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Change in Children's Competence Beliefs and Subjective Task Values Across the Elementary School Years: A 3-Year Study

Allan Wigfield
University of Maryland College Park

Jacquelynne S. Eccles and Kwang Suk Yoon
University of Michigan

Rena D. Harold
Michigan State University

Amy J. A. Arbreton
University of Michigan

Carol Freedman-Doan
Eastern Michigan University

Phyllis C. Blumenfeld
University of Michigan

The authors assessed change over 3 years in elementary school children's competence beliefs and subjective task value in the domains of math, reading, instrumental music, and sports. The longitudinal sample consisted of approximately 615 mostly White, lower middle to middle-class children. Stability correlations indicated moderate to strong stability in children's beliefs, especially older children's competence beliefs. The relation of children's ratings of their competence in each domain to estimates of their competence in those domains provided by both parents and teachers increased over the early elementary grades. Children's competence beliefs and ratings of the usefulness and importance of each activity decreased over time. Children's interest in reading and instrumental music decreased, but their interest in sports and math did not. Gender differences in children's competence beliefs and subjective task values did not change over time.

Researchers studying achievement motivation increasingly have focused on individuals' achievement-related beliefs as important mediators of subsequent achievement behavior (see Eccles, Wigfield, & Schiefele, in press, for review). Eccles and her colleagues (e.g., Eccles, 1984, 1993; Eccles et al., 1983; Eccles, Adler, & Meece, 1984; Eccles & Harold, 1991; Wigfield & Eccles, 1992) developed a model of motivated task choice and performance. They specified that children's and adolescents' competence beliefs and subjective task values are crucial motivational predictors of performance and choice. They also stated that individuals' competence beliefs and values are based on their previous performance at a given activity, and on the feedback they receive from socializers such as parents and teachers.

Individuals' competence-related beliefs, conceptualized as either estimates of how good one is at a given activity, expectations for one's future performance, or self-efficacy, have received much research attention. Researchers have shown that older children's, adolescents', and adults' competence-related beliefs predict their achievement performance, amount of effort exerted, achievement goals, and overall sense of self-worth, even after previous performance was controlled (see Bandura, 1994; Covington, 1984; Eccles et al., 1983; Eccles et al., in press; Nicholls, 1984, 1990; Schunk, 1991; Stipek & Mac Iver, 1989).

Eccles et al. (1983) broadly defined *subjective task values* as incentives for doing different tasks. They defined different components of individuals' task values, including interest in the task, its importance to individuals, and its utility for them (see Eccles et al., 1983; Wigfield & Eccles, 1992, for more details). Researchers have found that adolescents' subjective task values predicted both their actual and anticipated task choice; specifically, taking math and English classes, engaging in sports activities, and choosing a college major (e.g., Eccles, 1984; Eccles et al., 1983; Eccles & Harold, 1991; Feather, 1988; Meece, Wigfield, & Eccles, 1990). In general, however, researchers studying motivation have devoted less attention to children's task values than to their competence beliefs.

Eccles et al. (1983) developed their achievement choice model to explain older children's and adolescents' performance and choice of academic activities. The general purpose of the present study is to begin to assess the model from a developmental perspective. A basic theoretical question addressed is how do children's competence beliefs and values develop during middle childhood, the crucial time in which these beliefs become established (see Stipek & Mac Iver, 1989; Wigfield, 1994). Using factor analytic techniques, researchers now have shown that during the early

Allan Wigfield, Department of Human Development, University of Maryland College Park; Jacquelynne S. Eccles, Kwang Suk Yoon, and Amy J. A. Arbreton, Institute for Social Research, University of Michigan; Rena D. Harold, School of Social Work, Michigan State University; Carol Freedman-Doan, Department of Psychology, Eastern Michigan University; Phyllis C. Blumenfeld, School of Education, University of Michigan.

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Correspondence concerning this article should be addressed to Allan Wigfield, Department of Human Development, University of Maryland, College Park, Maryland 20742. Electronic mail may be sent via Internet to aw44@umail.umd.edu.

elementary school years children's competence beliefs form distinct factors (e.g., Eccles, Wigfield, Harold, & Blumenfeld, 1993; Harter, 1982; Marsh, 1989; Marsh, Craven, & Debus, 1991). Further, children as young as first graders distinguish between their sense of competence for an activity and its value to them (Eccles et al., 1993).

Given that these constructs appear to be distinct to children, we test predictions made by Eccles, Blumenfeld, and Wigfield (1984) and Wigfield (1994) concerning the development of competence beliefs and values specified in Eccles et al.'s (1983) model. The first prediction concerns mean-level change and is that children's competence beliefs and values initially are overly optimistic, and decline during the middle childhood years. The second is that children's competence beliefs and values become more stable over the elementary school years. The third prediction is that children's competence beliefs and subjective values are positively related, and these relations will increase across the elementary school years. The fourth prediction is that relations of children's competence beliefs and subjective values to parents' and teachers' evaluations of their competence will increase, especially during the early elementary school years.

Regarding mean-level change, using cross-sectional research designs, several researchers (e.g., Eccles et al., 1993; Marsh, 1989; Nicholls, 1979) examined age differences in children's competence beliefs, and showed that younger children have more positive (and sometimes unrealistically high) competence beliefs and performance expectations than do older children across several activity domains, at least during the elementary school years (see Eccles, Midgley, & Adler, 1984; Stipek & Mac Iver, 1989, for reviews). However, domain by age differences are common. For example, there were no age differences in beliefs about sports competence in the Eccles et al. (1993) study. Similarly, in some domains (e.g., math) the age differences favoring younger children continue through adolescence; whereas in other domains (e.g., English) adolescents have more positive competence beliefs than younger elementary school children (Eccles et al., 1983; Marsh, 1989).

Fewer studies of age differences in subjective task values have been done, especially during the middle childhood years. Eccles, Wigfield, and their colleagues showed that during early adolescence, change in domain-specific subjective task values varies across domain. Early adolescents' valuing of math and sports decreases; in contrast, their valuing of English initially remains stable and then increases (Eccles, 1984; Eccles et al., 1983; Eccles et al., 1989; Wigfield, Eccles, Mac Iver, Reuman, & Midgley, 1991). In the one extant study of elementary school-aged children's subjective task values, Eccles et al. (1993) found that first and second graders valued reading and instrumental music more than fourth graders. There were no age differences in children's valuing of math, and children's valuing of sports activities increased with grade level.

Despite the interest in how children's competence beliefs and values develop during middle childhood (see Stipek & Mac Iver, 1989), researchers have rarely assessed change in these beliefs, particularly in work with young children (the work of Alexander & Entwisle, 1988, and Nicholls & Miller, 1984, are the primary exceptions). Thus the assertion that many children's competence beliefs decline across childhood has not been tested fully. There are no studies reported in the literature of change during middle childhood in children's subjective task values.

We used a cohort-sequential longitudinal design to examine mean-level change in children's competence beliefs and subjective values. The design provided information about children across all the grades of elementary school that we link to existing longitudinal studies of children's competence beliefs and values during adolescence (e.g., Eccles et al., 1983; Wigfield et al., 1991). This design also allows for a comparison of different kinds of mean-level change, in particular a comparison of longitudinal versus cohort differences. This is a strong methodology for developmental studies (see Baltes & Nesselroade, 1979; Menard, 1991), although because of its expense and time demands it is rarely used in the field.

Plotting mean level change tells us little about how these beliefs and values change at the individual level; analyses of stability provide such information. Eccles, Blumenfeld, & Wigfield (1984) and Wigfield (1994) predicted that children's competence beliefs and values would become more stable during middle childhood, a prediction yet to be tested in this age group. Researchers found that during early adolescence children's competence beliefs show moderate stability over a 1-year period (*r*s averaging .50), and their subjective values are somewhat less stable, averaging .40 (Eccles et al., 1989). Following Stipek and Mac Iver's (1989) discussion of how competence beliefs develop during middle childhood, we predicted that the stability in children's competence beliefs and values will increase during the early elementary school years, but that by third or fourth grade the stabilities will asymptote. Further, because children receive more feedback regarding their competencies (see Stipek & Mac Iver, 1989; Wigfield, 1994), their competence beliefs should become more stable than their subjective task values.

Regarding the relations of competence beliefs and subjective values, Eccles et al. (1983) predicted that adolescents' competence beliefs and values should be positively related, so that they value the activities at which they think they are competent. In support of this prediction they found that adolescents' competence beliefs and values indeed were positively related (see also Eccles & Wigfield, 1995). Harter (1990) found that when children's competence beliefs are in synchrony with the importance they attach to a given activity, they have higher self-esteem. Eccles, Blumenfeld, and Wigfield (1984) and Wigfield (1994) proposed that the middle childhood years are the time when relations between children's competence beliefs and values become established, so that the positive relations between these constructs should increase during this time period. We tested this prediction by looking at differences in the correlations of these variables across age. A study by Chapman and Tunmer (1995) bears on this issue. They measured 5- to 10-year-old children's reading competence beliefs and attitudes toward reading (primarily assessed by items asking children how

much they liked reading). Correlations of the competence beliefs and attitude measures were highest among the 5- and 6-year-olds (*rs* = .71 and .50), and similar among the 7- to 10-year-olds (*rs* ranged from .35 to .46).

Eccles et al. (1983) proposed further that individuals' competence beliefs and values are based in part on parents' and teachers' judgments of children's competence, and they found that parents' judgments do relate to adolescents' beliefs and values. Eccles, Blumenfeld, and Wigfield (1984) and Wigfield (1994) predicted that early during elementary school relations between children's competence beliefs and values and parents' and teachers' evaluations should be weak or nonexistent, and these relations should increase in strength across the early elementary school years, as children incorporate the feedback they receive about their performance into their self-beliefs, and parents understand better how their children are doing. This prediction has been supported by other researchers, who found that teachers' and parents' evaluations of children relate more strongly to older than younger children's competence beliefs and expectancies (e.g., Alexander & Entwisle, 1988; Marsh, 1993; Nicholls, 1979). Similarly, correlations of children's performance and competence beliefs increase during middle childhood; Chapman and Tunmer (1995) demonstrated this recently in the reading domain. We extend this work to additional achievement domains, and include subjective task values along with competence beliefs. Further, Marsh and Craven (1991) showed that parents' judgments of their third- through sixth-grade children's self-concepts in domains such as reading, physical skills, and general school related more closely to children's own self-concepts than did teachers' judgments. Therefore, we also predicted relations between mothers' evaluations and children's beliefs and values will be stronger than for teachers' evaluations.

