PART FOUR

ADOLESCENCE

CHAPTER 12

Puberty, Sexuality, and Health

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THEORIES AND MODELS OF PUBERTY AND ADJUSTMENT 295
Developmental Contextualism 296
Holistic Interactionism 297
WHAT IS PUBERTY? 298
Phases of Puberty: Adrenarche and Gonadarche 298
Mechanisms Controlling the Onset of Puberty 298
Growth at Puberty 300
PUBERTY AND CHANGES IN EMOTIONS AND BEHAVIOR 301
Testosterone and Behavior 301
Estrogen and Behavior 303
Adrenal Androgens 304
TIMING OF PUBERTY AND PSYCHOSOCIAL DEVELOPMENT 305
Early and Late Pubertal Timing 305
Theoretical and Methodological Issues 306
PUBERTY AND ADOLESCENT HEALTH: CULTURAL SIGNIFICANCE AND SECULAR CHANGE 307
Secular Changes in Timing of Puberty 307
Puberty and Adolescent Health 308
Puberty and Adult Health 309
Timing of Puberty and Stress 310
Puberty and Sexuality 312
IMPLICATIONS FOR RESEARCH AND SOCIAL POLICY 314
Content of Programs on Puberty 314
Timing of Puberty and Prevention 315
Research and Theory Development 315
REFERENCES 316

Puberty, the passage from childhood to adulthood, fascinates scientists, parents, and adolescents alike. This fascination originates from its complexity, rapid and pervasive physical growth, profound psychological changes, and sexual awakening. Puberty is perceived to contribute to the turbulence and stress experienced by some adolescents.

Fortunately, over the last few decades, the conception of adolescence as a period of storm and stress (Blos, 1962; Hall, 1904) is being replaced by a more balanced view of adolescence as a period when biological, cognitive, emotional, and social functioning becomes reorganized. The majority of adolescents are viewed as experiencing neither maladjustment nor grossly undesirable behaviors.

Along with the reconceptualization of adolescence great strides have been made in developing interdisciplinary models of puberty that realistically portray the diversity of pathways through which adolescents progress from childhood to adulthood. Because of the myriad biological and psychological changes that characterize it, puberty engenders scientific interests that span the social, behavioral, medical and life sciences. Research foci include the biological and social mechanisms that initiate puberty, the timing of puberty, and the interactive influences among hormones, physical growth changes, emotions, problem behavior, cognition, and sexual activity. This chapter presents a summary of two predominant models of development at puberty as well as current perspectives on the biological processes of puberty, timing of puberty and psychological development, secular trends in timing of puberty, puberty and sexuality, and implications for theory, research, and social policy.

THEORIES AND MODELS OF PUBERTY AND ADJUSTMENT

The biological processes of puberty historically were integrated with the psychological processes at a conceptual level. In fact, in the early twentieth century perspectives on adolescent development featured the centrality of biological processes in psychological development. In contrast, at an empirical level, research tended to focus either on biological and health issues or on social, emotional, and contextual

processes in adolescent development but seldom on the interactions between biological, psychological, and contextual processes. Contextualism, behaviorism, and learning theory supplanted theories of development and evolution that dominated the early twentieth century (S. T. Parker, 2000). The empirical research reflected the predominant interest in contextual influences on development.

A turning point in the integration of puberty with biological, psychological, and contextual processes was the publication of *Girls at Puberty* (Brooks-Gunn & Petersen, 1983), followed shortly thereafter by models that incorporated the reciprocal interactions among biological, psychological, and contextual processes that contribute to the experience of puberty (Lerner & Foch, 1987; D. Magnusson, 1981; D. Magnusson, Stattin, & Allen, 1985). Subsequent to the articulation of these theories, empirical studies linking puberty-related hormones and psychological development began to appear in the literature. These studies addressed issues of aggressive behavior (Susman et al., 1985, 1987), adjustment (Nottelmann et al., 1987), depressed mood (Brooks-Gunn & Warren, 1989), and sexuality (Udry, Billy, & Morris, 1986; Udry, Billy, Morris, Groff, & Raj, 1985; Udry & Talbert, 1988). These studies integrated rather than compartmentalized psychological, biological, and contextual influences on development.

An early example of this integration was the recognition of the interdependence of family interactions and the adolescent's stage of pubertal development (e.g., Steinberg, 1988; Steinberg & Hill, 1978). In later theoretical perspectives integrating biological and psychological processes, no single level of functioning is viewed as primary or as the ultimate causal influence on development. Rather, development is characterized by reciprocal interaction, bidirectionality, plasticity, and organization (Cairns, 1997; Cairns & Rodkin, 1998; Lerner, 1998; D. Magnusson & Stattin, 1998). Systems or configural views of development are considered paramount with processes from different levels viewed as equal forces in development (Ford & Lerner, 1992; Susman, 1998). Within this perspective, the physical maturational, hormonal, and psychological processes of puberty interact to create the diversity of changes at adolescence.

