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ABSTRACT

The study evaluated a theory of gender specialization by J. H. Block that postulates that gender differences in personality and cognitive functioning are closely linked, both arising from the same sex-differentiated socialization experiences. This study tested the theory as it applies to creativity in children. Subjects were 244 children in grades 4-8 attending Montreal-area summer schools for gifted children. Two divergent thinking tests, each with a familiar and an unfamiliar item, were used to test cognitive style. Other measures were used to evaluate independence and social orientation. No sex differences were found in personality or in cognitive style and no significant association was found between measures of cognitive style and personality scores. Results are discussed in light of the moderating influence of sex-role flexibility and the relative freedom boys and girls experience in peer groups and play. Includes 45 references. (DB)

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Gender Differences in Divergent Thinking?: An Investigation of Block's Gender Specialization Theory

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Abstract

Block's theory (1984) of sex differences in personality and cognitive style was tested as it applied to creativity in children. Subjects were 244 children in grades 4 to 8 attending summer schools for gifted children. Two divergent thinking tests, each with a familiar and an unfamiliar item, were used to test cognitive style. The Dependency Proneness Test was used to measure independence and the FIRO-BC (Fundamental Interpersonal Relations Orientation - Behavior - Children) was used to measure social orientation. No sex differences were found in personality or in cognitive style and no significant association was found between measures of cognitive style and personality scores. The results were discussed in light of the moderating influence of sex-role flexibility and the relative freedom boys and girls experience in peer groups and play.

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Gender Differences in Divergent thinking?: An Investigation of Block's Gender Specialization Theory

Block (1981, 1983, 1984) has developed a theory of gender specialization that attempts to synthesize the literature on the psychological differences between the sexes and the extent to which these differences are influenced by socialization. Block postulates that gender differences in personality and cognitive functioning are closely linked, both arising from the same sex-differentiated socialization experiences. The research reported here focuses on those differences in personality and cognitive style that are most relevant to the study of creativity in children.

Block (1984) theorizes that individuals respond to new experiences in one of two ways: either by fitting the new information into existing cognitive schemas (assimilation) or by creating new schemas and modifying existing ones (accommodation). Because of their socialization, girls tend to assimilate when presented with new or discrepant information and boys tend to accommodate.

Block (1984) believes that both assimilation and

accommodation may be used creatively. Creative accommodative solution to problems break with tradition and foster innovation and change. Creative assimilative solutions to problems conserve existing social structures, provide continuity with the past, and support traditions and accepted values.

Because creativity is frequently considered synonymous with innovation and change, accommodative responses to problems are readily recognizable as being creative. However, products of creative assimilation are not likely to stand out as new or different and thus their creativity may not be recognized.

Support for the concept of assimilative creativity can be found in Taylor (1975), who has identified five distinct levels of creativity; assimilative processes are consistent with four of these (Bramwell, 1987), including expressive creativity and some scientific creativity. Much creative writing, from Shakespeare's sonnets to modern mysteries, fit the definition of assimilative creativity: they are written within a known form (formula) and are concerned with familiar topics. As such, written within the context of preexisting cognitive structures, they reflect

assimilative processes.

Similarly, most scientific research fits the assimilative definition of creativity: Whether identifying a new galaxy or developing a new vaccine, scientists follow established procedures and work within a given body of knowledge; new information is interpreted within the framework of existing theory. This process fits the assimilative function of conserving existing structures, providing continuity with the past, and supporting traditions and accepted values (Block, 1983). Even Copernicus' work, as characterized by Koestler (1964) fits the assimilative model. He described it as "not so much a new departure as a last attempt to patch up an outdated machinery by reversing the arrangement of its wheels" (p. 427). This is very similar to the assimilative process in which "Attempts are made to fit new, discrepant information or experience into existing structures" (Block, 1981, p. 150).

