Does a drama-inspired 'mirroring' exercise enhance mathematical learning?

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Recently, Schweppe and Rummer (2014) have argued CLT might benefit from considering other WM models as a means of generating novel instructional designs. For example, Kane and Engle's (2002) WM model holds that WM capacity is a function of the ability to control attention, so that information is held in an active, easily retrievable state. Kane and Engle's WM model raises questions as to what instructional activities or designs might best enhance attention control, or to put another way, reduce mind wandering as a failure of attentional control. Drama educators have argued the act of "mirroring" exercises, where students in pairs or groups mirror each other's movements, can improve attention, but to date evidence for this claim is anecdotal. This exploratory study investigated the effects of a pre-learning mirroring intervention on attention and mathematical performance. Twenty-six university students engaged in a mindful and embodied mirroring activity before learning a rapid mental mathematics strategy on the multiplication of two 2-digit numbers.

Effects on learning were evaluated using two mathematical problem-solving tests comprising 10 'Elementary' mathematical multiplication questions and 10 'Brain Builder' questions adapted from Julius (1992) completed after learning the maths strategy. Ceiling effects were found across both 'Elementary' and 'Brain Builder' tests for both experimental and comparison conditions, precluding analysis of test scores. Students in the mirroring condition solved Elementary test questions more quickly ($d = .86$, $p = .039$) and more complex Brain Builder test problems more quickly ($d = 1.08$, $p = .015$).

The Dundee Stress State Questionnaire (DSSQ) 'Thinking Content' sub-scale (Mathews Szalma, Panganiban, Neubauer, & Warm, 2003) was used after the intervention to retrospectively measure levels of attention during the lesson. Participants who mirrored did not report statistically reliable higher levels of attention across the acquisition phase than participants who did not mirror, $U = 69.50$, $p = .454$, $d = .32$. Alternative methods for measuring levels of attention may be appropriate in future research, such as Brown and Ryan's (2003) Mindfulness Attention Awareness Scale (MAAS).

In summary, this study found that a mirroring intervention prior to mathematical learning improved a student's efficiency in subsequent mathematical problem-solving. From a theoretical perspective, the study provides an initial attempt to broaden the range of working memory architectures considered by CLT (cf. Schweppe & Rummer, 2014), but further research will be needed to provide evidence that the mirroring effect occurs through attentional control mechanisms.