Two compatible and overlapping theoretical perspectives exemplify the integration of biological, psychological, and contextual influences on adolescent development: developmental contextualism and holistic interactionism.

Developmental Contextualism

The developmental contextualism model of adolescence, proposed by Lerner (1998), parallels modern life-span developmental theories. The life-span perspective is a set of ideas about the nature of human development and change from birth to death. This perspective is concerned with issues of the embeddedness of evolution and ontogeny, of consistency and change, of human plasticity, and of the role the developing person plays in his or her own development (Lerner, 1987). Within the developmental contextual perspective, individuals are viewed as producers of their own development (Brandtstaedter & Lerner, 1999): The theory embodies the notion of the dynamic interactions between individuals and the multiple contexts within which they live. With reference to adolescence, the biological changes of puberty both influence and reciprocally are influenced by psychological, behavioral, and social influences (Lerner, 1987; Lerner & Foch, 1987). Key concepts of the developmental contextualism perspective relevant to puberty are embeddedness, dynamic interactionism, and plasticity.

Embeddedness encompasses the notion that the phenomena of human life exist at multiple levels of being: inner-biological, individual-psychological, social network, community, societal, cultural, and the larger physical ecology and historical contexts. The biological, psychological, and social aspects of change are embedded in the contexts of development. Contexts of development include family, peers, and the multiple social institutions that surround the developing individual. The levels are not interdependent; rather, the processes at one level influence and are influenced by the processes at the other levels.

Dynamic interactionism refers to the dynamic interaction among the levels of analysis. This concept is especially central to integrating the biological and social contextual aspects of pubertal development. In contrast to a previous view that biological processes are deterministic or causal, dynamic interaction concepts embody the notion that biological processes and substances are dynamic and simultaneously influence and are influenced by the psychological and social contextual levels of analysis. For instance, genes no longer are considered purely deterministic influences on development. Instead, they are viewed as requiring a specific environment to be expressed. Furthermore, genetic influences are not static but shift with development (Rowe, 1999). Genes responsible for pubertal development, such as genes related to gonadotropin releasing hormone (GnRH), begin to express mRNA in late childhood, leading to a cascade of hormonal growth and psychological changes. Genes, the individual, and the environment consistently are in a state of dynamic interaction.

Plasticity evolves from the notion that the potential for change exists across the life span in the multiple levels of organization that characterize the developing human (Lerner,

1998). Contemporary theorists emphasize *relative* plasticity throughout the life span (Lerner, 1998). Relative plasticity implies that across the lifetime, intra-individual development is constrained. All developmental modifications are not possible, and all possible variations are not desirable (Brandtstaedter, 1998). Development and systematic change have constraints imposed both from endogenous (e.g., genetic) and exogenous (e.g., legal sanctions) constraints.

With regard to puberty, social and nutritional circumstances affect the timing of puberty, yet the normal age range for the onset of puberty is constrained by genetic influences. The normative current age range varies from 9 to 15 years for girls and 10 to 16 for boys, although this range may be broadening (see the section titled "Phases of Puberty: Adrenarche and Gonadarche"). Beyond this age range, plasticity in the timing of puberty becomes replaced by an abnormal or pathophysiological condition that requires evaluation and intervention. In brief, only a subset of variations in puberty is compatible with the natural laws of development.

Plasticity is influenced by the individual's experiential history in interaction with the multiple contexts of development. Behaviors, social contexts, and nutrition are hypothesized to affect the relative plasticity of timing of puberty. For instance, boys with a history of aggressive, disruptive behavior with peers and family were later in their pubertal development and were lower on testosterone than were their nondisruptive peers (Schaal, Tremblay, Soussignan, & Susman, 1996). Overall, the study of plasticity involves scrutiny of the history of dynamic organism-context interactions or the fusion of nature and nurture (Lerner, 1998). Plasticity is a feature neither of nature nor of nurture but rather the fusion of the dynamic interactions between nature and nurture.

Viewed from the developmental contextualism perspective, development at puberty is the product of the dynamic interactions among psychological, biological, and contextual processes. These processes reciprocally and bidirectionally influence each other (Lerner & Foch, 1987). Processes at different levels of functioning are not independent but are merged throughout puberty. The physical and hormonal manifestations of puberty are a product of a species genotype. Yet the experiential history of adolescents and the contexts for social interactions can interact with genes to change the timing and tempo of puberty. Puberty is, then, a process of change and the product of a complex interaction among genotype, brain-behavior, and context. No one research project can test these multiple reciprocal influences on adolescent development. Rather, the developmental contextual model acts as a guide for selecting constructs and measures to be considered in the conceptual framework and design of a specific study.

