Creativity in Home-schooled Children

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It has been argued that a conventional school environment can stifle children's creativity (Steffin, 1983). By teaching their children at home, home-schooling parents would seem to have the opportunity to develop a learning environment in which creativity could be encouraged. Indeed, these parents often cite an unstructured atmosphere, a flexible curriculum, and activities based on the child's interests as particular advantages of home-schooling (Mayberry, 1993). Although research has consistently demonstrated above-average academic performance by home-schooled children (e.g., Home School Legal Defense Association, 1991; National Center for Home Education, 1992; Ray, 1990, 1994; Ray & Wartes, 1991), there has been very little research on creativity among these children (Aiex, 1994).

Although creativity is an elusive concept (Brown, 1989), there is some agreement that creativity may be defined as the ability to generate novel and appropriate solutions to open-ended problems (Amabile & Tighe, 1993). This definition relies heavily on Guilford's (1967) concept of divergent production. Guilford's "Structure of Intellect" model proposed that human intelligence encompassed five operations, or ways of dealing with information, including divergent production. Divergent production was defined as "the generation of information where the emphasis is on variety and quality of output" (Meeker, Meeker, & Roid, 1991, p. 76) and was thought to be characterized by fluency, flexibility, and originality.

Research on creativity in conventional educational settings has shown that divergent production can be improved by: exposing children to creative models (Zimmerman & Dialessi, 1973), giving children direct instruction in creative skills (Cliatt, Shaw, & Sherwood, 1980), teaching in a game-like format (Goor & Rapaport, 1977), using humor (Ziv, 1976), and providing incentives for creative behavior (Runco, 1992). Though equivocal, research suggests that "open" classrooms may promote creativity more than traditional classrooms do (Kogan, 1983).

Research also suggests that parents can foster creativity in their children at home (Harrington, Block, & Block, 1987). Parents of highly creative children have been found to value independence and to allow their children to make decisions for themselves. They give their children time to daydream, play, and explore. They show appreciation for their children's accomplishments. They spend warm, intimate, and fun times together with their children. Although they express well-defined values, parents of creative children set few rigid rules and tend to use non-punitive forms of discipline (Dacey, 1989). They serve as models of hard work, interest in learning new things, and commitment to high standards of performance (Sloane, 1985).

Williams (1990) studied home-schooled children specifically to see if anecdotal observations of creativity in this group were supported by empirical research. He used the figural part of the Torrance Tests of Creative Thinking and found that home-schooled children's creativity scores were indeed high. But creativity was not strongly related to the parents' teaching practices. Instead, creativity scores were best predicted by factors seemingly unrelated to home-school instruction: family income, the number of years the child had spent in a conventional school, the parents' ages, the child's grade level, and the number of children in the family being home-schooled.

These results led Williams to conclude that, "more creative children are found in the home-school environment not because home-schooling made them that way, but because they were already more creative than their peers and thus they (or their parents) were attracted to the home-school environment, presumably because of the greater opportunities for freedom and flexibility that it affords" (p. 8). But Williams tested only figural creativity, which is measured by having children draw pictures. Perhaps home-schooling more readily fosters creative abilities that are more closely related to academics, such as creativity in verbal and math tasks. And although Williams recorded several aspects of parental teaching, perhaps he discovered few

relationships between creativity and instructional techniques because other, more effective techniques were not measured.

In the present research, creativity in figural, verbal, and math tasks was tested in home-schooled children. Their previous school experience and their parents' instructional practices were recorded, including three practices Williams assessed: the degree of structure in the home-school, the use of rewards to motivate children in their schoolwork, and the amount of freedom afforded children to direct their own studies. The parents' satisfaction with and commitment to home-schooling were also measured. Children's academic achievement was tested, as highly creative children often excel scholastically as well (e.g., Torrance, 1962; Yamamoto, 1964).

