Doing a Science Project: Gender Differences during Childhood

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Abstract: By adolescence, men’s participation and achievement in science exceeds women’s. This article reports a case study that examined the beginnings of this gender differentiation during a naturally occurring academic activity that was designed to support and guide young children’s interest in doing science. Data were collected during 2 successive years of a science fair for children in Grades 1–6 of a progressive private school. A total of 268 projects were characterized in terms of achievement and area of science. Parents provided information about the way children selected and created projects. In both years and in all grade levels, boys tended to choose to work in the physical sciences, and girls in the biological and social sciences. Peer collaborations were exclusively same sex. Achievement and parental involvement were not gender related. Factors are discussed that might lead to an early divergence of boys’ and girls’ interests in science within a context that promotes its exploration. © 1998 John Wiley & Sons, Inc. J Res Sci Teach 35: 845–857, 1998.

By adolescence, there is a robust gender difference in participation and achievement in science, a difference that continues to widen with development (Levin, Sabar, & Libman, 1991; Fleming & Malone, 1983; Steinkamp & Maehr, 1984). By adulthood, women are so greatly underrepresented, especially in the physical science disciplines, that encouraging their presence has been raised as a pressing concern (see special sections in Science, 1992, 1993). The purpose of this study is to investigate the onset of this divergence between boys and girls in their involvement with science in hopes of clarifying the process by which people embrace or abandon science as an intellectual pursuit.

The investigation of gender and science during late childhood and adolescence has generated ample empirical volume for meta-analyses (Becker, 1989; Fleming & Malone, 1983; Steinkamp & Maehr, 1984) and fascinating complexities for theoretical treatments (e.g., Eccles, 1989; Keller, 1985). At the center of most studies is a gender difference in science achievement that favors males. Researchers then examine variables that surround this difference, especially...
individual-based characteristics such as cognitive ability and aptitude, attitudes toward science, and interest in and affective orientation toward science activities.

Although some stable patterns have been discerned in the relation between science achievement and other variables, several puzzling findings have also emerged. First, although achievement differences are clearly marked by the end of high school, grade differences per se do not appear salient during the span from elementary to high school (Becker, 1989). The lack of an early relation between grade and science-related variables may in part be due to the very thin empirical record for younger children. For example, only 17% of the studies included in Becker’s (1989) extensive meta-analysis included children in Grades 1–3. In addition, the lack of a clear divergence between boys and girls may indicate that the relatively uniform elementary school curriculum can mask early gender differences in some aspects of orientation toward science.

Second, when differences appear during adolescence, it is tempting to relate them to differential patterns of course selection. However, before accepting this explanation, it is necessary to establish when and what sort of area differences initially emerge. Performance differences, while consistently favoring boys over girls, may be moderated by area of science. The literature is difficult to sort, because this variable has not often been treated as a focal factor. Nonetheless, when looking across studies, Becker (1989) noted that consistent gender differences favoring males have been found only in biology, general science, and physics (see also Steinkamp & Maehr, 1984); gender differences were not significant in areas such as geology and earth sciences.

Third, although there are many compelling reasons for considering the impact of noncognitive variables such as motivation and cultural influences on sex differences in science achievement (Science, 1993), the process through which these variables exert influence during childhood is not yet fully understood. For example, students’ attitudes about science have been linked directly to their level of scientific achievement (e.g., Schibeci & Riley, 1986). Yet, Steinkamp & Maehr (1984) found that younger girls, despite lower levels of achievement, do not as a group seem to like science less; indeed, they report liking some branches of science such as biology and chemistry in the classroom a good deal more than do boys. In addition, there is growing evidence that science-related experiences outside the classroom are gender related and that they may occur before clear differences in achievement are evident. For example, Catsambis (1995) found that in eighth grade, although achievement differences were not evident in test scores and favored girls in terms of grades, boys expressed more positive attitudes toward science and participated more in relevant extracurricular activities than girls. In addition, Greenfield (1996) recently found that boys at every grade level from 3 to 12 reported more physical science experiences while the youngest girls reported more life and general science experiences.

