Response to Goginsky

Daniel M. Landers, Jeffrey S. Hird, Jerry R. Thomas,
and John J. Horan
Arizona State University

Goginsky (1992) points out a number of variables she believes we were remiss in either not controlling or in some way measuring. Implicit in her argument is that the variables she mentions “can potentially alter the results” and that these “influential variables” could “confound any conclusions . . . thereby weakening the conclusions drawn by the authors” (p. 101). Unfortunately, Goginsky never really develops her arguments to the point of convincingly showing that the variables she mentions are in fact key or influential variables that need to be controlled or measured. Nowhere in her commentary does she cite any research evidence that demonstrates these variables to be of any influence. Instead, she simply assumes the importance of these variables, and from there she makes the inferential leap that these variables must have confounded our results.

A single study cannot realistically control or measure all possible variables; investigators should, however, control or measure variables known empirically to be related to the independent and dependent variables under investigation. In regard to the variables mentioned by Goginsky, we are confident that these variables are unimportant and in no way affect the results of our study.

The first variable mentioned by Goginsky concerns the order of presentation when assigning mental and physical practice during each of the practice sessions. As mentioned in our study, we used a practice protocol similar to Oxendine (1969), who had previously obtained significant mental-practice effects with the pursuit rotor task. This explains why we ordered the mental and physical practice trials within each session the way we did, but this may not satisfy Goginsky; she might argue that this procedure confounds the conclusions of both studies.

We could only find three studies that examined the order of mental and physical practice trials. Weinberg, Hakes, and Jackson (1991) found no significant difference in basketball shooting performances among mental-practice conditions varying either in number of minutes (1, 5, or 10 min) or in order of practice (mental practice followed by physical practice or vice versa).

Similar results were found in an unpublished master’s thesis (Dunbar, 1970) and a doctoral dissertation (Goldman, 1971). After examining women’s speed, form, and power in swimming the front crawl, Dunbar found no significant
differences among the following groups: (a) eight swimming trials followed by eight mental practice trials, (b) the same number of mental practice trials followed by physical practice trials, (c) eight physical practice trials alternated with eight mental practice trials, and (d) the same number of mental practice trials alternated with physical practice trials.

Goldman (1971) examined college women's performance of flipping a suspended ball into a hand-held receptacle. There were no significant performance differences among the following five groups: (a) mental practice during the first and third blocks of 25 trials, and physical practice in the second and fourth blocks; (b) mental practice for the first 5 trials of each block, and physical practice thereafter; (c) alternated 5 trials of physical practice with 5 trials of mental practice in each block; (d) mental practice for 5 trials between two sets of 10 physical-practice trials; and (e) alternated mental- and physical-practice trials in each block.

In our search of the mental-practice literature, we could find no study showing the order of mental and physical practice to be a statistically significant variable. Given the existing literature, the reasonable conclusion would be that order of mental and physical practice is not an influential variable and thus does not qualify as a confounding variable.

Although Goginsky did not indicate in her commentary a concern for a task-order effect (i.e., pursuit rotor followed by pegboard or vice versa), we checked our data to see if task order interacted in any way with the group factor. For the pegboard and pursuit rotor tasks, Group×Order×Pre-post (6×2×2) ANOVAs with repeated measures on the last factor revealed no task-order main effects, and more importantly, no significant two- or three-way interactions with the group factor (p>.05). Thus, the order in which the subjects performed the tasks did not affect the findings in our study.

The decision to use eight trials for the pursuit rotor and only four trials for the pegboard was based on previous mental-practice effect sizes obtained for these tasks (Feltz & Landers, 1983). It is well known that mental-practice effects are evident with few trials/sessions (≤6) or minimal practice time/session (≤1 min) when the motor task contains relatively more cognitive components. As we (Hird, Landers, Thomas, & Horan, 1991) pointed out in our study,

large effect sizes (>0.80) can be obtained for motor tasks, but these tasks require more time [i.e., trials] to be spent in mental practice than for cognitive tasks. The differential amount of mental practice necessary to establish large effect sizes in motor or cognitive tasks needs to be considered in the design of future research. (p. 283)

Even with fewer trials, our results showed that the more cognitive task (pegboard) showed larger posttest and pre- to posttest change-score effect sizes than the more motor task (pursuit rotor). This is consistent with the previous literature (Feltz & Landers, 1983; Feltz, Landers, & Becker, 1988). To equalize the number of trials between these dissimilar tasks would essentially show a disregard for the past literature and would merely accentuate between-task differences in mental-practice effect sizes. We agree that the between-task mental-practice differences may be weakened somewhat by an unequal number of trials, but the differences are still large; thus, more trials for the pegboard task would merely have been overkill.