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Part III
SCHOOL CURRICULUM AND PSYCHOLOGY

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DEVELOPMENT BETWEEN THE AGES OF 11 AND 25

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This chapter discusses development across a fascinating part of the life span—early adolescence, adolescence, and young adulthood. The time span covered is one in which individuals experience many changes, including the biological changes associated with puberty and the social and educational changes resulting from transitions from junior high to high school, from high school to college or the work force, and from college to the work force. During this period individuals make many choices and have many experiences that can direct the course of the rest of their adult lives. These choices include, among others, whether or not to stay in school, what career or occupation to undertake, and whether or not to get married. Despite their obvious importance, until recently the adolescent and young adult periods did not receive as much attention as childhood in the developmental literature. This has changed during the last decade, however; evidence of that change includes the new Society for Research on Adolescence, new journals on adolescence, and increased interest in postsecondary education, as shown by the Office of Educational Research and Improvement's funding of a center on postsecondary education focused on learning and thinking.

In this chapter we attempt to convey the most important changes occurring during this part of life, focusing in particular on changes in characteristics related to adolescents' and young adults' school performance. We discuss changes in characteristics such as self-concept, motivation, cognition, and achievement, and some factors that influence changes in these characteristics. To convey these changes best, the chapter is organized chronologically and with a developmental focus, beginning with early adolescence and moving through the adolescent period to young adulthood.

In conceptualizing how development occurs, theorists have proposed different theoretical models that can be classified into two metatheoretical types, organismic and contextual. Each type relies on different assumptions and metaphors for the description of change and development (Lerner, 1986; Pepper, 1942; Pintrich, 1990). Organismic models use a metaphor that highlights the individual organism as it develops through its active construction and organization of the environment. Organismic models also tend to assume that development is characterized by an epigenetic pattern of change involving qualitative and discontinuous growth. According to such models, an individual's cognitive, social, or personal development at higher levels of development is distinctly different from that at lower levels, involving not just quantitatively more of some function or structure but qualitatively new functions, structures, or organizations. In addition, many, although not all, organismic models assume that there is a teleological end point or final stage

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of development (e.g., formal operations in Piagetian theory) that some individuals will reach over the course of their life (Lerner, 1986; Pintrich, 1990).

In contrast, contextual models use a basic metaphor of the "historical event" as the key organizer of development, thereby shifting the focus away from the individual to the context. Contextual models emphasize the nature of the individual's interactions with others in different situations and different environments over the life course as the main influence on development (Higgins & Parsons, 1983; Lerner, 1986; Pintrich, 1990). Although contextual models such as Vygotskian theory and different life-span theories focus on the importance of the contextual and situational demands on the individual, theorists working in those frameworks also argue that change is an active, constructive, and dialectical process among the multiple contextual determinants of change and the individual's personal construal of these determinants (Pintrich, 1990). Contextual models have been gaining greater prominence in both psychology and education.

We include these contextual models in this chapter in two ways. First, we highlight recent contextual theoretical models of the development of adolescents' and young adults' cognition and self-concepts; these models are a special focus in the section on later adolescent and young adult development. Second, we highlight different contexts of development that adolescents and young adults experience—the school, family, and peer group—and examine how each influences adolescent and young adult development. We focus on the important changes that occur in these contexts during this time period—the school transitions, the "distancing" in parent–child relations, and the emerging influence of the peer group during early and middle adolescence. Because this book is on educational psychology, the larger part of the discussion is devoted to the influence of school contexts on development. Peer group and family relations are discussed most extensively in the section on early and middle adolescence. We also consider how different developmental trajectories, both positive and negative, across this period can be understood. For instance, we discuss adolescents who drop out of school versus those who enroll and succeed in college. In each section we group differences in the characteristics we discuss, with a particular focus on gender and race differences.

Most of our own theoretical and empirical work has concerned adolescents' and young adults' achievement motivation, achievement beliefs and attitudes, the relation of these beliefs to student cognition and strategy use, and their influence on students' performance in school (e.g., Eccles, 1984a, 1984b; Eccles, Adler, & Meece, 1984; Eccles & Wigfield, 1985; Eccles et al., 1983; Meece, Wigfield, & Eccles, 1990; Pintrich, 1988, 1989; Pintrich & De Groot, 1990; Pintrich & Garcia, 1991; Wigfield & Eccles, 1992; Wigfield, Eccles, Mac Iver, Reuman, & Midgley, 1991). For this reason, our emphasis will be on research that has examined students' motivation and cognition and the relation of these factors to students' achievement, an emphasis that seems appropriate to a handbook on educational psychology. Because the research in these areas across the age span under consideration is voluminous, we have had to be selective in our review. Wherever possible we make suggestions about where readers can find more information on topics that they find to be of particular interest.

DEVELOPMENT DURING EARLY AND MIDDLE ADOLESCENCE

During the early adolescent years children experience the biological and social changes associated with puberty. Most adolescents also make two important school transitions during early and middle adolescence: moving from elementary to middle school or junior high school, and then from middle school to high school. Different theorists (e.g., Blyth, Simmons, & Carlton-Ford, 1983; Eccles & Midgley, 1989; Hill & Lynch, 1983; M. Rosenberg, 1986; Simmons, Blyth, Van Cleaves, & Bush, 1979) have proposed that these changes have significant impact on a variety of developmental outcomes. Many children make these changes relatively easily. Others, however, have difficulty with one or another of these changes and as a result are at risk for a number of unfortunate developmental outcomes, such as dropping out of school, drug abuse, and delinquency. We begin our discussion of these changes with a consideration of the biological changes that occur during early adolescence.

Biological Changes Associated With Puberty

The biological changes associated with puberty are the most dramatic ones that individuals experience during their lifetimes (outside of prenatal development), and these changes have often been used to characterize the early adolescent period as a period of "storm and stress" (Hall, 1904), during which there is a great deal of conflict between children, parents, and teachers (e.g., Blos, 1979; Freud, 1958). We have heard teachers (and parents) say, "If we could just lock kids up for those years, things would be fine!" While it is undeniable that 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, e.g., Brooks-Gunn & Reiter, 1990; Dornbusch, Petersen, & Hetherington, 1991). Yet recently Lerner, Entwisle, and Hauser (1994) again used the term "crisis" in their description of the state of contemporary American adolescents. Whether or not adolescents are in crisis, the biological changes they go through do have many influences on their behaviors and thoughts.

A complete review of those biological changes is beyond the scope of this chapter (see Adams, Montemayor, & Gullotta, 1989; Brooks-Gunn & Reiter, 1990; Buchanan, Eccles, & Becker, 1992; Malina, 1990; and Paikoff & Brooks-Gunn, 1990, for a thorough discussion of these changes). Briefly, during early adolescence children undergo a growth spurt and develop secondary sex characteristics as a result of activation of the hormones controlling these physical developments. The processes by which the hormones become activated are not well understood, but their effects are clear. One important point to note is that 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 grades classrooms. There now is a large literature on the effects of early versus late maturity for boys and girls. There is some consensus that for boys, early maturity is advantageous, particularly with respect to their participation

in sports activities (see Malina, 1990) and social standing in school (Petersen, 1985). For girls, early maturity can be problematic, since they will be the first to experience pubertal changes and thus can feel "out of sync" with their agemates (see Petersen, 1988; Simmons & Blyth, 1987). In fact, Simmons and her colleagues (1979) report that early-maturing girls have the lowest self-esteem and the most difficulty adjusting to school transitions, particularly the transition from elementary to junior high school. Like early-maturing girls, later maturing boys also may have some difficulties as a result of their physical development being out of synchrony with their agemates' development.

Magnusson and Stattin have traced the long-term consequences of early maturation in females (Magnusson, 1988; Stattin & Magnusson, 1990). Early-maturing girls in Sweden obtain less education and marry earlier than their later maturing peers despite no initial differences in achievement levels. The authors present evidence that this effect is mediated through the association of early maturation with involvement with older adolescents: Early-maturing females are more likely to join older peer groups and to begin dating older males; in turn, the early-maturing girls in these peer groups are more likely to drop out of school and get married, perhaps because school achievement is not valued by their peer social network, while early entry into the job market and early marriage are. These results are consistent with the oft-cited finding that underachievement in males tends to begin in early elementary school, while underachievement in females is more likely to begin in early adolescence. Clearly, there is a need to understand the link between pubertal development and school achievement better, particularly for females.

Recently a number of researchers have been assessing how the hormonal changes that occur in early adolescence relate to children's behavior at this time. Both Paikoff and Brooks-Gunn (1990) and Buchanan et al. (1992) have proposed several different possible models to account for these relations, ranging from models that propose a direct link between hormonal change and behavior to models that propose mediated and cumulative effects—that is, the hormones' effects on behavior are said to be mediated through the physical changes in children's bodies and the social experiences early adolescents have. There is some interesting evidence for the relatively direct effects of hormones on behaviors such as aggression (Olweus, Mattsoon, Schalling, & Low, 1980, 1988; Susman, Inof-Germain, Nottelmann, Loriaux, Cutler, & Chrousos, 1987), sexuality (Udry, 1988), and mood swings (Buchanan, 1989; Buchanan et al., 1992). However, many researchers (e.g., Buchanan et al., 1992; Petersen & Taylor, 1980) have adopted the mediated effects model, arguing that hormones affect behavior indirectly through their impact on secondary sex characteristics, or in combination with social and personality factors. As an example of the latter kind of effect, Brooks-Gunn and Warren (1988) reported that pubertal changes influenced girls' body image and descriptions of themselves; for instance, breast development was associated with a positive body image, superior adjustment, and positive peer relations. These psychological differences likely influence other psychological and behavior outcomes, such as school achievement. To give an example of how pubertal changes can influence children's relations with others, Steinberg (1987, 1988) argued that parent–child relations change most at the peak of pubertal development, a point we return to later.

These physical changes are not the only changes early adolescents face; they also undergo school transitions and important social changes as well. Those researchers adopting a cumulative effects model (e.g., Simmons & Blyth, 1987; Simmons, Burgeson, Carlton-Ford, & Blyth, 1987) argue that it is the combination of changes occurring in early adolescence that can be problematic for some early adolescents. Pubertal change, school transitions, social changes such as dating, and potential 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 and early sexual activity (Simmons et al., 1987). Again, because girls enter puberty earlier than boys do, they are more likely to be coping with pubertal changes at the same time they make the middle grades school transition, and thus are more likely to face multiple transitions simultaneously.

One important educational implication of this work concerns the issue of timing for the transition from elementary to secondary school. Because of the difficulties of coping with several transitions at once, some researchers have argued that middle grades school should begin earlier, so that students make the school transition before they enter puberty. The recent movement in many parts of the country to make middle grades schools more like elementary schools and less like traditional junior high schools also reflects concern over the variety of changes early adolescents have to face. Others have argued that a kindergarten through eighth grade organizational structure may be most beneficial to early adolescents. There is increasing awareness among educators that this is a unique developmental phase that requires careful structuring of educational environments (see further discussion later in this chapter).

In sum, the physical changes that occur at adolescence are dramatic, and they have been shown to relate to emotional and behavioral changes occurring at that time. Although many adolescents have little difficulty going through these changes, they can be a source of problems for some, particularly when other social and psychological changes occur at the same time. Developmental researchers recently have done much important work on the impact of these changes on different behaviors; now educational researchers need to pay more attention to how these physical changes influence early adolescents' school performance, interactions with peers, and interactions with teachers. We will refer to the effects of these changes in later sections of this chapter.

Changes in Cognition and Achievement During Early and Middle Adolescence

A great deal has been written about how children's thinking changes during the adolescent years (e.g., see Byrnes, 1988; Keating, 1990), and many chapters in this *Handbook* are devoted to students' cognition and information processing (see in particular chapters 2, 3, and 8, as well as the chapters on learning in different subject areas). Because of this coverage we discuss this issue rather briefly in this section. We provide more detailed discussion of how cognition changes during this part of the life span in the section on development during the

college years, because many of those changes reach fruition during that developmental period.

In summarizing how children's thinking changes as they go through adolescence, the most important changes to note are the increasing ability of children to think abstractly, to consider the hypothetical as well as the real, to engage in more sophisticated and elaborate information-processing strategies, to consider multiple dimensions of a problem at once, and to reflect on oneself and on complicated problems (see Keating, 1990, for more complete discussion). Abstract thought and hypothetical thinking are of course hallmarks of Piaget's formal operations stage, the stage that he and his colleagues stated should emerge during adolescence (e.g., Piaget, 1952; Piaget & Inhelder, 1973). Although currently there is much debate over exactly when these kinds of cognitive processes emerge and although many researchers question whether the emergence of these processes reflects global stage-like changes in cognitive skills as described by Piaget, most theorists do agree that these kinds of thought processes are more characteristic of adolescents' cognition than of younger children's cognition (e.g., see Fischer, 1980).

Many cognitive theorists have assessed more specific information-processing skills, cognitive learning strategies, and metacognitive skills (see Bjorklund, 1989; A. L. Brown, Bransford, Ferrara, & Campione, 1983; Pressley, Borkowski, & Schneider, 1987; Weinstein & Mayer, 1986; and chapters 2, 3, 5, 6, and 8), and how those skills and strategies change over the course of development. This work demonstrates a steady increase in children's information-processing skills and use of more sophisticated learning strategies, in their knowledge of a variety of different topics and subject areas, in their ability to apply their knowledge to new learning situations, and in their awareness of their strengths and weaknesses as learners. One major implication of this work on children's cognitions and strategy use is that adolescents should be more efficient, sophisticated learners, ready to cope with relatively advanced topics in many different subject areas. However, Keating (1990) argued that these changes do not necessarily make adolescents better thinkers, particularly during the early adolescent years. They need more experience with these skills before the skills become very useful (see further discussion of these issues under "Cognitive Development in Late Adolescence and Young Adulthood," below).

Along with their implications for children's learning, these changes in children's thinking have important implications for individuals' self-concepts, thoughts about their future, and understanding of others. As we discuss in more detail below, theorists such as Erikson (1963) and Harter (1990b) view the adolescent years as a time of change in children's self-concepts, as they consider what possibilities are available to them and try to come to a deeper understanding of themselves. These sorts of self-reflections require the kinds of higher order cognitive processes just discussed. During early adolescence and adolescence individuals also become much more interested in understanding others' internal psychological characteristics, and friendships become based more on perceived similarity in these characteristics. Again, these sorts of changes in person perception reflect the broader changes in cognition that occur at this time.

During the 1980s many researchers examined the ways in which children and adolescents regulate their cognition and learning in educational settings. Zimmerman (1989b) stated that students are self-regulated when "they are metacognitively, motivationally, and behaviorally active participants in their own learning processes" (p. 4). As Zimmerman (1989a, 1989b), Schunk (1991a), Pintrich and De Groot (1990), and others have discussed, students who are self-regulated are more likely to use effective learning strategies, be meaningfully engaged in their own learning, and attain their academic goals. From a developmental perspective, as children's cognitive skills increase and they have more experience in educational settings, they should be able to regulate their learning better, and so be able to do more complicated and elaborate achievement tasks. Zimmerman and others have argued that helping students become self-regulated learners should be an important educational goal.

These changes in cognitive skills and the ability to regulate behavior are used as a rationale for special middle grades schools, in which students purportedly learn more challenging material. However, observational studies of seventh-grade classrooms in traditional middle schools show that the intellectual level of content taught in these classrooms often is *lower* than the intellectual level of content in elementary school classrooms, which could contribute to the decrease in academic engagement of some students (see Eccles, Wigfield, Midgley, et al. 1993, and further discussion later). In addition, these advances in information-processing skills do not necessarily translate into better school performance. Several investigators have found that grades for many early adolescents decline following the transition to junior high (see Simmons & Blyth, 1987), and that this lower performance is predictive of later dropping out (Finn, 1989; Roderick, 1992; Rumberger, 1987). These declines reflect in part the stricter grading standards in junior high and high school (see Blyth, Simmons, & Bush, 1978; Kavrell & Petersen, 1984; Schulenberg, Asp, & Petersen, 1984; and further discussion later), but they also reflect some students' difficulties in dealing with the transition to middle grades schools, and subsequent disengagement from academic pursuits.

There has been continuing debate over how much schooling can influence cognitive development and achievement outcomes. In discussing secondary schools' effects on educational attainment, Entwisle (1990) concluded from her review of relevant research that the effects of school quality on educational attainment are relatively small, and that achievement test gains in high school are relatively small. She pointed to adolescents' abilities and social class standing as more crucial variables explaining educational attainment. Keating (1990) also discussed how increases in achievement slow during adolescence. However, he also argued that a number of factors in the school setting can influence cognitive development and success in school: the amount of meaningful material introduced, how the training of thinking skills is (or is not) embedded in detailed content knowledge, and the ways in which teachers foster (or don't foster) critical thinking skills. In a recent review Ceci (1991) marshaled evidence to show, first, that schooling has a strong influence on IQ, so that children who stay in school longer have higher IQ scores; and second, that aspects of school quality such as the pacing of lessons, curricular demands and attainments, and class organization, along with the sheer quantity of schooling, also influence children's cognitive develop-

ment. However, the specific ways in which the indicators of school quality influence IQ and cognitive processes was not completely clear from his review. From this work it appears that school's influence on IQ and achievement does diminish during adolescence, but still has significant effects.

