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3.1 The Roles of Individual Interest(s) and Gender in Learning: An Overview of Research on Preschool and Elementary School-Aged Children/Students

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Research on individual interest among preschool and elementary-school students has addressed the content of student interest(s). It has also investigated the role of interest in the ways students access, work through or process, and finally complete tasks (i.e., reading a text, solving a mathematical word problem, playing with play dough). The range of information available about children's individual interest(s) is considerable: some studies have focused on the origins of interest, others on the experimental effects of existing interest on classroom-based learning and cognition; some studies map directly onto the classroom environment; others, representing basic research, provide clarity about interest and its relation to other measures or moderators of learning. There is also variability across these studies – they often differ with respect to the conceptualization of interest that guided them, the particular samples studied, the methods employed, and/or whether effects of gender were evaluated.

This paper addresses our working knowledge about the roles of interest(s) and gender in the ways young children and elementary-school students learn. Issues that affect the interpretation of these data are described, and their implications for subsequent research practice are discussed.

Working Knowledge of Individual Interest(s) and Gender

Some findings emerge consistently across studies of individual interest and gender among young children and elementary school-aged students, and/or have been replicated with different samples of children/students by the same researcher. These include the following:

- *A variety of topics can interest children.* Theoretically, children can be interested in anything. Studies dating from the early 1900s have tallied the interests of boys and girls. This information was used to figure out which books teachers might want to assign, or the

activities scout leaders, for example, might want to pursue with their troops. More recently, studies of interest content have focused on types of interest, the genesis of interest, the extent to which students' interests are school-based, and the range and intensity of interest(s).

Findings indicate that interests can be described in terms of leisure, school, and occupation (cf. Fölling-Albers & Hartinger¹; Todt & Schreiber); students' interests typically emerge in the home (Eccles, Barber, Updegraff, & O'Brien; Fölling-Albers & Hartinger); and interests are frequently not school-related (Fölling-Albers & Hartinger; Renninger, 1992). Furthermore, topics of interest vary, so that one child's interest is not likely to be the same as that of the next child (Renninger & Wozniak, 1985; Renninger, 1992), although they may be equally intense (Renninger, 1990, 1992).

- *The development of interests is influenced by parents, teachers, and peers.* The interests of children and elementary-school aged students are influenced by the others in their environment. Teachers, parents, and other children provide both direct and indirect influences on the choices that are made about courses to take and toys to play with, and even the courses and toys that are available (Eccles et al.; Fölling-Albers & Hartinger; Gisbert; see also, Fivush; Renninger, 1989). In fact, Todt and Schreiber point out that gender-related differences in interests begin to emerge around three years of age, and from then on they moderate which interests are "appropriate" and which are not (see also Wigfield & Eccles, 1992; see discussion in Fivush).

In addition to influencing the specific content of tasks, the teacher's (parent's, clinician's) organization of the classroom (home, sessions) and instructional process can affect opportunities for students to pursue their interests (see Renninger, 1992). Students whose classrooms allow them to provide input about topics of instruction and involve them in action-oriented lessons are also students whose interests are likely to reflect school-based subject matter (Fölling-Albers & Hartinger).

- *Children's interests are probably more rather than less stable.* While children are always taking in new information, and can develop new interests, both younger (Krapp & Fink, 1992; Renninger & Leckrone, 1991) and older (Fink; Fölling-Albers & Hartinger) girls and boys have been found to maintain at least one

1 Citations without an indication of year refer to chapters in this volume.

interest over time. Such interest has been found to provide stability for young students in the face of transitions such as those involved in moving to a new school (Krapp & B. Fink, 1992) or a new classroom and play expectations (Renninger & Leckrone, 1991).

By later elementary school and middle school, there are clear links among interest, preferred content for school subjects, and hobbies for some students (R. Fink; Todt & Schreiber), while for others this consolidation does not occur until mid-adolescence (Todt & Schreiber).

- *Interests change over time.* Although individual interests are relatively enduring, children are always in the process of developing new interests, and the interests they already have are always either being consolidated or merged into new interests (Renninger & Leckrone, 1991; see also Krapp & B. Fink, 1992). The particular character of children's development of interest has been linked to the questions and challenges of play (Renninger, 1989, 1990), the impact of others in shaping the nature of such inquiry (see preceding section), and gender identification (see discussions in Fivush; Hannover; Todt & Schreiber). A critical dimension of interest development among young children appears to be the their changing understandings and what might be labeled a reciprocal self-knowledge that informs the interests they develop.

The study of young children's free play, for example, indicates that girls and boys will explore such operations as balance or sequencing, and will use more strategies and more patterns of activity in their play and work with identified objects of interest than with objects of noninterest (objects of which they have knowledge, but for which they have low value). In fact, interest has been described as leading the development of children at this age (Renninger, 1989, 1990; see also Renninger, 1992).

