The Pursuit of Mastery by Preschool Boys and Girls: An Observational Study

Janice M. Molnar
Cornell University

John R. Weisz
University of North Carolina at Chapel Hill

MOLNAR, JANICE M., and WEISZ, JOHN *The Pursuit of Mastery by Preschool Boys and Girls: An Observational Study* CHILD DEVELOPMENT, 1981, **52**, 724–727 Earlier research has found that at elementary school age levels boys show evidence of greater mastery motivation than do girls To assess the validity of these findings for younger children in a naturally occurring setting, we observed 50 preschoolers at play in a Montessori school Behaviors thought to reflect actual mastery and motivation for mastery were systematically recorded, for both younger and older preschoolers In general, the findings were that older preschoolers did, but younger preschoolers did not, show evidence of the sex effects found in previous research The findings suggest that sex differences in mastery motivation may emerge in the preschool years

Children apparently have an innate urge to master their environment But some evidence suggests that motivation to master may be less pronounced in girls than in boys For example, Harter (1975) found that boys played longer at unsolvable than at solvable problems, but that girls did not Girls, unlike boys, played longer in an experimenter-present than experimenter-absent condition Harter has interpreted such findings as evidence that boys are more motivated by a desire to master than are girls, who are more motivated by a need for approval

Findings on sex differences have emerged from controlled experimental research To assess their generality across situations—that is, their transcontextual validity—it is important to capitalize on the strengths of naturalistic methods as well (see Weisz 1978) Toward this end, we conducted observations of preschoolers' naturally occurring behavior Mastery was operationally defined as successful completion of a task with an objectively defined end point Mastery measures were derived from operational definitions used in experimental research Harter and Zigler (1974) measured preference for challenging tasks by letting children choose from puzzles of differing difficulty In the present study, teachers rated the difficulty of activities children chose spontaneously, with difficulty assessed relative to each child's ability Harter (1977) measured pleasure in mastery by rating facial expressions of children completing challenging tasks We adopted a similar measure Persistence in attempts at mastery has been measured by the amount of time spent on an unsolvable task (Harter 1975), it was operationally defined here as perseverance at an uncompleted task To distinguish mastery motivation from need for approval, we simulated Harter's (1975) experimenter-present and experimenter-absent conditions by observing behavior in the presence and absence of teachers

Sex differences in mastery behavior have been found as early as first grade (Harter 1977), but it is not clear when differences first emerge To shed light on this question, we observed preschool boys and girls, ranging from 2-8 to 5-7 The 50 predominantly upper-middle-class preschoolers attended a Montessori school A median split formed young ($\bar{X}$ = 3-4) and old ($\bar{X}$ = 4-7) groups, with 9 young girls 16 young boys, 14 old girls, and 11 old boys

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Thus, age and sex were nonorthogonal factors We observed only mastery tasks—that is, those with explicit criteria for successful completion Montessori materials are graded, self-correcting, and adaptable to differing age levels, they require sorting, matching, ordering, fine motor activity, language skills, elementary math, and basic science The materials, which did not include sex-stereotyped items such as dolls, were used about equally often by both sexes Children were free to engage in any individual activities they chose, large motor tasks and group activities were discouraged, but there were few other directives Teachers (all female) encouraged children, consistently answered questions, and diverted inappropriate behavior such as shouting, but otherwise were nondirective

For each observation, the observer scanned the room until she saw a child initiating a mastery task (defined above) She observed this activity until it was terminated, then scanned the room until another child began a new activity Using a single-page checklist, she recorded time spent at an activity, whether it was completed, physical proximity of a teacher, and smiling at task completion (0 = no response, 1 = partial smile, 2 = full smile, 3 = laugh) Reliabilities were high (r = 93, 94, 95, 90, respectively) as assessed by two observers during 20 activities After each session, the head teacher and the observer rated each activity attempted by target children (1 = considerably below this child's ability level, 3 = right at this child's level, 5 = considerably above this child's level) Over all 125 observations, the teacher-observer correlation was 69 The validity of the teacher ratings was supported by their correlation of 35 (p = 01) with time to task completion

