The Use of Verbal Protocols in the Study of Insight

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Verbal Protocols and Insight

Verbal protocols have been used as data in the study of the cognitive processes underlying many problem-solving tasks (see Ericsson & Simon, 1993, for a review). However, the utility of verbal protocols in the analysis of insight and related processes has been questioned because "verbal overshadowing" was reported in participants solving insight problems (Schooler, Ohlsson, & Brooks, 1993). If this effect applies broadly to insight problems, then the use of verbal protocols in the study of insight would be called into question. However, Fleck and Weisberg (2003) demonstrated that verbal overshadowing did not extend to the *Candle Problem*. The present research examined the effect of verbalization on three additional insight problems, to examine the potential usefulness of verbal protocols in insight problem solving research.

Method

Undergraduates were randomly assigned to verbalization (V; n = 45) or nonverbalization (NV; n = 22) conditions. Because the focus of the present study was to test the resulting protocols, there was an effort to collect as many protocols as possible. Participants were videotaped individually in one-hour sessions. The V condition received training on thinking aloud. All participants completed two training problems and three randomly ordered test problems (10 min maximum per problem). The test problems included the *Lilies*, the *Socks*, and the *Triangle of Coins* (*Coins*; Metcalfe, 1986; Sternberg & Davidson, 1982).

Results

To determine if V affected problem-solving performance, we examined solution rates and solving times for V and NV conditions. Solution rates were examined using chi-square analyses; solving times, for solvers only, were compared using independent *t*-tests. All analyses were two-tailed. Differences were not found in solution rates between the V and NV conditions for the *Lilies*, $\chi^2(1) = 0.007$, $p = .932$, $\phi = .011$; the *Socks*, $\chi^2(1) = 0.032$, $p = .858$, $\phi = .022$; or the *Coins*, $\chi^2(1) = 0.108$, $p = .742$, $\phi = .042$. Significant differences were also not found in the solving times of successful solvers for the *Socks*, $t(39) = 0.349$, $p = .729$, $d = .12$; or the *Coins*, $t(40) = 1.203$, $p = .236$, $d = .41$. However, solving times were shorter in the V condition for the *Lilies*, $t(10.807) = 2.202$, $p = .050$, indicating a faciliatory effect, rather than an adverse effect stemming from verbal overshadowing. The effect size for the *Lilies* was not reported because of unequal variances. We concluded that further analyses could be conducted on the verbal protocols of participants. Therefore, we examined the types of strategies used by solvers at the point of solution, including *analytic*, using reason or logic; *mathematical*, using computation or formulas; *visual*, imagining or drawing the problem scenario; and *trial and error*, making a number of attempts without planning. Inter-rater agreement between two independent coders for the three problems ranged from 81% to 92%.

Table 1: Proportion of strategies used by solvers

Problems	Analytic	Mathematical	Visual	Trial and error
Lilies	.93	.07	0	0
Socks	.29	.04	.54	.13
Coins	.25	0	.57	.18

Participants who solved the *Lilies* used an analytic strategy most often, whereas those who solved the *Socks* or the *Coins* used a visual strategy most often. Further, although several participants solved the *Socks* and the *Coins* using an analytic strategy, none of the participants who solved the *Lilies* used a visual strategy.

Conclusions

Our analyses did not support the occurrence of verbal overshadowing of insight in the *Lilies*, the *Socks*, or the *Coins*. Therefore, we suggest that protocol analysis can be an effective methodology through which to examine the cognitive processes – e.g., strategy use – underlying insight.

References

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