We measured children's competence beliefs and subjective task values in four activity domains: math, reading, instrumental music, and sports. The Eccles et al. (1983) model was developed primarily to predict performance and choice in math and English and has been extended to the sports domain (Eccles & Harold, 1991). The domains assessed here were chosen because they are common to most children's experience, they all involve skill acquisition and activity choice, and they have been linked to gender stereotypes. Further, earlier work showed that children have differentiated beliefs about these activities, even during middle childhood (e.g., Eccles et al., 1993; Harter, 1982; Marsh, 1989), and so it is important to examine self-beliefs in specific domains.

Finally, because Eccles and her colleagues have been concerned with gender differences in competence beliefs and values (e.g., Eccles et al., 1983; Eccles et al., 1989; Wigfield et al., 1991), we examined the emergence of such gender differences during the middle childhood years. The middle childhood years are thought to be a crucial time in the development of gender differences in children's beliefs about different activities (Huston, 1983; Ruble & Martin, in press); we therefore predicted that gender differences in children's competence beliefs and values would increase across the elementary school years. Researchers studying children's competence beliefs and subjective task values have reported gender differences in early adolescents' competence beliefs and values, particularly in gender-role stereotyped domains. For instance, boys hold higher competence beliefs in math and sports than girls do, whereas girls often have higher competence beliefs in the English and social domains (Eccles et al., 1989; Eccles et al., 1993; Harter, 1982; Huston, 1983; Marsh, 1989, 1993; Marsh et al., 1991; Wigfield et al., 1991). The extent of this pattern varies by age, however, and becomes more pronounced as adolescents move through high school.

Eccles et al. (1993) found gender differences in competence beliefs and values even among first-grade children. Boys' competence beliefs about math and sports were higher than girls' beliefs, in contrast girls' competence beliefs were higher than boys for instrumental music and tumbling. Girls valued reading and instrumental music more than boys; the boys valued sports more than girls. Interestingly, there were no gender differences in the valuing of math. There were also no Gender × Grade interactions in any domain, indicating that the size of the observed gender differences was as large among first graders as among fourth graders. This latter finding is consistent with results reported by Marsh (1989). Yet longitudinal work is needed to assess fully the prediction that gender differences in self-related beliefs and values become established during middle childhood (Huston, 1983; Ruble & Martin, in press).

Method

Participants

The present study is part of a longitudinal project (the Michigan Childhood and Beyond Study) investigating the development and socialization of children's self-perceptions, task values, and activity choices.[1] Children, parents, and teachers were recruited through their children's schools; all children in each classroom were asked to participate. Seventy-five percent of the children both agreed to participate and obtained parental permission. During Year 1, 865 first-, second-, and fourth-grade children attending 10 elementary schools in four school districts in the suburbs of a large midwestern city participated. These children comprise the base sample for the longitudinal results reported. By Year 3, these children were in Grades 3, 4, and 6. Thus the combined cross-sequential sample provides information on children from Grade 1 through Grade 6. In addition, the design yielded data for more than one cohort of children at the same grade level at various time points in the study, providing replication of grade level effects across cohorts.

The final longitudinal sample used in the analyses presented includes approximately 615 children (the sample size varies slightly across measures because of small variations in missing

[1] This article is the first from the larger project to present cohort sequential analyses of mean level change, analyses of construct stability, relations of children's competence beliefs to their subjective values and to adults' evaluations of their competence, and analyses of change in gender differences in children's competence beliefs and values. The first publication from this project (Eccles et al., 1993) presented factor analyses of children's competence beliefs and values, and cross-sectional analyses of age and gender differences in children's competence beliefs and values.

data); 325 are girls, 290 are boys. Cohort 1 (first graders in Year 1, second graders in Year 2, third graders in Year 3) contains 195 children; Cohort 2 (second graders in Year 1, third graders in Year 2, fourth graders in Year 3) contains 210 children; Cohort 3 (fourth graders in Year 1, fifth graders in Year 2, sixth graders in Year 3) contains 210 children. On the basis of information about income provided by the school districts, the children are from middle-class backgrounds; average family income in the districts is $50,000. Over 95% of the children are European American.

The 615 children represent 71% of the original sample of 865 children; children were missing in the longitudinal sample either because they did not complete all measures, or because of sample attrition. Attrition in the sample was due mostly to children moving far away from the school districts sampled. Every effort was made to relocate children each year, and children continuing to live in the same general area but not attending participating schools are included in the longitudinal sample. To see if sample attrition influenced the results, we compared the mean scores for the full cross-sectional sample and the longitudinal sample for each of the variables at each time of measurement. None of these comparisons yielded significant differences between the two overlapping populations. Further, gender and grade analyses of variance (ANOVAs) done on the variables from the full sample and the longitudinal sample at each time of measurement produced identical effects. These results suggest that attrition did not affect the results reported in this article.

Procedure and Measures

Each spring, the children completed questionnaires measuring their competence beliefs and subjective task values about math and reading, instrumental music, and sports, as well as other constructs. Children completed the questionnaires in their classrooms in the participating schools. Most items were answered using a 7-point Likert-style response scales, and the items were modified from earlier questionnaire items developed by Eccles and her colleagues to assess children's and adolescents' beliefs about mathematics, English, sports, and social activities. The items have good psychometric properties (see Eccles, 1984; Eccles et al., 1983; Eccles, Adler, & Meece, 1984; Eccles & Wigfield, 1995; Eccles et al., 1993; Parsons, Adler, & Kaczala, 1982). Because the children in the current study are younger than children in previous studies using these questions, great care was taken (particularly during the first year of questionnaire administration) to ensure that the children understood the constructs being assessed. The items were pilot tested on 100 children, and the answer scales were illustrated to foster children's understanding of how to use them (see Eccles et al., 1993, for more detailed discussion). All questions were read aloud to all the children in Years 1 and 2; in Year 3 the oldest two groups read the questionnaires on their own. The questionnaires were administered in three sessions lasting 20 min each.

Competence belief items. For math, reading, and sports, the five competence belief items asked the children how good they were at each activity, how good they were relative to the other things they do, how good they were relative to other children, how well they expected to do in the future at each activity, and how good they thought they would be at learning something new in each domain. Because of time limitations, fewer items were used for instrumental music: In Year 1, three of the competence belief items were asked in this domain (how good at each activity, good relative to other activities, good at learning something new) and during Years 2 and 3 the item asking children how good they are relative to other children also was included. The specific items used are presented in the Appendix.

Subjective task value items. For math, reading, and sports, the subjective task value items asked children how interesting or fun each activity was, how important they thought being good at the activity was, and how useful they thought each activity was. At Year 1, four items were used: one assessed importance, one assessed usefulness, and two assessed interest. At Years 2 and 3, two new values items were added: one asked how important doing well on the activity was to them compared with other activities, and the other asked how useful the activity was compared with the other activities. Comparable wording was used in each domain, except for the name of the domain. In the music domain, three task value items were asked in Year 1 (two assessing interest and one assessing importance). Five music task value items (two assessing interest, two assessing importance, and one assessing usefulness) were used in Years 2 and 3. The specific items used are presented in the Appendix.

Scale construction. On the basis of factor analyses and theoretical considerations (see Eccles et al., 1993, for more details about the factor analyses), scales were developed for the competence belief and subjective value constructs. Internal consistency reliabilities for the various competence belief scales ranged from .74 to .90 across domains and times of measurement. For subjective task values, separate scales for interest and for usefulness and importance were created in each domain.[2] For usefulness and importance, the internal consistency reliabilities were low in Year 1 (.36 for math, .43 for reading, and .57 for sports) but ranged from .61 to .88 across domains at the other two times of measurement. For interest, the reliabilities ranged from .73 to .92 across domains and times of measurement. Thus, overall the internal consistency of the competence beliefs and interest measures was from good to excellent. Because the reliabilities of the measures of the youngest children's sense of the usefulness and importance of the different activities was lower, in the correlational analyses presented later we corrected for attenuation in the relations of usefulness and importance to other variables.

Mother and teacher evaluations of children's competence. To assess the relations of children's competence beliefs and values to external evaluators' judgments about them, we obtained indicators of their mothers' and teachers' estimates of children's competence in each domain.[3] Each year of the study, each teacher rated the competence in the different domains of each child in his or her class, using the following questions: "Compared to other children, how much innate ability or talent does this child have in [domain]?" and "How well do you expect this child to do next year in [domain]?" The first question was answered on a 7-point Likert scale anchored at 1 (*much less than other children*) and 7 (*much more than other children*). The second question was answered on a 7-point Likert scale anchored at 1 (*very poorly*) and 7 (*exception-*

[2] Although the items assessing task values did not always factor into separate usefulness–importance and interest factors, we created separate scales for two reasons: First, in earlier work with older students (e.g., Eccles et al., 1989; Wigfield et al., 1991), change in these two separate values constructs was examined, and we wish to compare the present results to that work. Second, the separate scales are quite reliable (with the exception of the Usefulness–Importance scales at Year 1).

[3] We analyzed mean-level change in these ratings as well. Unlike children's competence beliefs, the teacher and parent ratings changed little over time. Because of space limitations and this article's focus on children's competence beliefs and values, we do not present the analyses of change in teachers' and parents' ratings. The results are available from Allan Wigfield.

ally well). The internal consistency reliabilities for this scale ranged from .82 to .92 across domains and times of measurement.

Mothers' estimates of their children's competence in each domain also were collected each year. The items were as follows: "How good is your child in [domain]?" (1 = *not at all good*, 7 = *very good*); "How well do you think your child will do in [domain] next year?" (1 = *not at all well*, 7 = *very well*); "Compared to other children, how much innate ability or talent does your child have in [domain]?" (1 = *much less than other children*, 7 = *much more than other children*); "In comparison to other children, how do you evaluate your child's performance in [domain]?" (1 = *much worse than other children*, 7 = *much better than other children*). The last item was not used in the instrumental music domain because many of the children did not play musical instruments. The internal consistency reliabilities for these scales ranged from .90 to .96 across domains and times of measurement.