Group Differences in Cognition and Performance. Group differences in academic performance between minority and majority adolescents are well documented and often increase during secondary school (see Parham & Parham, 1989). Although some ethnic groups (particularly Asian Americans) continue to excel in school and on standardized tests, other minority students (particularly African Americans and Hispanics) fare less well in the secondary school years. Compared to whites and Asians, adolescents from these groups continue to perform worse on standardized achievement tests and enroll in more remedial and less advanced courses (Council of the Great City Schools, 1992; Rumberger, 1987; Slaughter-Defoe, Nakagawa, Takanishi, & Johnson, 1990). The latter difference is especially marked for math and science. African-American and Hispanic adolescents also drop out of high school at substantially higher rates than do white or Asian students (Rumberger, 1987), although the drop out rate among African-American students has leveled lately.

In contrast to these widening differences between ethnic groups, the pattern for gender differences is less consistent. Boys' and girls' grades do not differ substantially during secondary school and college; and in fact girls often outperform boys even in math and science (see Linn & Hyde, 1989; Vetter, 1992). Comparisons on standardized test performances and course enrollments show a different pattern: There are gender differences favoring males on both of these indicators for math and physical science achievement, even among the highly gifted and talented (Eccles & Harold, 1992; Vetter, 1992; White, 1992). In contrast, females are more likely than males to enroll in advanced courses in language and literature.

Many researchers have tried to explain these ethnic group and gender differences in achievement performance and choice. Explanations have focused on differences in quality of instruction, differences in cognitive and learning styles, differences in aptitude, and differences in self, social, and motivational factors. Much of the work on the first three of these explanations is reviewed elsewhere in this volume (see chapters 9, 11, 12, and 15). We turn next to a discussion of self, social, and motivational factors that are a crucial aspect of adolescent development and that also help explain individual and group differences in school achievement.

Adolescents' Self-Concepts, Achievement Beliefs, and Achievement Values

In this section we consider work on different aspects of children's self-beliefs, including their general self-concepts and beliefs focused more on their achievement activities (readers interested in these topics also should see chapters 4, 5, and 9, this volume). The specific achievement beliefs we focus on come from recent theoretical and empirical work on the nature of adolescents' achievement motivation and include adolescents' sense of competence and efficacy for different activities, their valuing of those activities, and the goals they have for different activities. Adolescence is a time during which these beliefs change in important ways. It is also a time in which many more choices and options become available to adolescents, which means that the beliefs they have about different activities can have more substantial effects on their behavior. For instance, earlier in school students have little choice about which subjects to take, and so even if they believe they lack competence for a particular subject and don't like it much, they still have to take it. In high school students can make choices about whether to continue taking classes in areas like math and science. As we will see, their beliefs about those subjects, as well as their performance in them, have a strong impact on these choices. Thus, to understand adolescents' specific choices of which activities to pursue and more general choices about whether or not to stay in school, we must understand how their self-beliefs change during adolescence.

Self-Concept and Identity Development During Early and Middle Adolescence. Research on adolescents' general self-concept has burgeoned in the past decade. Adolescence has long been thought to be a time of great change in children's self-concepts; in Erikson's (1963) groundbreaking work, he characterized adolescence as the time in which individuals searched for their identity, either finding it or sinking into role confusion. More recently, Harter (1990b) has discussed how during middle adolescence the self-concept is both less integrated and more unstable than at earlier or later time periods, and that perceived inconsistencies or conflicts in one's characteristics were a source of great concern during this period (see also M. Rosenberg, 1986; Simmons & Blyth, 1987; Simmons, Rosenberg, & Rosenberg, 1973). Thus, like Erikson, Harter proposed that a major task of adolescence is to integrate the disparate aspects of self.

One hallmark of recent research on adolescents' general self-concepts is that much of it is more theoretically based than earlier work (see Byrne, 1984; Harter, 1990a, 1990b; Wigfield & Karpathian, 1991). Also, researchers have focused on more particular aspects of self-concept rather than just measuring individuals' general sense of themselves, and have developed measures of self-concept that have better psychometric properties and convergent and divergent validity (see Byrne, 1984; Wigfield & Karpathian, 1991; and Wylie, 1989, for further discussion). Byrne (1984) discussed different theoretical models of the self-concept. Three of these models have received the most research attention. First is the nomothetic position that the self-concept is unidimensional. Second is a taxonomic model that proposes a multifaceted self-concept with the facets relatively distinct, and also a more general self-concept factor (e.g., see Harter, 1985, 1986). Third is a hierarchical model that posits multiple facets of the self-concept arranged in a hierarchy, with more specific aspects of the self-concept at the base and the general self-concept at the apex (e.g., see Marsh, 1990b; Marsh & Shavelson, 1985; Shavelson, Hubner, & Stanton, 1976). Most researchers now reject the nomothetic model, but there continues to be debate between proponents of taxonomic models and hierarchical models.

Marsh and his colleagues have done a great deal of empirical work to examine the structure of self-concept, utilizing Shavelson et al.'s (1976) hierarchical model of the self-concept as the theoretical basis for their work. They developed three different scales to measure children's self-concept, called the

Self-Description Questionnaire (SDQ) I, II, and III, for use with different-aged children and adolescents. These scales contain subscales that assess children's self-concepts in many different activity domains, including both academic and nonacademic activities. The primary constructs assessed on these questionnaires are children's and adolescents' beliefs about their ability and liking for each of the activity domains assessed.

Extensive factor-analytic work with these scales has shown, first, that the items in each domain form separate factors, with these factors emerging in children as young as kindergarten and first-grade children (see Marsh, Craven, & Debus, 1991; Marsh & Hocevar, 1985; see also Eccles, Wigfield, Harold, & Blumenfeld, 1993, for further evidence of young children's differentiated beliefs about their abilities). That is, there are clearly separate dimensions of self-concept even in very young children. Second, during middle childhood and early adolescence children's self-concepts appear to be organized hierarchically (e.g., Marsh, 1990b; Marsh & Hocevar, 1985; Marsh & Shavelson, 1985); however, the model is more complex than the one originally proposed by Shavelson et al. (1976). Interestingly, during later adolescence there is less evidence for a hierarchical self-concept. Marsh and O'Neill (1984) and Marsh and Shavelson (1985), using SDQIII, found that the 13 SDQIII scales were very clearly defined. However, correlations among these factors were very low (averaging .09), leading Marsh and Shavelson to conclude that late adolescents' self-concepts, though multifaceted, are not hierarchically organized. As noted earlier, Harter (1990b) also proposed that the self-concept is less integrated and more unstable during middle adolescence. Marsh and O'Neill's results may reflect this "disintegrated" self. These findings suggest an intriguing pattern in self-concept development across childhood and adolescence: from differentiated and hierarchical to differentiated into quite distinct components. We know less about how these components of self-concept are organized during the college years and after, because researchers have not assessed this issue as frequently in those populations. The research on self and identity processes during the college years and later has taken more of a process approach (see discussion below).

Researchers also have examined how children's and adolescents' general self-esteem changes (see M. Rosenberg, 1986, for a review). Simmons et al. (1973) showed that following the transition to junior high school, early adolescents' general self-esteem is lower and less stable and their self-consciousness is higher, though there has been some debate about how prevalent these negative changes in general self-esteem are. In our work (Eccles, Wigfield, Flanagan, Miller, Reuvman, & Yee, 1989; Wigfield et al., 1991), we found children's self-esteem to be lowest immediately after the transition into junior high school in seventh grade but increased during the seventh-grade year. In their longitudinal work Blyth et al. (1983) and Simmons et al. (1979) found that for most children, self-esteem scores increased across adolescence (see also Dusek & Flaherty, 1981; Nottelmann 1987; O'Malley & Bachman, 1983). In Simmons's work and Blyth's work, white girls making the transition to junior high school were the only group to show consistent evidence of declines in self-esteem. Eccles and her colleagues (Eccles & Midgley, 1989; Eccles, Wigfield, Midgley, et al., 1993) and Simmons and her colleagues (Blyth et al., 1983; Simmons & Blyth, 1987; Simmons et al., 1973, 1979) have postulated that these changes in early adolescents' self-beliefs are due in part to changes in the school environment that occur following the transition to junior high; these changes are discussed in more detail later.

Which specific components of children's self-concepts relate most strongly to their overall self-esteem or self-worth at different ages has been an important research topic in this area. Harter (1985, 1986) reported that during childhood and adolescence children's perceptions of competence correlated positively with one another and with their general self-worth, with the correlations between these constructs ranging between .40 and .67 (these correlations are somewhat lower in Marsh's work, though still significant). Harter also found that during the elementary school years and adolescence perceptions of physical appearance and social acceptance relate most strongly to children's feelings of self-worth (see Harter, 1990a, 1990b). These findings probably will come as no surprise to teachers and others working with early adolescents. Social status and physical appearance often seem to be much more important to adolescents than more mundane things like school success. The great changes in physical appearance occurring at this time likely are a major reason why adolescents are so concerned about their appearance.

A more difficult issue is determining exactly *how* the specific aspects of self-concept may influence general self-worth. Taking a broad perspective on this issue that she derived from William James, Harter (1985, 1990a) posited that individuals' general self-worth is determined in part by the synchrony between their sense of competence at different activities and the importance of those activities to them. Doing well on activities that are important should foster positive general self-worth. Harter has found support for this notion in her empirical work: Children who believe they are good at activities they think are important have more positive general self-worth than do children who believe certain activities are important but do not think they are competent at those activities.

In their discussion of how specific aspects of self-concept relate to one's overall sense of self, Marsh and Shavelson (1985) argued against merely summing scores from different subscales to form a total score. Instead, they proposed that a weighted combination of self-concept facets would be a more appropriate method. However, Marsh and Shavelson stated that it is not known exactly how individuals would engage in the process of weighting different aspects of the self-concept in determining general self-concept, a problem also noted by Harter (1986). This equation likely differs from individual to individual, although as we have seen, beliefs about physical appearance and social acceptance appear to have relatively large weights for most adolescents. Further assessment of this issue should be a priority for self-concept research in the 1990s.

This issue also has very important implications for students' school engagement. To the extent that adolescents do well in school and believe it is important, they should remain engaged in academic activities. If either their performance decreases or they begin to decide that school is not important, then their engagement will decrease. As we just noted, the importance of school often decreases during adolescence because many adolescents begin to see social activities as more important to them at this time, and they like those activities much more than they like academic tasks (see Eccles et al., 1989; Wigfield et al., 1991).

Links of General Self-Concept to School Achievement. There has been a running debate among educational researchers concerning the direction of causality in this relationship. Some have argued that achievement determines self-concept. Others take a "self-concept enhancement" approach, arguing that increases in self-concept can improve achievement (see Byrne, 1984; Calsyn & Kenny, 1977, for more complete discussion of these different views). In earlier reviews, Hansford & Hattie (1982) concluded that general self-concept and achievement were only moderately related. Scheier and Kraut (1979) argued that programs attempting to boost children's general self-concept had little effect on their achievement; thus they strongly rejected the self-concept enhancement view. These reviewers focused primarily on general self-concept; the more recent work just discussed suggests that specific aspects of self-concept relate more closely to achievement in a given area than does general self-concept (see Byrne, 1984; Eccles & Wigfield, 1985; Wigfield & Karpathian, 1991, for more detailed discussion). However, based on her review of studies of more specific aspects of self-concept and achievement Byrne (1984) concluded that causal predominance in this relationship still had not been established.

Two recent studies have addressed the issue of causality in the self-concept/achievement relation, using more sophisticated designs than in many previous studies. Skaalvik and Hagtvet (1990) look at longitudinal relations between academic self-concept of ability, general self-esteem, and school achievement in third- and fourth-grade and sixth- and seventh-grade cohorts of Norwegian students. They hypothesized that academic achievement would predict academic self-concept of ability more strongly than vice versa, and that self-concept of ability would predict general self-esteem more strongly than would academic achievement. Their structural equation modeling analyses provided some support for these hypotheses in both cohorts; however, important cohort effects emerged. For the younger cohort, academic achievement more strongly predicted self-concept of ability than vice versa, but in the older cohort there was some evidence that the relationship between the two variables was reciprocal. Results of this study thus show that there are age differences in the nature of the relation between self-concept and achievement.

In a longitudinal panel study, Marsh (1990a) examined relations at four time points between ability perceptions and grades in a sample of high school males. Prior ability perceptions and grades influenced subsequent grades, but subsequent ability perceptions were most strongly influenced by prior ability perceptions. In fact, previous grades did not relate to subsequent ability perceptions at any of the time points. Based on these findings, Marsh concluded that "the effects of academic self-concept were 'causally predominant' over those of reported grades, and these results provide strong support for the self-concept enhancement model of the relation between self-concept and achievement" (p. 651). These findings contradict Scheier and Kraut's (1979) point that self-concept is not causal, but need replication before this conclusion is fully supported. The relations between these constructs are complex, and it will be difficult to prove conclusively a causal direction in these relations. It is more likely that the relations between self-concept and achievement are reciprocal, at least by the middle school years. That is, students' achievement outcomes should continue to influence their self-concepts, and these beliefs could then influence subsequent achievement (see Eccles & Wigfield, 1985; Marsh, 1990a; Wigfield & Karpathian, 1991, for further discussion). Adolescents' more specific achievement beliefs also can influence their achievement behaviors; we consider that topic next.

Adolescents' Specific Achievement Beliefs and Achievement Motivation. Work on motivation and achievement-related beliefs also flourished in the 1980s and 1990s. As discussed in more detail in chapters 4 and 5 in this volume, much of this work has taken the broad perspective that children's *interpretations* of their achievement outcomes are the critical mediators of subsequent achievement behavior. For that reason, children's beliefs about their accomplishments have been studied extensively. The beliefs receiving the most attention include attributions for success and failure (Weiner, 1979, 1985, 1986), competence beliefs (Blumenfeld, Pintrich, Meece, & Wessels, 1982; Covington, 1984; Dweck & Elliott, 1983; Eccles et al., 1983; Harter, 1982; Nicholls, 1984, 1990; Stipek & Mac Iver, 1989), perceptions of efficacy at different tasks (Bandura, 1986; Schunk, 1991a, 1991b), perceptions of control over outcomes (Connell, 1985; Skinner, 1990), achievement goals (C. Ames, 1992; Dweck & Leggett, 1988; Nicholls, 1984; Wentzel, 1989), and achievement values (Eccles et al., 1983; Wigfield & Eccles, 1992). Still other work has focused on children's intrinsic versus extrinsic motivation (Deci & Ryan, 1985; Harter, 1981a, 1981b), and children's anxiety (Wigfield & Eccles, 1989). An important feature of much of this work has been the focus on relatively specific beliefs rather than on more global beliefs such as self-concept.

Researchers looking at how these beliefs change during early adolescence and adolescence often have found that adolescents' beliefs and values become more negative (see Eccles, Midgley, & Adler, 1984; Eccles & Midgley, 1989; Harter, 1990b; Stipek & Mac Iver, 1989, for reviews). Many early adolescents become more anxious about school (Fyans, 1979; Harter, Whitesell, & Kowalski, 1992) and have lower academic intrinsic motivation (Harter, 1981b; Harter et al., 1992). Early adolescents have lower ability self-concepts than do their younger peers (Eccles, Adler, & Meece, 1984; Eccles et al., 1983, 1989; Marsh, 1989; Wigfield et al., 1991). In a summary of his cross-sectional studies of age differences in aspects of self-concept, Marsh (1989) reported that children's beliefs about their ability in a variety of different activity domains show quadratic effects that are U shaped: lower in eighth and ninth grade than in seventh grade, and higher in tenth and eleventh grade. Some studies suggest that early adolescents' beliefs about mathematics become particularly negative (Brush, 1980; Eccles, Adler, & Meece, 1984). Because most of these studies were done in schools, they included only adolescents who were at least engaged enough in school to still be there; the achievement beliefs of adolescents' dropping out may become even more negative at earlier ages.

The work on achievement goals also suggests change across age. Nicholls (1979, 1984) defined two major kinds of goal orientations that children have, ego involvement and task involvement (see Dweck & Elliott, 1983, for a complementary analysis). Individuals adopting an ego-involving orientation seek to maximize favorable evaluations of their competence and

minimize negative evaluations of competence. Questions like "Will I look smart?" and "Can I outperform others?" reflect ego-involved goals. With task involvement, individuals focus on mastering tasks and increasing competence at different tasks. Questions such as "How can I do this task?" and "What will I learn?" reflect task involvement. Nicholls has discussed that when children focus on ego-involved goals, they try to outperform others, and are more likely to do tasks they know they can do. Task-involved children choose challenging tasks and are more concerned with their own progress than with outperforming others. Researchers (e.g., Nicholls, 1979) have suggested that ego-involved goals become more dominant during secondary school.

Wentzel (1989) assessed a broader set of goals obtained from interviews with adolescents. Some of these are similar to Nicholls's (1979) task goals, including "being a successful student," "learning new things," "understanding new things," and "doing one's best." Other academic goals, like "being better than others," are more like Nicholls's ego goals. Some of the goals concern social aspects of school (making friends, winning approval, being helpful, getting others to help, being dependable and responsible), and others concern enjoyment of school (having fun). Wentzel found that high-, middle-, and low-achieving adolescents had quite different sets of goals; the high achievers focused more on several of the achievement-related goals and social responsibility. The middle achievers and low achievers focused more on social interaction goals, and low achievers in particular stated they did not try to win others' approval or be successful. Wentzel (1989) has not looked at how these goals might differ in older and younger children. One possible change would be that for many children, social goals may become more critical than academic goals, especially during early adolescence. Further, the differences between high, middle, and low achievers may become more pronounced during adolescence, as some children continue to do well in school and others struggle. Those doing poorly may especially seek goals other than academic ones in school, or reject school altogether (see Finn, 1989; Rumberger, 1987). How individuals choose among these different goals should have an effect on their engagement in school.

