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DEVELOPMENT DURING EARLY AND MIDDLE ADOLESCENCE

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In this chapter we discuss development during the early and middle adolescent years (approximately ages 10 to 20), updating the chapter on this topic from the first edition of this *Handbook* (Wigfield, Eccles, & Pintrich, 1996).² The adolescent time period is one in which individuals experience many changes, including the biological changes associated with puberty, cognitive changes, and numerous changes in social relations. In addition, adolescents make many major life transitions, from elementary to middle school, middle school to high school, and high school to college or the work force. Many early adolescents deal with these changes well. However, as discussed in the previous edition of this *Handbook* and elsewhere, the early adolescent years mark the beginning for some individuals of a downward spiral in achievement and motivation that can lead to academic disengagement, failure and school dropout, and sometimes delinquency and other serious social problems (Eccles, 2004; Eccles et al., 1993; Lerner & Steinberg, 2004; NRC, 2004; Wigfield & Eccles, 2002a). As a result a substantial portion of America's adolescents are not succeeding as

well as might be hoped for. Depending on ethnic group, between 15 and 50 percent drop out of school before completing high school; adolescents as a group have the highest arrest rate of any age group; and increasing numbers of adolescents consume alcohol and other drugs on regular basis (NRC, 2004). Thus this developmental period clearly is a turning point for many of our youth.

Because this *Handbook* is for the educational psychology audience, we focus primarily on changes in adolescents' cognition and motivation, and how these changes influence adolescents' achievement. We also consider briefly the important biological changes that occur at adolescence. We take an interactionist approach in this chapter, as we believe adolescent development reflects changes within the individual, as well as changes in the environments and relationships adolescents experience (Bronfenbrenner & Morris, 1998). Thus we discuss changes in the major contexts and relationships in adolescents' lives, including the peer group, the family, and school. Within many of the sections we discuss gender and ethnic differences in the psychological

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²We dedicate this chapter to Paul R. Pintrich, who coauthored with Wigfield and Eccles the chapter on adolescent development for the first edition of this *Handbook*. Paul passed away on July 12, 2003.

constructs and contexts discussed. It is important to acknowledge at the outset that adolescence is very much a cultural phenomenon, and the experiences adolescents have vary greatly across different cultures. We focus in this chapter primarily on adolescent development in the United States.

BIOLOGICAL, COGNITIVE, AND MOTIVATIONAL CHANGES DURING ADOLESCENCE

Biological Changes During Adolescence

The biological changes associated with puberty are among the most dramatic ones that individuals experience during their lifetimes. In part because of these dramatic biological changes, different theorists portrayed the early adolescent period as a period of "storm and stress," where there is a great deal of conflict between children, parents, and teachers (e.g., Blos, 1979; Hall, 1904). Although major physical changes occur during early adolescence, many researchers now believe that the characterization of this time period as one of storm and stress is an overstatement (see for example Arnett, 1999; Dornbusch, Petersen, & Hetherington, 1991). Whether or not adolescents are in crisis, the biological changes they go through do have many influences on their thinking and behavior (Arnett, 1999; Buchanan, Eccles, & Becker, 1992).

A complete review of the biological changes that occur during puberty is beyond the scope of this chapter (see Buchanan et al., 1992; Graber, Petersen, & Brooks-Gunn, 1996; Susman & Rogol, 2004). Briefly, during early adolescence children undergo a growth spurt and develop secondary sex characteristics, as a result of the activation of the hormones controlling these physical developments. The processes by which the hormones become activated are still not well understood, but their effects are quite clear. Most researchers think the effects of hormones on behavior are mediated through psychological processes and also are influenced by the contexts adolescents are in, rather than having direct effects on behavior (Buchanan et al., 1992; Susman & Rogol, 2004).

Two issues with respect to pubertal development are particularly germane to children's development in school. First, puberty is occurring earlier for many children in this country, beginning as early as age 8 for some girls, particularly African-American girls (Herman-Giddens, Slora, Wasserman, Bourdony, Bhapkor, & Koch, 1997). Relations between children and teachers, and among children themselves, change as children enter puberty, and this is happening earlier. Second, the timing of puberty is quite different for girls and boys. Girls enter puberty approximately 18 months before boys do, which means

that during early adolescence girls and boys of the same chronological age are at quite different points in their physical development, a fact that is readily apparent to anyone observing in middle grade classrooms. There now is a large literature on the effects of early versus late maturity for boys and girls. There is some evidence that early maturity is advantageous for boys, particularly with respect to their participation in sports activities and social standing in school (Malina, 1990; Petersen, 1985), although the findings for boys are not always consistent and change over time. For instance, Ge et al. (2003) reported that fifth-grade early-maturing boys report more depressive symptoms than do later maturing or on time boys, but by seventh grade this no longer is the case. For girls the evidence is more consistent and shows that early maturity is especially problematic. Early-maturing girls are the first to experience pubertal changes and so can feel out of sync with their age mates, thus experiencing greater depression and other adjustment issues (e.g., Angold, Costello, & Worthman, 1998; Ge, Conger, & Elder, 2001; Ge et al., 2003). The challenges for early-maturing girls continue over time, particularly if they face other life stressors (Ge et al., 2001). Further, Simmons and her colleagues reported that early-maturing girls have the most difficulty adjusting to school transitions, particularly the transition from elementary to junior high school (Simmons & Blyth, 1987; Simmons, Blyth, VanCleave, & Bush, 1979).

One important educational implication of the work on pubertal changes and their effects concerns the issue of timing for the transition from elementary to secondary school. Many researchers and educational policy analysts urged that middle school should begin earlier, so that students make the school transition before they enter puberty. The concern is that dealing both with puberty and school changes make both transitions more complex (Wigfield & Eccles, 2002a; Wigfield et al., 1996). Many school districts have followed this advice. Middle school now often encompasses sixth through eighth grade, rather than seventh through ninth grade. Others have argued that a K-8 organizational structure may be most beneficial to early adolescents. The issue of timing this transition is complicated by the fact that boys and girls go through puberty at different times, making it very difficult to time the school transition to avoid the pubertal transition for one gender group or the other.

Another important area of research on biological development, and one that has grown markedly since the publication of the first edition of this *Handbook*, is research on brain development during adolescence (Byrnes, 2001b and Keating, 2004, provide reviews of this work). Imaging techniques such as fMRI (functional magnetic resonance imaging) allow researchers to study brain functioning and

development, and they have found that the brain indeed does change in important ways during adolescence. The changes include a reorganization of synaptic connections, and changes in the levels of different neurotransmitters in the areas of the brain that control emotional functioning. The first of these changes may relate to more efficient information processing, and the second to greater emotional activity. The prefrontal cortex (which controls executive functioning) becomes fully mature during late adolescence (Keating, 2004), which could relate to the changes in cognition that occur at adolescence (we describe these changes in the next section). Researchers are beginning to connect changes in brain structure and functioning to cognition and behavior, with decision-making being one area of particular interest (Byrnes, 1998; Keating, 2004). The specific ways in which brain structure relates to cognition and behavior remain elusive at this point (Byrnes, 2001b), although research over the next 10 years likely will enhance greatly our understanding of the relations of brain structure and function to adolescents' cognition and behavior.

These physical changes are not the only changes early adolescents face. They also undergo school transitions and important cognitive and social changes as well, as we will discuss. Researchers adopting a "cumulative effects" model argue that it is the combination of changes occurring at early adolescence that can be problematic for some early adolescents (e.g., Sameroff, Gutman, & Peck, 2003; Simmons, Burgeson, Carleton-Ford, & Blyth, 1987). Biological changes, school transitions, social changes such as dating, and possibly family changes all can occur at this time; if several of those changes are negative, children can be at risk for developmental problems such as lowered self-esteem, depression, and early sexual activity. Again, because girls enter puberty earlier than boys do, they are more likely than boys to be coping with pubertal changes at the same time they make the middle grade school transition, and thus are more likely to face multiple transitions simultaneously.

Changes in Cognition and Achievement During Adolescence

Important cognitive changes during this period of life include the increasing ability to think abstractly, consider the hypothetical as well as the real, engage in more sophisticated and elaborate information processing strategies, consider multiple dimensions of a problem at once, and reflect on oneself and on complicated problems (see Byrnes, 1988; Keating, 2004; Moshman, 1998). Historically, these developments were attributed to the emergence of formal operational thinking as defined by Piaget

(e.g., Piaget & Inhelder, 1973). Whereas it is clearly the case that older adolescents and adults are more likely to demonstrate such higher order cognitive processes than younger adolescents and children, the evidence as a whole fails to support the strong form of the Piagetian account (i.e., that children younger than 11 are incapable of abstract thinking, that most children older than 11 are capable of it, and there are global, domain-general increases in performance). In addition, a further problem is that adolescents are also more likely to demonstrate other kinds of skills and tendencies as well, and these skills and tendencies are not captured by the original model of formal operations proposed by Piaget. For a growing number of scholars, the key shift that occurs in adolescence is not so much the emergence of an abstract logical ability as much as the capacity to organize, coordinate, and reflect on formal operational constructs and other abilities and tendencies (Keating, 2004; Moshman, 1998). This executive function aspect of cognition is thought to be subtended by a neural network that involves the frontal lobes and important subcortical structures related to emotional processing and inter-hemispheric communication.