Results

We begin with the analyses of mean-level change in children's competence beliefs and subjective task values. The competence belief, perceived usefulness–importance, and perceived interest scales were analyzed in repeated measures multivariate analyses of variance (MANOVAs). First, four-way MANOVAs with two within-subjects factors (time of measurement [3 levels] and activity domain [4 levels]), and two between-subjects factors (gender and cohort) were run, to determine if there were significant effects of activity domain, and interactions of activity domain with the other factors. These effects were significant in all the analyses, indicating that children's beliefs and values differed across the activity domains. The full table of these effects can be obtained from Allan Wigfield. The four-way analyses were followed by three-way MANOVAs that assessed cohort, gender, and time of measurement effects on each scale within each domain; we focus on these analyses. The significant multivariate and univariate statistics from these analyses are presented in Tables 1 and 2. Significant time of measurement effects are interpreted by examining both linear and quadratic trends (Kirk, 1968). Post hoc tests were performed as follow-up tests to the trend analysis and the other univariate effects to determine which of the individual means differed significantly from one another.

Table 1
Effects of Gender, Cohort, and Time of Measurement on Children's Competence Beliefs and Usefulness–Importance

Effect	Competence beliefs			Use and importance		
	df	*F*	Effect size	*df*	*F*	Effect size
Between subjects						
Gender (G)	(4, 596)	67.27**	.31	(4, 602)	36.21**	.19
Math	(1, 599)	41.26**	.06			
Reading	(1, 599)	7.15**	.01	(1, 605)	7.87**	.01
Music	(1, 599)	38.78**	.06	(1, 605)	33.61**	.05
Sports	(1, 599)	174.25**	.23	(1, 605)	70.53**	.10
Cohort (C)	(8, 1190)	6.88**	.04	(8, 1202)	8.47**	.05
Math	(2, 599)	6.25**	.02			
Reading	(2, 599)	18.51**	.06			
Music	(2, 599)	5.23**	.01	(2, 605)	25.87**	.08
G × C	(8, 1190)	.49	.00	(8, 1202)	.32	.00
Within subjects						
Time of measurement (T)	(8, 592)	22.34**	.23	(8, 598)	72.24**	.49
Math linear	(1, 599)	9.22**	.02	(1, 605)	111.59**	.16
Math quadratic				(1, 605)	34.25**	.05
Reading linear	(1, 599)	43.06**	.07	(1, 605)	171.40**	.22
Music linear	(1, 599)	91.87**	.13	(1, 605)	276.07**	.31
Music quadratic	(1, 599)	49.60**	.08			
Sports linear	(1, 599)	18.70**	.03	(1, 605)	202.25**	.25
Sports quadratic				(1, 605)	12.71**	.02
G × T	(8, 592)	2.80*	.04	(8, 598)	5.09**	.06
Sports linear				(1, 605)	28.69	.05
C × T	(16, 1182)	3.88**	.05	(16, 1194)	3.60**	.05
Reading linear	(2, 599)	9.70**	.03			
Reading quadratic				(2, 605)	5.53**	.02
Music linear	(2, 599)	14.23**	.05	(2, 605)	10.83**	.04
Music quadratic				(2, 605)	6.34**	.02
G × C × T	(16, 1182)	1.02	.01	(16, 1194)	1.57	

Note. For the trend analyses and other univariate effects, only significant effects are presented.
*$p < .01$. **$p < .001$.

Table 2
Effects of Gender, Cohort, and Time of Measurement on Children's Interest

Effect	*df*	*F*	Effect size
	Between subjects		
Gender (G)	(4, 577)	49.26**	.26
Reading	(1, 580)	56.46**	.09
Music	(1, 580)	78.98**	.12
Sports	(1, 580)	57.50**	.09
Cohort (C)	(8, 1152)	5.99**	.04
Math	(2, 580)	7.71**	.03
Reading	(2, 580)	13.13**	.04
G × C	(8, 1152)	1.10	.01
	Within subjects		
Time of measure (T)	(8, 573)	11.31**	.14
Reading linear	(1, 580)	12.24**	.02
Music linear	(1, 580)	74.53**	.12
G × T	(8, 573)	1.59	.02
C × T	(16, 1144)	3.52**	.05
Math linear	(2, 580)	6.47**	.02
Music quadratic	(2, 580)	7.52**	.03
Sports linear	(2, 580)	5.31**	.02
G × C × T	(16, 1144)	1.48	.02

Note. For the trend analyses and other univariate effects, only significant effects are presented.
*$p < .01$. **$p < .001$.

Because of the relatively large sample size and large number of possible effects, we only present effects that are significant at the .01 level or above. We also focus on the results with the strongest effect sizes (see Table 1). These include the time of measurement effects, domain effects (from the four-way analysis), gender effects, and (to a lesser extent) the cohort effects.

Children's Competence Beliefs in the Different Domains

Longitudinal change and cohort differences. As predicted, children's competence beliefs in each domain changed across time, and varied by cohort, as indicated by significant effects in both the three-way and four-way analyses (see Table 1 for the statistics for the three-way effects). Figures 1 and 2 show the mean level of children's competence beliefs in each domain, separately for each cohort at each time of measurement (tables of means and standard deviations are available from the authors). One can see both the main effects of cohort and time of measurement effects, as well as the time of measurement by cohort interaction effects in these plots.

Looking first at the longitudinal effects, as predicted, in general children's competence beliefs decreased over time in each domain for the two youngest cohorts, although the decreases were strongest in music. In each of the domain-specific three-way analyses, a linear trend best captures the observed decreases (see Table 1). In addition, the significant quadratic effect for instrumental music indicates that children's music competence beliefs decreased more sharply from Year 2 to Year 3 than between Years 1 and 2 in all cohorts. Also for music competence beliefs, a very different pattern characterized the change for Cohort 3, as shown by the significant time of measurement by cohort interaction in this domain. Children in this cohort showed an inverted U pattern. Their instrumental music beliefs were significantly higher in Grade 5 than in Grades 4 or 6, which did not differ from one another.

The cohort main effects occurred because children in Cohort 1 (the youngest cohort) generally have more positive competence beliefs in each domain than children in the other two cohorts. The major exception to this pattern was children's sports competence beliefs, where there were no significant cohort differences.

Domain differences. As mentioned earlier, the domain main effect, and its interactions with other factors were significant in the four-way analysis, indicating that children's beliefs differed across activity domain. In general at each time of measurement, the children's competence beliefs are highest for reading and sports, then math, and instrumental music (see Figures 1 and 2). Post hoc tests indicate that the means for instrumental music competence beliefs are consistently lower than the means in the other three domains.

Gender differences. As predicted, boys' and girls' competence beliefs differ across activity domains, as the two-way interaction of Activity Domain × Gender in the four-way analysis indicates, $F(3, 597) = 80.80$, $p < .001$, effect size = .289. The three-way follow-up analyses done in each domain show that these effects are significant in each of the domains (see Table 1). The means collapsed over time are shown in Table 3. As can be seen in the table, boys have significantly more positive competence beliefs than do girls in the domains of math and sports; in contrast, girls have significantly more positive competence beliefs than boys in reading and instrumental music.

The three-way interaction of Gender × Domain × Time of Measurement was significant in the four-way analysis, $F(6, 594) = 3.49$, $p < .01$, effect size = .04, indicating that the gender differences varied over time. However, in the three-way follow-up analyses the Gender × Time of Measurement interaction was significant for sports only (see Table 1). Inspection of the means suggests a slightly increasing divergence in sports competence beliefs between the sexes over time. Thus the gender differences varied little across time of measurement.

Children's Beliefs About the Usefulness and Importance of the Different Activities

Longitudinal change and cohort differences. As predicted, children's beliefs about the usefulness and importance of the activities varied over time, over domain, and across cohort, as indicated by significant effects in both the three-way and four-way analyses. Children's ratings of the usefulness and importance of the different activities for each cohort at each time of measurement are shown in Figures 3 and 4. As can be seen in the figures, the general pattern is

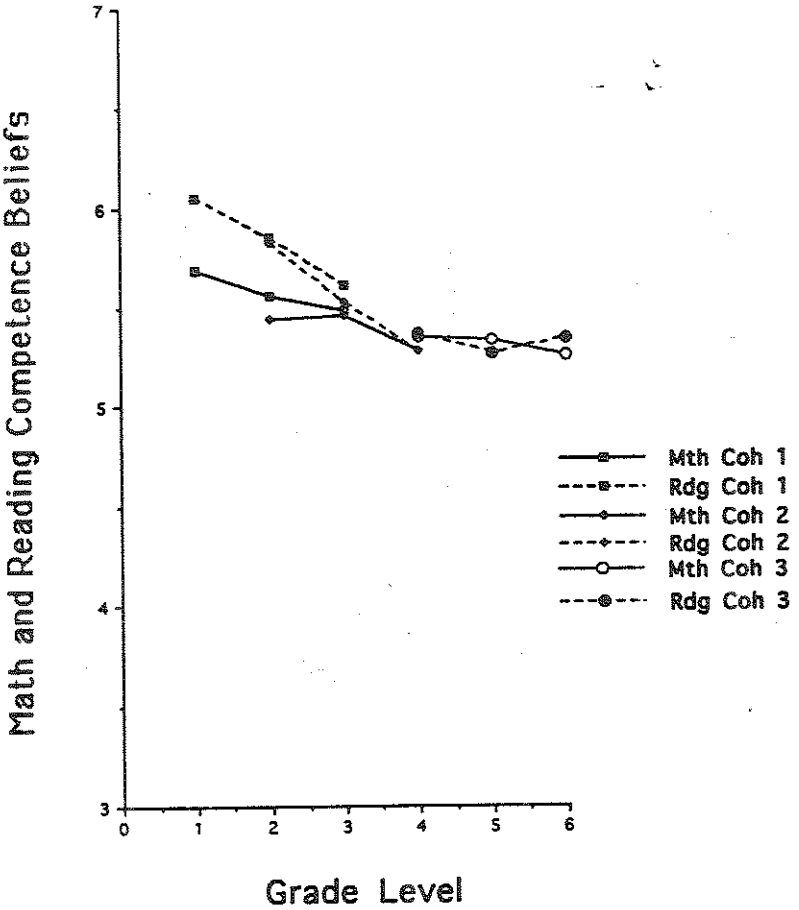

Figure 1. Change in children's competence beliefs for math (Mth) and reading (Rdg). Coh = cohort.

for these value beliefs to decrease over time for all cohorts and domains.[4] The polynomial contrasts (see Table 1) for the time of measurement and Cohort × Time of Measurement interactions within each domain indicate that these declines contain either a linear trend, a quadratic trend, or both. For the time of measurement main effect, both the linear and quadratic trends are significant in the math and sports domains. These trends reflect the fact that the decreases in these two domains are less pronounced from Year 2 to Year 3 than from Year 1 to Year 2 for all three cohorts. In fact, the individual contrasts for the means from Year 2 and Year 3 are not significantly different from one another in math. A similar pattern occurred for reading, with the exception of Cohort 1, which showed a linear decline (the Cohort × Time of Measurement interaction was significant in this domain).