Relations of Specific Achievement Beliefs and Values to Academic Performance and Choice. Some researchers have examined how adolescents' specific achievement beliefs relate to their academic achievement and choice of activities. For instance, researchers interested in children's and adolescents' self-efficacy for different tasks have posited that efficacy beliefs relate to individuals performance, persistence, and choice of different activities (e.g., Bandura, 1986; Schunk, 1991b; Zimmerman, Bandura, & Martinez-Pons, 1992). In their expectancy-value approach to this issue, Eccles, Wigfield, and their colleagues have extensively examined these relations in studies done with late-elementary-school- through high-school-aged students (e.g., Eccles, 1984a, 1984b; Eccles, Adler, & Meece, 1984; Eccles et al., 1983; Meece et al., 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 math 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 continue math and actual decisions to do so (see Wigfield, 1994; Wigfield & Eccles, 1992, for more complete reviews; see also Feather, 1982, 1988, for work on how students' values relate to their choice of college major). As we discussed earlier, 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. We know less about the processes by which adolescents come to value and devalue different activities; understanding these processes should be a research priority for the later 1990s.

Pintrich and his colleagues have examined how adolescents' expectancies and values for different school subjects relate to their use of cognitive strategies as well as to their achievement performance (Pintrich & De Groot, 1990; Pintrich & Garcia, 1991; Pintrich & Schrauben, 1992). This work is important because these researchers have specifically examined links between cognition and motivation. Pintrich and his colleagues have found that students' perceived self-efficacy and values relate positively to their use of cognitive strategies and self-regulation. The relations between achievement values, strategy use, and self-regulation are stronger than those between self-efficacy, strategy use, and self-regulation. They also found that expectancies relate more strongly to performance than do achievement values. However, in predicting performance from the motivational variables, strategy use, and perceived self-regulation, they found that it is the cognitive strategy and self-regulation scales that directly predict performance. The effects of self-efficacy and values on performance appear to be mediated through the cognitive variables. Pintrich and De Groot argued that students' self-efficacy may facilitate their cognitive engagement, and their achievement values relate to their choice of whether to become engaged, but their use of cognitive strategies and self-regulation relate more directly to performance.

Most of the research just discussed concerns how children's motivation relates to their performance and choice. In contrast, Kuhl (1985, 1987) has argued that motivation does not directly determine these outcomes, but instead only leads the individual to action beyond motivation. Once the individual undertakes an action, Kuhl posited that volitional processes take over and determine whether or not the intention is fulfilled (see also Corno, 1989, 1993). Thus, along with understanding motivational processes, Kuhl proposed that we need to understand how individuals control (or do not control) the motivated actions they undertake. He proposed several different volitional strategies individuals can use to help them carry through their plans: selective attention, encoding control, emotional control, motivational control, environmental control, and parsimony of information processing. Corno (1993) has discussed possible relations between motivational and volitional processes, and how students implement the motivated decisions they make through volitional strategies like those discussed by Kuhl.

In the work both on motivation and volition, we now need more studies of the processes involved in these evolving relations, and studies of different developmental trajectories in both these achievement-related characteristics and their relation to school performance and choice. We also need to look more closely at exactly how achievement beliefs, motivation, and volition relate to students' cognition and regulation of their

learning and actual conceptual change (see Pintrich, Marx, & Boyle, 1993; Wigfield, 1993; and chapter 9 for further discussion). We are encouraged that many researchers now are proposing more specifically how motivation, volition, and cognition relate, but much work remains to be done before we have a clear understanding of those relations.

Group Differences in Self-Concept, Motivation, and School Performance During Adolescence

Gender Differences. Though sex typing itself occurs in the preschool years (see Huston, 1983), several researchers have suggested that engaging in gender-role appropriate activities may become quite important to early adolescents, as they try to conform more to gender-role stereotypes once they enter puberty (Eccles, 1987; Hill & Lynch, 1983). Hill & Lynch 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. For instance, girls who believe that math is not appropriate for females and who wish to conform to perceived feminine roles may decide to discontinue taking math when that possibility becomes available, even if they are doing very well in that subject.

Rosenberg (1986) suggested that girls are more affected by the physical changes occurring at puberty and thus their self-concepts are more volatile than those of boys during this time period. Simmons and Blyth (1987) found that the junior high transition had a negative effect only on girls' self-esteem; our own work did not replicate this finding (Eccles et al., 1989; Wigfield et al., 1991). However, in our studies and those of others, boys reported higher self-esteem than did girls during early adolescence (e.g., Blyth et al., 1983; Marsh, 1989; Nottelmann, 1987; Rosenberg & Simmons, 1972; Simmons et al., 1979). We are unsure whether this finding reflects "true" gender differences in self-esteem or response bias, since boys tend to be more self-congratulatory than girls in their responses to self-report measures, while girls may be more modest in their self-reports (Eccles, Adler, & Meece, 1984).

There are many gender differences in children's competence beliefs for activities in different domains. We find these differences to be particularly intriguing in light of recent evidence that actual achievement and test score differences between boys and girls are decreasing. In an important article Linn and Hyde (1989) presented a meta-analysis of recent work on sex differences in verbal, mathematics, and science aptitude test performance. They concluded that sex differences in verbal ability now are negligible; differences in quantitative skills show that girls' computation skills are better at all ages and boys do better on mathematics conceptual "word" problems in high school, though again these differences have decreased in the past 15 years; and differences in science knowledge and process still favor boys, though they also are decreasing and appear to reflect experiential differences between boys and girls in science.

Despite these achievement findings, gender differences in self-perceptions remain. In our work adolescent boys had higher competence beliefs for sports and math than did adolescent girls, and the girls had higher competence beliefs for English (see Eccles et al., 1983, 1989; Wigfield et al., 1991). Marsh (1989) also reported many gender differences in response to his self-concept scales, though he noted that the gender differences explained only about 1 percent of the variance in responses. Across all three SDQ measures boys' physical appearance, physical ability, and math self-concept scores were higher than those of girls, whereas girls' scores were higher for verbal/reading and general school subscales. Interestingly, there were few age-by-sex interactions in children's and adolescents' responses to our measures or those of Marsh, suggesting that the gender differences neither increase nor decrease in magnitude across age. Recently, Eccles et al. (1993) found that many of these differences in competence beliefs occur in children as young as first graders.

Eccles, Wigfield, and their colleagues have found differences also in boys' and girls' valuing of different tasks. Boys like sports and rate sports activities as more important than do girls, whereas the opposite pattern occurs for social activities and English. There were no differences in math (Eccles et al., 1989; Wigfield et al., 1991). Although it is encouraging that boys and girls like math similarly and think it equally important, the fact that girls have less positive views of their ability in math could be problematic. If these trends continue into high school, which they seem to do (e.g., Eccles et al., 1983; Wigfield, 1984), girls should be less likely than boys to take optional advanced-level math courses. This potential problem could be further exacerbated by the fact that girls report liking social activities so much more than math; social activities also could interfere with continued participation in mathematics.

Differences for Minority Adolescents. Less is known about motivational differences across adolescents from different racial and ethnic groups, although work in this area is growing (see Berry & Asamen, 1989; Graham, 1989, 1994; and Slaughter-Defoe et al., 1990, for a review of some of this work). Of the work that has been done, most has concerned African-American adolescents and has attempted to explain the achievement difficulties many African-American adolescents experience. In her discussion of this problem, Graham (1989) stated, "Far too many minority children perform poorly in school not because they lack basic intellectual capacities or specific learning skills but because they have low expectations, feel hopeless, lack interest, or give up in the face of potential failure" (p. 40). In reviewing the research on differences between black and white students on motivational constructs such as locus of control and achievement attributions, Graham (1994) concluded that the (relatively small) literature in each area showed that differences between those groups are not very large, and often were not found. Further, she argued that many existing studies have not adequately distinguished between race and socioeconomic status, thus confounding the effects of those two variables. Graham (1989, 1994) stated that we do not yet have adequate theories explaining achievement motivation in African-American children and adolescents, and she called for theoretical work focusing on cognitive motivational variables such as attributions, achievement goals and values, and beliefs about ability and efficacy. We strongly concur with this suggestion but believe current theoretical models such as expectancy-value theory, self-efficacy theory, and attribution theory could be utilized. To give two examples of the importance of these kinds of variables in minority adolescents' achievement, Gurin and Epps (1974) found that perceived efficacy was an important predictor

of academic achievement among black adolescents. Hale-Benson (1989) also pointed to the importance of beliefs about *academic* efficacy, as contrasted to *personal* efficacy, to the achievement of African-American children, particularly boys. Interestingly, in discussing the high achievement of many Asian children, researchers have noted that those children often seem to focus on *effort* rather than ability or efficacy as a cause of their achievement (see Holloway, 1988).

Other researchers have looked at differences in components of self-concept between white and black children. Often there are no differences between groups in general self-concept or self-esteem (see Powell, 1989). However, Hare (1985) found that black adolescents' academic self-concepts were lower than those of black *children*, and he postulated that this was due to the adolescents' increasingly clear understanding of their relatively poor academic perfomance. Other studies have indicated that academic self-concept is not predictive of general self-esteem for African-American children (Bledsoe, 1967; Hare, 1977), suggesting that academic self-concept is not of critical importance to African-American children's sense of worth. Indeed, some studies have shown that possessing academic skills actually works against African-American students' social acceptance by their peers (McDermott, 1987; see also Fordham & Ogbu, 1986). Similarly, in looking at African-American students' performance in college, Steele (1992) has suggested that they develop an ambivalent orientation to academic achievement. Confronted throughout their school career with mixed messages about their competence and their potential, they lower the value they attach to academic achievement. Fordham and Ogbu have made a similar argument linking African-American students' perception of limited future job opportunities to lowered motivation to work hard on academic achievement. They argue that society and schools give African-American youth the dual message that academic achievement is unlikely to lead to positive adult outcomes for them and that they are not valued by the system. In response to these messages, African-American youth create an oppositional culture that rejects the value of academic achievement. Ogbu (1992) has discussed cogently how this dynamic is different for forced minorities (African Americans) than for voluntary minority immigrant groups (recent immigrants from Asia).

Thus, 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. For example, Spencer and Markstrom-Adams (1990) discussed identity formation (or self-concept development) during childhood and adolescence in different groups of minority children. They 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 the larger society, and lack of "identity-achieved" adults in their group who could serve as models for them. These difficulties sometimes impede identity formation in minority adolescents, leading to identity diffusion or possibly an inadequate exploration of different identities that the adolescent could take on. In discussing some of these same issues, W. E. Cross (1987) posited that to understand identity development in African-American children and adolescents, their personal identities and orientation to their racial group both must be understood. For instance, some African-American adolescents may have positive personal identities but be less positive about their racial group as a whole, whereas others may have negative personal identities but positive orientations toward their group. Cross argued that many researchers have confounded these two constructs in their studies, leading to confusion in our understanding of identity development in African-American adolescents.

Research on these issues, while growing, still is lacking, and like Graham's (1989, 1994) suggestion that more research be done on minority children's motivation in achievement settings, Spencer and Markstrom-Adams (1990) called for more research on the processes involved in the self-concept development of children from different ethnic and racial groups. We concur strongly with these recommendations and believe such work would make a very important contribution to both theory and application in these areas. At present we do not know enough to say whether or not current theoretical models are adequate for describing the development of self-concept and motivation in different groups of adolescents, or whether new models will need to be developed. As a result, it often is difficult to formulate appropriate intervention strategies to help minority children struggling with school. Certainly these topics should be a research priority for the later 1990s.

Finally, in thinking about the achievement and motivation of minority youth, it is important to consider the context of schooling and bear in mind the quality of the educational institutions that serve these youth. Thirty-seven percent of black youth and 32 percent of Hispanic youth, compared to 5 percent of white and 22 percent of Asian youth, are enrolled in the 47 largest city school districts in this country. Twenty-eight percent of these youths live in poverty and 55 percent are eligible for free or reduced-cost lunches, suggesting that class may be as important as (or more important than) race in the differences that emerge. Teachers in these schools report feeling less safe than teachers in other school districts, dropout rates are highest in these schools, and achievement levels at all grades are the lowest (Council of the Great City Schools, 1992). Finally, schools that serve this population are less likely than schools serving advantaged populations to offer either high-quality remedial services or advanced courses and courses that facilitate the acquisition of higher order thinking skills and active learning strategies (Mac Iver & Epstein, 1991). Even children who are extremely motivated may find it difficult to perform well under these educational circumstances.

Friendships and the Peer Group in Early and Middle Adolescence

Another major difference between children and adolescents concerns adolescents' more extensive involvement in social activities, sports activities, and a variety of other extracurricular activities. We have found that early adolescents rate social activities as very important to them and like them more than other activities, especially more than academic activities (Eccles et al., 1989; Wigfield et al., 1991). Indeed, activities with peers, peer acceptance, and appearance can take precedence over

school activities during this time period, often to the chagrin of parents and teachers. In fact, as mentioned earlier, Harter (1990a) found that early adolescents' physical appearance and social acceptance are the most important predictors of their general self-esteem, more important than their perceptions of their own cognitive competence (see also Harter, 1992, for discussion of some dangers in this pattern).

Children's friendships undergo some important changes during adolescence (see Berndt & Perry, 1990; Damon & Hart, 1987; Savin-Williams & Berndt, 1990; Selman, 1980). 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 more true for girls; see Douvan & Adelson, 1966). In addition, adolescents state that their friends share similar psychological characteristics, interests, and values, and that friends should be loyal to one another (see 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 (see Eisenberg, 1990; Selman, 1980). Yet Elkind (1967, 1985) proposed that many adolescents become more egocentric and self-focused at adolescence, 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).

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 B. B. Brown, 1990; Eder, 1985). Adolescents often form relatively rigid groups that sometimes differ in overall status in the school. For instance, T. B. 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 (see Hartup, 1983). 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'.

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. The problem of adolescent gangs engaging in various deviant behaviors also has received a great deal of media attention, and indeed gangs do pose serious social problems in many cities. However, although pressure from peers to engage in misconduct does increase during adolescence (see B. B. Brown, 1990), many researchers disagree with the simplistic view that peer groups often have a bad influence on adolescents. Hartup (1983) discussed how most adolescents tend to agree more with their parents' views on major issues such as morality, the importance of education, politics, and religion. Peers had more of an influence on things such as dress and clothing styles, music, and activity choice. B. B. 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; those involved in sports will have other athletes as friends, those serious about school will seek academic friends, and those less involved in school may belong to groups with similar attitudes. In one example of this kind of influence, Bain and Anderson (1974) discussed work showing that adolescents whose friends planned to go to college themselves were more likely to attend college. Thus the peer group acts more to reinforce predispositions than to change adolescents' characteristics in a major way.

Social acceptance also has been shown to relate to a variety of positive mental health outcomes, both before and during adolescence (see Parker & Asher, 1987). For instance, T. B. Perry (1987) found that adolescents who were satisfied with their friendships reported higher self-esteem. Miller and Berndt (1987) reported that children whose friendships had more positive characteristics were themselves more involved in school and received better grades. And Berndt and Hawkins (1987) found that children with good friendships during sixth grade were more popular in seventh grade, following the transition to junior high school. 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 seventh-grade year, though children's perceptions of their social ability at the end of seventh grade still were lower than they were at the end of sixth grade, before the transition (Wigfield et al., 1991).

How do children's friendships relate to their school achievement? From B. B. Brown's (1990) review (see also chapter 26, this volume), 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. In contrast, low achievers whose friends are primarily other low achievers may begin to do even worse in school. There is evidence to indicate that low achievers do tend to gravitate together in class (see McMichael, 1980). Given the importance of social acceptance to adolescents, children lacking friends may not get involved in extracurricular activities, and their school performance may suffer as well. Rejected children are at risk for numerous negative social and psychological outcomes (see Asher & Coie, 1990). One way that positive social interaction has been facilitated in classrooms is through cooperative learning (see Johnson & Johnson, 1987; Mergendoller & Marchman, 1987; Slavin, 1990). Generally, research on the effects of cooperative learning show that when it is used in classrooms, children are more accepting of one another, and fewer children are socially isolated. Thus the greater use of such techniques could mitigate the effects of peer rejection on students' achievement.

Group Differences in Children's Friendships

Relations between boys and girls undergo obvious and important changes during adolescence. Most researchers doing

sociometric studies of children's friendships during elementary school ask children for same-sex ratings of their friendships, because same-sex friendships are most prevalent at that time. During early adolescence cross-sex interactions become more prevalent, although interactions between the sexes are often awkward initially. In her observational study of friendships in a middle school, Schofield (1980) found that boys and girls often did not interact much, although some cross-sex friendships were developing. More important, in talking with boys and girls she found that they were very aware that they soon would be dating, and many of the awkward interactions between boys and girls featured teasing, pushing and shoving, and halting conversation seemed to reflect that awareness. Because of this awareness of the imminence of dating, Schofield described boys and girls as having "complementary" social identities.

The work by Magnusson and Stattin (Magnusson, 1988; Stattin & Magnusson, 1990) extends this idea into the high school years and beyond. They report that some young women (early maturers especially) are particularly likely to be channeled into complementary relations with their male peers. Because these females look sexually mature, they are more likely to become involved with older peers, particularly with older male peers who interact with them in terms of reciprocal gender roles. As the young women get caught up in this peer social system, they shift their attention from academic activities into heterosocial activities and roles. As a result, they lower their educational aspirations and, in fact, end up obtaining less education than other females, often marrying and becoming parents earlier instead. Thus, what appears initially as a charming set of complementary social identities can have quite negative consequences for some females (especially those who mature early) as their social identity detracts from educational focus and attainment.