Enhancement of the executive function aspect of cognition clearly affects learning and problem solving skills in adolescents, along with other aspects of adolescent psychology such as adolescents' self-concepts, thoughts about their future, and understanding of others, which we discuss later. In this section, we consider answers to the following questions with respect to cognitive development during adolescence: Are there age changes in the structural and functional aspects of cognition, and do these age-related trajectories in cognitive skills differ across gender and ethnic groups? We consider such issues briefly (see Byrnes, 2001a, 2001b, and Bjorklund, 1999, for fuller discussion).

Changes in Structural Aspects. Structural aspects of cognition include the knowledge possessed by an individual, as well as the information-processing capacity of that individual. Structuralist researchers often focus on the following two questions: (a) what changes occur in children's knowledge as they progress through the adolescent period? and (b) what changes occur in the information processing capacities of adolescents? In what follows, we provide answers to these questions in turn.

The term *knowledge* refers to three kinds of information structures that are stored in long-term memory: declarative knowledge (i.e., "knowing that"), procedural knowledge ("knowing how"), and conceptual knowledge. The third kind of knowledge, *conceptual knowledge*, is the representation of adolescents' understanding of their declarative and procedural knowledge. Byrnes (2001a, 200b) describes conceptual

knowledge as "knowing why" (e.g., knowing why one should use the least common denominator method to add fractions), and as knowledge that reflects insight into abstract commonalities and principles.

Various sources in the literature suggest that these three forms of knowledge increase with age during the adolescent period (Byrnes, 2001a). The clearest evidence of such changes can be found in the National Assessments of Educational Progress (NAEPs) conducted by the U.S. Department of Education every few years. NAEPs measure the declarative, procedural, and conceptual knowledge of 4th, 8th, and 12th graders ($N > 17,000$) in seven domains: reading, writing, mathematics, science, history, geography, and civics. In mathematics, for example, NAEP results show that children progress from knowing arithmetic facts and being able to solve simple word problems in Grade 4 to being able to perform algebraic manipulations, create tables, and reason about geometric shapes by Grade 12 (Reese, Miller, Mazzeo, & Dossey, 1997). Although similar gains are evident for each of the other six domains (Beatty, Reese, Perksy, & Carr, 1996), in no case can it be said that a majority of 12th graders demonstrate a deep conceptual understanding in any of the domains assessed (Byrnes, 2001a, 2001b). One reason for the low level of conceptual understanding in 12th graders is the abstract, multidimensional, and counterintuitive nature of the most advanced questions in each domain. Even in the best of circumstances, concepts such as *scarcity*, *civil rights*, *diffusion*, *limit*, and *conservation of energy* are difficult to grasp and illustrate. Moreover, the scientific definitions of such concepts are often counter to students' preexisting ideas. As a result, there are numerous studies showing misconceptions and faulty information possessed by adolescents and adults (see Byrnes 2001a, 2001b).

In sum, then, one can summarize the results on knowledge as follows:

- In most school-related subject areas, there are modest, monotonic increases in declarative, procedural, and conceptual knowledge between the 4th grade and college years.
- Misconceptions abound in most school subjects and are evident even in 12th graders and college students.
- The most appropriate answer to the question "Does knowledge increase during adolescence?" is the following: It depends on the domain (e.g., mathematics versus interpersonal relationships) and type of knowledge (e.g., declarative vs. conceptual).
- Although there is little evidence of dramatic and across-domain increases in understanding (as Piaget proposed), there is consistent evidence of within-domain, incremental increases in understanding as children move into and through adolescence. To abandon their

misconceptions, children sometimes need to experience within-domain qualitative shifts in their thinking as well.

Do these kinds of changes in knowledge influence behavior? For example, do older adolescents make better life decisions because they know more? Are they better employees? Parents? College students? Life-long learners? Do they solve problems better in their coursework or personal lives? At some level, the answer to these questions has to be yes. Certainly expanded domain-specific knowledge makes it easier to solve problems and perform complex tasks in activities very closely linked to the same knowledge domain (e.g., Ericsson, 1996). But does expanded knowledge on its own increase the wisdom of more general life decisions? The answer to this question is less clear because such decisions depend on many other aspects of cognitive as well as motivational and emotional processes that influence the likelihood of accessing and effectively using one's stored knowledge. For example, younger adolescents may have the knowledge needed to make decisions or solve problems (on achievement tests or in social situations), but they may lack the processing space needed to consider and combine multiple pieces of information. We turn to these other aspects of cognition next.

Processing space or capacity is analogous to RAM memory on a computer. A very good software package may not be able to work properly if the RAM memory on a PC is too small. One key index of processing capacity in humans is *working memory*—the ability to temporarily hold something in memory (e.g., a phone number). Not too long ago, it was assumed that working memory capacity changes very little after childhood. Several recent studies, however, suggest that this assumption is wrong. For example, Zald and Iacono (1998) charted the development of spatial working memory in 14- and 20-year-olds by asking them to remember the location of objects that were presented briefly on a computer screen and then removed. Zald and Iacono found that the introduction of delays and various forms of cognitive interference produced sharper drops in the performance of the younger than the older participants. Similarly, Swanson (1999) found monotonic increases in both verbal and spatial working memory between the ages of 6 and 35 in a large normative sample. Such increases should make it easier for older adolescents and adults to solve complex problems in school and also consider multiple pieces of information simultaneously when making important decisions.

Changes in Functional Aspects of Cognition. Functional aspects of cognition include any mental processes that alter, operate on, or extend incoming or existing information. Examples include learning (getting new information

into memory), retrieval (getting information out of memory), reasoning (drawing inferences from single or multiple items of information), and decision making (generating, evaluating, and selecting courses of action). As noted earlier, both structural and functional aspects of cognition are critical to all aspects of learning, decision-making, and cognitive activities. For example, experts in a particular domain learn new, domain-relevant items of information better than novices. Also, people are more likely to make appropriate inferences and make good decisions when they have relevant knowledge than when they do not have relevant knowledge (Byrnes, 1998; Ericsson, 1996). With this connection in mind, we can consider the findings sampled from three core areas of research to get a sense of age changes in functional aspects: (a) deductive reasoning, (b) decision-making, and (c) other forms of reasoning.

People engage in deductive reasoning whenever they combine premises and derive a logically sound conclusion from these premises (Ward & Overton, 1990). Adolescents are likely to engage in deductive reasoning as they try to make sense of what is going on in a context and what they are allowed to do in that context. Moreover, deductive reasoning is used when they write argumentative essays, test hypotheses, set up algebra and geometry proofs, and engage in debates and other intellectual discussions. It is also critical to decision making and problem solving of all kinds.

Although the issue of age differences in deduction skills is somewhat controversial, most researchers believe that there are identifiable developmental increases in deductive reasoning skills that occur between childhood and early adulthood. Competence is first manifested around age 5 or 6 in the ability to draw some types of conclusions from "if-then" (conditional) premises, especially when these premises refer to fantasy or make-believe content (e.g., Dias & Harris, 1988). Several years later, children begin to understand the difference between conclusions that follow from conditional premises and conclusions that do not (Byrnes & Overton, 1986; Grotto, Gilly, Blaye, & Light, 1989; Haars & Mason, 1986; Janveau-Brennan & Markovits, 1999), especially when the premises refer to familiar content about taxonomic or causal relations. Next, there are monotonic increases during adolescence in the ability to draw appropriate conclusions, explain one's reasoning, and test hypotheses even when premises refer to unfamiliar, abstract, or contrary-to-fact propositions (Klaczynski, 1993; Markovits & Vachon, 1990; Moshman & Franks, 1986; Ward & Overton, 1990). But again, performance is maximized on familiar content about legal or causal relations (Klaczynski & Narasimham, 1998). However, when the experimental content runs contrary to what is true (e.g., All elephants are small animals. This is an elephant. Is it small?) or has

no meaningful referent (e.g., If there is a D on one side of a card, there is a 7 on the other), less than half of older adolescents or adults do well.

Performance on the latter tasks, however, can be improved in older participants if the abstract problems are presented after exposure to similar but more meaningful problems or if the logic of the task is adequately explained (Klaczynski, 1993; Markovits & Vachon, 1990; Ward, Byrnes, & Overton, 1990). Even so, such interventions generally have only a weak effect. These findings imply that most of the development after age 10 in deductive reasoning competence is in the ability to suspend one's own beliefs and think objectively about the structure of an argument (e.g., "Let's assume for the moment that this implausible argument is true..."; Moshman, 1998) and the ability to retrieve appropriate information from memory while reasoning (Markovits & Barrouillet, 2002). Little evidence exists for an abstract, domain-general ability that is spontaneously applied to new and different content.

Turning next to decision making, surprisingly few studies have been conducted to determine whether there are age changes during adolescence. Nevertheless, these findings suggest that there may be age changes in the following aspects of decision making: (a) the ability to understand the difference between options likely to satisfy multiple goals and options likely to satisfy only a single goal (Byrnes & McClenny, 1994; Byrnes, Miller, & Reynolds, 1999), (b) the tendency to anticipate a wide range of consequences of their actions (Halpern-Felsher & Cauffman, 2001; Lewis, 1981), and (c) the ability to learn from their decision-making successes and failures with age (Byrnes & McClenny, 1994; Byrnes, Miller, & Reynolds, 1999). There is also some suggestion that adolescents are more likely to make good decisions when they have metacognitive insight into the factors that affect the quality of decision-making (Miller & Byrnes, 2001; Ormond, Luszcz, Mann, & Beswick, 1991). However, additional studies are needed to verify these initial findings.