Todt and Schreiber suggest that what is (and what ceases to be) of interest to children and students reflects questions specific to their development. In rough chronological order from infancy through 10-12 years of age, questions reflect: (a) the structure of their physical and social environment, (b) the gender appropriateness of their involvements, (c) their competence or ability, and (d) the prestige or social relevance of possible and preferred engagements. Only around age 10 does a gender difference emerge in children's priorities. At about that age, boys' interests shift to reflect prestigious activities or occupations, whereas for girls, interests tend to reflect concerns for social relevance.

It also appears that by 10 years of age students typically have a larger number of interests (approximately 6), than do younger children (approximately 2) (Renninger, 1992; see also Fölling-Albers & Hartinger).

- *Interest influences student performance on assigned tasks.* Interest has a positive influence on students' abilities to recall and comprehend sentences, stories, and text. It has also been found to influence the level of the difficulty of texts read and problems worked (Renninger, 1990, 1992), and to enhance the contexts for learning both in and out of school (e.g., generating connections for students between the content to be learned and their questions by having them develop the problems on which they work and/or challenging them to assume responsibility for these; use of the cooperative grouping technique called Jigsaw to learn about science) (see Fölling-Albers & Hartinger; Goldman, Mayfield-Stewart, Bateman, Pellegrino, & CTGV; Hidi, Berndorff, & Nolan; also see discussion in Renninger, 1992).

Fay, for example, reports that following their viewing of 8 episodes of the children's science television program CRO, both boys and girls were likely to be interested in learning and doing science activities such as making a catapult. They also reported engaging in unprompted activities related to the episodes, and seemed to understand topics addressed by the show better than did children in a control group. Fay also reports that girls in the experimental group outperformed girls in the control group, suggesting that viewing CRO enabled the girls to acquire a level of understanding of the science and technology covered equal to that of the boys.

Using within-child analyses (evaluating students relative to their own abilities to read or do mathematics) Renninger reports that girls' and boys' work with text varies: boys are more likely to perform best with texts that are of interest to them and are of low difficulty, whereas girls are more likely to perform accurately with texts that are of noninterest but of high difficulty. However, girls and boys with a specific interest in reading are likely to read and work with passages of interest and noninterest similarly, while both girls and boys with a noninterest in reading are positively influenced by interest embedded in the texts they are given to read.

Renninger reports that a pattern of interaction between interest and gender similar to that for reading emerges as well in students' work with mathematical word problems: girls were less likely than boys to

have set-up errors (such errors are understood to reflect a lack of comprehension) on problems with noninteresting contexts, whereas boys were less likely to have set-up errors on problems with interesting contexts. Girls were more likely to make computation errors on low-difficulty problems, whereas boys more often made computation errors on high difficulty problems. Neither girls nor boys with a specific interest in mathematics were influenced by the presence of interesting or noninteresting contexts in the problems they worked, whereas girls and boys with a specific noninterest were influenced by the presence of contexts that were interesting or noninteresting. In fact, girls with a specific noninterest for math were more likely than boys to make set-up errors on problems of interest, whereas in this sample, boys were more likely to make set-up errors on noninterest problems.

- *Interest increases student access to tasks.* Although the presence of an interesting context will not teach students skills (Renninger, 1992), it can provide a forum for learning skills if teaching, television programming, museum education, etc. is adjusted to include student interests (cf. Fay; Yotive & Fisch; see also Fink). In the case of the TV science program CRO, such adjustment enriched the comprehension of all students, although girls in particular benefited because their knowledge of the content covered was so limited at the outset of the study (Fay; see also Hoffmann & Häussler).

In the anchored instruction projects described by Goldman, et al., both girls and boys benefited from tasks that were: (a) based in real and meaningful problem contexts, (b) complex enough that collaboration and alternative perspectives provided a deepened understanding of the content being addressed, (c) common enough that students began developing their understanding with something they knew and extended this to concepts and issues specific to the project on which they worked; and (d) included multiple opportunities for students to “see” the thinking of others, get feedback on that thinking, and revise their initial ideas.

Similarly, Hidi, Weiss, Berndorff, and Nolan report that the learning of scientific information through visits to a science museum was dependent on the links between the exhibits, students’ in-school learning, and the process of their learning during the museum visit. While students, teachers, and researchers were especially impressed by the enthusiastic response to learning through the Jigsaw approach to cooperative learning (one of the experimental

conditions), and both boys and girls learned when this approach was used, it appears that boys were more likely than girls to benefit from this kind of activity.

- *Interest influences students' abilities to pose questions and to seek and use resources in problem-solving.* As has already been stated, the study of young children's free play indicates that girls and boys will explore operations such as balance or sequencing, and will use more strategies and more patterns of activity in their play and work with identified objects of interest than with objects of noninterest. The challenges that young children set for themselves in their play reflect the problems they are posing for themselves and their abilities to seek and use resources in their problem-solving.