Steinkamp and Maehr suggested, and we concur, that findings such as these should prompt research on how experiences outside the classroom may influence boys’ and girls’ affinity for science. This suggestion is also in line with Eccles’ (1989) comprehensive model of the process of gender differentiation in science and math, which underscores the importance of considering how youngsters’ choices about what to study are supported by their social relationships. Adults, including teachers, advisors, and parents, have often been viewed as central influences. Eccles, for example, suggested that academic choices are affected by adults “who both act out and believe in traditional gender-role prescriptions regarding appropriate activities for males and females” (1989, p. 54) (see Riddell, 1992, for examples). Another powerful social influence may be found within the gender-divided peer groups of childhood (Maccoby, 1990). As elementary school-aged boys and girls engage in different activities in their separate spheres, different skills may be fostered. For example, as boys gravitate toward group activities that involve making in-
In summary, there is little doubt that science is a highly gendered activity by late adolescence. However, there remains uncertainty about when and how this gender differentiation begins. Current evidence suggests that this differentiation may start early within subdomains of science, may emanate from experiences both outside and inside the elementary school classroom, and may involve an active process of choice, informed by both adult and peer social agents. This suggestion is consistent with Bronfenbrenner’s (1979) ecological systems theory of development that views children’s cognitive development within its social-cultural context. This theory contends that various aspects of a child’s context may interpenetrate such that performance in one sphere, such as the classroom, may be influenced by a variety of factors that reside in different spheres, such as the family or peer group, and/or at different levels of the system, such as culturally defined adult roles.

In the study reported here, we characterize how children from first to sixth grade produce science in the context of a schoolwide science fair in a progressive private school. This setting provides an excellent field site for a case study of the confluence of influences as young children begin to define themselves as scientists. During the days leading up to the fair, doing science receives extra emphasis throughout the school. All elementary-grade children engage in a schoolwide project, and most submit a project done outside of school either individually or with a self-selected partner. Parents are active participants who provide logistical and intellectual support for their children and volunteer labor for setting up and judging the fair.

Reported here are two waves of data drawn from the 1993 and 1994 science fairs. In both years, our methods were nonintrusive and involved only minor modifications in the event. During the first year, we sought to determine if, when given equal opportunity to produce a science project, boys and girls tend to display different levels and forms of engagement with the scientific process. During the second wave, we sought both to replicate our first-year findings and to probe further the extraschool context that surrounds participation in the science fair.

Method

Overview of the Science Fair

A naturally occurring event, a school science fair, afforded an opportunity to investigate how children engage in science. The setting for the study was a small, private, nonsectarian school for children from preschool through high school. The science fair is consistent with the school’s principles of valuing excellence and hard work and of encouraging a cooperative learning environment in which students take responsibility for their own learning, as well as its overarching philosophy that “a quality education acknowledges the innate curiosity of children and their desire to understand and master their environment.” Teachers in the school often employ nontraditional means to foster the acquisition of reading, writing, mathematics, and the scientific method.

The school enrolled 230 and 259 students in its elementary school during Year 1 and Year 2 of the study, respectively. Children were divided into nine classrooms, each with between 28 and 30 students, half boys and half girls. Each class spanned two grade levels. For this study, we grouped students into two levels of grade: lower (Grades 1–3; ns = 106 and 110, Year 1 and 2, respectively) and upper (Grades 4–6; ns = 124 and 149) elementary school, so that we would have a sufficient number of subjects for data analysis. Approximately 20% of the stu-
Students in the elementary school are ethnic minorities, predominantly African-Americans. The school draws primarily middle- and upper-middle-class families.