In contrast to the dearth of studies on decision making in adolescents, there are quite a number of developmental studies in a related area of research: risk taking (Byrnes, 1998). If a decision involves options that could lead to negative or harmful consequences (i.e., anything ranging from mild embarrassment to serious injury or death), adolescents who pursue such options are said to have engaged in risk-taking (Byrnes, Miller, & Schafer, 1999). Although all kinds of risk taking are of interest from scientific standpoint, most studies have focused on age changes in physically harmful behaviors such as smoking, drinking, and unprotected sex. Regrettably, these studies reveal the opposite of what one would expect if decision skills were improving during adolescence: that is, these studies show that older adolescents are more likely to

engage in these behaviors than younger adolescents or preadolescents (DiClemente, Hansen, & Ponton, 1995). Repeatedly, studies have shown that those who take such risks do not differ in their knowledge of possible negative consequences. Given that risk takers and risk avoiders do not differ in their knowledge of options and consequences, it is likely that the difference lies in other aspects of competent decision making (e.g., self-regulatory strategies; ability to coordinate health-promoting and social goals; the ability to regulate emotions) or in the fact that opportunities to take risks usually increase throughout the adolescent period. These hypotheses remain to be tested.

In addition to finding age-related increases in deductive reasoning and decision-making skills, researchers have also found increases in mathematical reasoning ability, certain kinds of memory-related processes, the ability to perform spatial reasoning tasks quickly, and certain aspects of scientific reasoning (Byrnes, 2001a). The variables that seem to affect the size of age increases in these areas include (a) whether students have to learn information during the experiment or retrieve something known already, and (b) the length of the delay between stimulus presentation and being asked to retrieve information. In the case of scientific reasoning, the ability to consciously construct one's own hypotheses across a wide range of contents, test these hypotheses in controlled experiments, and draw appropriate inferences from evidence also increases (e.g., Klaczynski & Narasimham, 1998; Kuhn, Garcia-Mila, Zohar, & Andersen, 1995).

Summary. The literature suggests that there are changes in the intellectual competencies of children as they progress through the adolescent period. However, there are many ways in which the thinking of young adolescents is similar to that of older adolescents and adults. Thus, before one can predict whether an age difference will manifest itself on any particular measure of intellectual competence or achievement, one needs to ask questions such as: "Does exposure to the content of the task (e.g., mathematics) continue through adolescence?", "How many issues have to be held in mind and considered simultaneously?", "Are the ideas consistent with naive conceptions?", and "Does success on the task require one to suspend one's beliefs?" If the answers to these questions are "No," then younger adolescents, older adolescents and adults should all perform about the same. However, if one or more "Yes" answers are given, then one would expect older adolescents and adults to demonstrate more intellectual competence than younger adolescents. Educators can use such questions as guides when they design curricula appropriate for younger and older adolescents.

Group Differences in Achievement

Given that gender and ethnic differences are considered in other chapters in this *Handbook* we provide only a thumbnail sketch here (see Byrnes, 2001a, 2001b, for a more complete summary). With respect to gender differences, male and female adolescents perform comparably on measures of mathematics, science, and social studies knowledge (e.g., NAEPs) and also obtain nearly identical scores on measures of intelligence, deductive reasoning, decision making, and working memory. Three areas in which gender differences have been found to occur are risk taking, SAT-math performance, and performance on standardized tests of writing skill (e.g., NAEP). With regard to risk taking, the pattern of gender differences is mixed. Whereas males are more likely than females to take such risks as driving recklessly or taking intellectual risks on standardized exams, females are more likely than males to take such health risks as smoking. The size of such gender differences, however, varies by age (Byrnes, Miller, & Schoefer, 1999). These findings seem to reflect differences in males' and females' expectations, values, and self-regulatory tendencies. For example, females might believe that accidents are more likely than males and would therefore drive more carefully. The former may be more likely to regulate their impatience and anger in traffic situations as well.

With regard to gender differences on the SAT math test, the average score for males is routinely found to be higher than that for females (De Lisi & McGillicuddy-De Lisi, 2002). It is still not clear why this difference obtains, given the fact that gender differences are typically not found on measures of math knowledge, the NAEP for math, or other kinds of reasoning. Researchers have shown, however, that part of this difference reflects gender differences in test-taking strategies, confidence in one's math ability, ability and motivation to use unconventional problem-solution strategies, mental rotation skills, and anxiety about one's math ability particularly when one's gender is made salient (see De Lisi & McGillicuddy-De Lisi, 2002, for review).

In the case of standardized writing assessments, females perform substantially better than males in both elementary school and high school. Thus, there is something unique about mathematics problem solving that contributes to the emergence of gender differences only during adolescence. As was the case for math, however, the reasons for the gender difference in writing are not entirely clear, but there is reason to suspect factors such as different levels of interest in writing and different levels of practice (Byrnes, 2001a).

With respect to ethnic differences, European-American and Asian-American students perform substantially better than African-American, Hispanic, and Native

American students on standardized achievement tests, the SAT, and most of the NAEP tests. In contrast, no ethnic differences are found in studies of deductive reasoning, decision making, or working memory. Moreover, ethnic differences on tests such as the SAT and NAEP are considerably reduced once variables such as parent education and prior course work are controlled (Byrnes, 2001a).

Changes in Motivation During Adolescence

Research on motivation has continued to flourish since the first edition of this *Handbook* was published. Much of this research has focused on children's and adolescents' beliefs, values, and goals as the major determinants of motivation (Eccles & Wigfield, 2002; Pintrich & Schunk, 2002; Wigfield, Eccles, Schiefele, Roeser, & Davis-Kean, in press; the separate motivation chapters in this volume provide extended review of this literature). We focus here on the development of adolescents' competence-related beliefs, valuing of achievement, intrinsic and extrinsic motivation, and achievement goals, as these have been prominent in the recent research on motivation.

Adolescence is a time in which these motivational beliefs, values, and goals change in important ways. It is also a time in which many more choices and options become available to adolescents, which means that their motivational beliefs and values for different activities could have more substantial effects on their behavior. During the early school years and even in middle school, students have little choice about which subjects to take. So, even if they believe they lack competence for a particular subject and do not like it much, they still have to take it. During high school students begin to make choices about which courses to take and whether to continue taking classes in areas such as mathematics and science. The interplay of cognitive and motivational processes in this decision making is an area that needs more investigation.

Change in Competence and Efficacy Beliefs.

Competence-related beliefs (including self-efficacy) are individuals' beliefs about their ability to accomplish different activities, and how much they believe they control what happens to them. There are theoretical and methodological discussions about how similar or different constructs are such as competence beliefs, expectancies, for success, and self-efficacy beliefs (Bandura, 1997; Wigfield & Eccles, 2000; Zimmerman, 2000). However, for our purposes here we group them together. As we will see, these kinds of beliefs relate in important ways to children's performance on different activities, and to their choices of which activities to pursue.

There are three main ways these kinds of beliefs change over time. First, they become increasingly differentiated

so that children have quite specific competence beliefs for different achievement domains and even activities within these domains (Bandura, 1997; Eccles, Wigfield, Harold, & Blumenfeld, 1993; Marsh & Ayotte 2003). Indeed, this differentiation starts quite early during the elementary school years (Eccles, Wigfield, & Schiefele, 1998; Wigfield et al., in press). Second, these beliefs become increasingly stable, when stability is assessed by correlating these beliefs over time. In some domains, those correlations reach as high as .75 across a one-year period by the end of elementary school (Eccles et al., 1989; Wigfield et al., 1997).

Third, children and adolescents' competence-related beliefs generally decline across the entire elementary and secondary school period (see Wigfield & Eccles, 2002a). Three recent longitudinal studies are illustrative. Jacobs, Lanza, Osgood, Eccles, & Wigfield (2002) and Fredericks and Eccles (2002), utilizing the same dataset, examined change over the elementary and secondary school years in U.S. children's competence beliefs in mathematics, language arts, and sports, and Watt (2004) did so for math and English beliefs and values of middle and high school Australian students. Jacobs et al. (2002) found that children's perceptions in each area were strongly positive early on. However, the overall pattern of change was a decline in each domain. Fredericks and Eccles and Watt also found declines over time in competence beliefs, although the specific trends were somewhat different across their investigations, perhaps reflecting contextual differences in secondary schools in the United States and Australia. Because these studies were done in schools, they include only adolescents who are at least engaged enough in school to still be there; the academic competence beliefs of adolescents who drop out may become even more negative at earlier ages.

Age differences in self-efficacy beliefs show a different pattern, with older children having more positive beliefs about their efficacy to do different activities than younger children. Shell, Colvin, and Bruning (1995) found that 4th graders had lower self-efficacy beliefs for reading and writing than did 7th and 10th graders, and the 7th graders' efficacy beliefs were lower than 10th graders' beliefs (see Zimmerman & Martinez-Pons, 1990, for similar findings). The inconsistency of these findings with those on children's competence beliefs just discussed likely reflects the self-efficacy measure used by Shell et al. Their instrument measured children's estimates of their efficacy on specific reading and writing skills rather than more general reading and writing, which should be higher among older children. Also, efficacy beliefs usually are not measured comparatively, whereas many measures of competence beliefs include comparisons of one's ability with that of others. The latter kind of measure may be more likely to show declines over age.