Cohort main effects occurred only in the instrumental music and sports domains ($p = .02$ in this domain). In the music domain, each successive cohort had less positive beliefs about the usefulness and importance of music. In sports, the children in Cohort 1 had more positive beliefs about sports usefulness and importance than did the children in the other two cohorts. There were no cohort main effects in the math and reading domains.

Domain differences. The domain main and interactive effects were significant in the four-way analyses. These effects occurred because children did not think all of the activities were equally useful and important to them and because this pattern varied across cohorts and time of measurement. Looking at the across-domain differences (see

[4] Because items were added to the Usefulness–Importance scales at Years 2 and 3, the pattern of change over time could be due to the change in the scales used each year. To check this, we analyzed the Usefulness–Importance scales based on the smaller number of identical items at each time of measurement. For instrumental music and sports, essentially the same pattern of results occurred with the two different sets of scales. For math and reading the results were different when the smaller sets of scales were used. In both of these domains in Cohorts 1 and 2 there were no decreases until Year 3. In Cohort 3 there was a decline from Year 1 to Year 2, but that decline was less dramatic than when the larger scale was used. There was no decline from Year 2 to Year 3. Thus in these two domains adding the items asking children to compare the usefulness and importance of math and reading with their other activities produced the larger decline in these beliefs.

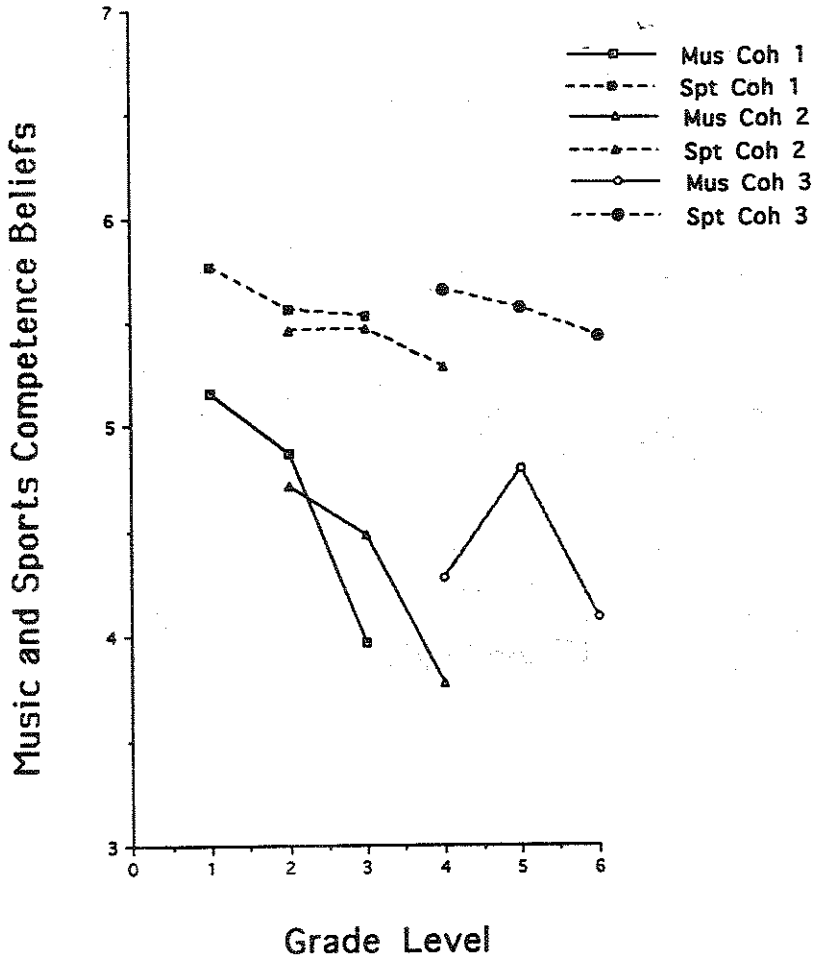

Figure 2. Change in children's competence beliefs for instrumental music (Mus) and sports (Spt). Coh = cohort.

Figure 3 and 4), at each time of measurement, children in all three cohorts rated reading and math as most useful and important, followed by sports, and then music. The individual contrasts of these means showed that the means for sports and instrumental music all were significantly different, as were the means for the two academic activities and sports and instrumental music.

Gender differences. The Gender × Activity Domain interaction was significant in the four-way analysis, $F(3, 603) = 48.32$, $p < .001$, effect size = .194. The three-way analyses (see Table 1) yielded significant univariate gender effects in the reading, instrumental music, and sports domains. The means collapsed over time are presented in Table 3. As can be seen in the table, girls believed reading and instrumental music were significantly more useful and important than boys did. Boys believed sports to be more useful and important than did girls. Boys and girls did not differ in their ratings of the usefulness and importance of math. The Gender × Domain × Time of Measurement interaction was significant in the four-way analysis, as was the Gender × Time of Measurement interaction in the three-way analysis (see Table 1). However, the only contrast significant was the sports linear effect, which showed a slightly increasing divergence over time in these beliefs. Thus overall the magnitude of the gender differences in each domain changed little over time.

Children's Interest in the Different Activities

Longitudinal change and cohort differences. As predicted, children's interest in the different activities changed over time and varied by cohort, as indicated by significant effects in the four- and three-way analyses (see Table 2). The means are plotted for each activity separately for each cohort at each time of measurement in Figures 5 and 6. Children's interest in reading and instrumental music decreased significantly over time for either two or all three cohorts; in contrast their interest in sports did not. The linear decreases over time are strongest in children's interest in instrumental music. Post hoc tests done on the means for reading interest showed that only the means at Years 1 and 3 were significantly different from one another. Further inspection

Table 3
Boys' and Girls' Mean Competence Beliefs and Subjective Task Values

Beliefs and values	Girls			Boys		
	N	*M*	*SD*	*N*	*M*	*SD*
Competence beliefs						
Mathematics	315	5.23_a	0.76	290	5.64_b	0.82
Reading	315	5.66_a	0.85	290	5.43_b	0.90
Music	315	4.74_a	1.02	290	4.15_b	1.31
Sports	315	5.04_a	0.94	290	6.04_b	0.93
Usefulness and importance						
Mathematics	324	5.53_a	0.68	287	5.53_a	0.87
Reading	324	5.75_a	0.71	287	5.57_b	0.87
Music	324	4.28_a	1.27	287	3.66_b	1.47
Sports	324	4.66_a	1.15	287	5.43_b	1.12
Interest						
Mathematics	310	4.84_a	1.44	276	4.94_a	1.45
Reading	310	5.42_a	1.29	276	4.57_b	1.51
Music	310	5.41_a	1.32	276	4.33_b	1.62
Sports	310	5.94_a	1.22	276	6.59_b	0.82

Note. Means are averaged over time. Similar subscripts in a row indicate the means in that row are not significantly different from one another.

of the means for each cohort suggests that this linear decreasing pattern for reading interest is only true for the youngest two cohorts. The decline in children's interest in reading mostly has stopped by Grade 4. For math, the Cohort × Time of Measurement interaction showed that Cohort 1 showed little change in their math interest, Cohort 2 an increase, and Court 3 a decrease.

The significant cohort main effects occurred because in the domains of math and reading, overall the youngest cohort's interest in those activities was higher than the interest of the other two cohorts, and the middle cohort's interest was higher than that of the oldest cohort. In sports ($p = .02$ in this domain for the cohort effect), the oldest cohort actually expressed more interest than did the youngest cohort. There was no cohort main effect for instrumental music or sports.

Domain differences. The significant domain effects in the three- and four-way analyses occurred because children were more interested in some activities than they were in others. The most dramatic finding is the differences between children's interest in sports and their interest in the activities in other domains (see Figures 5 and 6). Children are most interested in sports at each time of measurement, and all the post hoc comparisons between children's sports interest and their interest in other activities are significant at each time of measurement. The only domain by year difference worth noting is for instrumental music. Children liked it second best Year 2, and least by Year 4.

Gender differences. The gender main effect, $F(1, 580) = 18.02$, $p < .001$, effect size = .03, and the Gender × Activity Domain interaction effect, $F(3, 578) = 65.78$, $p < .001$, effect size = .255, were significant in the four-way analysis. The three-way analysis showed that the univariate gender effects were significant in the reading, instrumental music, and sports domains (see Table 3). Girls reported significantly more interest in reading and instrumental music than did boys, boys reported more interest than girls in sports. Boys' and girls' interest in math were quite similar. The fact that the interaction of gender, domain, and time of measurement was not significant in the four-way analysis, $F(6, 575) = 1.51$, $p > .05$, indicates that the magnitude of these differences did not change over time.