The school is distinguished by its enriched curriculum and a commitment to experiential learning approaches. The science fair, held annually in the late winter, is an extracurricular activity that draws together all the children in the school. Many aspects of the fair have become ritualized over time. Although the date of the fair is on the school calendar from the beginning of the year, preparations for the fair begin in earnest about 2 months before the exhibit date. The director of the fair captures the children’s interest with a dramatic slide review of the previous years’ projects and engages parents in the process through a series of inviting letters. The process of doing science is also encouraged during this time through a mega-experiment in which all elementary children participate. In 1994, for example, petri dishes that contained either an organic or an inorganic substance were displayed on a prominent school wall so that children could compare changes over time.

Preparation of projects is voluntary for elementary school children. Children electing to do a science fair project have great latitude in the selection of a topic as long as the finished project can be classified as a collection, a model, or an experiment. Children may choose to work individually on a project or to work jointly with another child. The finished projects, displayed on standard-sized boards and accompanied by written reports, range widely in adherence to scientific convention and in packaging. The considerable diversity of topics that children choose is reflected in some recent titles: “Can crickets see in color?”; “Aristotle vs. Galileo: Who was right?”; “How computers sort”; and “How dirty is the air in my backyard?”

The fair is opened with much drama and a hot dog supper for children and parents after projects are judged and a slide of each project is taken. For the next 2 days, classes of elementary schoolchildren return to the fair for a science scavenger hunt designed to engage everyone in careful study of the projects.

**Participation**

The 1993 science fair contained 107 projects produced by 129 (56.1%) of the elementary schoolchildren. The 1994 science fair contained 161 projects produced by 193 (74.5%) first through sixth graders. The record participation rate in 1994 reassured us that our 1993 study had not adversely affected the event. Rates of nonparticipation in the lower (Grades 1–3) and the upper (Grades 4–6) elementary were equivalent during both years: 48.5% of the 101 nonparticipants in Year 1 and 50.7% of the 67 nonparticipants in Year 2 were in the lower elementary group.

**Data Collection**

**Overview.** Each project was evaluated in two ways as part of the typical science fair procedures. First, before the fair was open for viewing, the projects were assessed by volunteer judges whose total scores were averaged to assign a merit score. Second, projects produced by children in the third through sixth grades were candidates for two types of awards: exemplary awards, which were given to projects that were deemed particularly well done and worthy of notice, and special awards, which were given to projects deemed particularly interesting or unique in some way but not meriting an exemplar (e.g., Special Award for Proving Piaget Was Right; Special Award for Most Beautiful Data). Exemplary awards were awarded based on the project’s merit score. Special awards were selected by the director who consulted with the classroom teachers.
As part of the research study, additional evaluative information was also obtained. During the first year, science fair judges provided this information by responding to supplemental questions that we placed on the routine evaluation form. During the second year, coders from the research project systematically described each project. In addition, parents of science fair participants were asked to respond to a survey about the science fair.

**Year 1 Procedures.** Great care was taken on our part to respect the integrity of the science fair by being as nonintrusive as possible. The established procedures were modified in only three ways. We ensured that each project was judged by one male and one female scientist; six additional questions relevant to the present study were added to the judging form; and the judges were asked to complete a brief biographical form about their background in the sciences and their experience in judging science fairs. In her orientation to the judges on the morning of the fair, the director introduced the study as an investigation of children’s interest in science, but did not disclose the specific questions of the study. She also introduced the investigators, who were available to discuss the study after the judging was completed.

**Judges**

The science fair director selected 45 volunteer judges and matched them to projects in their area of interest. Judges were selected from the entire school community so that the group that evaluated the elementary school projects was a disparate sample of teachers, parents with children in any grade from the preschool to high school senior, parents of alumni, and alumni, with a few falling into several of these categories. Most of the judges had advanced degrees, although not necessarily in the sciences, and had judged in previous science fairs; their average age was 43 years.

Each judge independently assessed a cluster of 10–15 projects using a standard rating form. The director assigned two judges, one male and one female, to each cluster. (In a few instances, an extra judge who the director was less confident in was also assigned to the cluster; this judge’s scores were not used in this study.) Judges were never asked to judge projects of their own child or of children at the same grade level. When they judged a project, they were blind to the students’ identity, including gender.