Relations across different ethnic and racial groups do not seem as complementary. In Schofield's (1980) study, despite strong efforts by school staff to create mixed groups of children in different school activities, children would resegregate at the first opportunity they had. In addition, different groups in the school did not have extremely positive views of one another; in many instances white students thought black students were aggressive, disruptive, and poor achievers, whereas black students thought white students were conceited and racist. As a result of these patterns Schofield suggested that black and white children have conflicting rather than complementary social identities. These patterns may be exacerbated by the separate neighborhoods in which children of different races often live. DuBois and Hirsch (1990) found that 80 percent of both black and white early adolescents said they had friends from other races at school. However, only 25 percent of the adolescents said that they had friends from other races in their neighborhoods. One way to increase cross-race friendships is the use of cooperative learning in the classroom; Slavin (1990) and Johnson and Johnson (1987) reported that both cross-race acceptance and interaction increase when more cooperative learning is used. The promotion of positive social relations among different groups will become even more important as our schools continue to become more diverse.

It is also important to consider the possible impact of peer groups on achievement behavior. As noted above, the reciprocal gender-role peer interactions of early-maturing females appear to have a negative effect on their academic achievement. Similar processes have been suggested for various ethnic groups. As noted earlier, several investigators have suggested, and provided evidence, that black youth are likely to receive less peer support for academic achievement than white youth (e.g., Fordham & Ogbu, 1986). Steinberg, Dornbusch, and Brown (1992) concluded, based on their recent study of ethnic differences in achievement in California and Wisconsin, that both the lower performance of African Americans and Hispanics and the higher performance of whites and Asians are more a result of ethnic differences in peer support for academic achievement than a result of ethnic differences in either the value parents attach to education or the youths' beliefs regarding the likely occupational payoff for academic success. Yet family relations continue to have an important impact on adolescents' school achievement and many other aspects of their development. We consider family relations during adolescence next.

Changes in Family Relations During Early and Middle Adolescence

A prevalent view holds that relations between parents and adolescents are much stormier than parent–child relations or relations between parents and their adult children. This view is more common in the clinical literature (e.g., Blos, 1979; Freud, 1958) and in anecdotal reports from some parents than it is in the research literature (e.g., Buchanan et al., 1992; Collins, 1990; Dornbusch et al., 1991; Petersen, 1988). Although the extent of actual disruption in parent–adolescent relations is debated, there is little question that parent–child relations do change during adolescence. As adolescents become physically mature they often seek more independence and autonomy and may begin to question family rules and roles. One clear finding is that parents and adolescents do have more conflicts than are reported in earlier parent–child relations, with those conflicts often centering on things like dress and appearance, chores, and dating (see Collins, 1990; Paikoff & Brooks-Gunn, 1990, for reviews). These conflicts appear to be especially likely when families experience different kinds of stress, particularly the stresses associated with economic hardships (McLoyd, 1990), and discord among family members (see Barber & Eccles, 1992; Hauser & Bowlds, 1990). Unfortunately, in U.S. society today more families are experiencing these kinds of economic and social difficulties, and so more conflicts will be likely. Yet, as mentioned earlier, many researchers find that parents and adolescents agree more than they disagree on core values such as beliefs about the importance of education, political beliefs, and spirituality (see Hartup, 1983).

Other ways in which relations between parents and adolescents differ from earlier parent–child relations is that they have fewer interactions and do fewer things together outside the home. This is perhaps best illustrated by the horror many adolescents express at being with their parents at places like shopping malls, where their friends might be. Also, especially during puberty, affective relations can be more negative, and girls in particular report feeling less accepted by parents (see Collins, 1990, for a more thorough review). In fact, Steinberg (1989) has argued that puberty has a special role in this distancing in

relations between adolescents and parents. He argued for an evolutionary basis for this distancing, citing evidence from nonhuman primates that puberty is the time when parents and offspring often go their separate ways. Because human parents and adolescents usually continue to live together for a long time after adolescents go through puberty, distancing rather than complete separation may be the evolutionary vestige in humans. Although he did not take an evolutionary perspective, Collins (1990) wrote that the distancing in parent–adolescent relations has great functional value for adolescents, in that it fosters their individuation from their parents, allows them to try more things on their own, and develops their own competencies and efficacy.

One arena in which this distancing may not be as advantageous is in parents' involvement in their adolescents' education. Most studies of parental involvement in schooling show that it is highest in elementary school and drops off after that (see Eccles & Harold, 1993, in press; Epstein, 1991). There are many reasons why this occurs. One reason is the structure of the schools themselves. Elementary schools are smaller and often located in the neighborhood, and children usually have just one teacher most responsible for their education. Secondary schools are much larger, more diffuse, and adolescents have a different teacher for each subject area. Parents often find this larger and more bureaucratic institution harder to deal with. At the same time, during adolescence children also may make it clear they do not want their parents to be as directly involved in their school activities, either at home or at school. Yet numerous studies indicate that continued parental involvement in their children's education is a critical factor in their school performance (see Eccles & Harold, 1993, in press; Epstein, 1991, for reviews). This has been demonstrated also in studies of African-American adolescents (see Hale-Benson, 1989; Jenkins, 1989); indeed, one hallmark of Comer's (1988) school reform programs is to enhance parental involvement in many different aspects of schooling.

Although the contextual factors associated with different school environments have a strong influence on parents' involvement or lack of involvement in their children's schooling, and thus may influence adolescents' school achievement, organismic factors also are important. Parenting style is one such factor, and developmental psychologists have explored how parents' styles of interaction and discipline with their children influence a host of children's developmental outcomes. Baumrind (1971) identified several different broad parental styles, the three most prominent being authoritarian, permissive, and authoritative. Authoritarian parents are those who have strict rules in place, allow little give-and-take about those rules, and use assertive discipline strategies. Permissive parents essentially leave children to their own devices and discipline them infrequently. Authoritative parents provide rules and structure, but discuss those rules with their children and show some flexibility in how the rules are applied. In addition, they are warm and accepting of their children. Baumrind found that the authoritative parenting style was associated with many positive developmental outcomes, more so than either the authoritarian or permissive styles. In a study with adolescents, Dornbusch, Ritter, Leiderman, Roberts, and Fraleigh (1987) assessed how these different parenting styles related to high school students' grades. In support of Baumrind's work, the authoritative parents tended to have adolescents who did better in school, whereas both authoritarian and permissive parents did not.

This brief review highlights the importance of both contextual factors (characteristics of the school environment) and organismic factors (parenting styles) in influencing both parental involvement in school and parental impact on adolescents' achievement. Finding ways to maintain parental involvement in their children's education during the middle and high school years remains an important priority.

SCHOOL TRANSITIONS AND ADOLESCENT DEVELOPMENT

Very few developmental periods are characterized by so many changes at so many different levels as is adolescence. The changes during adolescence relate to pubertal development, social role redefinitions, cognitive development, school transitions, and the emergence of sexuality. With rapid change comes a heightened potential for both positive and negative outcomes. And, although most individuals pass through this developmental period without excessively high levels of "storm and stress," many individuals do experience difficulty during this period (see Dryfoss, 1990). As a result, a substantial portion of America's adolescents are not succeeding as well as might be hoped: Between 15 percent and 30 percent (depending on ethnic group) 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 a regular basis (McCord, 1990; Office of Educational Research and Improvement, 1988). Many of these problems appear to begin during the early adolescent years (Carnegie Council on Adolescent Development, 1989). Is there something unique about this developmental period that puts individuals at greater risk for difficulty as they pass through it? In this section, we look more closely at this question, reviewing evidence for the hypothesis that some of the negative psychological changes associated with adolescent development result from a mismatch between the needs of the developing adolescent and the opportunities afforded them in their school environment. Thus we will be discussing an important context, the school environment, in which adolescent development takes place. We focus especially on the transition from elementary to middle or junior high school, but also discuss the transition into high school.

The Middle Grades School Transition

Evidence suggests that the early adolescent years mark the beginning for some individuals of a downward spiral that can lead to academic failure and school dropout. For example, both Roderick (1992) and Simmons and Blyth (1987) found a marked decline in some early adolescents' school grades as they moved into junior high school. The magnitude of this decline was predictive of subsequent school failure and dropout. Similar declines have been documented for such motivational constructs as interest in school (Epstein & McPartland, 1976), intrinsic motivation (Harter, 1982), self-concepts/self-perceptions (Eccles, Midgley, & Adler, 1984; Simmons et al., 1979), and

confidence in one's intellectual abilities, especially following failure (Parsons & Ruble, 1977). There are also reports of increases during early adolescence in such negative motivational and behavioral characteristics as test anxiety (Wigfield & Eccles, 1989), learned helplessness responses to failure (Rholes, Blackwell, Jordan, & Walters, 1980), a focus on self-evaluation rather than task mastery (Nicholls, 1990), and both truancy and school dropout (Rosenbaum, 1976; see Eccles & Midgley, 1989; Eccles, Midgley, & Adler, 1984, for full reviews). Although these changes are not extreme for most adolescents, there is sufficient evidence of a gradual decline in various indicators of academic motivation, behavior, and self-perception over the early adolescent years to make one wonder what is happening (see Eccles & Midgley, 1989). Although few studies have gathered information on ethnic or social class differences in these declines, we do know that academic failure and dropout is especially problematic among some ethnic groups and among youth from low-socioeconomic-status communities and families (e.g., Hauser, 1991). It is probable, then, that these groups will show declines in academic motivation and self-perception as they move into and through the secondary school years.

A variety of explanations have been offered to explain these negative changes. Some have suggested that such declines result from the intrapsychic upheaval assumed to be associated with early adolescent development (e.g., Blos, 1965). Others have suggested that it is the coincidence of the timing of multiple life changes. For example, Simmons and her colleagues have suggested that the coincidence of the junior high school transition with pubertal development accounts for the declines in the school-related measures and self-esteem, particularly for females (e.g., Blyth et al., 1983; Simmons & Blyth, 1987). Still others suggest that it is the nature of the junior high school environment rather than the transition per se that is important (e.g., Eccles & Midgley, 1989; Eccles, Midgley, & Adler, 1984). Drawing on person–environment fit theory (see Hunt, 1975), Eccles and Midgley (1989) proposed that the negative motivational and behavioral changes associated with early adolescence could result from the fact that traditional junior high schools are not providing appropriate educational environments for early adolescents. According to person–environment theory, behavior, motivation, and mental health are influenced by the fit between the characteristics individuals bring to their social environments and the characteristics of these social environments. Individuals are not likely to do well or to be motivated if they are in social environments that do not fit their psychological needs. If the social environments in the typical middle grades schools do not fit well with the psychological needs of adolescents, then person–environment fit theory predicts a decline in adolescents' motivation, interest, performance, and behavior as they move into this environment.

Evidence for this perspective is reviewed in this section. But in order to understand the role school environments might play in beginning negative motivational changes at early adolescence, two types of evidence need to be considered: evidence drawn from studies that follow the standard environmental influences approach, and evidence from studies that adopt a developmental variant on the person–environment fit paradigm, or, as Eccles and Midgley term it, the stage–environment fit approach (see Eccles & Midgley, 1989).

General Environmental Influences Model. Work in a variety of areas has documented the impact of various classroom and school environmental characteristics on motivation. For example, literature on big schools versus small schools has demonstrated the motivational advantages of small secondary schools, especially for marginal students (Barker & Gump, 1964). Similarly, the literature on teacher efficacy has documented the positive student motivational consequences of high teacher efficacy (Ashton, 1985; Brookover, Beady, Flood, Schweitzer, & Wisenbaker, 1979). Finally, organizational psychology has demonstrated the importance of participatory work structures on worker motivation (Lawler, 1976). The point is, there may be systematic differences between the academic environments of typical elementary schools and those of typical junior high schools and middle schools; if so, those differences could account for some of the motivational changes seen among early adolescents as they make the transition into junior high school or middle school. In other words, the motivational problems seen in early adolescence may be a consequence of the type of school environment these students are forced to adapt to rather than characteristic of the developmental period per se (see Higgins & Parsons, 1983, for a full elaboration of this argument). The same argument could be made for the problems associated with the transition to high school and college; these transitions are discussed later in this chapter.

Developmental Stage–Environment Fit Model. A slightly different analysis of the possible environmental causes of the motivational changes associated with the junior high school transition draws on the idea of person–environment fit. Such a perspective leads one to expect negative motivational consequences for individuals when they are in environments that do not fit well with their needs (Hunt, 1975; Lewin, 1935). At the most basic level, this perspective suggests the importance of looking at the fit between the needs of early adolescents and the opportunities afforded them in the traditional junior high school environment. A poor fit would help explain the declines in motivation associated with the transition to either junior or senior high school.

An even more interesting way to use the person–environment fit perspective is to put it into a developmental framework. Hunt (1975) argued for the importance of adopting a developmental perspective on person–environment fit in the classroom. He suggested that teachers need to provide the optimal level of structure for children's current levels of maturity while at the same time providing a sufficiently challenging environment to pull the children along a developmental path toward higher levels of cognitive and social maturity. Eccles and Midgley (1989) extended this perspective to an analysis of the motivational declines associated with the junior high school transition. They suggested that different types of educational environments may be needed for different age groups in order to meet the individual's developmental needs and to foster continued developmental growth. Exposure to the developmentally appropriate environment would facilitate both motivation and continued growth. In contrast, exposure to a developmentally inappropriate environment, especially a developmentally regressive environment, was predicted to create a particularly poor person–environment fit, which in turn would lead to declines in motivation and in attachment to the goals

of the institution. Imagine two trajectories, one a developmental trajectory of individual growth, the other a trajectory of environmental change across the school years. Positive motivational consequences are predicted when these two trajectories are in synchrony with each other, that is, when the environment is both responsive to the changing needs of the individual and offers the kinds of stimulation that will propel continued positive growth. In other words, transition to a facilitative and developmentally appropriate environment, even at this vulnerable age, should have a positive impact on children's perceptions of themselves and their educational environment. In contrast, negative motivational consequences are predicted when these two trajectories are out of synchrony. If this is true, then a transition into a developmentally inappropriate educational environment should result in the types of motivational declines that have been identified as occurring with the transition into junior high school.

This analysis suggests a set of researchable theoretical and descriptive questions. First, what are the developmental needs of the early adolescent? Second, what kind of educational environment would be developmentally appropriate in terms of both meeting these needs and stimulating further development? Third, what are the most common changes in the academic environment before and after the transition to middle or junior high school? Fourth, and most important, are these changes compatible with the physiological, cognitive, and psychological changes early adolescents experience? Or is there a developmental mismatch between maturing early adolescents and the classroom environments they experience before and after the transition to the junior high school—a mismatch that results in a deterioration in academic motivation and performance for some children? Finally, can a similar analysis be used to understand motivational changes associated with the transition to high school and college, or from school to work?

Stage-Environment Fit and the Transition to Junior High School. Eccles and Midgley (1989) argued that there are developmentally inappropriate changes at the junior high school in a cluster of classroom organizational, instructional, and climate variables, including task structure, task complexity, grouping practices, evaluation techniques, motivational strategies, locus of responsibility for learning, and quality of teacher–student and student–student relationships. They argued that these changes contribute to the negative change in students' motivation and achievement-related beliefs assumed to coincide with the transition into junior high school. The research of Eccles, Midgley, Wigfield, and their colleagues, as well as the little other available research, provides support for these suggestions. This research is summarized below (see also Arderman & Maehr, 1994).

Remarkably few empirical studies have focused on differences in the classroom or school environment across grades or school levels. Most descriptions have focused on school-level characteristics such as school size, degree of departmentalization, extent of bureaucratization, and so on. For example, Simmons and Blyth (1987) pointed out that most junior high schools are substantially larger (by several orders of magnitude) than elementary schools, and instruction is also more likely to be organized and taught departmentally. As a result of both of these differences, junior high school teachers typically teach several different groups of students each day and are unlikely to teach any particular students for more than 1 year. In addition, 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. Thus, the opportunity for forming close relationships between students and teachers is effectively eliminated at precisely the point in the students' development when they have a great need for guidance and support from nonfamilial adults (see Carnegie Council on Adolescent Development, 1989). Such changes in student–teacher relationships, in turn, are likely to undermine the sense of community and trust between students and teachers, leading to a lowered sense of efficacy among the teachers, an increased reliance on authoritarian control practices by the teachers, and an increased sense of alienation among the students. Such changes are also likely to decrease the probability that any particular student's difficulties will be noticed early enough to get the student necessary help, thus increasing the likelihood that students on the edge will be allowed to slip onto negative trajectories leading to increased school failure and dropout.

Although differences on these characteristics can have important effects on teacher beliefs and practices and on student alienation and motivation, until quite recently those links were rarely assessed. Most attempts to assess the classroom environment have included only one grade level and have related differences in the environment to student outcomes, particularly scores on achievement tests. Little research has focused on systematic differences between the classroom environment of elementary and junior high or middle schools. But looking across the various relevant studies, six patterns emerge with a fair degree of consistency.

Authority Relationships. First, despite the increasing maturity of students, junior high school classrooms, as compared with elementary school classrooms, are characterized by a greater emphasis on teacher control and discipline and fewer opportunities for student decision-making, choice, and self-management (e.g., Brophy & Everston, 1976; Lounsbury, Marani, & Compton, 1980; Midgley & Feldlaufer, 1987; Midgley, Feldlaufer, & Eccles, 1988a,b; Moos, 1979). For example, Brophy, Everston, and their colleagues found consistent evidence that junior high school teachers spend more time maintaining order and less time actually teaching than elementary school teachers (Brophy & Everston, 1976). Similarly, Midgley et al. (1988b) found that sixth-grade elementary school math teachers reported less concern with controlling and disciplining their students than these same students' seventh-grade junior high school math teachers reported one year later.