Holistic Interactionism

A basic proposition of holistic interactionism's theoretical framework is that the individual is an active, intentional part of an integrated complex, dynamic, and adaptive person-environment system who develops in that context from the fetal period until death (D. Magnusson, 1999). The holistic interactionism model of development can be summarized in a set of fundamental principles (D. Magnusson & Cairns, 1996): An individual (a) develops as an integrated organism (b) in a dynamic, continuous, and reciprocal process of interaction with the environment. This functioning (c) depends on and influences the reciprocal interaction among subsystems within the individual (perceptual, cognitive, emotional, physiological, morphological, and neurobiological). (d) Novel patterns of functioning arise during ontogeny, and (e) differences in the rates of development, such as differences in timing of puberty, may produce differences in the organization and configuration of psychological functions that are (f) extremely sensitive to the environmental circumstances in which they are formed, particularly the environment as it is perceived and interpreted by the individual. It follows that an individual is viewed as an active, intentional part of an integrated complex, dynamic, and adaptive person-environment system.

Furthermore, within this person-environment system, the individual functions and develops as an integrated organism in which biological, psychological, and behavioral factors operate in reciprocal interaction and dependency within integrated multidetermined, dynamic, and adaptive processes (Magnusson, 1999). Each aspect of the structures and processes that are operating in the individual (perceptions, plans, values, goals, motives, biological factors, and conduct), as well as each aspect of the environment, takes on meaning from its role in the total functioning of the individual. A specific element derives its significance not from its structure or function per se, but from its role in the system of which it forms a part. From a holistic interactionism perspective, development at puberty takes on meaning not from physical change per se but from its meaning to the adolescent in relation to psychological attributes, experiences, the timing of the change relative to peers, and its role as a social signal. Physical development is a signal that a child is becoming an adolescent, and this new status implies new social roles and responsibilities in the societal and cultural system in which the individual develops.

The holistic nature of the functioning of the integrated organism is that normally a psychological-biological process

cannot be determined by a single factor. As a consequence of the holistic nature of humans, the processes cannot be subdivided into independent parts in the analysis of the integrated organism's way of functioning. To understand and explain the role of a specific element in the functioning and development of an individual, it has to be analyzed in the context of the relevant system to which it belongs. Applied to the current instance, psychological and behavioral processes at puberty (e.g., aggressive behavior) cannot be understood without an awareness of the biological and contextual processes that simultaneously influence the adolescent. These processes range from the molecular and cellular levels to the level of the individual as an active, intentional part of an integrated sociocultural person-environment system.

Within a holistic interactionist view, developmental processes are accessible to systematic, scientific inquiry because they occur in a specific way within organized structures and are guided by specific principles. The claim for a holistic view on individual development implies that any theoretical or empirical analysis of developmental processes has to be performed with reference to a complex set of phenomena. This view does not imply that all aspects of puberty need to be considered simultaneously. Rather, the interpretation of findings at one level of functioning should be made by integrating the findings to levels above and below the level of empirical verification. An investigation of hormones at the physiological level and emotions at the psychological level can more meaningfully be interpreted by simultaneously considering the social (peer or family) levels of analysis.

WHAT IS PUBERTY?

Puberty encompasses a wide variety of phenomena, as reflected in the following definition: "Puberty is a transitional period between childhood and adulthood, during which a growth spurt occurs, secondary sexual characteristics appear, fertility is achieved, and profound psychological changes take place" (National Research Council, 1999, p. 1).

Phases of Puberty: Adrenarche and Gonadarche

Historically, puberty refers to the stage of development characterized by maturation of the reproductive system. Puberty now is considered to have two components, adrenarche and gonadarche, which are thought to be independent events controlled by separate mechanisms (Counts et al., 1987), although the mechanisms separating these periods remain controversial.