**Judging Form**

Judges used a standard rating form that had been developed for judging previous fairs. This form consisted of two sections. In the first section, judges used 3-point Likert scales (“poor,” “fair,” and “good”) to rate the project on four display or appearance characteristics: attractiveness, easily viewed material, grammar/spelling, and creative/original topic. In the second section, five characteristics describing the scientific merit of the project as either a model, a collection, or an experiment (e.g., adherence to scientific format, accuracy, and appropriateness of measurement) were rated using 5-point Likert scales (“missing,” “poor,” “fair,” “good,” and “outstanding”). These ratings were summed to yield a display score (four scales; 4–12 points), a project score (five scales; 0–40 points), and a total score for each project (4–52 points possible). Merit scores for the study were computed by averaging the ratings of the two primary judges assigned to the project.

Judges also were asked to categorize the project into one of five areas of science (social, biological, physical, engineering, or computer and information sciences). In addition, we re-
quested that they guess the gender of the child. We asked this question both to discern if the judges could correctly identify the child’s gender and to determine if their prediction influenced their scores.

**Year 2 Procedures.** During the spring of Year 1, brief oral reports of our study were presented at regularly scheduled meetings of the faculty and of Friends of Science, a faculty and parent volunteer organization. These meetings generated both support for further investigation and a new level of awareness about our aims that prompted changes in our second wave in the formal judging process, as well as the addition of two new data collection procedures, descriptive coding of projects and survey of the parents of science fair participants.

**Formal Judging**

Except for a typographical error on the score sheet used in Year 2 (the four Likert scales that comprised the display score contained five rather than three points, resulting in a range of possible scores from 4 to 20 points), judging procedures employed prior to Year 1 of the research study were used. We did this to minimize reactivity to gender-related issues that might have arisen in Year 1 when we consciously paired female and male judges and requested judges to answer additional questions, including a query about child gender. During Year 1, gender of judge was not found to affect merit ratings or perceptions of child gender.

**Supplemental Coding**

Graduate students in psychology (3 males and 3 females) served as coders to provide additional descriptive information about each project. Reliability was assessed by having a random sample of 26 (16%) of the projects coded by both a male and a female judge, neither of whom was aware of the duplication. First, they were asked to record the area of science (social, biological, physical, or computer science) which we later combined into two areas—social and biological science, and physical science—used during Year 1. Agreement for assigning projects to these two areas was 100%.

Coders then answered several additional questions about each project. Three questions, phrased as 5-point Likert scales, were used for subsequent analysis. These scales related to the use of a computer (“not at all” to “completely”), quantitative expression (“not at all” to “integral to project”), and verbal expression (“not at all” to “integral to project”). Agreement on these scales (using weighted kappas, an index of agreement that corrects for chance) (Bakeman & Gottman, 1986; Cohen, 1968) were 1.0, 0.59, and 0.65, respectively (with corresponding percentage agreements being 100%, 80.8%, and 88.5%).

**Parent Survey**

A parent survey was conducted under the auspices of the Friends of Science. The cheerfully decorated, one-page form contained three questions that were to be answered on 5-point Likert scales: How big a deal was this project for your family? (“what project?” to “dominated our existence”); how much did your family’s involvement feel like work? (“a breeze” to “a full-time job”); how much fun did your family have helping with this project? (“no grins” to “a sheer joy”). We also asked the parent to describe how the child came up with a topic, and who helped the child do what with the project. Comments were also welcomed. Forms were distributed during the science fair open house; one (or in the case of joint projects, two) form was addressed to the student’s parent(s) and attached to each project along with a return envelope addressed to
the science fair director. Of 192 surveys distributed, 125 (65%) were returned in a 1-month period; neither child’s gender nor grade level significantly affected the return rate.