Similar differences emerge on indicators of students' opportunity to participate in decision-making regarding their own learning. For example, Ward and her colleagues found that upper elementary school students are given more opportunities to take responsibility for various aspects of their schoolwork than seventh-grade students in a traditional junior high school (Ward, Mergendoller, Tikunoff, Rounds, Dadey, & Mitman, 1982). Similarly, Midgley and Feldlaufer (1987) reported that both seventh graders and their teachers in the first year of junior high school indicated less opportunity for students to participate in classroom decision-making than did these same students and

their sixth-grade elementary school teachers one year earlier. In addition, using a measure developed by P. Lee, Statuto, and Kedar-Voivodas (1983) to assess the congruence between the adolescents' desire for participation in decision-making and their perception of the opportunities for such participation, Midgley and Feldlaufer (1987) found a greater discrepancy when the adolescents were in their first year in junior high school than when these same adolescents were in their last year in elementary school. Clearly, the fit between the adolescents' desire for autonomy and their perception of the extent to which their school affords them opportunities to exchange in autonomous behavior had decreased during the junior high school transition.

As outlined earlier, person–environment fit theory suggests that such mismatch between young adolescents' desires for autonomy and control and their perception of the opportunities in their environments should result in a decline in the adolescents' intrinsic motivation and interest in school. More specifically, given the general developmental progression toward increased desire for independence and autonomy during early adolescence, Eccles and Midgley (1989) predicted that adolescents who experience decreased opportunities for participation in classroom decision-making along with increased desires for greater participation in such decisions should be at particularly high risk for negative motivational outcomes. In a longitudinal analysis of the P. Lee et al. (1983) measure, Mac Iver and Rueman (1988) provided some support for this prediction. They compared the changes in intrinsic interest in math for adolescents reporting different patterns of changes in the match between their desire for participation in classroom decision-making and their perception of the opportunity for such decision-making across the junior high school transition. Consistent with the prediction, it was the adolescents who thought that their seventh-grade math classrooms were putting greater constraints on their preferred level of participation in classroom decision-making than did their sixth-grade math classrooms who showed the most marked declines in their intrinsic interest in math as they moved from sixth grade into seventh grade.

Another way to look at stage–environment mismatch is to look for differences between children of the same age who are at different maturational levels. C. L. Miller (1986) and her colleagues adopted just such a strategy with the Michigan Study of Adolescent Life Transitions (MSALT). They focused on individual differences between sixth-grade girls at different stages of pubertal development in the match between the girls' desire for decision-making opportunities and their perceptions of the opportunity for such decision-making in their classrooms. Consistent with the intraindividual longitudinal pattern of age-related change reported above, the more physically mature female adolescents expressed a greater desire for input into classroom decision-making than did their less developmentally mature female classmates (C. L. Miller, 1986). Unfortunately, as was true for the longitudinal results, the more physically mature females did not perceive greater opportunities for participation in classroom decision-making. Although girls of varying degrees of pubertal development were in the same classrooms, the more physically mature ones (i.e., the early developers) reported fewer opportunities for participation in classroom decision-making than did their less mature female peers (i.e., the on-time and late developers).

These maturational differences are even more striking when one looks at the within-year changes in these female adolescents' perceptions of the opportunities they have to participate in classroom decision-making. Miller calculated the mean change in these females' perceptions of opportunities from fall to the spring testing and then looked at this change as a function of their pubertal status. The early-maturing females showed a negative change (a decline) over the course of the school year in the extent to which they felt they could participate in classroom decision-making. In contrast, the late-maturing females in these same classrooms showed a positive change (an increase) over the course of the school year (C. L. Miller, 1986). How could this be, given that these adolescents were in the same classrooms? Did the teachers actually treat these adolescent females differently—i.e., did the teachers respond to earlier physical maturity with more controlling behavior? Or did the adolescents perceive a similar environment differently—i.e., did the early-maturing adolescents perceive the same level of adult control as providing less opportunity for self-control than did the later maturing adolescents? Evidence from educational psychology, developmental psychology, and general psychology suggests that either or both of these explanations could be accurate: Teachers do respond differently to various children in the same classroom, depending on a variety of characteristics (Brophy & Evertson, 1976), and people do perceive similar environments differently depending on their cognitive and/or motivational orientation (see Baron & Graziano, 1991). More detailed classroom observations are needed to determine the exact nature of the relation between teachers' behavior and adolescents' perceptions. But, more important for the issues central to this discussion, the degree of mismatch between the female adolescents' desire for input and their perception of these opportunities in their classroom environment was related to their pubertal maturity, with the mismatch greater among the more physically mature female adolescents than among the less mature.

These last results are especially interesting in light of the finding by Simmons and her colleagues (e.g., Simmons & Blyth, 1987; Simmons et al., 1979) that it is the more physically mature girls who are also involved in dating who respond to the transition to junior high school with increased levels of truancy and school misconduct and decreased self-esteem. Simmons et al. (1979) and Simmons and Blyth (1987) have explained this result in terms of multiple risks—these girls are the early adolescents who are experiencing school and pubertal transitions simultaneously. Alternatively, it is possible that it is the mismatch between their desire for a less controlling adult environment and their perceptions of a decline in the actual opportunity for participation that puts these females at risk for the most negative motivational outcomes.

Affective Relationships. Second, junior high school classrooms, as compared with elementary school classrooms, are characterized by a less personal and less positive teacher–student relationship (see Eccles & Midgley, 1989). For example, in a study by Trebilco, Atkinson, and Atkinson (1977), students reported less favorable interpersonal relations with their teachers after the transition to secondary school than before. Similarly, Feldlaufer, Midgley, and Eccles (1988) found that both students and observers rated junior high school math teachers as less friendly, less supportive, and less caring than the teachers these same students had 1 year earlier in the last year of elemen-

tary school. The seventh-grade teachers in this study also reported that they trusted the students less than did these students' sixth-grade teachers (Midgley et al., 1988b).

Research on the effects of classroom climate indicates that the quality of student–teacher relationships is associated with students' academic motivation and attitudes toward school (e.g., Fraser & Fisher, 1982; Moos, 1979; Trickett & Moos, 1974). Consequently, there is reason to believe that transition into a less supportive classroom will impact negatively on early adolescents' interest in the subject matter being taught in that classroom. Midgley et al. (1988a) tested this hypothesis. As predicted, it was the early adolescents who moved from elementary teachers they perceived to be high in support to junior high school teachers they perceived to be low in support who showed the commonly reported decline in the value they attached to math; in contrast, the early adolescents who moved from teachers they perceived to be low in support to teachers they perceived to be high in support showed an increase in the value they attached to math. These differences were especially marked among the low-achieving students, suggesting that low-achieving students are particularly at risk when they move to less facilitative classroom environments following a school transition.

Organization of Instruction. Third, the shift to junior high school is associated with an increase in practices such as whole-class task organization and between-classroom ability grouping (see Eccles & Midgley, 1989). For example, in the MSALT study, whole-group instruction was the norm in the seventh grade, small-group instruction was rare, and individualized instruction was not observed at all. In contrast, the sixth-grade teachers mixed whole- and small-group instruction within and across subjects areas (Rounds & Osaki, 1982). Similar shifts toward increased whole-class instruction, with most students working on the same assignments at the same time, using the same textbooks, and doing the same homework assignments, were evident in the MSALT study (Feldlaufer et al., 1988). In addition, several reports have documented the increased use of between-class ability grouping beginning in junior high school (e.g., Oakes, 1981).

Changes such as these increase social comparison, concerns about evaluation, and competitiveness (see Eccles, Midgley, & Adler, 1984; Rosenholtz & Simpson, 1984). They may also increase the likelihood that teachers will use normative grading criteria and more public forms of evaluation, both of which negatively affect many early adolescents' self-perceptions and motivation. These changes may also make aptitude differences more salient to both teachers and students, leading to increased teacher expectancy effects and decreased feelings of efficacy among teachers (see Eccles & Wigfield, 1985).

Teacher Efficacy. Fourth, junior high school teachers feel less effective as teachers, especially for low-ability students. This was one of largest differences found between sixth- and seventh-grade teachers in the MSALT study. Seventh-grade teachers in these junior high schools reported much lower confidence in their teaching efficacy than did the sixth-grade elementary school teachers in the same school districts (Midgley et al., 1988b). Others have reported similar results. W. Alexander and George (1981) found that teachers in traditional junior high schools had a lower sense of their teaching efficacy than did teachers in a more innovative middle grades school.

Several studies have documented the impact of teacher efficacy on student beliefs, attitudes, motivation, and achievement. For example, Brookover et al. (1979), using schools as the unit of analysis, found negative correlations between teachers' sense of academic futility and students' self-concept of ability and self-reliance. W. Alexander and George (1981), in the study just mentioned, found that teachers in the more innovative middle grades school had higher expectancies for student success and also were more likely to take personal responsibility for student failure than were the junior high school teachers. Ashton (1985) found that teachers' sense of efficacy related positively to high school students' performance on math and language arts achievement test scores. The more efficacious teachers also were more encouraging and supportive of students.

Given these associations, differences in teachers' sense of efficacy before and after the transition to junior high school could contribute to the decline in early adolescents' beliefs about their academic competency and potential. Midgley, Feldlaufer, and Eccles (1989) tested this hypothesis. They divided their adolescent sample into four groups based on median splits of their math teachers' ratings of their personal teaching efficacy. The largest group of students (559 out of the 1,329 included in these analyses) moved from a high-efficacy sixth-grade math teacher to a low-efficacy seventh-grade math teacher. Another 474 adolescents had low-efficacy teachers both years, 117 moved from low- to high-efficacy teachers, and 179 had high-efficacy teachers both years. As predicted, the adolescents who moved from high-efficacy to low-efficacy teachers during the transition (the most common pattern) ended their first year in junior high school with lower expectancies for themselves in math, lower perceptions of their performance in math, and higher perceptions of the difficulty of math than the adolescents who had experienced no change in teacher efficacy or who had moved from low- to high-efficacy teachers. These effects were especially marked among the low-achieving adolescents. By the end of the junior high school year, the confidence that those low-achieving adolescents who had moved from high- to low-efficacy teachers had in their ability to master mathematics had declined dramatically—a drop that could well mark the beginning of the downward spiral in school motivation that eventually leads to school dropout for so many low-achieving adolescents. It is important to note, however, that this same decline was *not* characteristic of the low-achieving adolescents who moved to high-efficacy seventh-grade math teachers.

Cognitive Level of Academic Content. Fifth, despite what one might expect, given what we know about cognitive development at this age, there is evidence that classwork during the first year of junior high school requires lower levels of cognitive skill than classwork at the elementary level. One rationale often given for the large, departmentalized junior high school system is its efficiency in providing early adolescents with higher level academic work and more varied academic courses taught by specialists in their fields. It is argued that the early adolescents are ready for more formal instruction in the various subject areas. Two assumptions are implicit in this argument. First, it is assumed that more formal, departmentalized teaching is conducive to the learning of higher order cognitive processes.

Second, it is assumed that children in junior high school are undertaking higher order learning tasks in their departmentalized courses. Both of these assumptions can be questioned. For example, in an observational study of 11 junior high school science classes, only a very small proportion of tasks required higher level creative or expressive skills; the most frequent activity involved copying answers from the board or textbook onto worksheets (Fleming & Chambers, 1983; Mergendoller, Marchman, Mitman, & Packer, 1988). Similarly, Walberg, House, and Steele (1973) rated the level of complexity of student assignments across Grades 6 to 12 according to Bloom's taxonomy of educational objectives. The proportion of low-level activities peaked in Grade 9, the first year after the students in this district made the transition into secondary school. Both of these studies, as well as other studies, suggest that the actual cognitive demands made on adolescents decrease rather than increase as they make the transition from primary school into secondary school. No one has researched the impact of this decline in the cognitive demands placed on students, but one could speculate that its impact is likely to be negative, especially in light of the more rigorous grading practices often associated with this school transition (see review below). Although the students have been led to believe that they are moving to a more challenging school environment, they may well find themselves in classes that are reviewing the material they learned in elementary school, and they are likely to be given lower grades for their work. As we shall see below, this experience is not likely to facilitate their motivation.

Grading Practices. Finally, junior high school teachers appear to use a higher standard in judging students' competence and in grading their performance than do elementary school teachers (see Eccles & Midgley, 1989). There is no stronger predictor of students' self-confidence and efficacy than the grades they receive. If grades change, then we would expect to see a concomitant shift in the adolescents' self-perceptions and academic motivation. There is evidence that junior high school teachers use stricter and more social comparison–based standards than elementary schoolteachers to assess student competency and to evaluate student performance, leading to a drop in grades for many early adolescents as they make the transition into junior high school. For example, Finger and Silverman (1966) found that 54 percent of the students in New York State schools experienced a decline in their grades when they moved into junior high school. Similarly, Simmons and Blyth (1987) found a greater drop in grades between sixth and seventh grade for adolescents making the transition to junior high school at this point than for adolescents enrolled in kindergarten through eighth grade schools. Roderick (1992) found a similar difference in the likelihood of a grade drop between fifth and sixth grade, depending on whether the students moved into a middle school or remained in a kindergarten through sixth grade elementary school between these two grades. Finally, the decline in grades is not matched by a decline in the adolescents' scores on standardized achievement tests, suggesting that the decline reflects a change in grading practices rather than a change in the rate of students' learning (Kavrell & Petersen, 1984). Imagine what this decline in grades might do to early adolescents' self-confidence, especially in light of the fact that the material is not likely to be more intellectually challenging. Although neither Simmons and Blyth nor Roderick looked at this specific question, both documented the impact of this grade drop on subsequent school performance and dropout. Even controlling for a youth's performance prior to the school transition, the magnitude of the grade drop following the transition into either junior high school or middle school is a major predictor of early school leaving in both studies.

Summary. Changes such as those reviewed in the last several pages are likely to have a negative effect on many children's motivational orientation toward school at any grade level. But Eccles and Midgley (1989) have argued that these types of school environmental changes are particularly harmful in early adolescence, in light of what is known about psychological development during this stage of life. Evidence from a variety of sources suggests that early adolescent development is characterized by increases in desire for autonomy, peer orientation, self-focus and self-consciousness, salience of identity issues, concern over heterosexual relationships, and capacity for abstract cognitive activity (see B. B. Brown, 1990; Eccles & Midgley, 1989; Harter, 1990b; Katchadourian, 1990; Keating, 1990; Simmons & Blyth, 1987). Simmons and Blyth have argued that adolescents need a reasonably safe and an intellectually challenging environment to adapt to these shifts, an environment that provides a "zone of comfort" as well as new opportunities for growth. In light of these needs, the environmental changes often associated with the transition to junior high school seem especially harmful in that they emphasize competition, social comparison, and ability self-assessment at a time of heightened self-focus; they decrease decision-making and choice at a time when the desire for control is growing; they emphasize lower level cognitive strategies at a time when the ability to use higher level strategies is increasing; and they disrupt social networks at a time when adolescents are especially concerned with peer relationships and may be in special need of close adult relationships outside of the home. The nature of these environmental changes, coupled with the normal course of individual development, is likely to result in a developmental mismatch so that the fit between the early adolescent and the classroom environment is particularly poor, increasing the risk of negative motivational outcomes, especially for adolescents who are having difficulty succeeding in school academically. One important task for researchers in the 1990s is to assess whether the kinds of mismatch between school environments and early adolescent development we have discussed can be generalized to early adolescents in different kinds of educational settings (e.g., rural vs. urban schools; rich vs. poorer schools) or to different groups of early adolescents (see Berliner, 1989).

The Transition to High School

Although there has been less work on the transition to high school than on the transition to junior high school, the work on high school environments suggests that many of the same problems noted earlier for the junior high school transition characterize the transition into high school as well. Several of the changes are continued and exaggerated. For example, high schools are typically even larger and more bureaucratic than junior high and middle schools. Based on arguments related to the economies of scale, most public school districts have

moved toward consolidation at the secondary school level. It was hoped that consolidation would increase efficiency and provide more equal educational opportunities for all students in the district. In a major review of the impact of high school organization on teachers and students. Bryk, Lee, and Smith (1990) concluded that

> these aims . . . have not been achieved. The incidence of dropping out . . . increased through the 1970's and remains depressingly high, with rates in excess of 50 percent not uncommon in urban schools; . . . [T]he expansion of school bureaucracy . . . has contributed to student passivity and teacher alienation, both of which are now pervasive. A system of mass education relying on processes of specialization and centralization has promoted a breakdown in human commitment. . . . These forces appear especially disruptive in large urban districts. (p. 201)

They go on to give numerous examples of how the sense of community among teachers and students is undermined by school size and bureaucratic structure (e.g., Bryk & Driscoll, 1988; Newmann, 1981). Teachers do not know each other and do not know the students. Little effort is made to make the instruction relevant to the students. There is little opportunity for students and teachers to get to know each other and, as a consequence, there is distrust between them and little attachment to a common set of goals and values. As was true of the transition into junior high school, there is little opportunity for the students to form a mentorlike relationship with a nonfamilial adult. It is predictable that such an environment will undermine the motivation and involvement of many students, especially those who are not doing particularly well academically, those not enrolled in the favored classes, and those who become alienated from the values of the adults in the high school. But few studies have actually followed students through this transition in order to test this hypothesis; and even fewer studies have investigated ways in which existing high schools could be modified to overcome some of these problems. Designing and evaluating such interventions is an important challenge for the 1990s.