The first component of puberty, *adrenarche* (awakening of the adrenal glands), begins between the ages of 6 and 9 years. At adrenarche, the adrenal androgen concentrations begin to rise (Forest, 1989; Grumbach & Styne, 1992), but hormones of the hypothalamic-pituitary-gonadal (HPG) axis, testosterone and estrogen, are initially quiescent. The adrenal androgens continue to increase throughout gonadarche and include dehydroepiandrosterone (DHEA), dehydroepiandrosterone sulphate (DHEAS) and androstenedione (Δ4-A). The initial hormonal increases in adrenal androgen secretion occur prior to external physical changes, such as pubic hair development. The exact mechanism responsible for the onset of adrenarche is controversial, although recent evidence suggests that adrenocorticotropic hormone (ACTH; Weber, Clark, Perry, Honour, & Savage, 1997) or 3-hydroxysteroid dehydrogenase plays a significant role in the regulation of adrenarche (Gell et al., 1998). Adrenarche is severely understudied in relation to emotions and behavior change, an unfortunate happenstance given findings linking adrenarche and behavior (Brooks-Gunn & Warren, 1989; Susman et al., 1987). In addition, a recent study showed that premature-adrenarche children have significantly more behavior problems and psychopathology than do age-matched peers (Dorn, Hitt, & Rotenstein, 1999). (Findings relating adrenal androgens to behavior are discussed later.)

The second component of puberty, *gonadarche,* is the reactivation of the hypothalamic-pituitary gonadotropin-gonadal system, which initially had been activated during fetal and early infant development. Gonadarche begins at approximately age 9 to 10 years in White girls and at 8 to 9 years in African American girls (Herman-Giddens et al., 1997) and at 10 to 11 years in boys (Grumbach & Styne, 1992). Gonadarche is what most individuals refer to as "puberty" and entails sexual maturation and reproductive maturity. At gonadarche, HPG-axis activation and physical maturation result in the development of the primary sexual characteristics (testes and ovaries) and secondary sexual characteristics (pubic hair, body hair, and genital and breast growth). The culmination of gonadarche and reproductive function is menarche for girls and spermarche for boys.

Mechanisms Controlling the Onset of Puberty

Neural Control of Puberty

In the last two decades major advances have been made in explaining the physiology of puberty from the molecular level to the whole-organism level. Given that puberty (gonadarche) marks the development of reproductive capability, the physiology of puberty becomes synonymous with that of reproductive maturation. Gonadarche occurs when the

GnRH pulse generator (neurons in the medial basal hypothalamus) is reactivated or reaugmented (Knobil, 1988; Medhamurthy, Gay, & Plant, 1990; Tersawa, Bridson, Nass, Noonan, & Dierschke, 1984) and gonadal sex steroid hormone secretion increases. The mechanism for understanding the control system that defines timing of puberty and the neurobiological basis of this reaugmentation of the GnRH pulse generator continues to be speculative (Plant, 1995; Suter, Pohl, & Plant, 1998). Much of what we do know about puberty is based on a nonhuman primate model. In humans, research on the onset of puberty is much more difficult to carry out because frequent serial sampling of blood at night in prepubertal children is required as gonadotropin pulsatile secretion first occurs at night. In addition, very sensitive assays are required for detection of low concentrations of gonadotropins and gonadal steroids. Thus, few human studies are available on the onset of puberty, and in those that do exist, the sample size is small and not likely to be representative of the general population.

Hormone and growth changes at puberty are the consequence of complicated neuroendocrine processes. In the early days of research on the endocrine component of puberty, the emphasis was on specific releasing hormones or specific hormones such as testosterone and estrogen. The emphasis now is on the neural (Plant, 1998) and genetic control of puberty. Specifically, the identification of specific genes and the expression of genes responsible for the onset and progression of puberty now are the focus of study. Given these advances, the most widely accepted explanation of the onset of puberty is the expression of genes controlling the GnRH pulse generator and the reactivation of the HPG axis. In addition, the cortex, limbic system, and neurotransmitter systems modulate hypothalamic function (Brooks-Gunn & Reiter, 1990) and thus puberty.

Weight, Body Fat, and the Onset of Puberty

Various theories posit additional factors contributing to the onset of puberty in combination with programmed genetic influences. One earlier theory posits that critical body mass must be attained before puberty (specifically, menarche as an index of puberty) will occur (Frisch, 1984). The findings indicated that menarche is dependent on the maintenance of a minimum weight for height, likely representing a critical fat storage level (Frisch & McArthur, 1974). Undernutrition also delays puberty in boys. Fat may influence reproductive ability in girls through two mechanisms: (a) Fat converts androgens to estrogens that are critical to regular menstrual cycles and the maintenance of pregnancy, and (b) relative fatness influences the direction of estrogen metabolism from its least to most potent form (Frisch, 1984). It was hypothesized that absolute and relative amounts of fat are important because the individual must be large enough to reproduce successfully. This theory largely fell from wide acceptance. Somatic growth and maturation at puberty are now considered to be influenced by several additional factors that act interdependently to influence the onset of puberty.