Results

Our primary aim was to view the elementary science fair through the lens of gender to discern if and how children’s gender influenced how they do science in a context that is actively nonsexist and supportive of encouraging nascent interests in a variety of intellectual pursuits. To this end, our data analyses focused on how child gender related to participation rate, choice of topic, the evaluation of the project, and the parents’ comments about the activity of doing science during early (i.e., Grades 1–3) and late (Grades 4–6) elementary school.

Gender and Participation

Our first question was, “Do boys and girls have a different pattern of participation in the science fair?” Table 1 displays the number and percentage of boys and girls who participated. We found that participation did not vary as a function of child gender [χ²s = 1.21 and 0.004, Years 1 and 2, respectively; not significant (ns)]. During both years, boys and girls were equally likely to participate, and furthermore, they were equally likely to do so with a peer. With only one minor exception, all the children who entered a joint project did so with a same-sex peer. The only mixed gender grouping was composed of 2 boys and 1 girl, a sibling of one of the boys.

Gender and Area of Science

Our next question was whether the area of science that children selected for the projects varied as a function of gender. A significant gender difference was found, with girls more likely to work within the area of social and biological sciences and boys within the area of the physical sciences (Figure 1).

During Year 1, the science fair judges reliably classified projects using five codes which were collapsed into two categories, one representing the area of the social and biological sciences and the other representing the area of the physical sciences, engineering, and computers, for the purpose of analysis. There was little disagreement between judges about how to categorize the projects (κ = 0.83). Of the 107 projects, 59 (55.1%) were classified as physical science,

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<td>15.5</td>
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<tr>
<td>Total</td>
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<td>15.5</td>
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and 48 (44.9%) as social and biological sciences. Of the 55 projects done by boys, 70.9% were in the physical sciences. Of the 52 done by girls, 61.5% were in the social and biological science area. To compare how boys and girls distributed their selection of projects, a log linear analysis (Bakeman, Adamson, & Strisik, 1989; Fienberg, 1980) of Area (social/biological science, physical science) $\times$ Gender $\times$ Grade (first through third, and fourth through sixth) contingency table of projects was run. The best model was generated by the interaction of gender and area \[G^2(1), \text{the partial likelihood ratio } \chi^2 = 11.4, p < .001\]; grade did not qualify this interaction.

These results were replicated in Year 2 when coders rather than judges reliably classified the children’s projects using five codes which, for the purpose of analysis, we combined into two categories: social/biological sciences and physical science. Of the 161 projects, 75 (46.6%) were classified as physical science and 86 (53.4 %) as social/biological science. There was a significant interaction between gender and area of science \[G^2(1) = 6.12, p < .05\] that was not qualified by grade. Of the 79 projects produced by girls, 63.3% were in the social/biological sciences; of the 82 projects produced by boys, only 43.9% were in this area. Conversely, 36.7% and 56.1% of the projects produced by girls and by boys, respectively, were in the physical sciences.

\textit{Gender and Project Evaluation}

Our next concern was whether there was a systematic relation between gender and the evaluation of projects. There were three sources of project evaluation: the official science fair judges, the presenters of awards, and, during Year 2, the project coders. As noted in the methods, the judges were not informed about the child’s gender although they were asked to guess it for each project.
There was little indication in the data derived from all of these sources that gender affected how the projects were assessed (Table 2). The judges, who did not know who did the projects, were able to identify the gender of the child(ren) producing a project at a rate significantly greater than chance \[ \chi^2(1)=8.1, p<.01 \]. However, during both years of the study, the judges’ scores for design characteristics and project merit did not vary as a function of child gender either as a main effect or in interaction with the child’s grade or the project’s area of science.

In Year 2, trained coders provided relatively reliable characterization of children’s verbal and quantitative expressiveness and of computer use. These variables all increased significantly as a function of grade level \[ F(1, 153) = 8.0, 11.5, \text{ and } 9.4, \text{ respectively; all } ps < .005 \]. However, there were no significant main or interaction effects for gender.