Change in Children's Valuing of Achievement and Intrinsic and Extrinsic Motivation. Children's valuing of achievement refers to reasons or incentives children have for doing different activities. Eccles, Wigfield, and their colleagues defined different aspects of achievement task values: interest value, or doing an activity for its own sake; importance value, or the salience of the activity to the individual; and utility value, or how useful the activity may be to the individual (see Eccles, 1984a, 1984b; Eccles et al., 1983; Wigfield & Eccles, 1992, 2000). As with competence-related beliefs, researchers have determined that children's valuing for different activities are differentiated early on and become more stable over time, although the stability correlations are not as high as those for competence beliefs (Eccles & Wigfield, 1995; Eccles, Wigfield, Harold, & Blumenfeld, 1993; Eccles et al., 1989; Wigfield et al., 1997).

Jacobs et al. (2002) found that children's valuing of the domains of mathematics, language arts, and sports declined. As was the case for competence beliefs, children's valuing of language arts declined most during elementary school and then leveled off. By contrast, children's valuing of mathematics declined the most during high school (see also Fredericks & Eccles, 2002; Watt, 2004).

Intrinsic motivation refers to doing an activity for its own sake or because it is pleasurable to the individual, whereas extrinsic motivation involves doing an activity to receive a reward (Ryan & Deci, 2000). Intrinsic motivation thus is somewhat similar to interest value, and extrinsic motivation to utility value, although it should be noted that these constructs come from different theoretical traditions. Research done with both American and European children (e.g., Gottfried, Fleming, & Gottfried, 2001; Harter, 1981; Hedelin & Sjoberg, 1989; Helmke, 1993) has shown that that intrinsic motivation in different subject areas school declines across the school years. This is especially true for the natural sciences and mathematics (e.g., Oldfather & McLaughlin, 1993) and particularly during the early adolescent years. Pekrun (1993) found that intrinsic motivation stabilized after 8th grade, and Gottfried et al. (2001) reported surprisingly high stability coefficients for intrinsic motivation measured across a 1-year period for children ages 13 and above.

The negative changes in children's competence-related beliefs, achievement values, and intrinsic motivation have been explained in two ways: (a) Because children become much better at understanding, interpreting, and integrating the evaluative feedback they receive, and engage in more social comparison with their peers, children become more accurate or realistic in their self-assessments, leading some to become relatively more negative and also to devalue achievement (see Dweck, 2002; Stipek & Mac Iver, 1989; Wigfield et al., 1996); (b) because school

environment changes in ways that make evaluation more salient and competition between students more likely, some children's self-assessments and valuing of achievement will decline as they get older (e.g., Eccles & Midgley, 1989; Wigfield, Eccles, & Rodriguez, 1998).

Change in Achievement Goal Orientations and Achievement Goals. Work on achievement goal orientations has burgeoned over the last 15 years. Initially researchers distinguished two broad orientations to achievement that students can have, a mastery or task-involved orientation, and a performance or ego orientation (Anderman, Austin, & Johnson, 2002; Pintrich, 2000a). With mastery orientation, individuals focus on mastering tasks and increasing competence at different tasks. Performance-oriented children and adolescents focus on demonstrating their competence and outperforming others. Mastery-oriented children and adolescents choose challenging tasks and are more concerned with their own progress than with outperforming others. Researchers studying goal orientations generally believe that having a mastery orientation is more facilitative to long-term motivation and learning than is a performance orientation. Different researchers defining these goal orientations used somewhat different labels for them (Thorkildsen & Nicholls, 1998); however, in our view, the similarities outweigh the differences between the conceptualizations of these orientations (see also Harackiewicz, Barron, Pintrich, Elliot, & Thrash, 2002).

Recently, researchers distinguished approach and avoidance components of each of these goal orientations, with the approach component generally seen as more positive (e.g., Elliot, 1999; Elliot & McGregor, 2000; Pintrich, 2000b; Skaalvik, 1997). However, there has been debate among goal orientation researchers about the relative merits of performance approach goals in particular, with an interesting series of articles appearing on this topic in the *Journal of Educational Psychology* (see Harackiewicz et al., 2002; Kaplan & Middleton, 2002; Midgley, Kaplan, & Middleton, 2001). Harackiewicz et al. (2002) argue that performance-approach goals are beneficial for some educational outcomes, whereas Midgley et al. (2001) and Kaplan and Middleton (2002) continue to believe that mastery goals hold the most promise for long-term engagement in learning.

Increasingly, goal orientation researchers discuss how children have multiple goals that can influence outcomes in multiple ways (Meece & Holt, 1993; Pintrich, 2000a, 2000b; Wolters, 2004). For instance, Wolters (2004) found that middle school aged students endorsed both mastery and performance approach and avoided goals, although they endorsed mastery goal to a greater extent. Students' mastery and performance approach goals

showed differential relations to engagement, learning strategies, and school performance, with the former predicting engagement and use of learning strategies, and the latter predicting school achievement.

There is a growing body of work on the development of achievement goal orientations. Anderman, Machr, Midgley, Turner, and their colleagues conducted a number of studies looking at how classroom instructional practices relate to children's goal orientations and how these relations may change over time. Turner et al. (2002) found that sixth-grade students are more likely to adopt mastery-oriented goals in classrooms that emphasize learning, the importance of effort, and the enjoyment inherent in learning. Anderman and Anderman (1999) reported that adolescents endorse performance goals more than mastery goals. A major reason for this likely is that schools increasingly emphasize performance goals as children get older. One clear example of this is how evaluations of different kinds proliferate and have stronger consequences for adolescents' futures. Midgley, Anderman, and their colleagues have done a number of studies showing two major things: (a) elementary-school teachers focus on mastery-oriented goals to a greater extent than do middle-school teachers, and (b) middle-school students perceive school as more performance oriented than do elementary school students (see Anderman et al., 2002, for review).

Other researchers have looked at the content of children's goals rather than children's goal orientations. Wentzel (1989, 1994, 1996) studied children's social and academic goals in school, finding that high-achieving children have positive academic and social goals, and lower achieving children emphasize social goals at the expense of academic goals (Wentzel, 2002b). To date, there has been little developmental work on how the content of children's goals may change over time. Based in part on Wentzel's work, it seems that adolescents doing poorly in school may be especially likely to seek goals other than academic ones in school, or reject school altogether (Finn, 1989; Rumberger, 1987). How individuals choose among these different goals should have a lot to do with their engagement in school (Fredericks, Blumenfeld, & Paris, 2004).

Relations of Achievement Beliefs, Values, and Goals to Academic Performance and Choice

Researchers have examined how adolescents' specific achievement beliefs relate to their academic achievement and choice of activities. For instance, they have shown that self-efficacy beliefs relate to individuals' goals, performance, persistence, and choice of different activities

(e.g., Bandura, Barbaranelli, Caprara, & Pastorelli, 1996, 2001). Researchers have looked at how adolescents' competence-related beliefs and values relate to their performance and choice of different academic and nonacademic activities (Bong, 2001; Eccles et al., 1983; Meece, Wigfield, & Eccles, 1990; Pintrich & De Groot, 1990). Two fundamental findings emerge from this work. First, children's perceptions of ability and expectancies for success are the strongest predictors of subsequent grades in mathematics and English, predicting those outcomes more strongly than either previous grades or achievement values. Second, children's achievement values such as liking of tasks, importance attached to them, and their usefulness are the strongest predictors of children's intentions to keep taking mathematics and actual decisions to do so (Wigfield, 1994; Wigfield & Eccles, 2002b). As we discussed, given the increasing opportunities for choice among different academic courses during middle adolescence, the finding that adolescents' achievement values relate most strongly to their choices is particularly important.

In the self-concept literature (where self-concept often is measured as perceived competence in different areas), there was debate for many years about the causal direction of relations between self-concept and achievement, with some researchers proposing that change in self-concept produced change in achievement, and others arguing just the opposite (Marsh & Yeung, 1997; Wigfield & Karpathian, 1991). A myriad of studies were done on this issue with no clear resolution of the debate emerging in large part due to methodological problems with the research (see Marsh, 1990; Marsh & Yeung, 1997). Researchers have argued more recently for a reciprocal effects model of these relations, rather than the more simplistic "which causes which" approach (Guay, Marsh, & Boivin, 2003; Marsh & Yeung, 1997; Wigfield & Karpathian, 1991). In such models, achievement and self-concept are posited to exert causal influences on each other, rather than one variable having causal predominance. Guay et al. (2003) and Marsh and Yeung (1997), both utilizing multiwave designs incorporating multiple measures of self-concept and achievement, found support for the reciprocal effects model in children and adolescents. Valentine, DuBois, and Cooper (2004) recently provided a meta-analysis that supports the contention that self-perceptions of ability predict subsequent performance even when previous performance is controlled.

Along with performance motivational beliefs, values, and goals relate to cognitive strategy use and self-regulation. For instance, students' efficacy beliefs relate to their use of cognitive strategies and to the regulation of their achievement behavior (Meece, Blumenfeld, & Hoyle, 1988; Pintrich & De Groot, 1990; Pintrich &

Zusho, 2002; Schunk, 1994). Students with mastery goal orientations and performance approach goals appear to be more self-regulated in their approach to learning, whereas students with performance avoid goals are not (Pintrich, 2000a, 2000b; Wolters, Yu, & Pintrich, 1996). Turning these relations around, Wolters (2003) discussed the importance of students regulating their motivation during different learning activities.