Also for reasons of efficiency, most large public high schools have organized instruction around curricular tracks that sort students into different groups. As a result, there is even greater diversity in the educational experiences of high school students than of middle grades students. Unfortunately, this diversity is often associated more with the students' social class and ethnic group than with differences in the students' talents and interest (Lee & Bryk, 1989). As a result, curricular tracking has served to reinforce social stratification rather than foster optimal education for all students, particularly in large schools (Lee & Bryk, 1989). Lee and Bryk have shown that average school achievement levels do not benefit from this curricular tracking—quite the contrary. Evidence comparing Catholic high schools 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. A more thorough examination of how the organization and structure of our high schools influence cognitive, motivational, and achievement outcomes should be an important task for research in the 1990s. During the 1980s we learned much about the transition from elementary to junior high school; now it is time to look more closely at transitions into and out of high school.

Leaving High School Early: The Problem of Dropping Out. 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. A more fundamental educational decision is whether or not to stay in school at all. Along with these choices about schooling and academics, high school students (and, increasingly, middle school students) face a variety of social choices as well: how sexually active to become, whether or not to use drugs and alcohol, and whether or not to engage in different kinds of deviant or criminal behaviors. Some adolescents struggle with eating disorders. Others, for a variety of reasons, decide that they cannot cope with their circumstances, and commit suicide. These distressing choices, and the troubling statistics showing higher levels of teen pregnancy, adolescent drug use, and adolescent crime and violence, indicate that more and more adolescents are engaging in what McCord (1990) calls problem behaviors (see also Dryfoss, 1990; Lerner et al., 1994). A complete review of the work on these problem behaviors is outside the scope of this chapter; interested readers should consult Hauser and Bowlds (1990) and McCord (1990) for excellent discussions of stress, coping, and problem behaviors that occur during adolescence. Because we are focusing primarily on academic outcomes in this chapter, in this section we focus on the issue of dropping out of school.

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. Although there is debate about the exact numbers of students dropping out (see Rumberger, 1987), the numbers are large enough to be a major social problem. Further, a disproportionate number of African-American and Hispanic students leave high school before graduating; in some school districts as many as 50 percent or more of these students leave school before completing their degree work (Bryk et al., 1990). 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 low ability, low achievement, coming from a poverty background, working too many hours while trying to go to school, and early pregnancy. Entwisle pointed out that adequate prospective studies that could be used to identify which children would be most likely to drop out are lacking. Work that is available, however, suggests that students who do poorly in elementary school, who exhibit serious behavior problems in school, and who are 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 argued for the need to understand better *processes* related to dropping out, rather than just listing factors associated with the problem. In beginning to address that issue, Finn argued for a participation-identification model of the dropout 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 will 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 in this chapter and elsewhere (e.g., Eccles et al., 1983; Wigfield, 1994; Wigfield & Eccles, 1992). Students who do not value math 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 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. 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 like dropping out of school (see Finn, 1989, for a critique of the self-esteem explanation of dropping out of school).

We have been discussing dropping out of school as a choice; however, many students drift into dropping out of school rather than consciously deciding to do so. That is, the circumstances of their lives are 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 play a major role in influencing some students to drop out (see Finn, 1989; Rumberger, 1987). For the students who do make a more conscious decision that school is not for them, the relative contribution of both specific achievement values and more general valuing of education also plays a significant role, one that has not been addressed sufficiently.

One of the major outcomes of dropping out of school is that it seriously reduces the adolescent's chances of obtaining a well-paying job (see Rumberger, 1987). Rumberger estimated that the economic and social costs of dropping out both to the individual and to our society at large run into the billions of dollars. Not only do individuals who drop out lose potential earnings, but society often has to provide more extensive social services for dropouts, because they 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, in today's society a high school degree no longer ensures reasonable job prospects. When U.S. 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 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. Rumberger (1987) and Finn (1989) both discussed the need for intervention programs to keep more students in school, programs that focus on giving those students skills they will need in the workplace. Encouraging more students to stay in school, and finding meaningful and rewarding things for them to do after they finish high school, is an important challenge for the later 1990s. This challenge is important enough that the Clinton administration already is talking about ways to restructure high schools so that students not going to college receive adequate technical skill training so that they can obtain good jobs in the increasingly technological workplace.

Other students finish high school and move on to the world of work, or to college. What happens to them? That is the broad focus of the next section.

DEVELOPMENTAL CHANGES DURING LATE ADOLESCENCE AND YOUNG ADULTHOOD

This section describes the important changes that occur after the high school years. As in the previous section, we focus first on changes in later adolescents' and young adults' cognition, self-concepts, and motivation. We briefly consider group differences in these important constructs. We then discuss how individuals cope with the transitions from high school to college, and from college to the work force, although space limitations curtail the discussion on transitions. We realize that there are many individuals who do not go on to college and that the trajectories of development may be somewhat different for them (see McCall, Evahn, & Kratzer, 1992). Nevertheless, we focus on college students because this is a handbook on educational psychology, and the college classroom is an important site for development, learning, and instruction.

As we discussed earlier, both psychological and educational theory and research are moving away from organismic models that highlight the individual without giving equal or more weight to the context, and toward more contextual models (Bruner, 1990; Pintrich, 1994). However, organismic models that focus on the individual have to date been the most frequently used models in research on college students and are representative of much of the research reviewed in this section. In contrast, research on adults has tended to rely on a life-span approach to development and seems to represent an adequate integration of the tensions between organismic and contextual perspectives (Lerner, 1986). These life-span approaches (see Abeles, 1987; Baltes, 1987; Baltes & Schaie, 1973; Featherman, 1983) assume that development can be both quantitative and qualitative and is ongoing across all ages, not just limited to certain ages like childhood and adolescence, as suggested in many organismic models. In addition, life-span approaches generally describe development as being multidimensional (changes occur across biological, social, cognitive, and affective dimensions); multidetermined (changes can be a function of biological, social, physical, psychological, and historical events); and multidirectional (changes can occur in different patterns and trajectories, depending on both individual and situational factors; change is not necessarily directed along a single path to a particular end point such as formal operations). Finally, a recent assumption of the life-span approach is that the process of development is a dynamic relation between growth (gain) and decline (loss), with a larger ratio of gains to losses early in life but the ratio declining with age (Baltes, 1987). Of course, along with life-span approaches there are other contextual models, including Vygotskian, constructivist, and postmodern deconstructionist views, available to guide future research and thinking. One of the key issues for future research on adolescents and

young adults is the specification and refinement of these different contextual models and their application to classic problems in educational psychology such as classroom learning and motivation.

Cognitive Development in Late Adolescence and Young Adulthood

We discussed earlier how cognition changes during adolescence; we build on that discussion in this section. To recapitulate briefly, in terms of research on adolescent thinking and cognitive development, Piagetian theory (Inhelder & Piaget, 1958) is the standard model, with the fourth stage, formal operations, representing the sine qua non of mature thinking. The hallmarks of formal operational thinking (cf. Flavell, Miller, & Miller, 1993; Keating, 1980, 1990) include (a) abstract thinking, or the ability to think about possibilities beyond concrete reality; (b) propositional thinking, or the ability to think about logical relations among ideas, concepts, propositions, and cognitive operations; (c) combinatorial thinking, or the ability to generate different possible combinations of ideas and cognitive operations; (d) hypothetical-deductive thinking, or the ability to think scientifically, including the ability to define and control variables and to generate, test, and revise hypotheses; (e) the ability to regulate cognition, including the ability to define a problem, select a strategy, and revise options in the course of solving a problem, (f) metacognition, or the ability to think about cognitive processes, memory, learning, language, and thinking; and (g) the ability to be self-reflective about not just cognitive processes but also issues such as identity, existence, morality, and personal relationships.

The second decade of life is when much of this thinking should develop, especially the latter third (18–20 years), when many students are in college. In fact, in classic Piagetian theory, most college students should have attained formal operations. However, the research on college students suggests that almost half have not acquired formal operations by their freshmen year (Pascarella & Terenzini, 1991). In addition, the few longitudinal studies of college students (e.g., Eisert & Tomlinson-Keasey, 1978; Mentkowski & Strait, 1983) have shown very small gains in formal operational thinking from freshman to senior years. Moreover, depending on the sample (including both secondary- and post-secondary-school students) and the nature of the assessment tasks, the results can range from zero to 100% of the sample demonstrating formal operations, with most estimates in the 40 percent to 70 percent range (King, 1986; Neimark, 1983; Pascarella & Terenzini, 1991).

Obviously, there are difficulties in the operational definition and assessment of formal operations (Keating, 1980, 1990). These formal operations are typically assessed by interviewing students regarding their strategies for solving a variety of Piagetian-type tasks such as conservation, the balance beam problem, the pendulum problem, and their reasoning on syllogisms or the creation of combinations. These tasks are decontextualized and often do not accurately reflect students' knowledge on academic or school tasks (Keating, 1980; King, 1986; Laboratory of Comparative Human Cognition, 1983). In addition, the problem of intraindividual differences in the level of reasoning depending on the domain assessed remains a major problem for any strong stage model (in Piagetian terms, the problem of horizontal decalage). For example, DeLisi and Staudt (1980) found that college students majoring in physics, political science, and English were more likely to display formal operational reasoning on problems relevant to their discipline when presented with the traditional pendulum problem (physics), a political socialization problem, or a literary analysis problem. This type of domain specificity of reasoning suggests that students' thinking may depend more on their knowledge in a particular subject area and on the type of task presented to them than on any broad general logical structure such as a stage of formal operations (cf., A. L. Brown et al., 1983; Gelman & Baillargeon, 1983; Glaser, 1984). Accordingly, there has been a move away from strong stage formalizations such as Piagetian formal operations in the study of adolescent cognitive development (Keating, 1990; Pintrich, 1990).

There are, however, more recent post-Piagetian or neo-Piagetian models that describe cognitive development beyond formal operations (e.g., Case, 1985, 1992; Demetriou, Efklides, & Platsidou, 1993; Fischer, 1980). These models are organismic and assume that cognitive development is hierarchical, with later stages dependent on the attainment of earlier stages such as formal operations. These models do propose stage-related descriptions of thinking, but they tend to use a "soft" stage model where stages can be more domain specific and related to actual experience rather than "hard" stage models where development is universal and not context dependent (Kohlberg & Armon, 1984). As Campbell (1993) points out, there are different variations on this domain-specific stage development notion, with the weakest version suggesting that development is the same in different domains but that the pace of development varies (e.g., Fischer, 1980). Stronger versions include the idea that there can be different steps in different domains (e.g., Turiel & Davidson, 1986) and the strongest version is that development follows different processes in different domains (e.g., Keil, 1990). The nature and definition of a stage is one of the key issues in current cognitive developmental theory and research in adolescence and adulthood. In addition, the neo-Piagetian proposal that development is stagelike but can vary by domain still leaves unresolved questions regarding the nature of domains. These questions include (a) How are domains to be identified? (b) What are the boundaries between domains? (c) Do these boundaries remain fixed or do they change with development? and (d) Within a "domain," are there subdomains and subsubdomains (see Campbell, 1993)?

Fischer and his colleagues (Fischer, 1980; Fischer, Hand, & Russell, 1984; Fischer & Kenny, 1986; Fischer, Kenny, & Pipp, 1990) have proposed a skill theory of development that builds on Piagetian theory but does not assume universal change in cognition across domains. For instance, this model accepts horizontal decalage as both theoretically and empirically important rather than as something to be explained away. Fischer argues that skill development is domain specific as a function of individual differences in aptitude and motivation as well as variations in environmental conditions that might support or discourage skilled performance. He uses the same construct as Vygotsky's zone of proximal development, albeit labeled range of development, to describe the difference between displaying a skill under conditions of optimal support and not being able to use a skill in many ordinary environmental conditions

(Fischer et al., 1990). There are ten levels in skill theory, with levels 7 through 10 emerging between 10 and 25 years of age. Levels 7 and 8 (approximately ages 10–15) parallel many of the operations subsumed under formal operations concerning the use of abstractions and the coordination of two abstractions. Level 9 (ages 19–21) involves building abstract systems in which a number of different abstractions (intention, responsibility, morality) can be related to one another in complex ways. Finally, level 10 (ages 24–26) involves the integration of two or more abstract systems from level 9 to form a general theory or generate general principles such as an overall epistemological framework (Fischer et al., 1990). This model represents an integration of organismic and life-span views and provides a useful theoretical model that can be applied to development in many domains, not just cognition. For example, Harter (1990c) has suggested that the development of a general ability to coordinate and integrate abstractions serves an adaptive function for adolescents as they become better able to cope with their multiple, and potentially conflicting, self-concepts. Recently, Kitchener, Lynch, Fischer, & Wood (1993) mapped the development of epistemological thinking onto Fischer's skill levels.

In another model that describes thinking beyond formal operations, Commons and his colleagues (Commons & Richards, 1984a, 1984b; Commons, Richards, & Kuhn, 1982) have described postformal stages of development that go beyond the reasoning about variables indicative of formal operations to reasoning about systems of variables (fifth stage) to reasoning about paradigms (sixth stage). These abilities to think systematically and paradigmatically would be especially relevant to college courses requiring students to compare and contrast different theories and paradigms, such as courses in the social sciences or education. A related model includes the empirical research on college students' ability to think dialectically (Basseches, 1980, 1984, 1986) based on Riegel's (1973, 1975, 1976) suggestion that a fiftn stage of development beyond formal operations would involve dialectical thinking. Basseches has described 24 schemas or dialectical operations, among which are the ability to look for and recognize examples of the dialectic inherent in competing principles, models, or theories (cf. the systematic and paradigmatic thinking of Commons) and the ability to use dialectical logic to analyze different systems of knowledge and theories in terms of their context and relationships to each other (Basseches, 1986). The ability to use these operations would be related to students' and teachers' understanding of many of the neo-Vygotskian and situated cognition models that emphasize the situational, contextual, and dialectical nature of behavior. To the extent that students in educational psychology courses at the undergraduate or graduate level are not able to use these dialectical schemas, this model would predict that they would have difficulty in those courses.

Another developmental model that addresses some of the same issues and has enjoyed popularity in the research literature on higher education as well as in the literature on college student counseling and faculty improvement is W. G. Perry's (1970, 1981) model of college student development. In contrast to the emphasis on the formal logic of students' reasoning, as described above, Perry has been more concerned with the content of college students' epistemological reasoning about the intellectual and moral relativism often encountered in the course of a college education. The nine stages and transitions are quite detailed (see W. G. Perry, 1970, 1981), but the initial positions describe students who are moral and intellectual absolutists and believe that there are correct solutions for every moral and intellectual problem and rely on authorities to teach them the proper answers. The middle positions in Perry's scheme are characterized by the discovery of relativistic answers to problems and contextual reasoning about issues. In these stages authorities are perceived as other individuals who have beliefs and opinions that may be helpful to the student in understanding the moral and intellectual issues, but authorities' beliefs may be challenged on contextual and relativistic grounds. The final stages in Perry's model describe students as developing a set of personal values to which they become committed as an expression of their own identity. This personal commitment helps the student cope with the relativity inherent in many intellectual and moral issues and allows the student to move away from absolutism and idealism to the pragmatic considerations and commitments of adulthood (Labouvie-Vief, 1982).

Besides the methodological issues concerning operationalization and measurement (use of interviews and reliable coding of responses) and sampling (original developmental scheme based on a longitudinal study of 84 undergraduate men from Harvard), one of the theoretical difficulties with Perry's description of the stages of college student development is that it seems to blur some important distinctions between intellectual, moral, and identity development. In particular, the model seems to shift away from the epistemological concerns of stages 1 through 5 to identity issues in stages 6 through 9 (Pascarella & Terenzini, 1991). Following this criticism, Kitchener and her colleagues developed the reflective judgment model, which focuses solely on the development of individuals' beliefs and assumptions about the nature of knowledge or forms of epistemic cognition (King & Kitchener, 1994; King, Kitchener, Davison, Parker, & Wood, 1983; Kitchener, 1983, 1986; Kitchener & King, 1981; Kitchener et al., 1993). This includes individuals' understandings about what can and cannot be known (e.g., how a child learns), how they can come to know something (e.g., through experience, research, intuition, etc.), and how certain they can be in their knowledge (e.g., absolutely, probabilistically). These assumptions about the nature of knowledge influence how individuals will justify their beliefs, identify and define problems, seek solutions, and revise their problem-solving behavior (Kitchener, 1986; cf. Arlin, 1986; Pintrich et al., 1993; Posner, Strike, Hewson, & Gertzog, 1982). The model proposes that there are seven stages that characterize the different levels of epistemic cognition. Individuals in the first stage believe that reality can be understood through direct observation, that there is no uncertainty in this knowledge, and that there is therefore no need to justify one's beliefs. The second and third stages reflect a move away from these absolutist beliefs, although there is still an assumption of a true reality and an assumption that differences in perceptions of reality are due to false claims or uncertainty. Direct observation and knowledgeable authorities provide a means of deciding among competing claims in these stages. In the fourth and fifth stages reality is seen as subjective and dependent on individuals' perceptions and experience. Accordingly, in this world view, beliefs are not certain and can be developed only through a reliance on data, logic, and rules of inquiry that are applicable to a specific context.

In the final two stages, there is a move away from the purely relativistic thinking of the fourth and fifth stages to beliefs that reality is constructed through personal interpretations and that appropriate methods (e.g., personal evaluation of the opinions of experts, critical inquiry, or synthesis) are available for evaluating the evidence for different world views. This leads to the development of a personal world view that acknowledges that some claims about reality are better or more complete than others (Kitchener, 1986).

Baxter Magolda (1992) and Kuhn (1991) also have examined the development of epistemological reasoning. Baxter Magolda interviewed 70 male and female college students over the course of 5 years, from their first year in college to 1 year after graduation. She found that students' responses to her open-ended interviews about the nature of learning and knowledge evolved over time through four levels, from a focus on absolute knowing (knowledge is certain) through transitional knowing (knowledge is partially certain, partially uncertain), to independent knowing (all knowledge is uncertain), to the final level of contextual knowing (knowledge is contextual and judged on the basis of evidence within a certain domain or context). Kuhn's cross-sectional study of individuals ranging in age from middle adolescence (14–15 years old) to adulthood (through the 20s, 40s, and 60s) found a similar shift across age groups from an absolutist to a multiplist to an evaluative perspective on the nature of knowledge and epistemology.