Further support for the concept of assimilative creativity comes from Kirton (1976). He has described two types of creativity in administrators that are very similar to assimilation and accommodation. The adaptor (assimilator) "seeks solutions to problems in

tried and understood ways ... with maximum of continuity and stability" (p. 623). The innovator (acommodator) queries assumptions and ".. often challenges rules. He has little respect for past custom" (p. 623). Furthermore, Kirton has found a higher proportion of women managers among the adaptors than among the innovators, which is consistent with Block's theory.

In children, creativity is most often measured by divergent thinking tests which present subjects with a wide range of tasks. On some, such as the unusual uses test, subjects can earn high scores simply by listing uses recalled from past experience. Even many responses that earn scores for originality, such as using a tin can to store bait in, require no modification of existing schemas and should probably be considered examples of assimilation.

Other divergent-thinking tests present problems that are outside normal experience and thus could more readily be answered using accommodative processes that transform or restructure previous experience. For example, the consequences task that asks what might happen if clouds had strings attached to them which could be used to pull them down to earth is outside

previous experience and cannot readily be answered without modifying schemas.

Block's gender-specialization theory leads to the prediction that boys would earn higher scores than girls on items that use unfamiliar tasks; girls would be expected to earn higher scores than boys on the familiar items. Because most tests include both types of items, boys and girls would be equally likely earn high scores.

In Block's theory, the differential socialization of the sexes has far-reaching consequences not only for children's cognitive structures but also for their personality development. Two traits, independence and social relationships, were selected for inclusion in this study both because they have important implications for creativity and because they seemed to be the core of the differences described by Block. For example, she states that "boys, more than girls are reared in ways encouraging curiosity, independence, and exploration of the environment' (Block, 1984, p. 275). "The developmental context of females, in contrast, is more interpersonal." (Block 1984, p. 205) with the result that girls tend to be more oriented toward the social world.

In adults, independence consistently has been found to be correlated with creativity, and is often considered the core of the creative personality (Perkins, 1981; Weisberg, 1986). In children, however, results are inconsistent. Some authors have found creativity in children to be associated with higher levels of independence (Bosse, 1979; Lett, Williams, & Poole, 1979; Singer & Rummo, 1973; Suseman & Justman, 1975). Others report inconsistent results (Cohen & Oden, 1974; Vernon, 1972). Still others have found the reverse relationship (Houtz, Denmark, Rosenfeld, & Tetenbaum, 1980; McHenry & Shoukesmith, 1970).

These outcomes are consistent with Block's gender specialization theory. Because creativity in children is identified by divergent-thinking tests, the theory leads to the prediction that assimilators, mostly girls, who earn higher scores on tasks using familiar items will be more dependent and interpersonally oriented than the accommodators, mostly boys, who earn higher scores on tasks using unfamiliar items. From this it follows that one would expect inconsistency in the personality correlates of creativity reported for children. Creative adults, however, are usually

nominated on the basis of their achievements. Because their style is more conspicuous, more accommodators than assimilators are likely to be identified, thus leading to the observed association between creativity and independence in adults.

The research reported here used divergent-thinking tests and personality measures to test Block's theory of gender specialization in personality and cognitive style and of an association between cognitive style and personality as it applies to creativity in children. Specifically, it was predicted that boys would earn higher scores than girls on items that use unfamiliar tasks and that girls would earn higher scores than boys on the familiar items. Second, it was predicted that children who earn higher scores on familiar items would be more socially oriented and less independent than other children. Third, it was predicted that girls would be more socially oriented and dependent than boys would be.

Method

Subjects were 244 children entering grades 4 to 8 at two Montreal-area summer schools for gifted children. The majority came from middle and upper-middle class homes. Tests were administered to

children in their classrooms jointly by a male and female tester over a three week period.

Because Raaheim and Raaheim (1986) have shown that IQ may be correlated to performance on unfamiliar convergent problems, the Otis-Lennon Mental Ability Test (Otis & Lennon, 1969) was used to measure intelligence. On this scale, subjects earned a mean IQ of 124.93 with a SD of 12.52. Children with relatively low IQs were found to have shown evidence of giftedness on other tests of intelligence or in high academic achievement.