We now need more studies of the processes involved in these relations, and studies of different developmental trajectories in both these achievement-related characteristics, and their relation to school performance and choice. Pintrich (2003) discussed the complex interplay of motivation, cognition, and self-regulation in relation to achievement outcomes, providing important guidance for the direction this work might take.

Group Differences in Motivation During Adolescence

Gender Differences. Although sex-typing itself occurs in the preschool years (Ruble & Martin, 1998), several researchers have suggested that engaging in gender-role appropriate activities may become important to early adolescents, as they try to conform more to gender-role stereotypes once they enter puberty (Eccles, 1987; Hill & Lynch, 1983). Hill and Lynch (1983) labeled this phenomenon gender-role intensification. This phenomenon may lead early adolescents to have less positive beliefs and be less involved in activities that they see as less appropriate to their own gender. However, recent research on children's competence-related beliefs and values in different areas does not show increasing gender differences at adolescence, casting doubt on the gender intensification hypothesis. Nonetheless, girls' involvement in different activities remains relatively strongly sex-typed during adolescence (McHale, Shanahan, Updegraff, Crouter, & Booth, 2004).

Despite evidence that performance differences in skill areas such as mathematics and English decreased over the past 30 years (Ruble & Martin, 1998), there are many gender differences in children's competence beliefs for activities in different domains. These gender differences appear particularly in gender-role stereotyped domains and on novel tasks. For example, boys hold higher competence beliefs than girls for mathematics and sports, even after all relevant skill-level differences are controlled; in contrast, girls have higher competence beliefs than boys for reading and English, music and arts, and social studies (see Wigfield et al., in press, for review). Recent work done in the United States shows that the gender differences in competence beliefs in math narrow during adolescence,

but those in English remain (Jacobs et al., 2002). Further, the extent to which children endorse the cultural stereotypes regarding which sex is likely to be most talented in each domain predicts the extent to which girls and boys distort their ability self-concepts and expectations in the gender stereotypic direction (Early, Belansky & Eccles, 1992; Eccles & Harold, 1991). However, these sex differences are generally quite small (Marsh, 1989).

Earlier work showed gender differences in mathematics value favoring boys emerging during adolescence (Eccles, 1984a, 1984b), but more recent studies show that boys and girls value mathematics equally during adolescence (Jacobs et al., 2002). Although boys and girls now appear to value mathematics equally, girls are less interested in science (with the exception of biology) and engineering than are boys and enroll much less frequently in these majors in college (Wigfield, Battle, Keller, & Eccles, 2002).

Differences for Minority Adolescents. In 1996, Wigfield et al. reported that there is much less information on differences in self-beliefs and values between minority and majority adolescents. This picture has changed greatly over the past 10 years, although more work on this topic still is needed. Much of this work has focused on the academic problems and prospects of African American (see Meece & Kurtz-Costes, 2000; Slaughter-Defoe, Nakagawa, Takanishi, & Johnson, 1990); Mexican-American (e.g., Padilla & Gonzalez, 2001); and Asian-American youth (Fulgini & Tseng, 1999; Lee, 1994). Recent work has also focused on immigrant populations within the United States, some of whom are doing much better in school than both white middle class children and third and fourth generation members of their same national heritage (e.g., Chen & Stevenson, 1995; Kao & Tienda 1995; Slaughter-Defoe et al., 1990).

Graham (1994) reviewed the literature on differences between African-American and European-American students on such motivational constructs as need for achievement, locus of control, achievement attributions, and ability beliefs and expectancies. She concluded that, in general, the differences are not very large. Further, she argued that many existing studies have not adequately distinguished between race and socioeconomic status, making it very difficult to interpret any differences that emerge.

Graham and her colleagues have studied differences in the valuing of achievement across different minority groups. They (Graham & Taylor, 2002; Graham, Taylor, & Hudley, 1998) used a peer nomination technique to assess group differences in achievement values. Participants indicated which children in their class they admired,

respected, and wanted to be like, and Graham and her colleagues argued that this is one way to gauge what children value. Results showed that White, Latino, and African-American girls chose high-achieving girls as those whom they admired, respected, and wanted to be like. For boys, this was only true for White boys; the other two groups of boys admired low achievers more. In a third study, Graham and her colleagues looked at this issue developmentally and found that in 2nd and 4th grades, all children were more likely to nominate higher achievers. In 7th grade the sex-differentiated pattern for the different groups emerged. This intriguing work needs to be followed up to examine what it is about entering adolescent and puberty that seems to cause many African-American and Mexican-American youth to endorse values and role models that exclude school achievement (e.g., Tatum, 1997).

Researchers interested in ethnic and racial differences in achievement have proposed models linking social roles, competence-related beliefs and values. For example, Steele (1992, 1997) proposed stereotype vulnerability and disidentification to help explain the underachievement of African-American students (see also Aronson, 2002). Confronted throughout their school careers with mixed messages about their competence and their potential and with the widespread negative cultural stereotypes about their academic potential and motivation, African American students should find it difficult to concentrate fully on their schoolwork because of the anxiety induced by their stereotype vulnerability (Steele & Aronson, 1995). In turn, to protect their self-esteem, they should disidentify with academic achievement, leading to both a lowering of the value they attach to academic achievement and a detachment of their self-esteem from both positive and negative academic experiences. In support, researchers have found that academic self-concept of ability is less predictive of general self-esteem for some African-American children (Winston, Eccles, Senior, & Vida, 1997).

In considering performance and motivational differences across different ethnic and minority groups, it is essential to point out that such differences must be considered in light of larger contextual issues that influence development. Indeed, several researchers have pointed out the importance of taking a contextual view of minority achievement and motivation. For example, Spencer and Markstrom-Adams (1990) discussed identity formation during childhood and adolescence in different groups of minority children (see also Wigfield & Wagner, 2005, for discussion of recent models of multiethnic identity formation). Spencer and Markstrom-Adams argued that in forming their identities minority children have to deal with

several difficult issues that majority adolescents do not face, such as the often negative view of their group held by many members of the majority society, conflict between the values of their group and those of larger society, and lack of "identity achieved" adults in their group who can serve as models for them. These difficulties sometimes impede identity formation in these adolescents, leading to identity diffusion or possibly an inadequate exploration of different possible identities that the adolescent could take on.

Identity Development During Adolescence

Erikson (1968) proposed that identity formation is a major task of adolescence. This Handbook has a chapter on self-processes and identity, so we touch on identity development only briefly here. Identity is a term broader than either self-concept or self-esteem, referring to individuals' general sense of themselves and their psychological reality that includes many different beliefs and attitudes about the self (Spencer & Markstrom-Adams, 1990; Wigfield & Wagner, 2005). Identity formation involves the successful negotiation of a variety of activities during adolescence, including school achievement, social relations with others, and development of career interests and choices, along with a great deal of exploration of different activities and roles (Cantor & Kihlstrom, 1987). One's gender, ethnicity, and sexual orientation all are important to the adolescent's developing identity, and work on ethnic identity and its role in adolescents' overall identity development has flourished of late (Oyserman, Harrison, & Bybee, 2001; Phinney, 1996). Integrating these experiences and characteristics into a coherent sense of self is fundamental to identity formation, and researchers have proposed different phases of the identity development process (Marcia, 1980, 2002; Waterman, 1982, 1999).

Development of identity as student is an especially important topic for this chapter. Roeser and Lau (2002) describe adolescents with *positive student identities* as having histories of positive academic performance and relationships with classmates, positive emotions related to academic goals, high academic efficacy, positive conceptions of themselves as students, and a commitment to learning. Adolescents with *negative student identities* have histories of academic failure and difficulties with peers, negative emotions associated with academic goals, poor academic efficacy, frustration with themselves as students, and diminishing aspirations for educational attainment. Roeser and Lau argue that school environments play an important role in the development of students' identities.

FRIENDSHIPS AND THE PEER GROUP AT ADOLESCENCE

During the childhood years, children become more and more involved in social activities, sports activities, and a variety of other extracurricular activities. At adolescence, these trends become even more pronounced. Indeed, involvement in sport and social activities with peers, peer acceptance, and appearance can take precedence over school activities at this time period, often to the chagrin of parents and teachers. Friendships are important to adolescents for many reasons. In terms of the issues discussed in this chapter, a major reason is that friends help each other through major life transitions, such as the school transitions that adolescents experience (Rubin, Coplan, Chen, Buskirk, & Wojslawowicz, 2005). Children lacking friends are at risk for a variety of negative developmental outcomes (Rubin, Bukowski, & Parker, 1998).

By contrast, social acceptance has been shown to relate to a variety of positive mental health outcomes, both before and during adolescence (Rubin et al., 1998). For instance, Perry (1987) found that adolescents who were satisfied with their friendships report higher self-esteem. Unfortunately, school transitions often disrupt children's friendships, perhaps causing some difficulties in these important psychological outcomes. In our study of how the transition to junior high school influenced children's perceptions of social ability, we found a dramatic decrease in those beliefs immediately after the transition. Fortunately, this effect moderated during the 7th-grade year, although children's perceptions of their social ability at the end of 7th grade still were lower than they were at the end of 6th grade, before the transition (Wigfield, Eccles, MacIver, Reuman, & Midgley, 1991).

