2x2 between-subjects design manipulated two variables in four conditions: Labeling was varied between DAX/MED/Neither DAX nor MED, versus DAX/MED/ZIF (that is, the third goal was either labeled or unlabeled). In addition, number of goals was manipulated by asking participants (N=65) to find either the DAX rule alone, or all three rules. Solution rates in all four conditions were very high, ranging from 71% to 88%. There were no significant differences between groups.

Discussion

These results suggest that once a third category of rule is even *suggested* to exist, performance is enhanced. In effect, the mere presence of three categories of triples may encourage subjects to search for more than once goal and hence may facilitate performance no matter what instructions are used.

In conclusion, our results suggest that more than "goal-complementarity" is involved. Perhaps, as the number of rules grows from two to three, the subjects are led to a representation of the possible rule space that includes a greater number of possibilities. Perhaps they become sensitized to the need to explore more than simply the fit between a hypothesis of their own set of triples. In either case, it is clear that complex representational effects are at work.

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References

Gale, M. & Ball, L. J. (2002). Does positivity bias explain patterns on Wason's 2-4-6 task? In W. D. Gray & C. D. Schunn (Eds.), *Proceedings of the twenty-fourth annual conference of the Cognitive Science Society*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Tweney, R. D., Doherty, M. E., Worner, W. J., Pliske, D. B., Mynatt, C. R., Gross, K. A., & Arrkelin, D. L. (1980). Strategies of rules discovery in an inference task. *Quarterly Journal of Experimental Psychology*, 32, 109-123.