Leptin and Puberty

Discovery of the hormone leptin led to the theory that it may be a signal allowing for the initiation of and progression toward puberty (Mantzoros, Flier, & Rogol, 1997). An alternative perspective is that leptin is implicated in the onset of puberty but may not be the cause of the onset. Leptin is a 16-kDa adipocyte-secreted protein, a product of the obesity gene. Serum leptin levels reflect mainly the amount of energy stores but are also influenced by short-term energy imbalance as well as several cytokines (indexes of immune system function) and hormones (Mantzoros, 2000). Leptin is implicated in the initiation of puberty, energy expenditure, normal menstrual cycles, fertility, maintenance of pregnancy, and nutrition. Specifically, leptin may well be one of the messenger molecules signaling the adequacy of the fat stores for reproduction and maintenance of pregnancy at puberty (Kiess et al., 1999). The possible mechanism involves leptin as a hormone that serves to signal the brain with information on the critical amount of fat stores that are necessary for luteinizing hormone-releasing hormone (LHRH) secretion and activation of the hypothalamic-pituitary-adrenal (HPA) axis. Moreover, circadian and ultradian variations of leptin levels are also associated with minute-to-minute variations of LH and estradiol in normal women (Mantzoros, 2000). The mechanisms whereby leptin regulates body weight, adiposity, and the hormones that increase at puberty (e.g., testosterone and estrogen) are not yet known.

Controlling for adiposity, leptin is higher in girls than in boys (Blum et al., 1997). At the initiation of puberty, circulating leptin concentrations diverge in boys and girls. In boys leptin concentrations increase and then markedly decrease to prepubertal concentration levels in late puberty. In contrast, in girls there are increasing concentrations at puberty (Roemmich & Rogol, 1999). The increase in leptin is believed to result from alterations in the regional distribution of body fat in boys and girls at puberty. Overall, sex differences in leptin concentrations are accountable to differences in the amounts of subcutaneous fat in girls and greater androgen concentrations in boys (Roemmich et al., 1998).

The biological effects of leptin in adult humans are still to be determined, but reports show that congenital leptin

deficiency leads to hyperphagia and excessive weight gain from early infancy onward as well as failure of pubertal onset in adolescence (Ong, Ahmed, & Dunger, 1999). Leptin concentrations also are higher in girls with premature adrenarche than in girls with on-time adrenarche (Cizza et al., 2001). Leptin concentrations have not yet been examined in relation to behavior changes at puberty, but leptin provides a promising biological probe for understanding physiological pubertal processes and issues of body image, self-esteem, and behavior at puberty.

Growth at Puberty

It is well known that pubertal growth includes a significant increase in height, or linear growth, as well as changes in body size and proportions. Puberty brings on the most rapid rate of linear growth since infancy (Rogol, Roemmich, & Clark, 1998). Rate of linear growth slows throughout childhood and reaches a low point just before the growth spurt (Tanner, 1989). The growth spurt refers to a rapid increase in linear growth at puberty. The timing and magnitude of the growth spurt is different for girls and boys. Girls grow an average of 25 cm with a peak rate of 9 cm per year at about age 12 (Marshall & Tanner, 1969). Boys grow more than girls, but their growth occurs later than in girls because they grow at an average of 28 cm with a peak rate of 10.3 cm per year at about age 14 (Marshall & Tanner, 1970). Tanner (1989) described much of what is known about growth and changes in physical proportions. The rapid increase in height in boys is largely due to faster growth in trunk length than in leg length, particularly since leg length peaks about 6 to 9 months before trunk length does (Tanner, 1989). However, the legs and trunk are not the only parts of the body that are growing. Adolescents show some increase in head diameter, an aspect of growth that has otherwise been basically dormant since the first few years of age. The skull bones also demonstrate an increase in thickness of about 15% (Tanner, 1989). Growth arrest occurs as a result of epiphyseal fusion (Cohen & Rosenfeld, 1996) or ossification (hardening) of the ends of long bones.

The main regulator of growth is growth hormone (GH), a hormone produced in the anterior pituitary. GH is secreted at puberty, first at night, followed by surges during the day in later stages of puberty. The hypothalamic hormones, growth hormone releasing hormone (GHRH) and somatostatin, stimulate and inhibit GH secretion, respectively (Cohen & Rosenfeld, 1996). The increase in GH at puberty parallels the growth spurt. Other endocrine factors influence growth, such as thyroid hormone and glucocorticoids. Sex steroids, primarily testosterone and estrogen, also facilitate growth at puberty. Many nonendocrine growth factors are implicated in growth, the largest of which are genetic influences that control the growth rate, age of puberty, and adult height (Cohen & Rosenfeld, 1996). Growth also can be affected by nutrition, physical activity, and stressors.