Analyses are reported in two parts First we examine mastery behavior over the entire sample as a function of teacher presence Then we examine the same behavior as a function of children's age level and sex (Not included are analyses of persistence at uncompleted tasks, only 25 activities were left uncompleted, and with this small N, no effects were significant)

1 Mastery behavior and teacher presence We assessed the impact of teacher presence on three key measures (1) Task difficulty A paired observations t-test was conducted on task difficulty ratings for the 23 children who began at least one activity in the presence and one in the absence of a teacher It revealed no significant differences as a function of teacher presence, $p > 25$ (2) Actual mastery (task completion) Despite teachers' nondirectiveness, their presence apparently had a powerful impact Every activity terminated in the presence of a teacher (N = 32) was terminated with task completion, but only 68 of 93 that were terminated in the absence of a teacher were successfully completed, $\chi^2(1)_{\text{Yates}} = 9\,14$, $p < 01$ (3) Smiling Smiling (any rating > 0) occurred at the end of 51 of the 100 completed activities, but only one of the 25 uncompleted activities, $\chi^2(1)_{\text{Yates}} = 16\,28$, $p < 001$ This is consistent with the view that smiling in this context reflected gratification of mastery motivation However, smile ratings were not significantly correlated with difficulty ratings when teachers were present or when they were absent And an additional analysis suggested that smiling at mastery may have been influenced in part by need for approval A paired observations t test was conducted on smile ratings for the 18 children who completed activities in the presence and absence of teachers Ratings were higher when teachers were present than when they were not ($\bar{X}$ 1 06, 22), $t(17) = 3\,36$, $p < 01$, two-tailed t test So, evidently, mastery was a necessary precondition for smiling, but teacher presence (and, thus, perhaps children's need for approval) was a significant determinant of smiling once mastery had occurred

2 Sex, age, and task difficulty Turning to the effects of sex and age, we performed a sex × age least-squares analysis of variance (ANOVA) on average difficulty level of all attempted activities (for procedure see Applebaum & Cramer 1974) There were no significant effects, means ranged from 3 0 to 3 5 Planned t tests revealed no significant sex difference at either age level A sex × age partitioned χ^2 analysis (Winer 1971) was also performed to gauge group differences in whether the children attempted any difficult tasks (i e , any rated 4 or 5 by teachers) Table 1 shows the resulting main effect of age $\chi^2(1) = 8\,01$, $p < 01$, and age × sex interaction, $\chi^2(1) = 5\,69$, $p < 05$ Older children were less likely to attempt a difficult task than younger children The interaction showed that among younger children, girls were more likely than boys to attempt a difficult task, while among older children the reverse was true Fisher exact tests revealed no sex effects within either the older or younger group Viewing the interaction another way, older girls were more likely than younger girls to choose difficult tasks (exact test $p < 01$,

TABLE 1

TASK DIFFICULTY AND TASK COMPLETION AS A FUNCTION OF AGE AND SEX

TASKS	YOUNGER ($\bar{X}$ = 3-4)		OLDER ($\bar{X}$ = 4-7)	
	Girls	Boys	Girls	Boys
	Difficult Tasks Attempted			
One or more	8	9	2	5
None	1	7	12	6
	Tasks Completed (%)			
100	5	7	3	7
Less than 100	3	6	9	3