It was hypothesized that both creativity and academic achievement would be high and that they would be positively related to one another. Creativity was expected to be correlated with the number of years children had been home-schooled and with the amount of time children worked independently in their home-school. Parents who described their home-school as being unstructured, as not being "traditional," and as including art, drama, literature, and critical thinking skills were expected to have more creative children.

Method

Participants

Sixty-two home-schooled children and their parents--43 families in all--participated in this study. A total of 28 boys and 34 girls representing grades three through eleven were included (see Table 1). Two brothers and their parents were African American; the rest of the participants were White. The children as a group had spent an average of 3.07 years in home-schools and 2.93 years in conventional schools. The mean age of the parents was 38.85 years and they had completed an average of 13.80 years of formal education. The parents had been home-schooling for an average of 3.95 years.

Materials and Procedure

Creativity. Three subtests of the Structure of Intellect Learning Abilities Test (SOI-LA) (Meeker, Meeker, & Roid, 1991) were used to measure creativity. Based on Guilford's (1967) model of intelligence, this test consisted of 26 subtests designed to measure as many specific cognitive abilities. The subtests used in this study measured three different kinds of divergent production: divergent production of figural units (pictures), divergent production of semantic units (words), and divergent production of symbolic relations (math concepts).

The reliability of the SOI-LA has been evaluated using test-retest and alternate forms methods. Reliability coefficients for total SOI-LA scores ranged from .81 to .94 while coefficients for the three divergent production subtests ranged from .46 to .69 (Meeker, Meeker, & Roid, 1991). Test validity for the SOI-LA has been based both on test construction--subtests were designed to be representative of the cognitive abilities included in Guilford's model of intelligence--as well as on correlations with academic achievement scores, intelligence test scores, reading ability, gifted classroom placement, and teacher ratings of intellectual and creative ability (Meeker, Meeker, & Roid, 1991). Factor analysis has supported the construct validity of the divergent production subtests (Thompson & Andersson, 1983).

The Divergent Production of Figural Units subtest assessed figural creativity, or the ability "to communicate through figural representations" and "to use ambiguous stimuli in creative ways" (Meeker, Meeker, & Roid, 1991, p. 77). Children were given a form printed with 16 small squares and were told, "by drawing, make each of the squares into something different" within a five-minute time limit (Meeker, Meeker, & Roid, 1991, p. 25). Four aspects of figural creativity were scored: fluency was defined as the number of squares used, set change was measured by the number of distinct ideas expressed in the drawings, a transformation was counted when a student used two or more squares to express a single idea, and originality was defined as the

presence of any of nine characteristics such as humor, movement, or three-dimensionality. The figural creativity score was the sum of the fluency, set change, transformation, and originality scores.

The Divergent Production of Semantic Units subtest measured "verbal fluency and creativity" and "the ability to write and develop unique ideas" (Meeker, Meeker, & Roid, 1991, p. 77). Children were instructed to write a short story within a five-minute time limit. Fluency was measured by the total number of words in the story, and originality was scored according to the presence of any of ten characteristics such as puns, poetry, or personification. The verbal creativity score was the sum of the fluency and originality scores.

The Divergent Production of Symbolic Relations subtest measured math creativity, defined as the ability "to be creative with numerical concepts" and "to generate connections between letters or numbers in different ways" (Meeker, Meeker, & Roid, 1991, p. 77). Children were given five matrices; each matrix had nine cells. Some of the cells in each matrix already contained letters or numbers, while other cells were empty. Children were told to enter letters or numbers into the empty cells to make a pattern within a ten-minute time limit. Some matrices required that the numbers entered follow certain rules, such as "across to 6" for each row. For this subtest, fluency was defined as the total number of cells completed, set change was measured by the number of cells completed with any letter or number different from those given, and originality was based on the number of unique solutions, such as using negative numbers or operations other than addition in the matrices involving math. The math creativity score was the sum of the fluency, set change, and originality scores.