Two repeated shapes and two consequences tasks were employed to measure divergent thinking. Test selection followed the recommendations of Hargreaves and Bolton (1972). The familiar item of the consequences test asked subjects to list possible consequences of winning a million dollars; the unfamiliar item asked for consequences resulting from clouds having strings attached that could be used to pull them down to earth. The familiar item of the repeated shapes test asked subjects to make drawings incorporating pairs of parallel lines; the unfamiliar item presented subjects with an equal number of open curved lines with which to make drawings.

Familiar and unfamiliar items of each test were selected on the basis of pilot testing. Care was taken to select items that were rated equally familiar or unfamiliar by both boys and girls. Additionally, subjects earned higher scores on the familiar items than on the unfamiliar items, which provides additional evidence that the two sets of tasks represented different levels of familiarity (Sawyers, Moran, Fu, & Milgram, 1983). The tests were scored for fluency and blind as to sex by the first author. Fluency was defined as the number of interpretable relevant responses. Rescoring 20 protocols selected at random revealed a correlation of .98 and .99 for the two scores on the consequences and repeated measures respectively.

Barron and Harrington (1981) report more than 70 studies in which a positive and significant relationship was found between divergent-thinking scores and one or more indices of creative achievement. Howieson (1981) found that fluency scores in elementary school children in 1965 correlated significantly with measures of creative achievement taken 10 years later.

The measure of children's specialization in

assimilation or accommodation was the difference between their standardized familiar and unfamiliar scores on the divergent-thinking tests. Positive scores indicated a higher score on familiar (assimilative) items; negative scores indicated higher scores on unfamiliar (accommodative) items.

The inclusion and affection scales of the FIRO-BC test (Fundamental Interpersonal Relations Orientation - Behavior - Children) (Schutz, 1978) were used to measure social orientation. High scores indicate greater desire and expectation to be socially involved. Social isolates have been shown to score significantly lower than other children on these scales (Schutz, 1978). The alpha coefficients of reliability obtained in this sample were .84 and .79 for inclusion and affection respectively.

Independence was measured by the Dependence Proneness Scale (Flanders, Anderson, & Amidon, 1961); low scores indicate relatively high independence. Amidon and Flanders (1961) report that dependent high school students desire more support and approval than do their independent peers.

Results

A 2 x 5 x 2 x 2 repeated measures analysis of

variance was employed to test the effects of material (figural, verbal), grade (4 to 8), familiarity (familiar, unfamiliar) and sex (male, female) on divergent-thinking scores. IQ was entered as a covariate.

The hypotheses that there would be an interaction between sex and familiarity on divergent-thinking scores was not upheld. Instead, there was a main effect for sex, F (1, 222) = 10.20, p. < .01. The effect size was .40. Girls earned higher scores than boys on both the familiar and the unfamiliar items, as well as on both verbal and figural material (see Table 1). The hypothesis was therefore rejected.

The hypothesis that boys would be more independent and less socially oriented than girls was not supported. A 2 x 5 multivariate analysis of variance for the effects of sex and grade on dependence proneness, affection, and inclusion revealed no significant sex differences in personality, F(3, 164) = 1.20; p > .8.

The hypothesis that cognitive style and personality would be related was also rejected. Separate regression analyses for boys and girls were used to test the effects of dependence-proneness,

inclusion and affection on specialization scores. IQ scores were first forced into the equation to control for the effects of intelligence, then the personality variables were allowed to enter. For girls, only the inclusion scores significantly predicted specialization, R^2 change = .06; F change (1, 71) = 4.73, $p < .05$. As predicted, the regression coefficient was positive, $b = .07$, indicating that high inclusion scores were associated with specialization on familiar material. The results for boys indicated that IQ was a significant predictor of specialization, F equation (1, 99) = 8.64. $p < .01$. In addition, the dependence-proneness scores significantly predicted specialization, R^2 change = .04, F change(1, 98) = 4.23, $p < .05$. The regression coefficient for this variable was negative, $b = -.04$, indicating that boys who were less prone to be dependent performed better on the familiar tasks than on the unfamiliar tasks. This is contrary to the direction predicted.

