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Object location memory: A direct test of the verbal memory hypothesis[☆]

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Abstract

Although the male advantage in traditional spatial abilities is well established, the female advantage in object location memory remains tentative. Object location memory is the only spatial ability that yields a female advantage, leading some to speculate that other factors, such as verbal memory, may solely account for the sex difference. The present experiment directly addressed the role of verbal memory using a novel object location memory task. Results suggest that the direction of the sex difference is context-specific, depending on the nature of the stimuli, and that verbal memory may account for the female bias in object location memory.

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Keywords: Object location memory; Sex difference; Verbal memory

Although the male bias on traditional spatial tasks has been firmly established, sex differences in object location memory, the only spatial ability that yields a female advantage, has been reported less reliably (Barnfield, 1999; Eals & Silverman, 1994; James & Kimura, 1997; Silverman & Eals, 1992), leading some to question its validity. There has been some speculation that other factors, such as methodology and verbal memory, may wholly account for the female bias in object location memory. The present study directly investigated the role of verbal memory using a novel object location memory task.

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Object location memory is the ability to recall specific locations of individual objects. Many tasks designed to evaluate object location memory have been confounded by verbal memory, particularly in instances in which common objects were used (Barnfield, 1999; Eals & Silverman, 1994; James & Kimura, 1997; Silverman & Eals, 1992). Silverman and Eals, for example, found that females outperformed males on a task in which common objects exchanged locations, which was presumed to measure object location memory. It has been demonstrated, however, that this task supports a strategy based on memory for the objects per se rather than their specific locations; under conditions in which this particular strategy could not be used, sex differences failed to persist (James & Kimura, 1997), suggesting that the female advantage in object memory may be responsible for the sex difference in object location memory. Related research reveals that the female bias in object memory, in turn, may be attributed to female superiority in verbal memory. For instance, although females were better able to recall previously viewed diagrams compared to males, verbal memory wholly accounted for this sex difference, leading to the speculation that verbal memory may facilitate object memory, and consequently, object location memory (Chipman & Kimura, 1998). Enhanced memory for verbal information, such as a list of object names and their respective positions in an array (e.g., the bell is left of the bottle) may aid performance on object location memory tasks. Given that sex differences in verbal memory generally favors females (e.g., Bleeker, Bolla-Wilson, Agnew, & Meyers, 1988; Kramer, Delis, & Daniel, 1988), it is plausible that verbal memory plays a significant role in the female bias found in many object location memory tasks.

The present study evaluated the role of verbal memory on object location memory. The verbal memory hypothesis was tested using nonsense and common objects, which allowed for a direct comparison between objects that can and cannot be readily verbally labeled. Given that the nonsense objects do not have accessible labels, it is presumed that verbal memory would play a lesser role in this condition. Based on this hypothesis, it is predicted that an interaction between sex and condition will emerge; females should outperform males in the concrete condition in which common objects comprised the array, but perform similarly to males in the abstract condition in which nonsense objects comprised the array. Alternatively, if the female bias in object location memory is independent of verbal memory, it is expected that the female bias would persist in the abstract condition.

1. Method

1.1. Participants

Fifty male ($M=19.43$ years, $SEM=0.15$) and sixty-one female ($M=19.17$ years, $SEM=0.16$) undergraduate students were recruited from Introductory Psychology courses at the University of Lethbridge and received course credit for their participation. All participants spoke English.

1.2. Materials

The object location memory task consisted of three-dimensional figures constructed from wooden toy pieces (see Fig. 1). Fifteen objects in the concrete condition resembled common sex-neutral objects and measured 6.2×1.2 in. to 3.1×2.0 in. Fifteen objects in the abstract condition were nonsense figures and ranged in size from 5.2×2.7 in. to 3.8×1.4 in. A magnet was affixed to each

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