Academic Achievement. The Stanford Achievement Test (SAT), Eighth Edition (Psychological Corporation, 1992), measured academic achievement. This norm-referenced, multi-level test battery assessed achievement in reading, mathematics, language, spelling, study skills, science, social science, and listening. Test reliability of

the SAT has been evaluated using Kuder-Richardson, test-retest, and alternate forms methods. The reliability coefficients generated by these methods "cluster around .90" (Keyser & Sweetland, 1987, p. 540). Test validity has been based largely on item development--items were derived from an extensive review of many of the most popular textbook series at each grade level and were thoroughly field-tested (Keyser & Sweetland, 1987).

School Experience, Instructional Practices, and Parental Attitudes. Parents provided information about their home-school in a brief questionnaire. They recorded the number of years their children had spent in conventional schools and in home-schools. They reported how much of each home-school day consisted of independent work by their children. They indicated whether or not they would describe their home-school as "traditional," which was defined as resembling the schooling often experienced in conventional schools, with a different book for each subject, lessons planned and presented by the parent, and reading and answering questions about the content of that reading accounting for much of each day's activity.

On a five-point scale ranging from "not at all structured" (1) to "very structured" (5), parents indicated how highly structured their home-school program was. Using a scale ranging from "not at all frequently" (1) to "very frequently" (5), they rated how often they used rewards to motivate their children in their schoolwork and how often they allowed their children to direct their own studies. They used the same scale to indicate how frequently they had included the following topics in their curriculum in the past year: appreciation of art, techniques of art, appreciation of drama, dramatic productions, appreciation of literature, creative writing, and critical thinking skills.

Finally, parents used a five-point scale ranging from "not at all satisfied" (1) to "very satisfied" (5) to rate how satisfied they were with their home-school. They used a similar scale, ranging from "not at all likely" (1) to "very likely" (5), to rate how likely

they would be to send their children to a conventional school if an excellent one were available to them.

Results

The mean figural, verbal, and math creativity scores for all grades combined corresponded to percentile ranks of 72, 71, and 76 respectively.[1] The mean SAT Complete Battery score for all grades combined corresponded to a percentile rank of 71. Mean figural, verbal, and math creativity scores and SAT scores for each grade separately, converted to percentile ranks, are presented in Table 2. These means ranged widely, but most were above the 50th percentile, which is the average for students attending conventional schools.

Correlations between creativity scores and achievement scores for the group as a whole were significant for figural creativity scores, $r(60)=.301$, $p=.010$, and for verbal creativity scores, $r(60)=.433$, $p<.001$. The correlation between math creativity and achievement was not significant (an alpha level of .05 was used to determine significance in all analyses).

School Experience. Verbal creativity scores were correlated with the number of years children had spent in conventional schools, $r(42)=.365$, $p=.009$. Math creativity scores, in contrast, were correlated with the number of years children had been home-schooled $r(42)=.309$, $p=.023$. Figural creativity scores and achievement scores were not significantly related to the number of years children had spent in either home-schools or conventional schools.

Instructional Practices. The parent questionnaire revealed that, on the average, 60% of each home- school day consisted of independent work by their children. Verbal and math creativity scores were correlated with the amount of independent work by children in each home-school day: $r(41)=.295$, $p=.031$, and $r(41)=.301$, $p=.028$, respectively. The correlation between figural creativity scores and the amount of

independent work approached significance, $r(41)=.250$, $p=.057$. Achievement scores were also correlated with children's independent work, $r(42)=.263$, $p=.046$.

Most parents (78%) characterized their home-school as "traditional." A series of t-tests showed that creativity and achievement scores of children in these home-schools did not differ significantly from those of children whose parents did not describe their home-schools as traditional.

Mean ratings of the level of structure (3.45), use of rewards (2.40), and the frequency of allowing children to direct their own studies (2.69) were all moderate. Only one of these variables was significantly related to creativity scores: the frequency with which children were allowed to direct their own studies was negatively correlated with figural creativity scores, $r(41)=-.323$, $p=.020$. None of these measures were significantly related to achievement scores.