The development of epistemological thinking is an important aspect of a college education. It appears that there is a developmental shift over time (in both cross-sectional and longitudinal studies), with upperclass students demonstrating higher levels of thinking about the nature of knowledge, evidence, and rules of inquiry, with the biggest shift often coming between the first and second years of college (Pascarella & Terenzini, 1991). In addition, even when age, socioeconomic status, and general ability differences between those who attend and those who do not attend college are controlled for, there appears to be a strong effect of a college education on students' ability to reason about epistemological issues (Kuhn, 1991; Pascarella & Terenzini, 1991).

Although an important outcome of college, these models of epistemological reasoning still focus on general reasoning schemas that cut across domains, reflecting the authors' general organismic metatheory. There is a need for more research on the domain specificity of students' reasoning in line with the assumptions of a life-span approach. For example, Donald (1990) has shown that experts in certain disciplines (professors in both basic and applied fields of study in physics, psychology, and English) use different methods for determining truth and verifying knowledge claims and make differential use of conceptual models and empirical evidence. It would seem likely that students majoring in the different disciplines might reason differently, depending on the principles used by their professors. Moreover, Kuhn (1991) found domain and intraindividual differences in students' reasoning and epistemological theories about school failure, unemployment, and recidivism in criminals (three social science topics), suggesting a role for content knowledge within a discipline. Accordingly, there is a need for more research on how these general reasoning schemas interact with students' content and disciplinary knowledge in specific domains. For example, Schommer and her colleagues (Schommer, 1990; Schommer, Crouse, & Rhodes, 1992) showed that college students' beliefs about the nature of knowledge and learning influenced their comprehension and metacognition. Students who believed that knowledge is simple (knowledge consists of isolated facts), that learning occurs quickly, and that knowledge is unchanging were lower in metacognitive comprehension monitoring and actual comprehension, even when prior knowledge was taken into account. These two studies focused on specific domains (statistics, psychology, health/nutrition) and parallel some of the findings for students' beliefs about mathematics (Schoenfeld, 1983, 1985).

Research on these epistemological beliefs and the role they play in student learning, cognition, and motivation is just beginning but promises to be an important area of future endeavor as traditional scientific and rational models of thinking and reasoning are called into question by constructivist, deconstructionist, and feminist scholars. Research is needed on how and why certain types of epistemological beliefs may influence students' thinking and learning. In addition, research on epistemological beliefs is important for understanding not just student learning, but also teacher development, learning, and education (Pintrich, 1990). It may be that an important goal of teacher education involves changing novice teachers' absolutist beliefs about education toward a more evaluative and reflective belief system about education. Finally, the vast majority of this research has focused on college students, but it is likely that the genesis of these epistemological beliefs occurs earlier, in junior high and high school. In one of the few studies that has examined high school students, Schommer (1993) found the same pattern of epistemological beliefs as she found in college students. Clearly, these beliefs begin to develop earlier than the freshman year in college, but there is little research on the early development of these beliefs and the roles that different school contexts may play in that development.

At the same time, a great deal of conceptual and definitional work remains to be done. The general epistemological beliefs about knowledge and reasoning that are a concern of W. Perry and Kitchener are not the same as beliefs about how to learn in mathematics (Schoenfeld, 1983), or how to learn in general (Baxter Magolda, 1992). Nor are they a general orientation to the source of knowledge (Belenky, Clinchy, Goldberger, & Tarule, 1986). There has been a tendency to label a variety of beliefs as epistemological beliefs (e.g., learning is innate, success is unrelated to hard work; see Schommer et al., 1992) when some of these beliefs may be better classified as motivational beliefs. These different beliefs may be related and general epistemological beliefs may have some motivational "force" to inspire more cognitive engagement, but there needs to be more theoretical and empirical work on the nature of these beliefs and the different functions they may play in learning.

In addition, there has been very little research on how gender, ethnicity, and socioeconomic differences may influence students' reasoning and their beliefs. Belenky et al. (1986) interviewed college women about their epistemological beliefs and found that some women emphasized a more connected and empathic reasoning style beyond their earlier absolutist and multiplist stages. They suggested that this trajectory may be an equally valid path for the development of reasoning, in contrast to the final stages of Perry's or Kitchener's models, which rely on a more traditional scientific paradigm as the epitome of

sophisticated thinking. At the same time, Baxter Magolda (1992) and Kuhn (1991), who included both men and women in their samples, did not find very important gender differences in epistemological reasoning; this result contrasts with the work of researchers such as Belenky et al. (1986) or Gilligan (1982). In this sense the argument of Belenky et al. parallels other feminist critiques (e.g., Gilligan, 1982; Noddings, 1984) of Kohlberg's and Piaget's models of development. The nature of these gender differences and of potential ethnic or class differences needs to be explored in more detail in future research. At the same time, the basic construction and search for differences along gender, ethnicity, or class lines can paradoxically reify some of the bias and inequality inherent in the social structures that create the need to examine questions of differences (Hare-Mustin & Marecek, 1988). Accordingly, future research needs to be sensitive to this issue and to the possibility that, given a life-span perspective that emphasizes contextual influences and experiences, there probably are important individual differences within the broad categories of gender, class, or ethnicity.

In summary, current research on cognitive development in the college years has addressed issues of both the content and form of thinking. As domain-specific and contextual models become more important and researchers move away from very general Piagetian and information-processing models, issues regarding the content of students' thinking will become even more important. There is a great need for research on students' understanding of disciplinary and epistemological knowledge, not just the domain-specific declarative knowledge represented in college courses. It appears that acquisition of domain-specific and discipline-specific knowledge is one of the key cognitive abilities that college students acquire as they major in different areas (Snow & Swanson, 1992), paralleling the cognitive development of very young children (Wellman & Gelman, 1992). Accordingly, research on late adolescent thinking in the next decade needs to develop in-depth descriptions of students' theories and frameworks for thinking in these different domains.

Self-Concept and Motivation in Late Adolescence and Young Adulthood

Identity Development: General Models. Paralleling the Piagetian view of cognitive development, many of the traditional organismic models of social and personal development conceptualize development as evolving over time in terms of both the objective events (i.e., physical, social, biological) that occur at certain chronological ages or stages in the development of the individual as well as the more subjective, psychological issues that these events seem to evoke in individuals (e.g., Erikson, 1963; Levinson, 1978; Neugarten, 1968; Veroff & Veroff, 1980). As Brim and Ryff (1980) point out, biological maturational events, social role changes in marital, career, and family status, and changes in the physical environment as a result of relocation, physical injuries or illness, or changes in physical appearance are all objective events that individuals must cope with as they develop. These events provide one aspect of the context that help shape individuals' social and personal development.

Traditional stage models propose that these contextual events are usually age dependent and in the course of normal development most individuals will cope with the psychological issues elicited by these events at approximately the same time. For instance, regarding self-concept development, during the college years, the issue of identity remains the most salient (Chickering, 1969; Erikson, 1963; Marcia, 1980). Research has focused on the dimensions of identity as well as the structure and form of the developmental patterns. For example, one of the most popular models in the literature on higher education is Chickering's (1969) model of the seven vectors or domains of college student identity development (achieving competence, managing emotions, developing autonomy, establishing a stable identity, developing interpersonal relations, developing purpose [including career goals], and developing integrity). Development within and across these domains is assumed to show directional change following the general orthogenetic principle of increased differentiation and integration. It appears that there is development in these areas in the course of a student's four years in college, but there is very little evidence that attending college per se influences the course of development (Pascarella & Terenzini, 1991). This would be expected, in that the seven domains reflect normative life tasks most individuals confront in U.S. society regardless of college attendance.

A model that has focused more on the form of identity development is Marcia's (1980) extension of Erikson's identity versus diffusion stage. Marcia proposes that there are two dimensions of identity, presence or absence of a crisis and extent of personal commitment to an occupation and an ideology. By crossing these two dimensions, a 2 by 2 matrix is formed, generating four different individual modes or personal styles for coping with the identity issue. The most adaptive mode is labeled *identity achievement* and represents students who have experienced a crisis, wrestled with the issues, and made a commitment to a particular identity. In contrast, students who have made a commitment to an identity but who have not experienced a crisis are said to be in *foreclosure status,* suggesting a too early resolution of identity (e.g., going along with a parentally chosen occupation). The *identity diffusion mode* is represented by students who have not made any commitments and may or may not have experienced a crisis. Finally, the *moratorium mode* reflects students who are actively in crisis but have only a vague commitment (Marcia, 1980). Although these four distinct modes were originally seen as mutually exclusive categories of stable individual differences, current theorizing suggests that they may represent a normative developmental sequence (Harter, 1990c; Waterman, 1982, 1985). In addition, Waterman (1982), in line with a life-span perspective, has suggested that there may be alternative trajectories of identity development, with the potential for diffusion and moratorium to reappear after the attainment of identity achievement. Finally, Marcia's empirical work on this model remains limited, and we do not know the extent to which it can be generalized.

Identity Development: Domain-Specific and Social Cognitive Models. As in the area of cognitive development, general stage models provide an important description of self-concept development. However, recent research has taken a more social cognitive and life-span perspective and focused on the domain-specific features of development, intraindividual and individual differences in development, and contextual influences on development. This general constructivist approach has suggested that a variety of idiosyncratic, personal, and contextual constru-

als of the general life events and psychological issues are experienced by individuals over the life course. The resolution of identity issues is an important psychological event in most people's lives, but there is a great deal of variability in how these issues are defined, represented, and resolved.

There are a number of models of this process, including life tasks (Cantor & Kihlstrom, 1987), current concerns (Klinger, 1977), personal projects (Little, 1983), and life themes (Csikszentmihalyi, 1985). In these constructivist models, an individual's life tasks may not follow a proscribed, universal pattern of development (e.g., identity and generativity issues may be resolved before intimacy issues). For example, in a series of studies of college students, Cantor and her colleagues (see Cantor & Kihlstrom, 1987) found that students could identify a number of concerns that were personally demanding and guided their activities. These included academic goals (doing well, getting organized) as well as social goals (making friends, being on their own, and establishing an identity). Eisenhart and Holland (e.g., Eisenhart, 1990; Holland & Eisenhart, 1988) in an ethnographic study of 23 college women found that negotiating male–female intimate relationships was a major life task of the transition to college. In addition, they noted that there were a number of different strategies the women used to resolve the difficulties surrounding these relationships but that the range of strategies was limited by certain peer group beliefs. As Cantor and Kihlstrom (1987) pointed out, these concerns reflect normative life tasks (i.e., achievement, intimacy, independence) that would be predicted by most developmental models (e.g., Erikson, 1963; Veroff & Veroff, 1980). However, the life-task approach, in line with the assumptions of a life-span contextual approach, differs in assuming that individuals will define these issues somewhat differently and will seek different strategies for solution. For example, some students defined independence in terms of coping without parental support, while others concentrated on more practical matters such as money management. In addition, students had very different problem-solving strategies as a function of their personal construal of college life tasks (Cantor & Kihlstrom, 1987). Accordingly, this model suggests that all college students will have to cope with issues related to achievement, identity, and intimacy and that a more microgenetic, intraindividual, and contextual analysis will be revealed, not a linear developmental sequence as in classic organismic models. In this developmental model, a variety of personal construals, strategies, and developmental trajectories describe social development in different contexts.

Although there are a number of social cognitive models, one commonality is that the notion of a life task (or current concern or personal project) includes an individual's representation of both a goal for the task and a strategy for solving the task. Thus, this approach describes personal development in terms of both motivational components (goals, self-beliefs) and cognitive components (strategies for problem solving and self-regulation). This conceptualization of personal and social development makes explicit the links with more general cognitive models of learning and thinking. In fact, the life-task approach of Cantor and Kihlstrom (1987) is isomorphic with models of cognition based on declarative and procedural knowledge. This basic distinction about knowing what and knowing how can be applied to traditional motivational and cognitive constructs to generate a framework for the analysis of motivational self-knowledge and motivational strategies and cognitive knowledge and cognitive strategies. Garcia and Pintrich (1994) have proposed just such a framework to examine the role of content and self-knowledge and motivational and cognitive strategies in the academic domain. Accordingly, in terms of motivational and social development, there should be changes in both self-knowledge and strategies for regulating the self over the life span.

Self-Schemas and Motivation

A number of models propose that motivational self-knowledge is an important construct, and *self-schemas* (Markus & Nurius, 1986) provide a way to link a variety of motivational constructs such as goals, beliefs, aspirations, motives, and affect into an organized cognitive framework (Markus & Nurius, 1986). Self-schemas are the individually constructed, dynamic, contextual, and flexible organizations of knowledge about oneself. A self-schema is similar to the traditional self-concept (Wigfield & Karparthian, 1991) in its content but functions as a much more situated, dynamic, and cognitive representation of the self than the somewhat static view implicit in traditional self-concept research. Self-schemas function as personal construals of goals and provide a self-regulatory function for individual cognition, emotion, and motivation (Markus & Kitayama, 1991). In particular, the self-schema construct includes the notion of a "possible self," which refers to a positive self-image that a person would like to become (e.g., a good learner, tennis player, spouse, parent), which can function as a goal to approach, as well as negative future self-schemas that we strive to avoid (e.g., poor, unemployed, homeless).

The developmental trajectories of self-schemas in the college years have not been investigated in many studies. In a cross-sectional study of possible selves across the life span, Cross and Markus (1991) queried 183 individuals ranging in age from 18 to 86 about their hoped-for and feared selves. They found that the younger college students (ages 18–24 years) had higher ratings of instrumentality in terms of believing that they could bring about hoped-for selves and avoid feared selves. In addition, younger individuals generated more possible selves but reported fewer strategies or actions undertaken to accomplish these selves. In contrast, the older individuals reported doing more to bring about a more limited number of possible selves. This result is in line with general theories of identity and personal development that suggest that over the course of the life span, individuals develop more focused and enacted personal identities, in contrast to the myriad of possibilities that younger adolescents think about abstractly but do not necessarily attempt to actualize. Accordingly, these results highlight the need to examine both self-schemas and the strategies to accomplish them in the course of development.

There has not been much empirical research on self-schemas in academic settings, but Garcia and Pintrich (1994) have outlined how academic self-schemas might be related to the use of various cognitive and motivational self-regulatory strategies in an academic setting. They propose that self-schemas function as "declarative knowledge of the self" that can influence the activation and use of various motivational strategies (self-handicapping, defensive pessimism) as well as cognitive learning strategies (elaboration, comprehension monitoring). The utility

of the self-schema construct for research in educational psychology awaits further empirical research, but preliminary correlational studies with junior high and college students (see Garcia & Pintrich, 1993; Pintrich & Garcia, 1993; Pintrich, Garcia, & De Groot, 1994) suggest that students with positive academic self-schemas are more likely to report using more cognitive learning strategies (e.g., elaboration) and self-regulatory strategies (e.g., comprehension monitoring).

Links Between Motivation and Achievement Behavior

Although few studies are developmental in design, a number of studies have examined the motivational strategies used by college students to accomplish life tasks or achieve possible selves. These strategies, such as self-handicapping, defensive pessimism, and reevaluation of task value and interest (Garcia & Pintrich, 1994) are used by students to control their effort and motivation and parallel Kuhl's self-regulatory strategies of motivation and emotion control (Kuhl, 1992). These motivational strategies may be automatic, habitual, and used without awareness and intentionality, but they can be brought under the intentional control of the learner (cf. Paris, Lipson, & Wixson, 1983; Schneider & Pressley, 1989). They influence students' motivated behavior in terms of choice, level of activity, and persistence at a task (see Garcia & Pintrich, 1994).

Self-handicapping refers to the creation of obstacles or withdrawal of effort to make potential failure less indicative of ability (Baumeister & Scher, 1988; Tice & Baumeister, 1990). For example, procrastination before an exam can have beneficial effects on ability attributions because failure can be attributed to lack of effort, while success can be attributed to ability (Covington, 1992; Covington & Omelich, 1979). For the self-handicapper, protection of self-worth is the most important goal, so not putting forth effort, although jeopardizing actual performance, maximizes the potential for positive self-ascriptions. College students use a variety of self-handicapping strategies that can have detrimental influences on their cognitive engagement as well as their actual learning (Covington, 1992).

Another type of motivational strategy is defensive pessimism, which refers to the setting of low expectations for performance but coupling those low expectations with an increase in effort in order to gain control over anxiety (Cantor & Norem, 1989; Norem & Cantor, 1986, 1990). Defensive pessimists seem to activate a negative self-schema (e.g., "I'm not prepared for this test," "This course is so hard, and I really don't understand it."), which generates anxiety about doing well, which then leads to increased effort to overcome the anxiety. In this sense, the negative self-schema serves as a negative goal for students to avoid, and they harness the fear of becoming that possible self to increase their effort. Accordingly, high levels of self-regulation (increased effort, as in defensive pessimism) need not always be driven by perceptions of high efficacy and competence (cf. Kuhl, 1987; Paris & Newman, 1990; Pintrich & Schrauben, 1992; Schunk, 1994); they can also arise from concerns about lack of efficacy and competence. At the same time, Norem and Cantor (1990) reported longitudinal data suggesting that over the course of several years of college life there was eventually a cost for defensive pessimists in terms of lower levels of academic achievement. Norem and Cantor suggested that this decline may be a function of accumulated stress from higher levels of anxiety over several years, increased self-expectations, and less social support from friends. Future research needs to examine under what conditions and for which individuals self-efficacy and higher levels of self-regulation are linked in a positive fashion, in contrast to the negative relations between efficacy, anxiety, and self-regulation for individuals using a defensive pessimism strategy. In addition, there is a need for research regarding the intraindividual stability in contrast to the situational or domain specificity of these motivational strategies (e.g., differences in use of these strategies in academic, work, or social domains). Finally, there is a clear need for developmental research on the ontogenesis of these motivational strategies, since Norem and Cantor's work suggests that they are available to students when they enter college. In addition, there is a need for research that extends these constructs to how individuals cope with transitions and life tasks after college (e.g., adjustments to work, marriage, and family).