NOTE.—Sample N was 50 but the figures under Tasks Completed total only 43 because they apply only to tasks completed in the absence of a teacher

two-tailed t test), but older and younger boys did not differ significantly

3 Sex, age, and actual mastery Analyses of task completion used only activities terminated in the absence of a teacher, since all other activities were completed We classified children high in completion if they succeeded at all their activities, and low if they failed to complete one or more A 2 (age) × 2 (sex) × 2 (high vs low completion) partitioned χ^2 analysis revealed a significant sex × age interaction, $\chi^2(1) = 4\,04$, $p < 05$ Among younger children, girls were more likely than boys to show high task completion, but among older children the reverse was true (see table 1) More fine-grained analyses of sex differences within the older group and the younger group yielded no significant effects, although the sex difference among older children was marginal, exact test $p < 10$, two-tailed t test The age × sex interaction apparently was not confounded with the number of activities attempted, means on this variable ranged from 2 3 to 2 6, and no group differences approached significance Nor did the interaction result from differences in the time teachers spent with children A sex × age least-squares ANOVA on time teachers were present during relevant activities yielded no effects approaching significance

4 Sex, age, and smiling A sex × age least-squares ANOVA of smile ratings at completion of tasks in the absence of teachers yielded no significant effects Nor did our planned t tests reveal sex differences within either older or younger groups The least-squares ANOVA of smile ratings at task completion in the presence of a teacher did yield a marginal age × sex interaction, $F(1,24) = 3\,38$, $p = 079$ The planned t tests revealed that boys and girls did not differ significantly in the younger group, but that among older children girls had significantly higher smile scores than boys ($\bar{X}$ 1 33 vs 20), $t(9) = 3\,49$, $p < 01$, two-tailed t test (Identical analyses of smile ratings at completion of optimally challenging tasks [i e, those rated 3 or above] yielded results essentially identical to those just reported in this paragraph)

Children who are more likely to smile if an adult is present may be revealing a need for approval In a search for this pattern, we constructed a 2 × 2 table for each of our four age × sex groups, plotting teacher presence versus absence against smiling (any rating > 0) versus not smiling (0) on at least half of the tasks completed Only the table for older girls was statistically significant, exact test $p < 05$, two-tailed t test When a teacher was present at task completion, all older girls smiled (N = 6), when tasks were completed with no teacher present, most older girls did not smile (N 7 vs 4)

In general, the sex × age analyses showed that older children did, but younger children did not, show evidence of the sex difference found in earlier research with older populations Girls tended to be less mastery oriented than boys, but only among older preschoolers Of the four groups, the older girls were least likely to attempt a difficult task and least likely to complete the tasks they did attempt Moreover, only among the older girls was smiling at mastery significantly influenced by the presence of an adult The findings suggest that the sex difference found in earlier research may emerge during the preschool years

However, the findings need to be cross validated In naturalistic follow-ups, it would be useful to focus on specific children long enough to equalize cell N's and observations per child In experimental follow-ups, it would be useful to control actual task difficulty vis-à-vis children's ability levels When younger children prove more likely than older ones to choose a difficult task (as occurred here), one would like to be sure that this is not an artifact of relative unavailability of tasks that are difficult for older children (Parenthetically, participating teachers discounted this interpretation, they argued that the Montessori materials could be used in diverse ways, including many that would be rated extremely difficult for even

the oldest child) For a number of reasons, then, the present findings must be regarded as preliminary and in need of replication, but they are useful in suggesting potentially important directions for future research on children's pursuit of mastery

References

Appelbaum, M I , & Cramer, E M Some problems in the nonorthogonal analysis of variance *Psychological Bulletin,* 1974, **81,** 335–343

Harter, S Mastery motivation and need for approval in older children and their relationship to social desirability response tendencies *Developmental Psychology,* 1975, **11,** 186–196

Harter, S The effects of social reinforcement and task difficulty on the pleasure derived by normal and retarded children from cognitive challenge and mastery *Journal of Experimental Child Psychology,* 1977, **24,** 476–494

Harter, S , & Zigler, E The assessment of effectance motivation in normal and retarded children *Developmental Psychology,* 1974, **10,** 169–180

Weisz, J R Transcontextual validity in developmental research *Child Development,* 1978, **49,** 1–12

Winer, B J *Statistical principles in experimental design* (2d ed) New York McGraw-Hill 1971