Neither personality measure explained much of the variance in the specialization scores. The dependence-proneness scores accounted for 4% of the variance in boys' specialization scores, and the

inclusion scores accounted for 6% of the variance in girls' specialization scores.

Discussion

There a number of possible explanations for this lack of support for the gender-specialization theory. It is possible that the use of students attending a summer school may have attenuated scores. However, gender differences in divergent thinking were detected, and both IQ and two measures of personality predicted specialization scores, suggesting that there was in fact adequate variability in these measures.

Although the data base from which Block derived her theory was very large, it was not without limitations (Block, 1981). Thus, it may be worthwhile to examine two additional strands of research which are particularly pertinent to the study of creativity and divergent thinking: the research which shows a tendency for girls to have greater sex-role flexibility than boys, and the evidence concerning the amount of freedom boys and girls experience in their peer groups and play.

The degree of sex-role flexibility accorded boys and girls is particularly relevant to the study of creativity because androgyny (Hargreaves, Stoll,

Farnworth & Morgan, 1981) and lack of conformity to sex roles (Lott, 1978) have been shown to be related to higher scores on divergent-thinking tests. Both adults and peers permit greater sex-role flexibility to girls than to boys. Traditional sex roles are more strictly enforced in boys' groups than in girls' groups (Best, 1983; Hemmer & Kleiber, 1981). Girls can be tomboys without loss of status, but being considered a sissy leads to ostracism for boys (Best, 1983). Adults, too, are less likely to enforce strict sex-role adherence in girls than in boys (Fagot, 1984; Tudiver, 1980). This greater flexibility accorded to girls may allow them opportunities to develop accommodative strategies while at the same time requiring boys to develop assimilative skills.

The amount of freedom experienced by children also has been linked to their creativity (Miller & Gerard, 1979; Rejskind, 1982) and Block (1981) considered that boys' greater freedom from adult supervision and their greater freedom to explore to be partly responsible for their predicted tendency to excel on accommodative tasks.

However, there are areas in addition to sex-roles in which girls have greater freedom than boys. For

example, girls have a wider range of games open to them (Best, 1983; Lever, 1976, 1978) and greater individual control over what game or activity they engage in at any particular time (Best, 1983). Furthermore, boys are more susceptible to peer pressure than are girls (Cochran & Gunnarsson, 1985; Pitcher & Schultz, 1983; Thompson, 1985). Thus, in the type of games they play, in their freedom to choose whether or not to play, and in peer group pressure, girls have more freedom than do boys. Again, these differences may encourage the development of accommodative skills in girls and assimilative skills in boys.

Block (1981) also noted the importance of structure in inhibiting the development of accommodative processes in girls. However, the structure she is concerned with is that provided by adults (e.g. Block, 1984, p. 196). Although boys experience more freedom from adult structure than girls do, the activities they substitute may provide alternate sources of structure. For example, Huston, Carpenter, Atwater and Johnson (1986) reported that at a day camp girls spent more time in activities structured by adults. Boys' preferred activity, board

games, was considered "the least structured of all activities because they were not part of the adult-prescribed agenda". A counter interpretation is that the rules of the board games themselves, and other children playing them, provide structure for the boys. Other research also confirms that boys spend more time than girls in structured activities, particularly team sports (Best, 1983; Lever, 1978; Medrich, Roizen, & Rubin, & Buckley, 1982; Newson & Newson, 1976; Roberts, 1980). Girls' play is also more spontaneous (Lever, 1978), more inventive (Roberts, 1980), more varied (Best, 1983; Roberts, 1980) and includes more imaginative play (Lever, 1978; Newson & Newson, 1976). Thus the games they play present boys with the need to learn assimilative skills and provide girls with the opportunity to develop accommodative skills.

Finally, it should be noted that girls and boys frequently react to the same events in different ways. Thus, while Block has noted that proximity to mothers facilitates imitative behavior, (Block, 1984, p. 204), it cannot be assumed that the presence of adults decreases girls' inventiveness in play. Although girls spend more time than boys close to adults, or in

adult-structured activities (Block, 1984) this does not decrease the amount of novel behavior girls engage in relative to boys (Carpenter & Huston-Stein, 1980) and may even enhance it in girls but not in boys (Cohen & Tomlinson-Keasey, 1980).