In addition to height and other linear measurements, body weight increases dramatically during puberty. Fifty percent of adult body weight is gained during adolescence (Rogol et al., 1998). As with height, girls reach their peak growth in weight earlier than boys, but boys show a greater increase in weight than girls. Girls' average rate of weight gain peaks at 8.3 kg per year at about 12.5 years of age and about 6 months after their peak height increase (Barnes, 1975; Tanner, 1965). Boys' peak weight gain of 9 kg per year occurs at about the same time (14 years) as their peak increase in height (Barnes, 1975; Tanner, 1965).

Along with the increase in body weight, body composition also changes at puberty. The changes in body composition are quite different for boys and girls. Girls reach the fat-free mass of a young woman by about 15 to 16 years of age (Rogol et al., 1998). Fat mass also increases by about 1.14 kg per year, and it increases to a greater extent than the fat-free mass, meaning that girls have a net increase in percentage of body fat (Rogol et al., 1998). Girls' body fat is redistributed during puberty in a female-specific pattern. The deposition rate of subcutaneous fat on girls' limbs decreases (Tanner, 1989), while estrogens promote fat deposition at the breasts, thighs, and buttocks (Sherwood, 1993). Another source of the body mass increase in girls is a deposition of skeletal minerals. Girls accumulate almost one third of their total bone mineral within 3 to 4 years after beginning puberty (Bonjour, Theintz, Buchs, Slosman, & Rizzoli, 1991; Slemeda et al., 1994). The importance of emphasizing good nutrition and exercise in fostering bone accretion during puberty has not been public health policy. Therefore, an important opportunity to prevent osteoporosis later in development may have been missed by many women.

Body composition in boys follows a very different pattern. Boys' fat-free mass increases faster and for a longer period of time than in girls, and boys reach the fat-free mass of a young man at about 19 to 20 years of age (Rogol et al., 1998). During this time of increase in fat-free mass, boys maintain a fairly constant fat mass, so they show a net decrease in percentage of body fat (Rogol et al., 1998). The skeletal mineral accumulation in boys also differs from that of girls. Boys accumulate bone mineral content for a longer period of time after the pubertal growth spurt, and they have substantial increases in mineralization between 15 and 18 years of age (Rogol et al., 1998), which may explain the lower incidence of osteoporosis in men than in women.

The sex differences in growth and especially in body-composition changes during puberty result in the typical

female and male body types (Rogol et al., 1998). There are other sex differences in how body and facial structure change during puberty in addition to the previously discussed differences in height, weight, fat-free mass, body fat and its distribution, and skeletal mineralization. Adolescent girls experience a large spurt in hip width, a spurt that is quantitatively as great as boys' growth even though girls' growth is less in almost all other dimensions (Tanner, 1989). Boys demonstrate a large increase in shoulder width (Tanner, 1989). The differences in these body proportions are due to the responsiveness of cartilage cells in the hip to estrogens and of the shoulder cartilage cells to androgens, particularly testosterone (Tanner, 1989). Another sex difference is that the later growth spurt of boys results in the greater leg length typical of males (Tanner, 1989): boys' legs grow for a longer period of time than do girls'. Finally, facial features change over the course of puberty, with the forehead becoming more prominent, the jaws growing forward, and facial muscles developing, although these changes tend to be much more pronounced in boys than in girls (Tanner, 1989). Facial structure in girls is rounder and softer than it is angular.

Secondary Sexual Characteristics

Secondary sexual characteristics refer to breast and pubic hair development in girls and genital and pubic hair development in boys. These changes have been carefully described and fall into five stages (Marshall & Tanner, 1969, 1970; pictures of these five stages appear in these references; see also Brooks-Gunn & Reiter, 1990). However, the description of stages of puberty has been done only for White adolescents; therefore, little information exists regarding pubertal changes in populations throughout the world. Adolescent, parent, or health-professional ratings of the five stages are frequently used in research assessing the relationship between pubertal development and psychological development, although the most well-accepted rating is that of a trained health care professional. Important to note is that there is wide variability in the timing and rate of pubertal development. This variability is normal yet may be distressful from the perspective of individual adolescents as their early or late maturation renders them different from same-age peers.

PUBERTY AND CHANGES IN EMOTIONS AND BEHAVIOR

Puberty long has been considered a progenitor of changes in moods and behavior. Until the last two decades, studies of behavior change at puberty considered only physical morphological characteristics in assessing biological change. These physical changes were considered in relation to psychological processes and the various ecological contexts of development that included family, peers, neighborhood, and socioeconomic factors. This perspective now has been enriched by studies that include actual biological substances, such as hormones, that are essential for establishing the direct effects of biological changes at puberty, as well as physical characteristics and contextual factors in development. Overall, hormones have a stronger relationship to emotions and behavior than does pubertal stage.