Gender also did not affect the distribution of the awards which the fair’s director made in consultation with other teachers. In Year 1, awards were given to 47.6% of the third through sixth graders, with 51 children receiving exemplar and 18 receiving special awards. Neither gender nor area of science significantly affected the distribution of awards to projects \[ \chi^2(2)=3.56; \text{ ns} \]. However, it is noteworthy that although projects produced by boys and girls were equally likely to be selected for an exemplar award (11 of 22 were given to boys), 27.9% of the projects produced by boys and only 13.0% of the projects produced by girls were selected for special awards. Thus, more boys than girls (28 vs. 19) were singled out for attention. In Year 2, an almost identical proportion of girls and boys (48.1% and 47.1%) were selected for awards.

**Parental Surveys**

Child gender did not appear to influence parental responses to the survey that was distributed during Year 2. In response to the 5-point Likert scale items, parents indicated that they typ-
ically found doing a project to be moderately involving, demanded a moderate amount of work, and was moderately fun [means ($M$s) = 3.2, 2.6, and 3.6, respectively; standard deviations ($SD$s) = 1.0, 1.1, and 0.9]. These ratings did not vary as a function of gender, either alone or in interaction with area of science and grade level.

Nor was gender salient in the lengthy comments that parents included on more than three-fourths of the 125 surveys. Common themes included the learning benefits of the fair, the difficulty of selecting a topic, and questions about the award system. Most parents also remarked on the intensity of feelings that the fair evoked (e.g., “Thank you again for excitement and fun. . . . We do enjoy this family interaction—tears, swearing, research, and, of course, the results”). However, only two of the parents even mentioned gender in their comments, and both were in response to the question about who helped and were related to adult gender roles (e.g., “The mother, of course!”). No one mentioned gender in relation to comments about the child’s motivation to participate, topic choice, or achievement.

Ninety-four percent of the respondents reported that one or both parents had provided moderate to extensive instrumental and/or emotional assistance with the project; of these, about a third specifically reported that topic selection was the product of family brainstorming. Only about a fifth of the parents indicated that their child’s project was conceived through peer discussion.

Discussion

This study raises intriguing questions about how very young boys and girls come to make choices about science, and whether these early choices foreshadow selections about academic pathways and ultimately the well-documented difference in science achievement favoring males (Becker, 1989). The finding of a gender difference in the area of science that children elect to study in a science fair project is interesting given that prior research has shown that subject matter is an important factor in both childhood and adult patterns of science participation and achievement. The present study found divergence in the area of science interest in children younger than those in other studies (Greenfield, 1995; Johnson, 1987; Levin et al., 1991). Already by the early elementary school years, boys tended to focus on the physical sciences while girls chose the biological and social sciences for their science project, suggesting that the trajectories propelling boys and girls toward different positions in the sciences are rooted at a very young age.

Interestingly, although boys and girls selected different areas of science to study, they did not differ in their level of participation or achievement. Most research finds that boys surpass girls in interest in science and in science achievement, but these studies tend to look at children’s academic performance within the regular school curriculum and on formal achievement tests (Becker, 1989). In this study, in which the context was an extracurricular elementary school science fair, the voluntary nature of the event offered a different window on young children’s involvement in science. When given choice of what field of science to study, over both years of the fair, boys and girls participated and achieved at similar levels.

The only place where gender may have played a role in children’s science achievement was in the presentation of “special awards” during Year 1, when boys outperformed girls. These additional awards, given to projects that the faculty wished to highlight, may reflect the pattern of boys getting more notice than girls in academic settings (American Association of University Women, 1992). During Year 2, this difference in special awards was not found, perhaps a result of an interim report at a Friends of Science meeting on the first year’s findings.

Thus, when pursuing science that interests them, elementary school boys and girls show equal competence and engagement in science. Reassuring as this finding may be at first gloss,
it also raises nagging questions about why young girls and boys select different areas of science and what might be the long-term implications of their choices. Given that boys and girls from the beginning grades were already selecting different areas of science, it is necessary to look beyond the school curriculum for the forces shaping these choices.

