Despite their applications in ordinal activities, some people fail to effectively perform mental arithmetic tasks, especially complex ones, in situations in which high mental procedures are required. For the visual task, the participants were presented with a visual pattern before the arithmetic problem and then asked to recall the pattern after solving the arithmetic problem. Previous studies have found that dependence on mental resources varies according to task features, including operation type (Cohen et al., 2000; Connaughton et al., 2017; Dehaene, 1992; Ischebeck et al., 2006; Mihulowicz et al., 2014; Prado et al., 2014), complexity (Campbell & Xue, 2001; Cavdarogle & Knops, 2015; Galy & Melan, 2015; Metcelfe & Campbell, 2011; Rosenberg-Lee et al., 2009; Setiz & Schumann-Hengsteler, 2000; Stanescu-Cosson et al., 2000) and presentation format (Imbo & LeFevre, 2010; Trbovich & LeFevre, 2003). As working memory has separate phonological and visual-spatial components, among other components (Baddeley, 2000), previous studies (Cragg et al., 2017; Hubber et al., 2013; Imbo & LeFevre, 2010; Lee & Kang, 2002; Logie et al., 1994; Otsuka & Osaka, 2015) have used dual-task paradigms (arithmetic and working memory) to better understand the working memory resources that are crucial for solving mental arithmetic problems. The dual-task paradigm was used, with addition representing the main task that was combined with one of four secondary tasks: (1) Articulatory suppression (to load the phonological loop component), (2) random generation (to load the central executive component), (3) viewing of irrelevant pictures, and (4) Hand movement (to load visual and spatial working memory components respectively). Indeed, several studies have found that task complexity limits mental arithmetic accuracy (Cavdarogle & Knops, 2015; Metcelfe & Campbell, 2011; Popescu et al., 2016; Prado et al., 2014; Seitz & Schumann-Hengsteler, 2000; Stanescu-Cosson et al., 2000). Therefore, in the current research, we aimed to directly compare the effects of several task demands related to operation type, working memory load (Experiment 1), and presentation format and complexity (Experiment 2) on mental arithmetic performance and ascertain whether the setting of the task impacts the solving strategies that are employed. Participants, who were Chinese or Canadians, solved the arithmetic task either with no secondary task or while simultaneously recalling and retrieving visual patterns or verbal letters. They presented the arithmetic problems either horizontally or vertically and compared the performance on difficult subtraction and multiplication exercises.

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