The mean ratings of the frequency with which parents included art, drama, literature, and critical thinking skills in their home-school curriculum showed that some topics were included more often than others. Appreciation of literature (mean rating=3.67), critical thinking skills (3.48), and creative writing (3.40) were included more frequently than art appreciation (1.88), art techniques (1.95), drama appreciation (1.71), or dramatic productions (2.05). Art appreciation was negatively correlated with both verbal creativity scores, $r(41)=-.401$, $p=.005$, and figural creativity scores, $r(41)=-.285$, $p=.035$. The frequency with which creative writing was included in the curriculum was positively correlated with achievement scores, $r(42)=.349$, $p=.012$.

Parental Attitudes. The parents in this study were satisfied with and committed to their home-schools: the mean rating of satisfaction was 4.02, while the mean rating of the likelihood that parents would send their children to a conventional school was only 2.19. Ratings of parental satisfaction were significantly related to ratings of both structure, $X^2(8)=15.89$, $p=.044$, and the use of rewards, $X^2(8)=18.08$, $p=.021$. Satisfaction was negatively correlated with the amount of independent work by children in each

home-school day, $r(42)=-.337$, $p=.015$, and with math creativity scores, $r(41)=-.374$, $p=.008$.

Discussion

All three kinds of creativity were well above the 50th percentile, which is the average for students attending conventional schools. Children who scored higher in verbal and figural creativity also tended to have higher academic achievement scores. Achievement, too, was above the national average.

Creativity with math concepts was related to the number of years children had been home-schooled. Richman, Girten, & Snyder (1990) found that some home-schooling parents prefer an approach to math instruction that emphasizes independent work by the student and that includes supplemental activities with math manipulatives. These teaching methods may promote math creativity by encouraging independence and a game-like approach to problem-solving (Runco, 1992).

Verbal creativity, however, was correlated with the number of years children had spent in conventional schools, suggesting that conventional schools may provide more effective opportunities for creative writing than most home-schools do. Hafer (1990) reviewed composition texts marketed to home-schoolers and concluded, "those acts which have been isolated in previous studies as characterizing good writing pedagogy largely do not appear in home school texts" (p. 2). Nevertheless, verbal creativity scores for these home-schooled children were higher than the average for public-school students (Meeker, Meeker, & Roid, 1991).

Figural creativity, which Williams (1990) found to be related to attendance at conventional schools, was not significantly related to the number of years students had spent in either conventional or home schools.

Only one teaching practice had a positive relationship to creativity: the amount of time children worked independently. This relationship may hold because creative children are given more freedom to explore their interests, or because a learning

environment that encourages independence actually promotes the development of creativity, as previous research seems to suggest (Dacey, 1989; Harrington et al., 1987; Kogan, 1983).

Academic achievement was also associated with children's independent work. Perhaps higher-achieving students need less direct instruction, or perhaps less direct instruction encourages higher achievement, as some educators maintain (e.g., Holt, 1982; Moore & Moore, 1982). In conventional schools, the relationship between achievement and independent work may be just the opposite: Stigler, Lee, and Stevenson (1987) have suggested that achievement declines as the amount of independent work increases among public-school students.

Contrary to expectation, no positive relationship was found between creativity and a variety of teaching practices including: the amount of structure, a non-traditional home-school, allowing children to direct their own studies, and including art, drama, literature, creative writing, and critical thinking skills in the home-school curriculum. These results agree with those of Williams (1990), who found figural creativity to be unrelated to the instructional variables he measured.