Children's friendships undergo some important changes during adolescence (Berndt & Perry, 1990; Rubin et al., 1998; Rubin et al., 2005). Sullivan (1953) suggested that adolescent friendships are characterized more by fulfilling intimacy needs than are earlier friendships, and indeed most research shows that children state that friends are those with whom one can share intimate thoughts. This depiction may be somewhat truer for girls (Rubin et al., 2005). In addition, adolescents state that their friends share similar psychological characteristics, interests, and values, and that friends should be loyal to one another (Berndt & Perry, 1990; Savin-Williams & Berndt, 1990). Many of these changes in adolescents' conceptions of friendships can be linked to changes in their growing cognitive skills, increased perspective-taking ability, and more varied social experiences (Rubin et al., 2005). Yet, Elkind (1967, 1985) proposed that many adolescents become more egocentric and

self-focused, thinking the world revolves around them (see Lapsley & Murphy, 1985, for an alternative view). Such egocentrism might reflect adolescents' struggles with their newly developed thinking skills (Keating, 1990, 2004).

Perhaps because of the importance of social acceptance during adolescence, friendships during this time period often are characterized by their organization into cliques and groups (see Brown, 1990, 2004; NRC, 2004). Adolescents often form different groups based on interests and participation in different activities, and these groups often differ in their overall status in the school. For instance, Perry (1987) found that more popular children tended to have friends who also were more popular, whereas less popular children's friends also were less popular. One reason for the existence of these cliques is to help adolescents establish a sense of identity; belonging to a group is one way to solve the problem of "who am I?" A second and related phenomenon is that children's conformity to their peers peaks during early adolescence; children are most likely to go along with others' wishes at this time (Rubin et al., 1998). This also has been related to the overwhelming importance of social acceptance to adolescents, as well as to children's developing identity. Individuals less certain of their own identities may be more likely to conform to others. The identity of these groups remains relatively constant during adolescence (e.g., jocks, brains, band members), but adolescents drift in and out of these groups as they go through middle and high school (Brown, 2004).

In the popular literature, much has been written about how conformity to peers can create many problems for adolescents, and that "good" children often are corrupted by the negative influences of peers. However, although pressure from peers to engage in misconduct does increase during adolescence (Brown, 1990, 2004), many researchers disagree with the simplistic view that peer groups mostly have a bad influence on adolescents. Brown (1990) reviewed studies showing that it is poor parenting that sometimes leads children to get in with a "bad" peer group, rather than the peer group pulling the child into difficulties. He also argued that adolescents usually seek out similar peers; this means that those involved in sports will have other athletes as friends, those serious about school will seek those kinds of friends, and those less involved in school may form groups. Thus, for many adolescents, the peer group acts more to reinforce predispositions, rather than to change adolescents' characteristics in a major way (Kindermann, 1993). Ryan (2001) provided further evidence for this view with respect to student groups and their impact on students' motivation and achievement, finding that students with similar levels of achievement tend to be friends.

One particular type of conformity to a group, gang membership, has received increasing attention and concern. Gang membership is increasing in many areas, particularly but not exclusively large urban areas, and it is extending into the suburbs as well. Although membership in a gang provides adolescents with some social support (Padilla, 1992), research indicates that gangs promote a variety of antisocial behaviors, including delinquency and various criminal activities, drug use, and poor school achievement (Battin-Pearson, Thornberry, Hawkins, & Krohn, 1998; NRC, 2004). As discussed by the National Research Council, adolescents who join gangs most often are low achievers who are marginalized in school, and often have various academic as well as social problems. Interventions to discourage gang membership have had some success, but much more needs to be done to combat the growing problem of gang membership (NRC, 2004).

Another concern with respect to social relations at adolescence receiving increasing attention is bullying and peer violence, and broader issues of school safety. Fighting increases during the middle school years, and more students are bullied in middle school than in either elementary or high school (Juvonen, Le, Kaganoff, Augustine, & Constant, 2004). Being bullied is associated with many negative developmental outcomes, including loneliness, depression, and social anxiety, as well as lower school performance (Juvonen & Graham, 2001; Juvonen, Nishina, & Graham, 2001). Increasing percentages of both middle and high school students report concerns about their safety in school, which of course distracts them from their school learning (Brand, Felner, Shim, Seitsinger, & Dumas, 2003). Victimization occurs at the individual level but also can include groups of children; some low-status groups of children (e.g., those who other adolescents perceive as "nerds") are at risk for being rejected and victimized at school. Creating safer school environments where bullying and other forms of violence are less likely clearly is an important priority.

How do children's friendships relate to their school achievement? The work just reviewed suggests that students who fear for their safety in school achieve less well. From Brown's (1990, 2004) and Ryan's (2001) reviews, it appears that friends potentially can have both positive and negative effects on school achievement. High-achieving children who seek out other high achievers as friends could end up performing better as a result of their interactions with these other children, although Ryan (2001) found that such groups' achievement declines less in comparison to other groups, rather than increasing. In contrast, low achievers whose friends are primarily other low achievers do even worse in school (Dishion, Andrews, & Crosby, 1995). In a similar vein, Altermatt and

Pomerantz (2003) found in a study of early adolescents that best friends' report card grades were similar, as were their beliefs about their competence in different subject areas. In addition, friends had significant (but modest) influence on each others' grades and motivational beliefs across the two school years studied.

In sum, peers play increasingly important roles in children's development during the adolescent period. Peers have many positive influences on one another, and also can have some negative influences as well. Fostering positive relations among adolescents in classrooms can have many benefits for both the adolescents and teachers.

CHANGES IN FAMILY RELATIONS DURING ADOLESCENCE

Relations between parents and children change as children enter adolescence, although the stereotypical view often presented in the popular media that adolescence means an inevitably stormy period for these relations is not supported in much of the psychological research on parent-child relations at adolescence (Collins & Laursen, 2004; Steinberg & Silk, 2002). Some of the major changes that do occur are (a) adolescents and parents spend less time together, in large part because adolescents are away from home more, spending more time with their peers and with various kinds of media and other activities; (b) a psychological "distancing" in parent-adolescent relations, because many adolescents desire more autonomy and often share less with their parents; and (c) some increase in conflict, or if not conflict, debate and bickering over a variety of things as adolescents assert their independence. This increase in conflict and discussion of parental rules likely emerges in part due to some of the cognitive and social changes in adolescents that were discussed earlier in this chapter. Finally, (d) there is a waning of parental influence as adolescents become more independent and also are more influenced by their peers. Parents' influence remains strong in many areas of adolescents' lives, however, and positive relations between parents and their adolescents have many beneficial outcomes to both parents and adolescents (Steinberg & Silk, 2002).

Since the last edition of this handbook, there has been a major debate within the field of developmental psychology about how much influence parents indeed do have on their children. Harris (1995, 1998) argued that genetics, peers, and the broader culture have a much stronger role in children's development than do parents. Similar arguments have been raised by some behavioral geneticists (see Rowe, 1994). Researchers who study children's socialization have responded in effective ways to these

arguments, documenting ways in which parents indeed do have important influences in a variety of aspects of their children's lives, including their overall psychological adjustment and various educational outcomes (e.g., Collins, Maccoby, Steinberg, Hetherington, & Bornstein, 2000; Steinberg & Silk, 2002). This debate served an important role in sharpening socialization research designs and interpretations of research bearing on the issue of the degree of parental influence, and specifying more clearly the kinds of influence parents do have on different adolescent outcomes.

As discussed in the previous edition of this *Handbook* and by many others, parenting styles have long been a major topic in the parent socialization literature. Baumrind (1971, 1978) identified four major parenting styles (i.e., authoritative, authoritarian, permissive or indulgent, and indifferent), and she and others have discussed their implications for children and adolescents' development. As Steinberg and Silk (2002) noted, these styles vary on dimensions of control and emotional warmth, with the authoritative style having the best blend of adequate control over children along with support of their autonomy, and provision of emotional warmth. In studies done in the United States, authoritative parenting style has been associated with many positive psychological and educational outcomes, including school achievement (Steinberg & Silk, 2002). This also appears to be the case in other countries and cultures, although there is evidence that the nature of these parenting styles differ across culture and relate in different ways to important child outcomes such as achievement (Chao & Tseng, 2002). For instance, in Asia authoritative parenting does not relate as clearly to children's educational achievement.

Work on parenting in different groups within our country and in different cultures has increased greatly over the past 10 years (e.g., Chao & Tseng, 2002; Garcia Coll & Pachter, 2002; Harwood, Leyendecker, Carlson, Ascencic, & Miller, 2002; McAdoo, 2002), as has work on family structural variables and parenting. There are similarities across these groups in practices and styles, but many important differences as well, both within and across ethnic groups. Because of space limitations, we can only mention a few examples.

Authoritative parenting is more common among European-American parents than among parents in some other ethnic groups, likely reflecting differences in cultural beliefs and values about appropriate parenting (Garcia Coll & Pachter, 2002; Harkness & Super, 2002). Latino children appear to be more family oriented than European American children, and more likely to live with members of their extended families (Harwood et al., 2002). Many Asian parents focus strongly on family interdependence, and also appear to be more controlling in

interactions with their children and adolescents (Chao & Tseng, 2002). More broadly, ethnic minority parents also have to decide how to teach their children about race, and prepare them for instances of racism and discrimination they likely will encounter, experiences that can profoundly affect these children's motivation and achievement (McAdoo, 2002).