In conclusion, this research did not find gender differences in assimilation, accommodation, and personality characteristics associated with creativity in children that had been predicted on the basis of Block's theory. As Block has noted (1984) boys spend less time than girls in activities structured by adults, and they have greater freedom to explore their larger environment, both of which encourage the development of independence and accommodative thinking skills in boys and assimilative skills in girls. These differences may be offset by other differences that Block did not stress: In particular, girls have greater freedom than boys in sex-role flexibility and in their play activities. Girls also have less structure in their games, and less peer pressure than boys do. Taken together these differences can be expected to develop independence and accommodative skills in girls and assimilative skills in boys.

References

Amidon, E., & Flanders, N. A. (1961). The effects of direct and indirect teacher influence on dependent-prone students learning geometry. Journal of Educational Psychology, 52, 286-291.

Barron, F., & Harrington, D. M. (1981). Creativity, intelligence, and personality. Annual Review of Psychology, 32, 439-476.

Best, R. (1983). We've all got scars. Bloomington, IN: Indiana University Press.

Block, J. H. (1981). Gender differences in the nature of premises developed about the world. In E. K. Shapiro & E. Weber (Eds.), Cognitive and affective growth: Developmental interaction (pp. 147-169). Hillsdale, NJ: Lawrence Erlbaum Associates.

Block, J. H. (1983). Differential premises arising from differential socialization of the sexes: Some conjectures. Child Development, 54, 1335-1354.

Block, J. H. (1984). Sex role identity and ego development. San Francisco: Jossey-Bass.

Bosse, M. A. (1979). Do creative children behave differently? Journal of Creative Behavior, 13, 119-126.

Bramwell, F. G. (1987). Sex differences and specialization in the divergent-thinking styles of gifted children. Dissertations Abstracts International, 49, 535B.

Carpenter, C. T., & Huston-Stein, A. C. (1980). Activity structure and sex-typed behavior in preschool children. Child Development, 51, 862-872.

Cohen, S., & Oden, S. (1974). An examination of creativity and locus of control in children. Journal of Genetic Psychology, 124, 179-185.

Cohen, N. L., & Tomlinson-Keasey, C. (1980). The effects of peers and mothers on toddlers' play. Child Development, 51, 921-924.

Cochran, M. M., & Gunnarsson, L. (1985). A follow-up study of group day care and family-based childrearing patterns. Journal of Marriage and the Family, 47, 297-309.

Fagot, B. I. (1984). Teacher and peer reactions to boys' and girls' play styles. Sex Roles, 11, 691-702.

Flanders, N. A., Anderson, J. P., & Amidon, E. J. (1961). Measuring dependence proneness in the classroom. Educational and Psychological

Measurement, 21, 575-587.

Hargreaves, D. J., & Bolton, N. (1972). Selecting creativity tests for use in research. British Journal of Psychology, 63, 451-462.

Hargreaves, D. J., Stoll, L., Farnworth, S., & Morgan, S. (1981). Psychological androgyny and ideational fluency. British Journal of Social Psychology, 20, 53-55.

Hemmer, J. D., & Kleiber, D. A. (1981). Tomboys and sissies: Androgynous children? Sex Roles, 7, 1205-1212.

Houtz, J. C., Denmark, R., Rosenfeld, S., & Tetenbaum, T. J. (1980). Problem solving and personality characteristics related to differing levels of intelligence and ideational fluency. Contemporary Educational Psychology, 5, 118-123.

Howieson, N. (1981). A longitudinal study of creativity -1965-1975. Journal of Creative Behavior, 15, 117-134.

Huston, A. C., Carpenter, C. T., Atwater, J. B., & Johnson, L. M. (1986). Adult structuring of activities and social behavior in middle childhood. Child Development, 57, 1200-1211.

Kirton, M (1976). Adaptors and innovators: A

description and measure. Journal of Applied Psychology, 61, 622-629.