Perhaps, as Williams (1990) concluded, home-schooled children are likely to be creative simply because the parents of creative children are drawn to home-schooling, believing it to be more appropriate to their children's abilities than a conventional education. It is also possible, however, that more intrinsic features of the home-schooling environment--rather than specific instructional techniques-- actually cause children's creativity to increase (see Amabile, 1989; Bloom, 1985). For example, Mayberry (1993) proposed that home-schooling is effective when parents model an enjoyment of learning and a commitment to excellence within a learning environment that is pleasant, orderly, and emotionally supportive. And this study suggests that a home-school environment that encourages children to work independently may do more to foster both creativity and academic achievement than any particular

pedagogical practice or curriculum content. It would be well for future research to examine these often overlooked intrinsic characteristics of homeschooling.

References

Aiex, P. K. (1994). *Home schooling, socialization, and creativity in children.* Washington, DC: Office of Educational Research and Improvement, U. S. Department of Education. (ERIC Document Reproduction Service No. ED 367 040).

Amabile, T. M. (1989). *Growing up creative.* New York: Crown.

Amabile, T. M. & Tighe, E. (1993). Questions of creativity. In J. Brockman (Ed.), *Creativity* (pp. 7-27). New York: Simon and Schuster.

Bloom, B. (Ed.) (1989). *Developing talent in young people.* New York: Ballantine Books.

Brown, R. T. (1989). Creativity: What are we to measure? In J. A. Glover, R. R. Ronning, & C. R. Reynolds (Eds.), *Handbook of Creativity* (pp. 3-32). New York: Plenum.

Cliatt, M. J. P., Shaw, J. M., & Sherwood, J. M. (1980). Effects of training of the divergent-thinking abilities of kindergarten children. *Child Development, 51,* 1061-1064.

Dacey, J. S. (1989). Discriminating characteristics of the families of highly creative adolescents. *Journal of Creative Behavior, 23,* 263-271.

Goor, A., & Rapaport, T. (1977). Enhancing creativity in an informal educational framework. *Journal of Educational Psychology, 69,* 636-643.

Guilford, J. P. (1967). *The nature of human intelligence.* New York: McGraw-Hill.

Hafer, G. R. (1990). *An Analysis of Writing Instruction in the Home School.* Unpublished doctoral dissertation, Purdue University, West Lafayette, IN.

Harrington, D. M., Block, J. H., & Block, J. (1987). Testing aspects of Carl Roger's theory of creative environments: Child-rearing antecedents of creative potential in young adolescents. *Journal of Personality and Social Psychology, 52,* 851-856.

Holt, J. (1982). *Teach your own: A hopeful path for education*. New York: Delacorte Press.

Home School Legal Defense Association. (1991, October/November). Home schoolers beat national averages on achievement tests. *Teaching Home,* p. 19.

Keyser, D. J. & Sweetland, R. C. (1987). *Test critiques* (Vol. 6). Kansas City, MO: Test Corporation of America.

Kogan, N. (1983). Stylistic variation in childhood and adolescence: Creativity, metaphor, and cognitive styles. In P. H. Mussen (Series Ed.) & J. H. Flavell & E. M. Hetherington (Vol. Eds.), *Handbook of Child Psychology: Vol. 3. Cognitive Development* (4th ed., pp. 630-706). New York: John Wiley and Sons.

Mayberry, M. (1993). Effective learning environments in action: The case of home schools. *School Community Journal, 3*, 61-68.

Meeker M., Meeker, R., & Roid, G. H. (1991). *Structure of Intellect Learning Abilities Test.* Los Angeles: Western Psychological Services.

Moore, R. S., & Moore, D. (1982). *Home-spun schools.* Waco, TX: Word Books.

National Center for Home Education. (1992, October/November). Research on home education continues to give good reports. *Teaching Home,* p. 26.

Psychological Corporation. (1992). *Stanford Achievement Test* (8th ed.). San Antonio, Texas: Author.

Ray, B. D. (1990). *A nationwide study of home education: Family characteristics, legal matters, and student achievement.* Salem, OR: National Home Education Research Institute.

Ray, B. D. (1994). *A nationwide study of home education in Canada: Family characteristics, student achievement, and other matters.* Salem, OR: National Home Education Research Institute.