Pintrich, Ryan, and Patrick found that among middle-school students task value (which includes interest) and mastery goal orientation play important roles in the self-efficacy, use of cognitive strategies, use of self-regulatory strategies, and grades of middle-school students. Boys and girls who valued or were interested in a content area (math, English, or social studies) were likely to rate themselves as capable of learning in that content area (see also Hannover). They also found that interest and value were related to the likelihood that girls and boys would use deeper processing strategies (see also Pintrich & Schrauben, 1992). Finally, girls and boys who valued tasks in a content area were also more likely to report planning, monitoring, and regulating their work, acts of metacognition (see also Renninger & Stavis, 1995a, 1995b).

This overview has a kind of convergent validity, given that the findings reported have been either replicated or similar kinds of findings have emerged across different investigations. It appears that individual interest has a significant effect on many aspects of the learning and development of young children and elementary-school students. However, questions that could help us to understand and consider this effect more fully remain unanswered. These include: How intense does a child's interest need to be in order for it to make a difference in the child's ability to learn? Can others really facilitate a specific (intense) interest in a particular content area? Are there individual differences within gender groups with respect to interest and its effects? Can a child or student really develop more interests than he or she already has? To what extent is the genesis of interest dependent on biology?

Issues of Interpretation; Some Implications for Research Methods

The usefulness of the existing research for both practice and theory-building is tempered to some extent by how it is understood and the way in which it is studied. Based on the studies reviewed here, it seems likely that more systematic considerations of both interest and learning might enhance what can be said about the roles of interest and gender in the learning of young children and elementary-school students. In particular, given the range of settings that have been used to generate our working knowledge and the nature of the interactions that have been noted (or not noted), it appears that the study of interest would be more systematic if as researchers we were to: (a) locate the children and students in our samples on a continuum of interest development, and then (b) articulate the roles of interest and gender in relation to the nature of the learning context.

Given clear differences in how students work on tasks when interest (high knowledge, high value) and noninterest (knowledge, low value) are contrasted (see Renninger), it seems reasonable to think that children's and students' learning might also vary depending on whether they: (a) have an established interest for a task or its conditions (e.g., embedded context), (b) have enough knowledge for a positive valuing of a given task to emerge (here positive value is considered to be in relation to the other classes of objects or events with which the student engages), or (c) do not yet have enough knowledge regarding the class that describes a task for it to be stored and for value to have developed (the condition of potential interest but not an identifiable individual interest).

Obviously, interests emerge and can be deepened. Interested involvement described in terms of stored knowledge and stored value (cf. Renninger), for example, suggests that a student already has his or her own interests and these influence the way in which he or she is ready to engage what might be considered prospective "interests" (such as becoming interested in physical science). The process of developing the knowledge base and feelings of value for a prospective interest (say, for choosing to do mathematics when this is not an existing interest) would require the reorganization and development of what the student presently knows about a topic and about him or herself as a person working with that topic—including the way in which information is extracted, the kinds of challenges or excitement that are found in the topic, the skills and strategies necessary for working on these challenges, and the ability to set new challenges based on how their present involvement unfolds (see Renninger, 1989, 1998 for related discussions).

If researchers were to specify the positions of the children and students they have studied on a developmental continuum with respect to a given "interest," individual interest might be better articulated: its influence on an individual's engagement with information and skills to be learned might be more predictable. Clarifying the focus or expected outcomes of learning, the nature of learning tasks, and the role of others in the process of learning would also be important (see related discussions in Bransford, 1979; Brown 1982; Jenkins, 1979). Learning can refer to mastery of discrete facts or skills and to the requisite development of discourse knowledge and skills. Learning can be described as including open-ended tasks that allow for different entry points, as permitting a student to explore multiple perspectives, as providing opportunities for students to share interest with others, as including the development of strategy use, and as enabling students to learn to work cooperatively with others. It can also involve others in assisting, facilitating, or appreciating the presence of interest.

Simply reporting on interest and gender and learning without accounting for the context and/or conditions of learning appears to seriously constrain what can be learned from a study. For example, Fölling-Albers and Hartinger report a difference between what one might glean by studying the interests of children in a school that encourages autonomy and work on projects, and what can be learned in a traditional school setting (see related discussion in Eccles, Wigfield, Midgley, Reuman, Mac Iver, & Feldlaufer, 1993). Similarly, elementary-school students working with project-based learning such as Jasper did not reveal gender differences (Goldman, et al.), although work with the same age group on more constrained (albeit highly individualized) reading comprehension and mathematical word problem solving tasks did (Renninger).

In conclusion, our current working knowledge of the roles of interest and gender in the learning of young children and elementary-school students is informed by findings that have been replicated. Given the range of settings on which these draw, and the nature of the interactions that have been noted (or not noted), it would also be useful if future studies were to: (a) locate the interests of the children and students studied on a continuum of interest development, and (b) specify the nature of the learning context. Such shifts in research methods would not undermine the importance of the varied research traditions and questions that comprise interest research (see Krapp, Renninger, & Hoffmann), and it appears that they would position us all to describe more effectively the roles of individual interest(s) and gender in the learning of preschool and elementary-school students.

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