Stability of Children's Competence Beliefs and Subjective Task Values

To assess stability, we looked at the across time, within-construct correlations of children's competence beliefs and task values for each domain. These correlations are presented in Table 4, separately for each cohort across the Year 1 and Year 2 questionnaire administration, and Year 2 and Year 3 administration. As can be seen by looking across the rows in the table, the oldest children's (fourth-graders in Year 1) beliefs and values were significantly more stable than those of the youngest children (first-graders in Year 1), particularly during the first 2 years of questionnaire administration. Across the first 2 years of questionnaire administration, the older children's beliefs and values were somewhat more stable than those of the middle group, (second-graders Year 1), with the differences significant in five of the 12 comparisons. Few of the differences between the younger and middle groups were significant for either time period. Looking within cohort (see the columns in Table 4) at the different measurement times, the youngest cohort's beliefs and values were more stable across Years 2 and 3 than Years 1 and 2, with 5 of the 11 differences significant (math competence beliefs, all the useful–importance variables, music interest). Fewer of the within-cohort, across-time differences were significant for the middle and oldest cohorts.

Because the reliabilities for the Usefulness–Importance scale were low for the younger and middle groups, we corrected these correlations for attenuation and then looked at the differences in stability. For the comparisons of the youngest and oldest groups, the differences remained significant for reading and sports but not for math. The difference between the stabilities for the youngest and middle group in the sports domain also remained significant after correction for attenuation.

Relations Among Children's Competence Beliefs and Subjective Task Values

The within-domain correlations of children's beliefs and values are presented separately by each grade level in Table 5. Because the grade levels at times come from different cohorts, we first assessed whether there were any cohort differences in the correlations by testing the differences in correlations between beliefs and values of children in the same grade but different cohorts (e.g., math competence beliefs for children in Grade 2 in Cohort 1 vs. math competence beliefs for children in Grade 2 in Cohort 2). Of the 32 possible comparisons, only 5 were significant at the

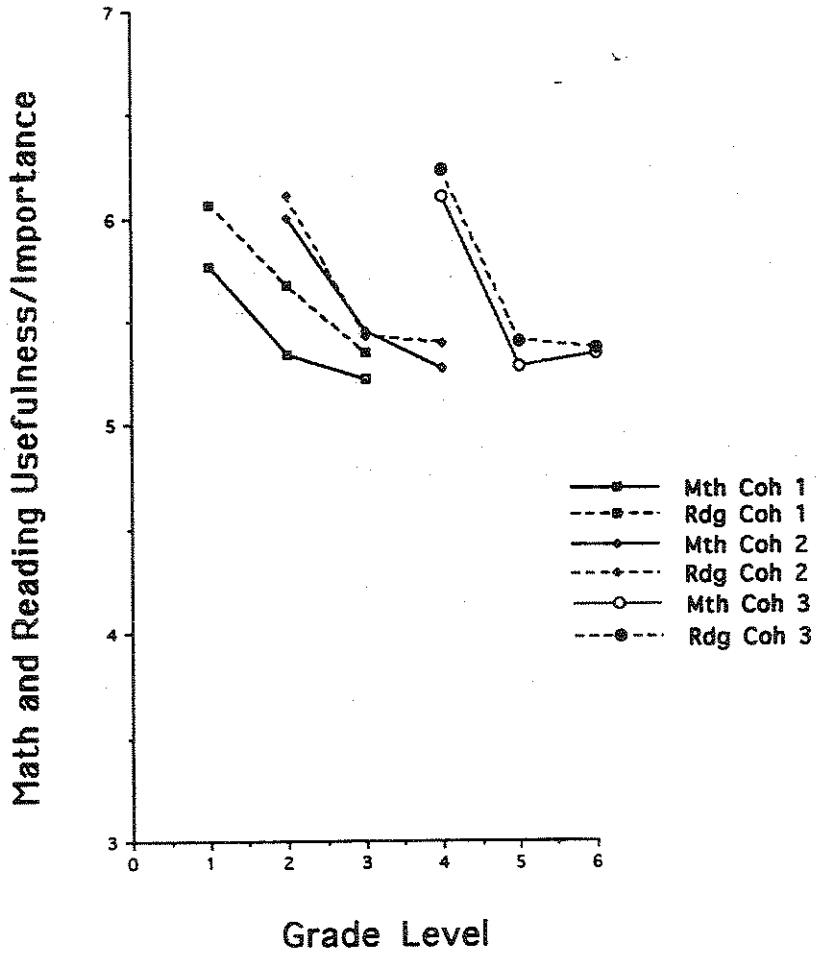

Figure 3. Change in children's beliefs about the usefulness and importance of math (Mth) and reading (Rdg). Coh = cohort.

.01 level, all involving the relations of competence to usefulness–importance. Therefore, there were few cohort differences in these relations, and so we present the correlations averaged across cohort.

As can be seen in the table, children's competence beliefs related positively to their valuing of the activity, particularly their interest in the activity. All of the competence beliefs–interest relations were significant, and most of the competence belief and usefulness–importance relations were. The only nonsignificant relations occurred in the correlations of competence and usefulness–importance for the first graders.

Tests of differences between pairs of these correlations showed that there were age differences in them, as predicted. Most of these differences occurred between the first graders and the older children. To summarize the significant differences (at the .01 level) between pairs of correlations, we found that all of the differences between the first graders and children at other grades were significant, with the exception of the correlations of interest and competence beliefs in the sports domain (in the first through fifth graders). Because the reliabilities were lower for the youngest children's usefulness–importance ratings, we corrected the correlations of this variable and the other variables for attenuation; the significant differences remained in all domains.

For children older than first graders, there were no significant grade differences in the correlations of usefulness–importance and competence in each domain, except between the second and sixth graders in the sports domains. For interest and competence beliefs, the correlations for the second graders were significantly lower than those in the fourth through sixth graders in the math and reading domains. The difference in these correlations between the second and the sixth graders were significant in the music and sports domains. There were few grade differences in these correlations among the third through sixth graders.

The correlations of the task value constructs of interest and usefulness–importance were significantly lower among the first graders than among the children in the other grades. When corrections for attenuation were calculated, the only significant difference remaining was in math, however. Across Grades 2–6 there were very few significant differences in these correlations (the main exception being the second graders vs. the other grades in the sports domain).

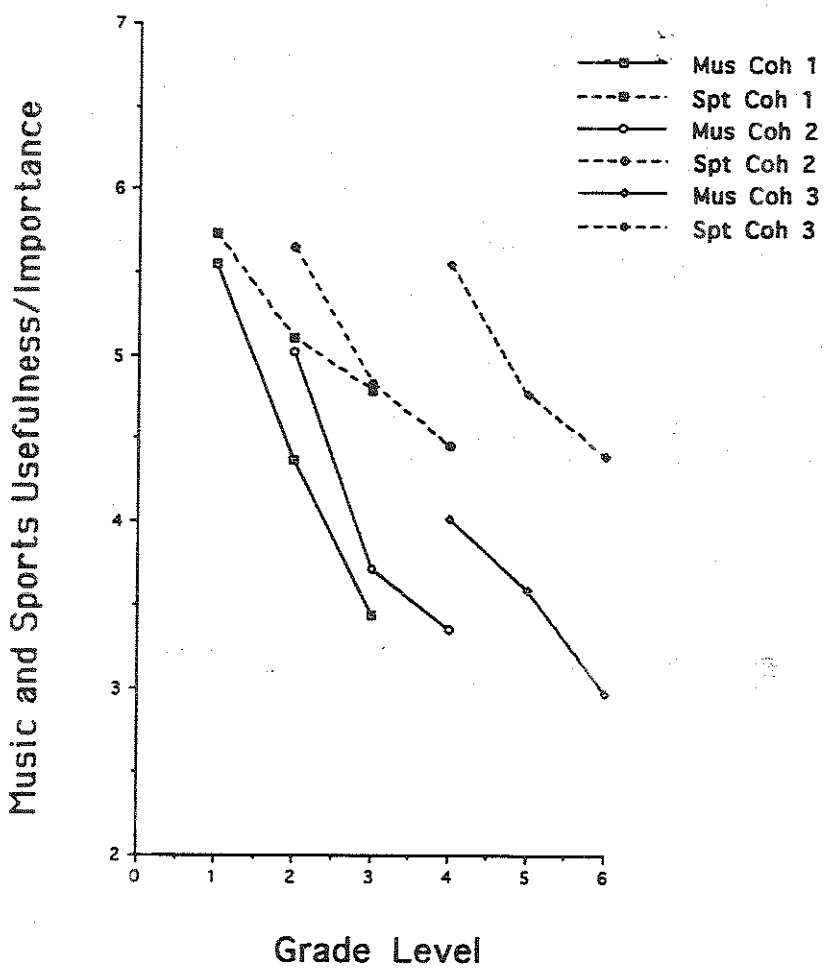

Figure 4. Change in children's beliefs about the usefulness and importance of instrumental music (Mus) and sports (Spt). Coh = cohort.

Relation of Competence Beliefs and Subjective Task Value to Adults' Ratings of Children's Competence

We first tested for cohort differences in these correlations; very few were significant. Hence we present the correlations separately by grade but averaged across cohort; the correlations are presented in Table 6. As predicted, the associations of children's own competence beliefs to both their teachers' and their parents' ratings of their competence become stronger with age. Tests of the significance of the differences in these correlations were done. To summarize the significant differences (at the .01 level) in each domain, we found that the relations between children's beliefs and mothers' evaluations generally are significantly lower among the first graders than they are among the third through sixth graders. These relations also are significantly lower among the second and third graders than among the fourth through sixth graders, particularly in the math and sports domains. There are few significant differences for the fourth through sixth graders.

For teachers and children, the relations between children's competence beliefs and teachers' competence evaluations are significantly lower for the first- and second-grade children than they are for children in third grade and above (in the music domain there are exceptions to this pattern). With the exception of the reading domain, the relations between teachers' evaluations and children's competence beliefs are significantly lower in the second- and third-grade children than those relations in the fourth- through sixth-grade children. There are few grade differences in these relations among the fourth through sixth graders.

In all domains, the strength of the relations between adults' evaluations and children's competence beliefs tends to be stronger for mothers' ratings than for teachers' ratings, particularly at the younger grade levels. For instance, with the exception of the sports and reading domain at Grade 1, first and second graders' self-beliefs related significantly higher to mothers' evaluations than to teachers' evaluations. A similar pattern occurred for the older children, although fewer of the differences between mother–child and teacher–child relations are significant.

