



Does gender role socialization mediate sex differences in mental rotations?

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Abstract

Prior research has shown strong sex differences in spatial ability and some researchers have argued that gender role socialization (i.e. the degree to which men and women internalize gender-related personality traits or act in gender-typed ways) mediates this relationship. This study provides a direct examination of the extent to which trait and behavioural components of gender role socialization mediate sex differences in spatial ability. The results of two path analyses show that, while sex is a significant predictor of spatial ability, only agentic personality traits significantly mediated that relationship. © 2002 Elsevier Science Ltd. All rights reserved.

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1. Introduction

Sexually dimorphic spatial abilities have been extensively documented (e.g. Hyde, 1990; Mann, Sasanuma, Sakuma, & Masaki, 1990; Masters & Sanders, 1993). Typically it has been observed that men outperform women on tasks requiring mental rotation of a target item (e.g. Geary, Gilger, & Elliott-Miller, 1992; Sanders, Soares, & D'Aquila, 1982; Vandenberg & Kuse, 1978). Theoretical explanations of why the sex differences in spatial ability occur have included both evolutionary (Eals & Silverman, 1994) and hormonal mechanisms (Gouchie & Kimura, 1991; Kimura & Hampson, 1994). However, relatively few researchers have examined the effects of

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gender role socialization on spatial ability. As such, there is the possibility that studies that have reported sex differences in spatial ability have actually been measuring the indirect effects of gender role socialization on this construct.

Gender role socialization reflects the extent to which individuals internalize stereotypic notions about men's and women's personalities and act in gender stereotypic ways. Current conceptualizations of gender role socialization stress that, on a theoretical level, sex and gender are relatively independent of one another, meaning that men and women internalize both male-typed and female-typed personality traits and act in both male-typed and female-typed ways (e.g. McCreary, 1990; McCreary, Newcomb, & Sadava, 1998; Orlofsky, 1981; Spence & Helmreich, 1978). This contemporary, bidimensional conceptualization has been operationalized into current measurement tools such as the Personal Attributes Questionnaire (Spence & Helmreich, 1978) and the Sex Role Behavior Scale (Orlofsky, 1981). More specifically, these scales define masculine and feminine traits and behaviours as those which are equally desirable for men and women, but more stereotypically associated with men or women, respectively. Thus, even though sex may be correlated with possessing male- or female-typed traits or acting in male- or female-type ways, the relationship is not strong; in other words, sex is not confounded with gender role socialization. However, not all gender-typed personality traits and behaviours are bidimensional and relatively unrelated to sex; some traits and behaviours are more desirable for one gender than the other and are more strongly associated with one sex than the other. Lippa (1991; Lippa & Connelly, 1990) refers to these as gender diagnostic aspects of socialization. Others refer to them as sex-specific characteristics (e.g. Orlofsky, 1981). Common measures of gender role socialization (e.g. Personal Attributes Questionnaire) and behaviours (Sex Role Behavior Scale) include items from both bidimensional and sex-specific domains.

Few studies have examined the role that gender role socialization plays in spatial ability. While all of these studies have reported significant sex differences in spatial ability (e.g. Ginn & Stiehl, 1999; Goodrich, Damin, Ascione, & Thompson, 1993; Jamison & Signorella, 1987; Kalichman, 1988; Parameswaran, 1995; Popiel & de-Lisi, 1984; Signorella & Jamison, 1978; Small, Erdwins, Gross, & Gessner, 1979), only two of these have found significant relationships between spatial ability and gender roles. In both these cases, spatial ability was positively related to masculine-typed gender role traits (Jamison & Signorella, 1987; Parameswaran, 1995).

Participation in gender-related behaviours has been hypothesized to play an especially salient role in the development and maintenance of spatial ability. Caplan and Caplan (1994) have argued that male-typed behaviours promote the development of spatial ability while female-typed behaviours do not. However, few studies have examined whether or not acting in gender-related ways is significantly related to spatial ability (Ginn & Stiehl, 1999; Kalichman, 1988; Parameswaran, 1995). In one study, Ginn and Stiehl (1999) found that participants who performed male-typed spatial activities outperformed those who performed gender-neutral spatial activities. However, all of the participants who engaged in the male-typed spatial activities were men, and no other men reported engaging in any female-typed spatial activities; as such, this difference confounds sex and gender role socialization and, as a result, cannot provide an adequate explanation of the relationship between sex, gender roles, and spatial ability. Using an approach similar to Ginn and Stiehl, Parameswaran (1995) also failed to observe a relationship between spatial ability and gender-related behaviours. Finally, Kalichman (1988) examined participants' skills and interests and found that men with interests in carpentry, mechanics, management and

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