Researchers also have examined more closely the impact of poverty on parental effectiveness, finding that poverty adds stress to lives in families that can change parent-child relations in important ways (Magnuson & Duncan, 2002; McLoyd, 1990). In addition, with the number of single-parent families in this country increasing dramatically, researchers also have looked at how living in single-parent homes influences adolescents. The stress of divorce and separation often disrupts parent-child relations and other child outcomes at least initially. Yet, these disruptions can be overcome (Hetherington & Stanley-Hagan, 2002).

During adolescence parents continue to be concerned about and influence adolescents' school performance in different ways, and we close this section by noting several of these influences. First, parents of children from many different ethnic groups and backgrounds continue to see schooling as the primary way for their children to achieve success in this society, and hope and expect that their children will go to college. Second, parents' specific beliefs about their adolescents' abilities, skills, and characteristics influences adolescents' own self-beliefs, performance, and choice of which activities to pursue (Bleeker & Jacobs, 2004; Eccles, Adler, & Kaczala, 1982; Heller & Ziegler, 1996; Jacobs, 1991). Bleeker and Jacobs found that mothers' predictions about their seventh-grade children's success in a mathematics-oriented career predicted their math ability beliefs in tenth grade, and math/science career efficacy during their middle twenties (although this relationship was mediated by adolescents' own beliefs). Mothers' beliefs about children's ability were an especially strong predictor of their daughters' choices of a math or science career.

Third, we noted earlier that relations between parents and adolescents become more distant at adolescence, and that this is in many ways a natural progression as most adolescents do desire more autonomy in their lives. One area in which this can be problematic is parents' involvement in adolescents' schooling. Most studies of parental involvement in schooling show that it is highest in elementary school, and drops off after that (Eccles & Harold, 1993; Sanders & Epstein, 2002). Although adolescents must learn to control their own achievement behaviors and often want their parents to be less involved in their schooling, parents' continuing involvement in their children's education helps to ensure their success in school,

and school improvement programs often include parent involvement as a major component (Comer, 1988; NRC, 2004). Parents' decreasing involvement in school likely reflects their adolescents' wishes to a degree, but also may reflect the characteristics of secondary schools themselves. As will be discussed, the larger and more bureaucratic secondary schools that parents encounter may be more difficult to become involved in than neighborhood-based elementary schools. However, many successful secondary schools encourage continued parent involvement in a variety of ways, with benefits for students (Sanders & Epstein, 2002).

In summary, relations between parents and adolescents change in important ways relative to relations of parents to their younger children. These changes, often portrayed as routinely negative in the media, pose challenges for both parents and adolescents, but in many cases are handled well by both groups. Further, parents continue to have a strong influence on adolescents' development both in and out of school, and parents who provide their adolescents with structure, autonomy support, and emotional support help the adolescents negotiate the challenges of this time period successfully.

SCHOOL TRANSITIONS AND ADOLESCENT DEVELOPMENT

As we hope is clear from our review to this point, very few developmental periods are characterized by so many changes at so many different levels as adolescence—changes due to pubertal development, cognitive development, social role redefinitions, and changes in peer and parent relations. We discussed that children facing multiple transitions and stressors are at greater risk for these negative outcomes. Here, we consider two major school transitions that most adolescents experience, from elementary to middle school and middle school to high school. The middle school transition has received most of the attention, and researchers (e.g., Eccles, 2004; Eccles & Midgley, 1989; Midgley & Edelin, 1998) have stated that there is a mismatch between the developmental needs of early adolescents and the school environments that many early adolescents experience (see also Eccles et al., 1993, and Wigfield et al., 1996, 1998).

The Middle School Transition

Traditional junior high schools and middle schools differ structurally in important ways from elementary schools. Most junior high schools are substantially larger than elementary schools, because they draw students from

several elementary schools. As a result, students' friendship networks often are disrupted as they attend classes with students from several different schools. Students also are likely to feel more anonymous because of the large size of many middle schools. Instruction is likely to be organized and taught departmentally. Thus, middle school teachers typically teach several different groups of students each day and are unlikely to teach any particular students for more than 1 year. This departmental structure can create a number of difficulties for students. One is that the curriculum often is not integrated across different subjects. A second is that students typically have several teachers each day with little opportunity to interact with any one teacher on any dimension except the academic content of what is being taught and disciplinary issues. It is becoming increasingly clear that caring relations with teachers are very important to adolescent development (Wentzel, 2002a). Finally, as mentioned, family involvement in school often declines during the middle school years.

Researchers also have discussed how in traditional junior high schools and middle schools, classroom and school environments emphasize mastery goals and intrinsic motivation less and performance goals more (Anderman & Maehr, 1994; Eccles, 2004; Maehr & Midgley, 1996; Midgley, 2002). Such shifts also can contribute to the decline in students' academic competence beliefs, interest, and intrinsic motivation discussed earlier. The major kinds of changes that have been discussed include changing authority relationships between teachers and students with authority issues becoming more salient, use of whole-class instruction and between-classroom ability grouping, decreases in teachers' sense of efficacy to reach all students, and stricter grading criterion (Eccles et al., 1998; Roeser, Eccles, & Sameroff, 1998; Wigfield & Eccles, 2002a). Finally, as noted peer networks are disrupted when children change schools. Many times friends are separated from one another, and it takes some time for children to reestablish social networks. Such disruptions could influence children's academic motivation as well (Ryan, 2001).

In summary, traditional junior high schools and middle schools have a variety of organizational characteristics and classroom practices that can have negative effects on students' competence beliefs, mastery goals, and intrinsic motivation for learning. Eccles and Midgley (1989) argued that a main reason these practices have a negative impact is that they are developmentally inappropriate for early adolescents. At a time when the children are growing cognitively and emotionally, desiring greater freedom and autonomy, and focusing on social relations, they experience teaching practices like those described, which do not fit well with the developmental characteristics of

early adolescents. Therefore, for many early adolescents, these practices contribute to the negative change in students' motivation and achievement-related beliefs.

Middle School Reform Efforts and Student Motivation

Based in part on the research showing declining student motivation and achievement during middle school, there have been a variety of proposals for reorganizing middle schools, and schools across the country are implementing these changes (Carnegie Council on Adolescent Development, 1989; Clark & Clark, 1993; Irvin, 1992; Mac Iver, Young, & Washburn, 2002; Midgley & Edelin, 1998). There is growing consensus about what kinds of changes should be made in middle grade schools (Lipsitz, Mizell, Jackson, & Austin, 1997). One structural change adopted in many school districts has been to move the transition to middle school from after to before sixth grade. This change on its own accomplishes little; what is more important is changing school organization and instructional practices in systematic ways (Mac Iver & Epstein, 1993). Both the Carnegie Council on Adolescent Development and the National Middle Schools Association have made recommendations for how middle schools should be changed. The broadest goal of these recommendations is to provide developmentally appropriate education for early adolescents (Wigfield & Eccles, 2002a).

There are a number of important ways in which these recommendations have been implemented in different middle schools. One is replacing department structures with teams of teachers working with the same group of students. This practice allows groups of teachers to spend more time with the same group of adolescents, thus getting to know them better. It also allows for greater integration across the curriculum. Teachers serving as advisors and counselors have become more prevalent, so that adolescents can develop relationships with adults other than their parents. To create smaller learning communities in often-large middle schools, "schools within schools" have been created, in part through the teaming approach just discussed. This is particularly likely to occur for the youngest group in a middle school, be they 5th graders, 6th graders, or 7th graders. Cooperative learning practices are used more frequently, in part to reduce the use of ability grouping or tracking.

Felner, Jackson, Kasak, Mulhall, Brand and Flowers (1997) reported systematic evaluations of schools implementing fully the recommendations from the Carnegie Council, comparing them with schools implementing the recommendations to a degree and not at all. Felner et al. obtained measures of students' achievement, school

attitudes, and behavior problems. Preliminary analyses indicate that schools in which the implementation has been fullest have higher achieving students. Students in these schools report higher self-esteem and fewer worries about bad things happening to them in schools, and teachers report fewer behavior problems. These results provide encouraging support for the efficacy of the reform efforts. One crucial point made by Felner et al. is that comprehensive reform is what is needed. Schools in which one or two of the recommendations have been implemented, or schools in which the implementation of several recommendations has proceeded slowly, have not been as successful.

In summarizing middle school reform efforts, Midgley and Edelin (1998) argued that many middle schools have improved the climate of their school, particularly relations between teachers and students, but fewer have changed their instructional practices. They argued for the need for both kinds of changes to occur in order for reform to occur more completely and therefore, for adolescents' achievement and motivation to improve.

The High School Transition

Work on the transition to high school is increasing, and the existing evidence suggests quite similar problems as occur in traditional middle schools (Lee & Smith, 2001; Mac Iver, Reuman, & Main, 1995; NRC, 2004). For example, traditional high schools are typically even larger and more bureaucratic than junior high schools and middle schools. There is little opportunity for students and teachers to get to know each other and, likely as a consequence, there is distrust between them and little attachment to a common set of goals and values. There is also little opportunity for the students to form mentor-like relationships with a nonfamilial adult, and little effort is made to make instruction relevant to the students. Such environments are likely to further undermine the motivation and involvement of many students, especially those not doing particularly well academically, those not enrolled in the favored classes, and those who are alienated from the values of the adults in the high school (NRC, 2004).