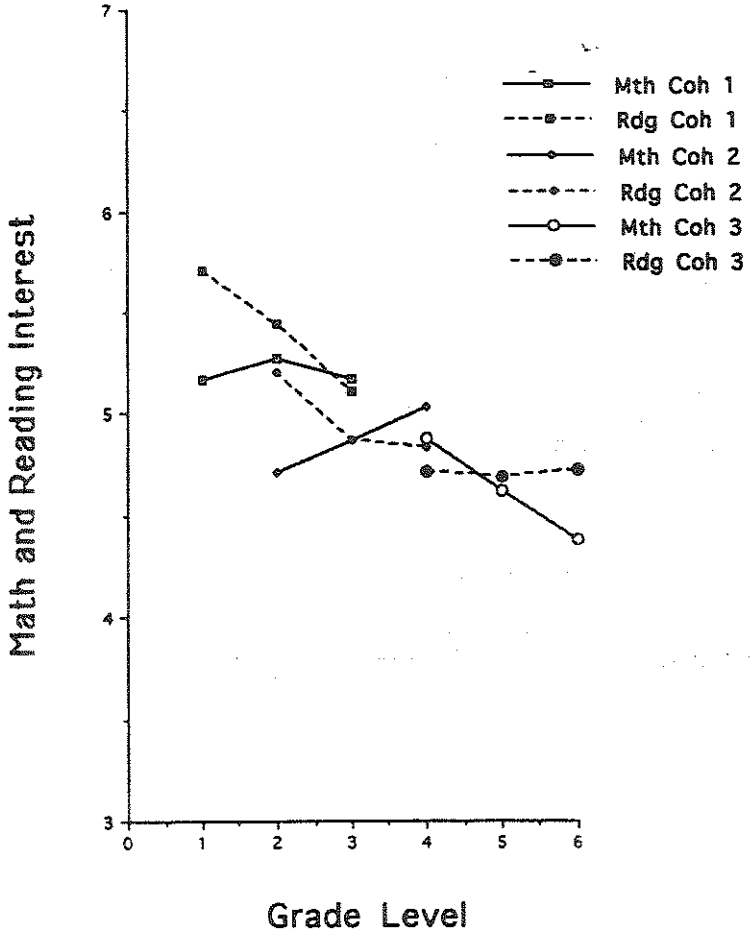

Figure 5. Change in children's interest in math (Mth) and reading (Rdg). Coh = cohort.

Both mothers' and teachers' ratings of children's competence relate more strongly to children's own competence beliefs than they do to children's interest in the different activities; particularly in the math and reading domains. In these domains, 20 of the 24 possible comparisons are significantly different. However, many of the correlations of mothers' evaluations of their children's competence to their children's interest are significant, especially in the music and sports domains. In these two domains, the correlations of teachers' evaluations of children's competence to children's interest also are significant for the fourth through sixth grade children.

Discussion

Results of this study provide new information about how children's competence beliefs and subjective task values change during the crucial middle childhood period, relate to one another, and begin to relate to adults' evaluations of their competence. We begin this section with a focus on change and stability in children's beliefs across middle childhood, and then turn to the other relational analyses, and gender differences.

Researchers studying motivation have discussed how children's achievement-related beliefs become established during middle childhood, and that many younger children tend to be more optimistic in their self-evaluations, and older children more realistic (e.g., Eccles et al., in press; Parsons & Ruble, 1977; Stipek & Mac Iver, 1989). Our results generally support this depiction, particularly in the case of children's competence beliefs and ratings of the usefulness–importance of different activities. Change in children's interest varied more by domain; the strongest decreases occurred for instrumental music and for reading, whereas in math and sports the decreases in interest were less pronounced. These different developmental trajectories for children's ratings of usefulness and importance compared with their interest in different activities provide support for Eccles et al.'s contention that different components of children's subjective task values should be considered.

The findings for both children's competence beliefs and values concerning instrumental music show the strongest decline. Eccles et al. (1983) stated that when children devalue an activity and have low competence beliefs about it they will be less likely to engage in it. Instrumental music is

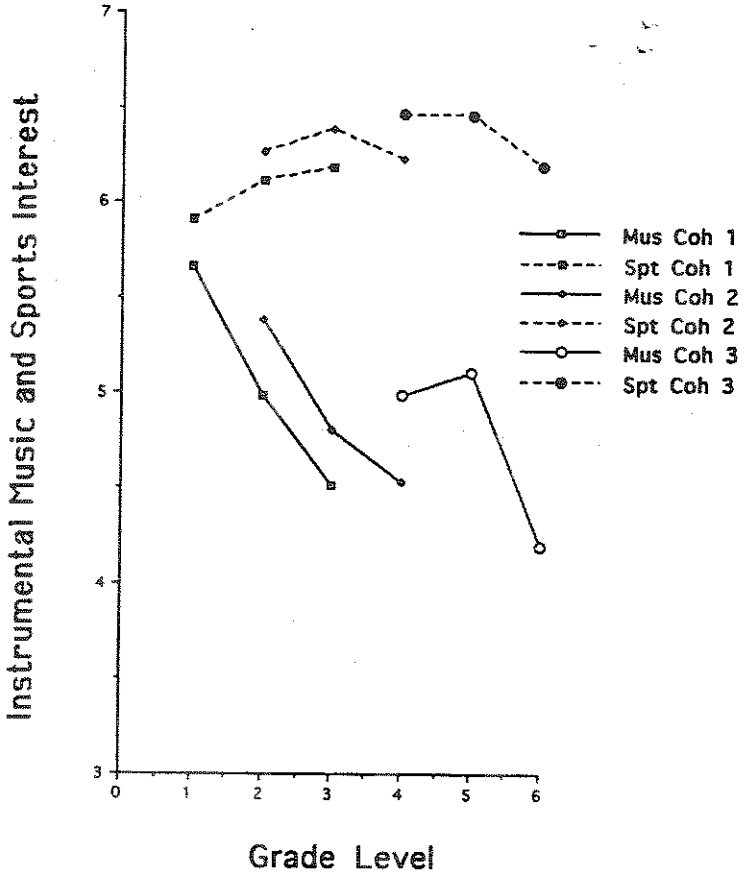

Figure 6. Change in children's interest in instrumental music (Mus) and sports (Spt). Coh = cohort.

one activity in which many elementary school-aged children decide not to engage in or engage in for a short time and then stop. Most children in this country are not exposed to instrumental music until relatively late in elementary school. Thus they form competence beliefs and values for these activities without a lot of experience with them. By the time many children start instrumental music their beliefs and values are declining, and the instructional practices used in American schools may accentuate the decline. In other countries instrumental music is introduced earlier, and different instructional practices are used. These differences in timing and practices may yield different developmental trajectories, but no one has studied this possibility.

The design of this study allowed us to compare change over time versus cohort differences in children's competence beliefs and values. For the most part, the analyses produced similar results. However, more of the longitudinal differences were significant, particularly in children's ratings of the usefulness and importance of the activities. This might have occurred because the cohort main effects involve collapsing across the different grades at each cohort (e.g., Cohort 1 consists of first, second, and third graders; Cohort 2 consists of second, third, and fourth graders), which could underestimate some of the age differences. To assess these patterns further, we performed cross-sectional analyses of age effects at each time of measurement. Results of these analyses overall provided further confirmation that younger children's competence beliefs and ratings of the usefulness–importance of the activities were more positive than older children's ratings. The age differences that occurred for children's interest were less pronounced, as found in the longitudinal analyses.

These results extend those of previous cross-sectional studies of children's competence beliefs and valuing of different activities (e.g., Eccles, 1984; Eccles et al., 1993; Marsh, 1989, 1993; Marsh et al., 1991; Wigfield et al., 1991; see also Eccles, Midgley, & Adler, 1984; Stipek & Mac Iver, 1989), by showing actual change over time in those beliefs. Although cross-sectional studies provide important information about age differences, it is crucial to supplement such analyses with longitudinal analyses, to be able to say clearly that there has been actual change in children's achievement-related beliefs. Further, when combined with results of longitudinal studies of adolescents' competence beliefs and values (e.g., Eccles et al., 1983; Eccles et al., 1989; Wigfield et al., 1991), we now have a relatively complete picture of change in children's competence beliefs and values from first grade through high school. The overall pattern of

Table 4
Stability Correlations in the Different Cohorts

Beliefs and values	Cohort		
	Youngest	Middle	Oldest
Competence beliefs			
Math Yr 1–2	27_a	$43_{a,b}$	51_b
Math Yr 2–3	49_a	41_a	52_a
Rdg Yr 1–2	26_a	36_a	60_b
Rdg Yr 2–3	36_a	$50_{a,b}$	61_b
Music Yr 1–2	34_a	31_a	50_b
Music Yr 2–3	34_a	$48_{a,b}$	59_b
Sports Yr 1–2	50_a	60_a	73_b
Sports Yr 2–3	58_a	$67_{a,b}$	74_b
Usefulness–importance			
Math Yr 1–2	04_a	20_a	26_a
Math Yr 2–3	32_a	34_a	41_a
Rdg Yr 1–2	03_a	13_a	34_b
Rdg Yr 2–3	32_a	35_a	44_a
Music Yr 1–2	—	—	—
Music Yr 2–3	37_a	42_a	60_b
Sports Yr 1–2	15_a	39_b	49_b
Sports Yr 2–3	49_a	51_a	57_a
Interest			
Math Yr 1–2	23_a	$29_{a,b}$	41_b
Math Yr 2–3	33_a	$39_{a,b}$	47_a
Rdg Yr 1–2	18_a	36_a	61_b
Rdg Yr 2–3	26_a	$39_{a,b}$	58_b
Music Yr 1–2	19_a	$23_{a,b}$	35_b
Music Yr 2–3	40_a	44_a	57_a
Sports Yr 1–2	29_a	48_b	$36_{a,b}$
Sports Yr 2–3	42_a	57_b	$49_{a,b}$

Note. Decimals are omitted. Different subscripts in a row indicate correlations are significantly different from one another. Correlations greater than .15 are significant at the .01 level. Yr = year; Rdg = reading.

change is one of decline in both competence beliefs and beliefs about the usefulness and importance of different activities from early in elementary school into middle adolescence. However, the variation across domains, especially in children's interest in the different activities, shows the importance of measuring these constructs at the activity-specific level.