Koestler, A. (1964). The act of creation. Great Britain: Macmillan.

Lett, W. R., Williams, A. J., & Poole, M. E. (1979). The achievement drive and ego strength of highly creative adolescents. Journal of Psychology, 102, 263-266.

Lever, J. (1976). Sex differences in the games children play. Social Problems, 23, 478-487.

Lever, J. (1978). Sex differences in the complexity of children's play and games. American Sociological Review, 43, 471-483.

Lott, B. (1978). Behavioral concordance with sex role ideology related to play areas, creativity, and parental sex typing of children. Journal of Personality and Social Psychology, 36, 1087-1100.

McHenry, R. E., & Shoukemith, G. A. (1970). Creativity, visual imagination and suggestibility: Their relationship in a group of 10-year-old children. British Journal of Educational Psychology, 40, 154-160.

Medrich, E. A., Roizen, J., Rubin, V., & Buckley, S. (1982). The serious business of growing up: A

study of children's lives outside school. Berkeley: University of California Press.

Miller, B. C., & Gerard, D. (1979). Family influences on the development of creativity in children: An integrative review. Family Coordinator, 28, 295-312.

Newson, J.. & Newson, E. (1976). Seven years old in the home environment. London: Allen & Unwin.

Otis, A. S., & Lennon, R. T. (1969). Otis-Lennon Mental Ability Test technical handbook. New York: Harcourt, Brace, & World.

Perkins, R. (1981). The mind's best work. Cambridge, MA: Harvard University Press.

Pitcher, E. G., & Schultz, L. H. (1983). Boys and girls at play: The development of sex roles. Westport, CT: Praeger.

Raaheim, K., & Raaheim, A. (1986, April). Intelligence and the solution of new tasks. Paper presented at the American Educational Research Association Conference, San Francisco.

Rejskind, F. G. (1982). Autonomy and creativity in children. Journal of Creative Behavior, 16, 58-76.

Roberts, A. (1980). Out to play: The middle years of childhood. Great Britain: Aberdeen University

Press.

Sawyers, J. K., Moran, J. D., Fu, V. R., & Milgram, R. A. (1983). Familiar versus unfamiliar stimulus items in measurement of original thinking in young children. Perceptual and Motor Skills, 57, 51-55.

Singer, D. L., & Rummo, J. (1973). Ideational creativity and behavioral style in kindergarten-age children. Developmental Psychology, 8, 154-161.

Schutz, W. (1978). FIRO awareness scales manual. Palo Alto: Consulting Psychologist Press.

Sussman, G., & Justman, J. (1975). Characteristics of preadolescent boys judged creative by their teacher. Gifted Child Quarterly, 19, 210-216.

Taylor, I. A. (1975). An emerging view of creative actions, In I. A. Taylor & J. W. Getzels (Eds.), Perspectives in creativity. Chicago: Aldine press.

Thompson, D. N. (1985). Parent-peer compliance in a group of preadolescent youths. Adolescence, 79, 501-508.

Tudiver, J. G. (1980). Parents and the sex-role development of the preschool child. In C. Stark-Adamec (Ed.), Sex-roles: Origins, influences and implications for women. Montreal: Eden Press.

Vernon, P. E. (1972). The validity of divergent

thinking tests. Alberta Journal of Educational Research, 18, 249-258.

Weisberg, W. R. (1986). Creativity: Genius and other myths. New York: Freeman.

Table 1

Means and Standard Deviations of Dependent Variables

	Males		Females	
Variable	Mean	SD	Mean	SD
	Divergent Thinking Measures			
	Familiar			
Verbal	7.33	4.14	8.63	4.07
Figural	13.48	6.03	15.44	5.66
	Unfamiliar			
Verbal	4.93	2.42	5.88	2.39
Figural	11.7	5.39	13.25	5.44
	Personality Measures			
Dependence				
Proneness	27.01	5.40	27.43	5.58
Affection	9.82	4.16	10.36	4.10
Inclusion	10.54	4.94	10.83	4.17

Note: N 92 females, 152 males.