Although the links between these specific motivational strategies and students' actual cognitive engagement have not been tested yet, there is a fairly large literature on how various motivational beliefs are linked to college students' use of different cognitive and self-regulatory strategies (Pintrich & Schrauben, 1992). For example, as discussed briefly earlier, Pintrich and his colleagues have shown in both early adolescents and college students that positive motivational beliefs such as high self-efficacy, a focus on mastery goals, and a belief in control over learning and lower levels of anxiety are positively related to deeper levels of cognitive processing, including the use of elaborative and metacognitive strategies (e.g., Pintrich, 1989; Pintrich & De Groot, 1990; Pintrich & Garcia, 1991). R. P. Perry and his colleagues (e.g., R. P. Perry & Magnusson, 1989) have shown that an attributional style that focuses on positive beliefs about control also have a positive effect on learning and performance. In addition, there has been work on how different classroom characteristics influence these motivational beliefs (R. P. Perry, 1991).

Group Differences in Cognition, Motivation, and Achievement

Research on gender and ethnic differences in college students' cognition, motivation, and achievement has yielded somewhat mixed results. On the one hand, there are a large number of studies that report gender and ethnic differences in many different kinds of outcomes, including cognitive abilities, self-concept, motivation, attitudes, and achievement (see Pascarella & Terenzini, 1991). Pascarella & Terenzini reported few group differences in cognitive outcomes such as postformal reasoning or critical thinking, although they did note that some gender differences seemed to emerge on the social outcomes such as motivation and self-concept. In most cases, these gender differences paralleled the findings discussed earlier in this chapter in respect to younger children. Females are more likely to have lower perceptions of their efficacy and self-concept than males, although their actual achievement does not differ greatly from that of males.

On the other hand, much of this research on group differences in college students has not been explicitly designed to focus on these differences, so there is a lack of theoretical sophistication about why differences might emerge in the col-

lege context. Moreover, many of the studies are fraught with methodological problems, including sampling problems that confound ethnicity with socioeconomic class (see Graham, 1992, 1994) or the use of very small samples and case studies that are difficult to generalize to a diverse college population, measurement problems due to the use of measures with poor psychometric properties, and design issues where age, differential experience, and contexts (community college vs. four-year college/university) are confounded with gender, class, and ethnicity. Needless to say, there is a great need for research on these topics that would overcome these methodological problems. More important, however, there is a need for thoughtful research on theoretically based models that would explain the ontogenesis of gender and ethnic differences. In particular, well-designed research is needed to test whether there is a need for alternative theoretical models that propose the existence of other psychological, sociological, or anthropological constructs and mechanisms for gender and ethnic differences (e.g.Ogbu's (1992) involuntary minority argument). In contrast, it may be that the current array of models and constructs is sufficient in terms of functional psychological mechanisms for explaining differences, although there may be important group differences in the *content* of such constructs and mechanisms. For example, attributional theory (see Graham 1992, 1994) and expectancy-value models in the motivational domain may be able to describe group differences by gender and ethnicity without recourse to other psychological constructs. Different groups may simply have different types of attributional patterns and motivational beliefs about their expectancies and values for academic work that lead to group differences in behavior and achievement. In the same way, there may be large differences in the content of cognitive schemas, knowledge, and the types of cognitive and motivational strategies used by different groups that lead to differences. On the other hand, these models may have to be adapted to include other constructs to help understand observed differences, as Spencer and Markstrom-Adams (1990) proposed in their discussion of identity development in minority youth. Future research will have to grapple with these theoretical and methodological issues, as research on group differences will continue to be an important topic of research into the 21st century.

TRANSITIONS AND CONTEXTUAL INFLUENCES ON DEVELOPMENT IN LATE ADOLESCENCE AND YOUNG ADULTHOOD

The literature on the influence of college on student development is vast and beyond review in the present chapter. However, there is an extremely important book on the effects of college on students by Pascarella and Terenzini (1991) that represents a monumental effort to review all the research published in this area since 1967 (over 3,000 studies). Anyone interested in how college influences any aspect of student development, from cognition to motivation to values to personality to moral development, should start with this book. More recently, Astin (1993) updated his classic book, *Four Critical Years* (Astin, 1977) and presented the results of a new longitudinal study of how various college characteristics influence student development over the 4 years of college. At the same time, much of this research in higher education that has examined contextual effects has not focused on psychological constructs that parallel the characteristics of middle schools discussed earlier, nor has it focused much on classroom-level analyses. Instead, many higher education researchers, given their sociological background and interest in higher education policy, have concentrated on macrolevel, sociological questions such as the general net effect of attending college (the value-added question), between-college differences (e.g., differences due to institutional type, size, or selectivity), and within-college differences in experience (differences due to academic major, residence arrangement, involvement in extracurricular activities, peer group characteristics; see Astin, 1993, and Pascarella & Terenzini, 1991). This information has important implications for college administrators but is less relevant to building psychological models of development, learning, and classroom teaching.

The research that has been done on the psychological dimensions of the college classroom has been conducted mainly following a general process–product paradigm of research on college teaching (see reviews by Murray, 1991; and R. P. Perry, 1991). In the previous section on transitions to junior high, six dimensions of classrooms (authority relations, affective relations, organization of instruction, teacher efficacy, cognitive level of academic content, and grading practices) were identified as having an important influence on cognitive and social development. Most of the research on processes in college classrooms that have a positive influence on cognition and motivation would fit into two of those dimensions, affective relations and organization of instruction. Both Murray (1991) and R. P. Perry (1991) found that the dimensions of instructor clarity, organization, and expressiveness and interestingness in lecturing (all aspects of organization of instruction) are correlated positively wth cognitive engagement and motivation. Given the overwhelming predominance of lectures in college classrooms, most of the classroom process research has focused on how to improve lectures, and so has not addressed issues of alternative activity structures. The other important aspects of this process research found that appropriate and timely feedback and opportunities for interaction with the instructor (aspects of affective relations) are also positively related to college students' cognition and motivation (Murray, 1991; R. P. Perry, 1991).

The other dimensions have been less researched, although there is some evidence that the cognitive level of academic content, defined in terms of the types of assessment tasks and evaluation procedures used, is at a fairly low level in most college classrooms, with the expected results of lowering cognition and motivation (Crook, 1988). In addition, there is little research on the authority structures and grading practices in college classrooms. Most college classrooms do not allow for much control and autonomy of tasks or grading practices, although they may allow for some choice of topics (McKeachie, Pintrich, Lin, Smith, & Sharma, 1990). Covington (1992) has shown that grading on a curve and the competition it engenders can have detrimental effects on cognition and motivation at all grade levels, including college classrooms. Most of this research on these dimensions of authority relations, cognitive level of tasks, and grading practices suggests that these aspects of the

college classroom are very similar to the negative aspects of junior high classrooms reviewed above. Indeed, in the college classroom these aspects may be even more negative. Interestingly, there has been little discussion and even less research on the developmental person–environment mismatch resulting from the negative aspects of college classrooms imposed on students who are likely to be cognitively ready for higher level tasks and more independence. Of course, there is a large self-selection process operating, whereby only some students go on to college, in comparison to all children under age 16 attending junior high. These students may have the self-schemas and coping strategies that allow them to adapt to this type of instruction in college. These students also have the freedom to choose their major, and can take a variety of electives; thus, they have more choices than students in secondary schools. In addition, the freedom college students have outside the classroom may allow them to meet their developmental "needs" for autonomy and independence elsewhere, if those needs are not met in the classroom. Nevertheless, there is a need for much more developmental research on the cognitive and motivational aspects of college classroom tasks, authority structures, and grading practices, following the analysis of Doyle (1983) in kindergarten through Grade 12 classrooms. In addition, this research must move beyond process–product and descriptive research paradigms to more constructivist approaches that address how students interpret and construct meaning for themselves, set goals, and develop various motivational and cognitive strategies for coping with the various classroom contexts they encounter over the course of their college career.

The Transition from High School to College. In terms of student development, the transition to college is often a difficult one for many students. Attrition is highest in the first 2 years of college, especially the first year (Pascarella & Terenzini, 1991). A great deal of research has examined this issue, with most of it guided by a general person–environment fit model (see Tinto, 1987) which proposes that students' entry level cognitive skills and their goals and motivation for college interact with the institutional characteristics of the college, defined in terms of academic integration (e.g., involvement in and support for learning) and social integration (e.g., involvement in and support for social and extracurricular activities), which then produce a "decision" to either stay in or leave college. This research has been very important because it suggests that the nature of the actual experiences and interactions that students have with faculty and other students and students' interpretations of these experiences are the most important mediators of college dropout, rather than macrolevel institutional characteristics per se. This work also has generated a literature on programs to improve student retention through integrative first-year experiences and various academic and social programs (e.g., Noel, Levitz, & Saluri, 1985; Upcraft & Gardner, 1989). In particular, these programs often have focused on the retention of minority students, given their much higher attrition rate in general (e.g., Nettles, 1988).

The general model that underlies much of this research on student attrition has been a functional one that has examined the interaction of an individual's cognitive and motivational characteristics with the various characteristics of the institutional setting. In contrast, more recent sociological and anthropological models have stressed social and cultural reproduction models whereby race, class, and gender are important considerations in the construction and reproduction of inequities in schools at all levels (e.g., Trueba, 1988). At the same time, cognitive anthropology and cultural psychology perspectives (e.g., Tharp & Gallimore, 1988; Trueba, 1988) on these issues have suggested the need for more microanalytic research on how individuals within different ethnic groups (e.g., African Americans, Latinos, Native Americans) vary in their coping strategies and their success. For example, a number of researchers have pointed out that within those different ethnic groups there are individuals who are successful in school and achieve academic success, thereby bringing into question global explanations regarding differences in minority achievement based on a typology of ethnic groups in terms of their immigrant status (e.g., Pottinger, 1989; Betoncourt & Lopez, 1993; Trueba, 1988). Similar arguments have been made in terms of gender differences in achievement in math and science (McDade, 1988). From our more psychological perspective, this is a much-needed addition to the more macrolevel sociological and cultural explanations for race, class, and gender differences and a trend that we hope continues into the 21st century.

The Transition to the World of Work. The transition to the world of full-time work is not an easy one, whether it occurs after high school or after college. Although a great deal of research has examined the influence of working while in high school on adolescent development (e.g., Fine, Mortimer, & Roberts, 1990; Greenberger & Steinberg, 1986), there is less developmental and psychological research on the effects of full-time work on adolescent and early adult development after formal schooling is completed. Most of the research that has examined this issue has taken sociological and economic perspectives and considered questions of access, opportunity, and equity in terms of race, class, and gender differences (e.g., Borman, 1991; Valli, 1986; Weis, 1990; Willis, 1977). In fact, there have been recent calls for more developmental and longitudinal research on the transition to work for individuals who do not go on to college. At the same time, it is clear that future psychological research on the transition to work needs to examine the person–environment fit as discussed in the research presented earlier on the transition to middle school, not just examine the psychology of the adolescent or the sociology of the work context in isolation from one another.

The transition from school to work is usually seen as a difficult one, because of the discontinuities between the nature of schools and the nature of work settings (Candy & Crebert, 1991; Marshall, 1988; Resnick, 1987). There are a number of dimensions along which the two may differ, paralleling the organizational and structural dimensions that can be used to distinguish secondary schools from elementary schools, although there may be greater discontinuities between schools and work settings than between elementary and secondary schools. Alternatively, there may be greater discontinuities between discrete work settings, depending on the nature of those settings (e.g., traditional manufacturing settings vs. traditional service organizations vs. knowledge-generating companies). Two major differences are the nature of the activities or work to be done and the procedures and cognitive operations necessary to accomplish the work. As Resnick (1987) has pointed

out, U.S. public schools often focus on individual production or performance, whereas work settings emphasize socially shared performances. In addition, Resnick noted that work settings often provide a variety of tools and contextual supports for accomplishing the task, in contrast to the emphasis on "unaided" thought in schools. Finally, Resnick proposed that schools tend to focus on the teaching of generalizable cognitive skills and on working with symbols and abstract ideas rather than on situated competencies and contextualized reasoning, as in work settings. Candy and Crebert (1991) suggested that these same differences characterize not just differences between kindergarten through Grade 12 education and work settings, but that postsecondary classrooms actually exacerbate these differences, making it even more difficult for college graduates to make the transition to the world of work. Accordingly, it would be expected that there may be a discontinuity between the students' knowledge and cognitive capabilities and the work setting, depending on the nature of the work in the specific setting. There is a need for more research on this issue, particularly longitudinal research that examines intra- and interindividual differences over time and across different work contexts, rather than just simple descriptive contextual studies of what individuals do in their work settings.

Besides the nature of the work, the reward, evaluation, authority, and participation structures may be different in school and work settings (Borman, 1991; Marshall, 1988). While schools may operate under a performance/grade exchange system focused on individual performance, the distribution of rewards in work settings is often based on group or unit performance. In addition, the importance of the extrinsic rewards (financial, status, power) or sanctions (loss of job) may be greater in work settings. Evaluation and authority structures may also vary. In a classroom setting, the teacher is most often the evaluator and authority figure. In work settings, there may be numerous evaluators (co-workers, supervisors, clients) who may use different evaluation criteria. In addition, in some work settings there may be clear authority structures with very little worker autonomy (e.g., traditional manufacturing positions) or more ambiguous authority structures where the individual is allowed more autonomy and choice. Finally, there may be differences in the participation structures. Traditionally, classrooms have forced students to work individually, although this may be changing with the rise in the use of cooperative learning in kindergarten through Grade 12 education. Most college courses still require students to work individually (to allow students to do otherwise is "cheating" to many professors). In contrast, most work settings require some type of interaction between co-workers. In fact, lack of interpersonal skills and inability to work collaboratively are often seen as more of a problem by employers than lack of knowledge or lack of cognitive skills. At the same time, there may be work settings that do not allow much interaction between co-workers (see Borman, 1991). Accordingly, given the obvious within-work setting differences, research on the school-to-work transition needs to examine not only the transition to work, but the nature and quality of that work experience, in the same way that research on the transition to middle school has examined not just the transition itself but the nature and structures of middle schools and their fit to the individual students that move into them. In light of the findings in the educational literature on the effects of different reward, authority, evaluation, and participation structures on student motivational beliefs (e.g., C. Ames, 1992; Maehr & Midgley, 1991), it would be expected that there would be similar findings for the work settings, although Fine et al. (1990) note that there has been little research on work setting and motivational beliefs. At the same time, it is important to examine not just the effects of the work setting, but how individuals construct their own meaning of the work setting in light of their own motivational goals, beliefs, and values (cf. Borman, 1991; Maehr & Braskamp, 1986).

In summary, in both the transition to college and the transition to work literatures, there are a number of different models of the effects, from macrolevel sociological and economic to more microlevel sociolinguistic, cognitive anthropological, and psychological models. In terms of future psychological research, we need to incorporate the insights from cultural anthropology and sociology about the importance of context and culture. At the same time, psychological models have much to offer in terms of conceptualizing how individuals construct meaning in the context and how they develop different cognitive and motivational schemas and strategies for negotiating the demands of the transition. In addition, researchers need to begin to examine not just the positive or negative effects of transitions in terms of producing discontinuous change, but also how transitions might accentuate preexisting individual differences, thereby producing continuous change (e.g., Caspi & Bem, 1990; Caspi & Moffitt, 1991). In this way, our models will begin to describe and understand both the role of different contexts and the role of the individual in constructing and creating individual trajectories of development over the life course from 11 to 25 years. In turn, this will allow for the development of better educational contexts to change and improve the developmental trajectories of all children in junior high, high school, and college classrooms.

CONCLUSION

We have come to the end of our description of development between the ages of 11 and 25. As we reflect on the information presented in this chapter, we are encouraged by the amount we have learned in the past 10 to 15 years about the nature of development during this part of the life span, as well as how different school and classroom environments affect students' development. We are excited about the growing emphasis on contextual models of development in psychological and educational theory. We also are encouraged by the application of this knowledge about adolescent and young adult development to educational practice, as best shown by reform efforts in middle school education occurring across the country. Yet, as we have pointed out throughout the chapter, much remains to be done, both in developmental research and in applying that research to education. We close by highlighting several areas in which more work is necessary. Despite the growing awareness and concern about the need to know more about the different groups that make up our increasingly diverse society, the amount of research on those groups still lags behind the research on white, middle-class adolescents and young adults, as Graham (1992, 1994) has discussed cogently. As research on these groups accumulates we will better know how current

theoretical models of development will need to be modified to explain development in the various groups in our society. This knowledge also will be very useful in developing educational programs to serve these adolescents and young adults. We have noted that middle school reform efforts are ongoing in many parts of the country; researchers need to assess these efforts to see if they are resulting in more positive developmental outcomes for early adolescents. We also now need to focus more on the transitions to high school and college, and to develop programs and practices to ease those transitions. We hope that by the time the chapter on development during adolescence and young adulthood is written for the next edition of this *Handbook,* much of this information will be available.

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