Stability of Children's Competence Beliefs and Subjective Task Values

Before discussing the relational analyses, a comment on the reliabilities of the measures is in order. Our measures of competence beliefs and interest showed good to excellent internal consistency reliabilities at all ages and times of measurement. However, the measure of children's sense of the usefulness and importance of different activities was less reliable among the younger children. This lack of internal consistency may have occurred because young children have a more difficult time determining which activities are useful and important to them (cf. Eccles, Blumenfeld, & Wigfield, 1984; Wigfield, 1994). Although we corrected for attenuation in the relations of younger children's usefulness–importance ratings to other variables, it should be kept in mind that this construct appears to be less well measured in younger than older children.

As predicted by Eccles, Blumenfeld, and Wigfield (1984), children's competence beliefs and values became more stable as they got older, especially when the youngest and older children are compared. Considering first the stabilities for children's competence beliefs, those for the youngest children, especially across first and second grade, were relatively low. Those for the other children are higher and similar in size to those reported by Eccles et al. (1989) in their study of early adolescents. Researchers studying motivation have discussed how during the first- and second-grade years children's understanding of their own performance, ability to compare their performance to that of other children, and integration of the different kinds of evaluative feedback they have received over time all increase dramatically (see Eccles, Midgley, & Adler, 1984; Higgins & Parsons, 1983; Nicholls, 1979, 1990; Parsons & Ruble, 1977; Ruble, 1983; Stipek & Mac Iver, 1989). Such changes

Table 5
Correlations of Children's Competence Beliefs and Achievement Task Values at Each Grade

Beliefs and values	1st		2nd		3rd		4th		5th		6th	
	CB	Use	CB	Use	CB	Use	CB	Use	CB	Use	CB	Use
Math												
Use	10	1	26**	1	38**	1	29**	1	38**	1	34**	1
Interest	23**	22**	39**	36**	46**	41**	50**	41**	55**	47**	52**	48**
Reading												
Use	08	1	46**	1	49**	1	41**	1	47**	1	43**	1
Interest	25**	22**	32**	43**	46**	51**	51**	43**	62**	48**	57**	48**
Music												
Use		1	68**	1	61**	1	68**	1	62**	1	74**	1
Interest	39**		59**	66**	56**	64**	66**	68**	70**	70**	77**	81**
Sports												
Use	35**	1	52**	1	65**	1	61**	1	65**	1	74**	1
Interest	57**	42**	55**	45**	61**	58**	63**	54**	58**	56**	72**	64**

Note. Decimals are omitted. CB = competence beliefs; Use = usefulness–importance.
**$p < .001$.

Table 6
Relations Between Children's Competence Beliefs and Perceived Interest and Parent and Teacher Evaluations of Children's Competence

Beliefs and values	Grade											
	1st		2nd		3rd		4th		5th		6th	
	PR	TR	PR	TR	PR	TR	PR	TR	PR	TR	PR	TR
Math												
Comp.	21*	01	20*	14	35**	27*	50**	37**	52**	34**	54**	50**
Interest	10	03	19	00	25*	02	15	10	32**	15	27**	17
Reading												
Comp.	13	16	27**	14	35**	23*	41**	33**	42**	39**	30**	32**
Interest	02	05	08	10	21	07	16	18	19	10	16	05
Music												
Comp.	11	01	24*	10	26*	08	31*	12	61**	39**	67**	41**
Interest	01	15	21*	10	21*	04	34*	15	58**	10	56*	41**
Sports												
Comp.	28**	26*	28*	16	38**	42**	52**	44**	51**	41**	57**	48**
Interest	20*	15	25*	16	27*	25	39**	29**	39**	36*	44**	35**

Note. Decimals are omitted. PR = parent ratings of child's competence; TR = teacher's rating of child competence; Comp. = Child's Competence Beliefs; Interest = Child's Perceived Interest.
*$p < .01$. **$p < .001$.

mean that children's beliefs should be unstable during this time, and more stable after that, a pattern our results support. Stability in competence beliefs is not necessarily a good thing, especially for children with negative competence beliefs. As these children's beliefs become more stable it will be more difficult to change their negative competence beliefs (see also Burhans & Dweck, 1995).

The stability correlations for children's valuing of the activities also indicated that the older children's valuing of the different activities was more stable than the younger children's subjective task values, even taking account of the lower reliability of the usefulness–importance measure. Further, these stability correlations were somewhat lower than the competence belief stabilities, especially among younger children. Perhaps children's subjective task values are less stable than their competence beliefs because they get less consistent information about the value of various activities from the variety of adults they encounter as they pass through elementary school. Different teachers likely stress the importance of different activities, and may be more interested in some activities than others. These variations likely make it difficult for children to decide which activities are the most important and useful. Variations in teaching style across school years could account for the instability in the children's ratings of how much they enjoy various activity domains. In contrast, children's comparative academic performance is amazingly stable across the elementary school years (Alexander & Entwisle, 1988), and therefore the feedback they get regarding their competencies is likely to be more similar than the information they receive related to task value.

Relations of Children's Competence Beliefs and Subjective Task Values

In support of predictions made by Eccles et al. (1983) and Wigfield (1994), relations between children's competence beliefs and their valuing of different activities all are positive. This finding is counter to Atkinson's (1957) proposal that expectancy-related beliefs and values should be inversely related; that is, tasks valued most highly are those for which the individual has low expectancies for success. The findings of this study, and those of other studies using more real-world achievement tasks (e.g., Battle, 1966; Chapman & Tunmer, 1995; Eccles et al., 1983; Eccles & Wigfield, 1995), show that instead individuals tend to value those tasks on which they can succeed. These findings also correspond to the perspective of James (1892) and Harter (1990), who state that positive relations of competence beliefs for a task and judgments of its importance relate to individual's self-esteem. As Harter discussed, having competence beliefs and values in synchrony is an important developmental outcome (see also Eccles, Blumenfeld, & Wigfield, 1984).

The positive relations between children's competence beliefs and subjective task values were stronger among the older than the youngest children, especially for the first graders compared with the other children. Although the measures of first graders' ratings of the usefulness and importance of the different activities were less reliable than the other measures, even when the correlations were corrected for attenuation the differences remained. For reasons discussed above regarding the stability correlations, it appears to be the second-grade year when competence beliefs and values become more synchronous for many children. An important question for future research is to examine the causal direction in this relation: Do children come to value those tasks at which they believe they are competent, or do their competence beliefs follow their values (see Eccles et al., in press; Wigfield, 1994, for further discussion)? We plan to use structural equation modeling analyses of these relations to assess these issues.

As mentioned earlier, Chapman and Tunmer (1995)

recently examined the relations of 5- to 10-year-old children's reading competence beliefs to their liking of reading, using measures somewhat similar to the ones used in this study. They found that the relations between these two variables were quite high in the 5- and 6-year-olds in their sample, and lower in the 7- to ten-year-olds. The sizes of the correlations for the 7- to 10-year-olds in their study were similar to one another, and relatively similar to the correlations of competence beliefs and interest reported here (with the exception of the 10-year-olds, which were higher in our study). The higher relations of the two variables for the 5- and 6-year-olds in Chapman and Tunmer's study could have occurred because the two constructs may be less clearly distinguished in younger children's minds, making them respond more similarly to their competence and attitude items. But the most important similarity in the results of these two studies is that competence beliefs and interest relate positively to one another.

Relations of Children's Competence Beliefs and Subjective Task Values to Parent and Teacher Ratings

As mentioned earlier, Eccles et al. (1983) stated that children's own competence beliefs and values are influenced by the evaluations of parents and teachers. As predicted by Eccles, Blumenfeld, and Wigfield (1984) and Wigfield (1994), these relations become established during middle childhood. We found that there is an increasing correspondence between children's own beliefs and those of adult evaluators, findings that are similar to those of Nicholls (1979) and Marsh (1993). The age differences are strongest when comparing these relations in the first- and second-grade children with those in the older children. These increasing correlations likely reflect children's integration of the information they receive about their performance, information they receive both from their own performance and from others' evaluations. As was the case in the other relational analyses, the first- and second-grade years seem to be the crucial time in which these relations become established. Children incorporate more systematically parents' and teachers' evaluations into their own self-judgments during these early school years, resulting in higher relations in children's and adult evaluators' beliefs. It is important to note that parents' evaluations are influenced by children's performance and take shape during this time period as well. Interestingly, however, in contrast to children's competence beliefs, parents' and teachers' ratings of children did not decline over time. We will test the causal direction in these relations more formally in subsequent structural equation modeling analyses of these data.

The correlations between mothers' beliefs about children's competence and children's own beliefs were stronger than those between teachers' beliefs and children's beliefs, even in the academic domains. These results are similar to those of Marsh and Craven (1991), and extend their findings to the younger children included in the present study. These results also are similar to findings from studies of adolescents that parents' expectations for children are stronger predictors of children's own competence beliefs than are the grades given them by teachers (Jacobs & Eccles, 1992; Parsons et al., 1982). Thus even though children spend a great deal of time with their elementary school teacher, relations of children's competence beliefs remain more closely tied to their mothers' beliefs about them.

The correlations of mothers' and teachers' judgments of children's competence to children's interest in the different activities were lower than the same correlations to children's competence beliefs, but the correlations were still significant in most cases, particularly in the sports and music areas. Understanding the determinants of children's subjective task values (beyond parents' and teachers' evaluations of children) remains an important priority for future work (see Eccles, 1984, 1993; Eccles et al., 1983; Eccles & Harold, 1991, for further discussion). Finally, the fact that the relations of children's competence beliefs and task values to teachers' and parents' evaluations occurred in all four domains studied (and indeed sometimes are stronger in sports and music than the two academic domains) suggests the linkages specified in the model occur in domains beyond the math and English–reading domains initially discussed by Eccles et al. (1983).

Gender Differences in Children's Competence Beliefs and Subjective Task Values

As has been found in other work (e.g., Eccles et al., 1993; Marsh, 1989), boys' and girls' competence beliefs and valuing of the activities differed in gender-role stereotypic ways. Boys' competence beliefs were higher than girls' for math and sports; girls' competence beliefs were higher than boys' for reading and instrumental music. Comparable gender differences occurred for children's ratings of the usefulness–importance and interest in the activities, with one notable exception: Boys and girls did not differ in how much they value math.