Many adolescents begin doing more poorly academically in high school, which has a strong impact on their engagement in school. Roderick and Camburn (1999) documented the increases in failure rates among Chicago public high school students (particularly minority students), and how early failures in high school strongly predict later poor performance. Other studies of ethnic minority youth document the negative impact of alienating and noninclusive high school practices on school

engagement and achievement of students of color (e.g., Darling-Hammond, 1997; Ferguson, 1998).

Most large public high schools also organize instruction around curricular tracks that sort students into different groups, although this appears to be changing at least to a degree (NRC, 2004). As a result, there is even greater diversity in the educational experiences of high school students than of middle grade students. Unfortunately, this diversity is often associated more with the students' social class and ethnic group than with differences in the students' talents and interests (Lee & Bryk, 1989; Lee & Smith, 2001). Curricular tracking has served to reinforce social stratification rather than foster optimal education for all students, particularly in large schools (Lee & Bryk, 1989; Lee & Smith, 2001). Both Lee and Bryk (1989) and Lee and Smith (2001) documented that average school achievement levels do not benefit from this curricular tracking. Quite the contrary, evidence comparing Catholic high schools, which track less, with public high schools suggests that average school achievement levels are increased when all students are required to take the same challenging curriculum. This conclusion is true even after one has controlled for student selectivity factors.

High School Reform Efforts. As at the middle-school level, there are efforts across the country aimed at reforming high schools to promote student engagement and achievement (see NRC, 2004, for summaries of a number of these efforts). These reform efforts vary, but many are guided by principles such as (a) having high and consistent standards and expectations for all students; (b) creating learning communities within schools and stronger personal relations between teachers and students so that adolescents feel connected to their schools; (c) creating curricula that students find meaningful and engaging; and (d) promoting family and community involvement in the schools. The NRC (2004) provided a set of recommendations for further high school reform that includes many of the suggestions just listed, and others, including the strong suggestion to do away with tracking and ability grouping to the largest extent possible. Unfortunately to date there is not extensive research evaluating the effectiveness of these reform efforts with respect to student learning, engagement, and adjustment, but studies are underway to provide these evaluations, and preliminary evidence is promising (NRC, 2004). As successful reform efforts are validated, the next challenge will be "scaling up" successful reforms to larger settings. The process of scaling up is very complex, however, and much remains to be learned about how to do so effectively.

Leaving High School Early: The Problem of Dropping Out

We reviewed the research on decision making that shows that adolescents' developing cognitive skills do not necessarily translate into better decision making in different areas in their lives. One major difference between middle school and high school is that there are many more social and educational choices available to high school students, choices that can have both positive and negative consequences. The educational choices students face include the kinds of classes they will continue to take in high school: for example, whether to focus on academically oriented or vocationally oriented courses. Such choices have the potential to increase student engagement and learning, as students choose areas of study in which they are interested and have the competencies to succeed.

A more fundamental educational decision is whether or not to stay in school at all. In middle or junior high school students can disengage from school by not trying, acting out, or being truant. However, they still are required to be in school. At age 16, students can make the decision to leave school, and unfortunately, many choose to do so. Nationally, approximately 75% of adolescents graduate from high school. This overall number masks huge differences across different groups of adolescents, however. About 56% of African-American students graduate and 54% of Latino students do so. Within these two groups there are striking variations depending on where the adolescents live and which schools they attend, with graduation rates dropping below 40% for students in some big cities (NRC, 2004).

Entwisle (1990) reviewed the work that has examined the characteristics of students more likely to drop out of high school (see also Rumberger, 1987). These characteristics include students with lower ability, those who achieve less well, those from poverty backgrounds, those who begin working too early and work too many hours while trying to go to school, and girls who become pregnant. Entwisle pointed out that there are inadequate prospective studies that can be used to identify which children will be most likely to drop out. Work that is available, however, suggests that students doing poorly when they are in elementary school, exhibiting serious behavior problems in school, and being truant on a frequent basis will be more likely to drop out of high school. Finn (1989) discussed how these problems often are interrelated. Understanding the factors related to dropping out certainly is important. However, Rumberger (1987) argued for the need to understand the processes related to dropping out better, rather than just listing factors associated with the

problem. In beginning to address that issue, Finn (1989) argued for a participation-identification model of the drop out process, stating that students who participate less in academic and nonacademic activities in school (beginning in elementary school) will identify less with the educational process, and ultimately be more likely to drop out of school.

As part of participation-identification processes, Finn pointed to the importance of valuing of school, a construct we have discussed extensively in this chapter and elsewhere (e.g., Wigfield & Eccles, 1992, 2002b). From our research, we know that students who do not value mathematics will be more likely to opt out of math when they no longer have to take it. Do adolescents' specific achievement values relate to their bigger decision about dropping out or staying in school? Assessing students' particular subjective values and other aspects of motivation over the school years may help predict which students will become disengaged from school, and could provide a better model for how students' achievement-related beliefs influence their decisions to stay in or leave school (Vallerand, Fortier, & Guay, 1997). Most researchers examining how students' beliefs relate to dropping out of school have focused on students' general self-esteem, a construct that may be too broad to have much predictive utility in explaining specific decisions such as dropping out of school.

We have been discussing dropping out of school as a decision; however, many students likely drift into dropping out of school rather than consciously deciding to do so. That is, the circumstances of their lives might be such that continuing to go to school would be very difficult. These circumstances include the economic pressure many poor students face, discrimination, and poor schools, to name just a few. These circumstances likely play a major role in influencing some students to drop out (Finn, 1989, Rumberger, 1987).

Of course, one of the major outcomes of dropping out of school is that it seriously limits the adolescent's chances of obtaining a well-paying job (NRC, 2004). Not only do individuals who drop out lose potential earnings, but society often has to provide more extensive social services for dropouts, because they often are more likely to engage in some or all of the problem behaviors that McCord (1990) discussed. Although receiving a high school diploma may alleviate some of these problems, unfortunately in today's society a high school degree no longer ensures reasonable job prospects. When our society was an industrial society a high school diploma often was enough to guarantee access to reasonably well-paying and secure jobs. As we move further into a postindustrial society that no longer is the case; indeed, some students now may be dropping out of high school because they realize a high school

diploma will not mean much to them in terms of job prospects.

CONCLUSION

In their chapter for the first addition of this *Handbook* Wigfield et al. (1996) concluded that although much had been learned about different aspects of adolescents' biological, cognitive, and motivational development, much remained to be done. They noted in particular the need to do more research on adolescent development in the different cultural and ethnic groups in our society. They also called for more work on the high school transition and its impact, to complement the larger body of work on the middle school transition. There now is a growing literature on these topics.

Perhaps we can now say that research on adolescent development is entering its own adolescence. We have learned much since 1996 about biological, cognitive, and motivational development during this critical developmental period (see Lerner & Steinberg, 2004). Theoretical models of adolescent development in different areas emphasize even more clearly both psychological processes and the influence of contexts in which adolescents develop. As we hope is evident in this chapter, much has been learned about adolescent development in different cultural and ethnic groups in our society, an accomplishment that is particularly noteworthy. Clearly there is much more to be done in this area, but the progress has been substantial. Studies of adolescents from different groups have provided and will continue to provide important tests of the generalizability of our theoretical models of different cognitive and motivational processes, helping to refine and sharpen these models.

We are encouraged that there have been important methodological and statistical advances that allow us to study adolescent development in richer and more meaningful ways. A number of the studies discussed in this chapter are using these methodologies. The growing focus on multiple methods in studies, particularly studies combining qualitative and quantitative methods are providing a richer understanding of adolescent development (e.g., Turner et al., 2002). Analyses of long-term change in the growth curves of different characteristics also help us understand the total picture of development across childhood and adolescence (e.g., Jacobs et al., 2002; Watt, 2004). HLM is allowing researchers to address carefully influences of different sources of variation in the outcomes of educational and intervention studies, which should lead to a better understanding of the effects of these interventions as well as improvements in

them (Mac Iver et al., 2002). Structural equation modeling techniques also continue to advance (Guay et al., 2003). These new and evolving methodologies provide powerful tools for the next generation of research on adolescent development.

With respect to school reform efforts, progress has been made in middle school reform, but it remains spotty. As evidenced by the volume published by the National Research Council (2004), suggestions for high school reform increasingly are on the national agenda. Like others (Deci & Ryan, 2002) we are concerned that the recommendations for reform coming from researchers doing the important work on changes in cognition, learning, and motivation (and summarized in places like the NRC book) often are at odds with policies adopted at the national level, particularly those policies emphasizing assessment as the driving force in education. We researchers need to find ways to communicate our findings more effectively,

to inform better educational policy to optimize adolescents' learning and development.

We characterize research on adolescence as being in the phase of adolescent development itself because a major task of adolescence is to integrate multiple possible selves into a coherent whole. In the case of research on adolescence, this means integrations across different areas that historically have remained distinct, such as research on how cognition and motivation interact to affect learning, or research on the interface of biological processes and cognitive development. Theorists and researchers now are making important connections across these areas. For example, Pintrich (2003) discussed cogently links between motivation and cognition, and Byrnes (2001b) provided an overview of the relevance of what we know about brain development in relation to educational outcomes. We think such integrations should be a major focus of the work of the next decade.

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