Contemporary biopsychosocial theories reflect the theoretical perspectives discussed earlier: developmental contextualism and holistic interactionism. "A biobehavioral science recognizes that behaviors are simultaneously determined by processes within the individual, in the social ecology, and in interactions between the two. A focus on either social or biological factors can yield only part of the story of aggressive and violent behaviors: integrative investigations are essential to complete the picture" (Cairns & Stoff, 1996, p. 338). In the last decade the empirical research on hormones and behavior during adolescence reflects this integrated perspective.

Adolescent increases in depression, aggressive and delinquent behavior, and sexual activity have been attributed to changes in hormones and physical morphological changes, brain changes (Giedd et al., 1999; Lange, Giedd, Castellanos, Vaituzis, & Rapoport, 1997; Zijdenbos et al., 1999), altered reactivity to stressors (e.g., life events), and cognitive changes (Bebbington et al., 1998; Nolen-Hoeksema & Girgus, 1994). The links between the biological changes at puberty and changes in affective qualities and aggressive behavior have been extensively reviewed (Brain, 1994; Brain & Susman, 1997; Petersen, 1988; Susman & Finkelstein, 2001; Susman & Petersen, 1992). Given these comprehensive reviews, a brief summary of changes in behavior and affective qualities will be considered in relation to the two groups of hormones most often examined at puberty: sex steroids (testosterone and estrogen) and adrenal androgens (4-A, DHEA, and DHEAS).

Testosterone and Behavior

Products of the endocrine system, principally the steroid hormone testosterone, are implicated in physical aggression in animals and antisocial behavior in adolescents and adults, but the findings are not entirely consistent across human model studies (see Archer, 1991; Brain, 1994, for extensive reviews of both animal and human model studies). The effects of steroid hormones like testosterone on antisocial behavior are hypothesized to derive from the regulatory functions of hormones on brain development that occur during pre- and postnatal periods (organizational influences) as well as in later development (activational influences). Because males

are exposed to higher concentrations of androgens than females during pre- and postnatal development and because males tend to express greater physical aggression, androgens are implicated in the higher incidence of physical aggression and dominance in boys than in girls. Because testosterone rises at puberty and antisocial behavior also rises at puberty, testosterone is assumed to affect antisocial behavior at puberty.

Evidence for the relationship between testosterone and aggressive behavior is derived from both correlational and experimental studies. Olweus, Mattson, Schalling, and Low (1988) examined the causal role of testosterone in older adolescents on provoked and unprovoked aggression. Based on path analysis, the findings showed that at Grade 9 testosterone exerts a direct causal influence on provoked aggressive behavior. Testosterone appeared to lower the boys' frustration tolerance at Grade 9. A higher level of testosterone appears to lead to an increased readiness to respond with vigor and assertion to provocation and threat. For unprovoked aggressive behavior (starting fights and verbal aggression) at Grade 9, the findings were somewhat different. Testosterone had no direct effects on unprovoked aggressive behavior. There was an indirect effect of testosterone with low frustration tolerance as the mediating variable. The authors conclude that higher levels of testosterone made the boys more impatient and irritable, in turn increasing readiness to engage in unprovoked aggressive behavior. The findings of the Olweus et al. studies are consistent with a study of midadolescent boys. Adolescents higher in testosterone levels did exhibit behaviors that are distinguishable from behavior in boys with lower concentrations of testosterone. Adolescent boys' perceptions of peer dominance were reflected in testosterone concentrations (Schaal et al., 1996; Tremblay et al., 1997). Testosterone was significantly higher in perceived leaders than in nonleaders.

A negative relationship between testosterone and behavior problems was reported in healthy young boys (Susman et al., 1987). In contrast, there was no relationship between diagnoses of conduct disorder problems and testosterone (Constantino et al., 1993). The low concentration of testosterone in 4- to 10-year-old children in combination with the older relatively insensitive assays made the measurement of testosterone difficult in young boys.