A unique aspect of this study was the assessment of whether gender differences in children's beliefs and values change over time. We predicted that early in elementary school boys and girls would have similarly positive competence beliefs for, and valuing of, most activities, and that gender differences would emerge as children have more experience with different activities in elementary school. Contrary to this prediction, there were very few interactions of gender with either cohort or time of measurement. In their cross-sectional studies, Eccles et al. (1993) and Marsh (1989) also reported few Gender × Age interactions in children's self-concepts in different domains. Taken together, these findings are an indication of the continuing strong and early role of gender-role stereotypes on observed gender differences. Even before they have much experience with different activities in more formal evaluative settings such as school, boys' and girls' competence beliefs and subjective task values differ. The fairly large effect sizes (especially in the three-way analyses) further underscore the significance of many of these gender differences (see Eccles, Jacobs, & Harold, 1990, for further discussion).

In summary, we found that children's competence beliefs and subjective values generally decline over the middle

childhood years, particularly children's competence beliefs and ratings of the usefulness–importance of different activities. Children's competence beliefs and values become more stable, relate positively to one another, and relate more closely to parent and teacher evaluations of competence. We also found gender differences in children's beliefs and values, starting with first-grade children. In future work, we will explore the links of children's competence beliefs and subjective values to their performance in different activity areas, and choices of which tasks to pursue.

References

Alexander, K. L., & Entwisle, D. R. (1988). Achievement in the first two years of school: Patterns and processes. *Monographs of the Society for Research in Child Development, 53*(2, Serial No. 218). Chicago: University of Chicago Press.

Atkinson, J. W. (1957). Motivational determinants of risk-taking behavior. *Psychological Review, 64,* 359–372.

Baltes, P. B., & Nesselroade, J. R. (Eds.). (1979). *Longitudinal research in the study of behavior and development.* New York: Academic Press.

Bandura, A. (1994). *Self-efficacy: The exercise of control.* New York: W. H. Freeman.

Battle, E. (1966). Motivational determinants of academic competence. *Journal of Personality and Social Psychology, 4,* 534–542.

Burhans, K. K., & Dweck, C. S. (1995). Helplessness in early childhood: The role of contingent worth. *Child Development, 66,* 1719–1738.

Chapman, J. W., & Tunmer, W. E. (1995). Development of young children's reading self-concepts: An examination of emerging subcomponents and their relationship with reading achievement. *Journal of Educational Psychology, 87,* 154–167.

Covington, M. V. (1984). The motive for self-worth. In R. Ames & C. Ames (Eds.), *Research on motivation in education* (Vol. 1, pp. 77–113). New York: Academic Press.

Eccles, J. S. (1984). Sex differences in achievement patterns. In T. Sonderegger & R. A. Dienstbier (Eds.), *Nebraska Symposium on Motivation, 1984: Psychology and gender* (Vol. 32, pp. 97–132). Lincoln: University of Nebraska Press.

Eccles, J. S. (1993). School and family effects on the ontogeny of children's interests, self-perceptions, and activity choices. In J. E. Jacobs (Ed.), *Nebraska Symposium on Motivation, 1992: Developmental perspectives on motivation* (Vol. 40, pp. 97–132). Lincoln: University of Nebraska Press.

Eccles, J. S., Adler, T. F., Futterman, R., Goff, S. B., Kaczala, C. M., Meece, J., & Midgley, C. (1983). Expectancies, values and academic behaviors. In J. T. Spence (Ed.), *Achievement and achievement motives* (pp. 75–146). San Francisco: Freeman.

Eccles, J. S., Adler, T., & Meece, J. L. (1984). Sex differences in achievement: A test of alternate theories. *Journal of Personality and Social Psychology, 46,* 26–43.

Eccles, J. S., Blumenfeld, P. B., & Wigfield, A. (1984). *Ontogeny of self- and task beliefs and activity choice.* Funded grant application to the National Institute for Child Health and Human Development (Grant RO1-HD17553).

Eccles, J. S., & Harold, R. D. (1991). Gender differences in sport involvement: Applying the Eccles' expectancy-value model. *Journal of Applied Sport Psychology, 3,* 7–35.

Eccles, J. S., Jacobs, J. E., & Harold, R. D. (1990). Gender-role stereotypes, expectancy effects, and parents' role in the socialization of gender differences in self-perceptions and skill acquisition. *Journal of Social Issues, 46,* 182–201.

Eccles, J. S., Midgley, C., & Adler, T. F. (1984). Grade-related changes in school environment: Effects on achievement motivation. In J. G. Nicholls (Ed.), *The development of achievement motivation* (pp. 285–331). Greenwich, CT: JAI Press.

Eccles, J. S., & Wigfield, A. (1995). In the mind of the actor: The structure of adolescents' achievement task values and expectancy-related beliefs. *Personality and Social Psychology Bulletin, 21,* 215–225.

Eccles, J. S., Wigfield, A., Flanagan, C., Miller, C., Reuman, D., & Yee, D. (1989). Self-concepts, domain values, and self-esteem: Relations and changes at early adolescence. *Journal of Personality, 57,* 283–310.

Eccles, J. S., Wigfield, A., Harold, R., & Blumenfeld, P. (1993). Age and gender differences in children's achievement self-perceptions during the elementary school years. *Child Development.*

Eccles, J. S., Wigfield, A., & Schiefele, U. (in press). Motivation to succeed. In W. Damon (Series Ed.) and N. Eisenberg (Ed.), *Handbook of child psychology* (5th ed., Vol. 3): *Social, emotional, and personality development.* New York: Wiley.

Feather, N. T. (1988). Values, valences, and course enrollment: Testing the role of personal values within an expectancy-valence framework. *Journal of Educational Psychology, 80,* 381–391.

Harter, S. (1982). The Perceived Competence Scale for Children. *Child Development, 53,* 87–97.

Harter, S. (1990). Causes, correlates and the functional role of self-worth: A life-span perspective. In R. J. Sternberg & J. Kolligian (Eds.), *Competence considered* (pp. 67–97). New Haven, CT: Yale University Press.

Higgins, E. T., & Parsons, J. E. (1983). Social cognition and the social life of the child: Stages as subcultures. In E. T. Higgins, D. W. Ruble, & W. W. Hartup (Eds.), *Social cognition and social behavior: Developmental issues.* New York: Cambridge University Press.

Huston, A. (1983). Sex typing. In P. H. Mussen (Ed.), *Handbook of child psychology* (Vol. 4, pp. 387–467). New York: Wiley.

Jacobs, J. E., & Eccles, J. S. (1992). The influence of parent stereotypes on parent and child ability beliefs in these domains. *Journal of Personality and Social Psychology, 63,* 932–944.

James, W. (1892). *Psychology: The briefer course.* New York: Holt, Rinehart & Winston.

Kirk, R. E. (1968). *Experimental design: Procedures for the behavioral sciences.* Belmont, CA: Brooks/Cole.

Marsh, H. W. (1989). Age and sex effects in multiple dimensions of self-concept: Preadolescence to early adulthood. *Journal of Educational Psychology, 81,* 417–430.

Marsh, H. W. (1993). Physical fitness self-concept: Relations of physical fitness to field and technical indicators for boys and girls aged 9–15. *Journal of Sport and Exercise Psychology, 15,* 184–206.

Marsh, H. W., & Craven, R. G. (1991). Self–other agreement on multiple dimensions of preadolescent self-concept: Inferences by teachers, mothers, and fathers. *Journal of Educational Psychology, 83,* 393–404.

Marsh, H. W., Craven, R. G., & Debus, R. (1991). Self-concepts of young children 5 to 8 years of age: Measurement and multidimensional structure. *Journal of Educational Psychology, 83,* 377–392.

Meece, J. L., Wigfield, A., & Eccles, J. S. (1990). Predictors of math anxiety and its influence on young adolescents' course enrollment intentions and performance in mathematics. *Journal of Educational Psychology, 82,* 60–70.

Menard, S. (1991). *Longitudinal research.* Newbury Park, CA: Sage.

Nicholls, J. G. (1979). Development of perception of own attainment and causal attributions for success and failure in reading. *Journal of Educational Psychology, 71,* 94–99.

Nicholls, J. G. (1984). Achievement motivation: Conceptions of ability, subjective experience, task choice, and performance. *Psychological Review, 91,* 328–346.

Nicholls, J. G. (1990). What is ability and why are we mindful of it? A developmental perspective. In R. J. Sternberg & J. Kolligian (Eds.), *Competence considered* (pp. 11–40). New Haven, CT: Yale University Press.

Nicholls, J. G., & Miller, A. T. (1984). The differentiation of the concepts of difficulty and ability. *Child Development, 54,* 951–959.

Parsons, J. E., Adler, T., & Kaczala, C. (1982). Socialization of achievement attitudes and beliefs: Parental influences. *Child Development, 53,* 310–321.

Parsons, J. E., & Ruble, D. N. (1977). The development of achievement-related expectancies. *Child Development, 48,* 1075–1079.

Ruble, D. (1983). The development of social comparison processes and their role in achievement-related self-socialization. In E. T. Higgins, D. N. Ruble, & W. W. Hartup (Eds.), *Social cognition and social development: A sociocultural perspective* (pp. 134–157). New York: Cambridge University Press.

Ruble, D., & Martin, C. L. (in press). Gender. In W. Damon (Ed.), *Handbook of child psychology* (5th ed., Vol. 3). New York: Wiley.

Schunk, D. H. (1991). Self-efficacy and academic motivation. *Educational Psychologist, 26,* 207–232.

Stipek, D. J., & Mac Iver, D. (1989). Developmental change in children's assessment of intellectual competence. *Child Development, 60,* 521–538.

Wigfield, A. (1994). Expectancy-value theory of achievement motivation: A developmental perspective. *Educational Psychology Review, 6,* 49–78.

Wigfield, A., & Eccles, J. S. (1992). The development of achievement task values: A theoretical analysis. *Developmental Review, 12,* 265–310.

Wigfield, A., Eccles, J., Mac Iver, D., Reuman, D., & Midgley, C. (1991). Transitions at early adolescence: Changes in children's domain-specific self-perceptions and general self-esteem across the transition to junior high school. *Developmental Psychology, 27,* 552–565.