Although in this study we did not probe these forces directly, there are several converging hints that suggest it may be fruitful to investigate further how both peers and the family may act as possible socializing agents in children’s approach to science. It is striking how much of the science fair seems to have been a public, social experience for the children. The slide show orientation to the fair, the celebratory viewing with friends and family, and the scavenger hunt each gave ample opportunity for peer review. About a fifth of the parents were aware that their child’s project was conceived through peer discussion. Moreover, that a third of the projects were done jointly by two or more children is consistent with the high value the school places on peer interaction and learning. Although school characteristics can account for the large number of collaborative projects, that these children worked uniformly in same-sex pairings most likely reflects the powerful tendency of young children to form peer groups that are sex segregated (Maccoby, 1990). We suspect that the sex-segregated peer group of elementary school also contributes to the divergence of boys’ and girls’ approach to science by maintaining sex-stereotypic values and attitudes, including the masculine image of physical science (Keller, 1985). Maccoby (1990) argued that the sex-segregated peer group is a key context for the maintenance of such gender role beliefs and occupational images. In her view, the gendering of the childhood peer group reflects how children form social categories that serve both to explain and govern their behavior. Moreover, gender holds particular power in the socialization process because of its tendency to force binary rather than graded categorizations or constructs that may be supported by evidence in the larger culture. That many fewer women pursue physical science careers may be viewed as cultural confirmation for the social construction that physical science is masculine.

In addition to being influenced by peers, most of the children conceived of and carried out their projects with ample assistance from parents and family. Clearly, a science fair project provides many opportunities for families to interact around the topic of science, and through this process, communicate values, beliefs, and expectations about science. Such perceptions and beliefs may be held out of conscious awareness as part of the “lens of gender” (Bem, 1993). It is surprising that although we found significant gender differences in area of science selected by boys and girls, their parents did not report on the questionnaires that their children’s choice of topic might in part have been influenced by gendered interests.

To evaluate hypotheses about the influence of peers and family, it would be interesting in future research on science fair participation to study the decision making process of nonparticipants as well to discern if, even when the nonparticipation rates for boys and girls are equivalent, as they were in this study, they make their decision for different reasons. One possibility is that peers may play a particularly influential role for girls who, unlike boys, may elect not to participate in a public display of doing science, to conform to beliefs held by boys that science is an inappropriate pursuit for girls (Greenfield, 1996).

What does it mean that boys and girls select different areas of science to study? We suspect that the meaning differs depending on whether the perspective taken is short or long term. Most immediately, boys and girls are simply making choices about science that are consistent with their gendered interests and, perhaps, their gendered learning styles (Belenky, Clinchy, Goldberger, & Tarule, 1986). Boys study airplane trajectories and girls collect gems. These are benign choices by children moving toward interest areas supported by peers, family, and the larger culture. These young girls are not choosing away from physical science; rather, they are as engaged and as successful as the boys, and, as others have reported (Steinkamp & Maehr, 1984), seem to like science as much or more than boys. Significantly though, these very early
choices toward either the “soft” or the “hard” side of science accompany and are reinforced by many forces thought to mediate the gender difference in science achievement. Factors such as gender stereotypes and expectations (Kelly, 1988), differences in toy play and leisure activities thought to reinforce scientific thinking (Johnson, 1987), or classroom patterns and teacher behaviors that foster boys’ involvement in learning science and math and discourage girls (Eccles, 1989) interact synergistically to bolster gendered constructions of science. Much later, in high school and college, when students must make academic choices that carry career consequences, such as whether to take courses in advanced math and the physical sciences, it is not surprising that girls choose differently from boys.

In this study, we were able to detail how children approach doing science in a context that is extraordinarily supportive of their choices. Such a case study approach helped to expose processes that otherwise might remain hidden in investigations that consider only classroom performance. Further research exploring children’s thinking about how they image different fields of science and about themselves as scientists is needed to make sense of boys’ and girls’ divergent choices.

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