Ray, B. D., & Wartes, J. (1991). The academic achievement and affective development of home-schooled children. In J. Van Galen & M. A. Pitman (Eds.), *Home schooling: Political, historical, and pedagogical perspectives* (pp. 43-62). Norwood, NJ: Ablex.

Richman, H. B., Girten, W., & Snyder, J. (1990). Academic achievement and its relation to selected variables among Pennsylvania homeschoolers. *Home School Researcher, 6*(4), 9-16.

Runco, M. A. (1992). Children's divergent thinking and creative ideation. *Developmental Review, 12,* 233-264.

Steffin, S. A. (1983). Fighting against divergent thinking. *Childhood Education, 59,* 355-358.

Sloane, K. (1985). Home influences on talent development. In B. Bloom (Ed.), *Developing talent in young people* (pp. 439-476). New York: Ballantine Books.

Stigler, J. W., Lee, S., & Stevenson, H. W. (1987). Mathematics classrooms in Japan, Taiwan, and the United States. *Child Development, 58,* 1272-1285.

Thompson, B., & Andersson, B. V. (1983). Construct validity of the divergent production subtests from the Structure-of-Intellect Learning Abilities Test. *Educational and Psychological Measurement, 43,* 651-655.

Torrance, E. P. (1962). *Guiding creative talent.* Englewood Cliffs, NJ: Prentice-Hall.

Williams, L. T. (1990). The relationship of family characteristics and instructional approach to creativity in home school children. *Home School Researcher, 6*(3), 1-10.

Yamamoto, K. A. (1964). Role of creative thinking and intelligence in high school achievement. *Psychological Reports, 14,* 783-789.

Zimmerman, B. J., & Dialessi, F. (1973) Modeling influences on children's creative behavior. *Journal of Educational Psychology, 65,* 127-134.

Ziv, A. (1976). Facilitation effects of humor on creativity. *Journal of Educational Psychology, 68,* 318-322.

Footnotes

Normal Curve Equivalent (NCE) scores were used to calculate figural, verbal, and math creativity means for all grades combined. NCE scores were also used for all analyses involving the SAT. The NCE scale is an equal-interval scale with a mean of 50 and a standard deviation of 21.06. For all other analyses involving figural, verbal, and math creativity scores, raw scores were used. For purposes of presentation in the text and in Table 2, all means were converted to percentile ranks. NCE means were converted to corresponding percentile ranks using a conversion table provided by the publisher of the SAT (Psychological Corporation, 1992). Figural, verbal, and math creativity means by grade level were converted to percentile ranks using norm tables for each grade level provided by the publisher of the SOI-LA (Meeker, Meeker, & Roid, 1991). These norms were based on a sample of over 4,000 children, all of whom attended public schools.

Table 1

Characteristics of Participating Children

Grade	Males	Females	Total	Mean Age
3	0	3	3	9.00
4	7	8	15	10.13
5	6	4	10	11.24
6	3	3	6	12.56
7	2	6	8	13.18
8	3	3	6	14.44
9	2	2	4	15.25
10	5	3	8	16.03
11	0	2	2	17.25

Table 2

Mean Figural, Verbal, and Math Creativity Scores and SAT Complete Battery Scores, Converted to Percentile Ranks, for Each Grade Level

Grade	Figural	Verbal	Math	SAT
3	84	94	40	71
4	78	85	53	71
5	90	75	95	71
6	80	59	25	44
7	99	46	86	81
8	34	35	60	69
9	16	39	99	76
10	99	61	61	79
11	6	99	3	34

This is an accepted manuscript of an article published by the National Home Education Research Institute in *Home School Researcher* in 1996, available online: http://www.nheri.org/home-school-researcher/

REFERENCE:
Medlin, R. G. (1996). Creativity in home-schooled children. *Home School Researcher, 12* (1), 7-13.