In girls, testosterone was not related to aggressive behavior in two studies (Brooks-Gunn & Warren, 1989; Susman et al., 1987). Furthermore, testosterone was not related to dominance behaviors when young adolescent boys and girls interacted with their parents (Inoff-Germain et al., 1988). It is noteworthy that the associations between antisocial behavior and testosterone are less apparent in girls and in male children and younger adolescents (Brooks-Gunn & Warren, 1989; Constantino et al., 1993; Nottelmann et al., 1987) than in the associations in older adolescents (Olweus, 1986; Olweus et al., 1988) and adults (see review by Archer, 1991). These inconsistencies should be expected given the different constructs and measures used in the studies. Questionnaires that assess aggressive behavior may not have adequate sensitivity for capturing subtle differences in the behavior of adolescents that covary with testosterone levels. The developmental differences in findings between children, adolescents, and adults indicate that elevated testosterone and antisocial behavior may be a consequence as opposed to a cause of aggressive behavior during adulthood (Constantino et al., 1993; Susman, Worrall, Murowchick, Frobose, & Schwab, 1996). Boys who consistently displayed disruptive behavior problems across 6 years were significantly lower on testosterone than were boys who were not disruptive and who were later in pubertal maturation (Schaal et al., 1996). The effect of antisocial behavior on suppression of gonadal steroids may result from higher concentrations of stress-related products of the HPA axis (corticotropin releasing hormone [CRH], ACTH, and cortisol; Susman, Nottelmann, Dorn, Gold & Chrousos, 1989).

Given the dynamic interactive process models discussed earlier, it is likely that biological characteristics, ongoing behaviors, and characteristics of the environment interact to predispose an individual toward certain levels of sex steroids. In an animal model, Sapolsky (1991) showed that the dynamic interactions between one's place in the dominance hierarchy affected both cortisol and testosterone. As dominance increased, testosterone rose and cortisol decreased. In contrast, as dominance decreased, testosterone fell and cortisol increased, suggesting the importance of social interactions as influences on testosterone. High dominance was related to higher concentrations of testosterone, but this relationship was not stable over time. In an extensive review of the literature on testosterone and dominance, Mazur and Booth (1998) concluded that dominance is more closely linked to testosterone than is physical aggression. Dominance sometimes does entail physical aggression with the intent of inflicting harm on another person, but dominance also can be expressed nonaggressively such as in rebellion, competitiveness, and illegal behavior.

Testosterone is related to depression as well as to aggressive behavior at puberty. Earlier research assessed the indirect effect of hormone change on depression as reflected in the relationship between depression and pubertal stage. Transition to Tanner stage III was associated with a sharp increase in rates of unipolar depression (defined by the *Diagnostic and Statistical Manual of Mental Disorders–Fourth Edition*) in girls, but neither the timing of puberty nor menarche had any effect on depression (Angold & Worthman,

1993). Tanner stage had a bigger effect on depression than did age, suggesting that biological change rather than merely a period in development had an effect on depression. A later study found an effect of Tanner stage on depression but a larger effect for testosterone (Angold, Costello, Erkanli, & Worthman, 1999). When Tanner stage and hormones were entered simultaneously, the effect for Tanner stage became nonsignificant, but the effect for testosterone and estradiol remained unchanged.

Experimental studies are the preferred method for establishing the cause-effect relationship between hormones and behavior at puberty. A unique experiment was carried out to examine this cause-effect relationship. Testosterone or estrogen was administered to boys and girls in a placebo-controlled, randomized, double-blind, cross-over design study. The boys and girls had delayed puberty and were being treated with physiological doses of testosterone (boys) or conjugated estrogens (girls; Finkelstein et al., 1997; Kulin et al., 1997; Susman et al., 1998). Each 3-month treatment period was preceded and followed by a 3-month placebo period. The doses of gonadal steroids were calculated to simulate the concentrations of gonadal steroids in blood in normal early (low dose), middle (middle dose), and late (high dose) pubertal adolescents. Aggressive behaviors, problem behavior, and sexual activity were measured by self-reports. In boys who were treated with testosterone, aggressive behaviors were measured by self-reports about physical and verbal aggression against peers and adults, aggressive impulses, and aggressive inhibitory behaviors. Significant increases in aggressive impulses and physical aggression against peers and adults were seen in boys but only at the middle dose. (Findings for estrogen are discussed later.) There were no effects for testosterone treatment on behavior problems (Susman et al., 1998). Administering midpubertal levels of testosterone to hypogonadal boys resulted in significantly increased self-reports of nocturnal emissions, touching girls, and being touched by girls (Finkelstein et al., 1998). (See also the section titled "Puberty and Sexual Activity.") In brief, testosterone levels are related to aggressive behavior, but the results are not consistent across studies.

Estrogen and Behavior

The effects of estrogen, the other major sex steroid that increases rapidly at puberty, are less frequently examined in relation to behavior than is testosterone. In the few studies that have examined estrogens in relation to emotions and antisocial behavior, the relationship between estrogen and moods and behavior at puberty in girls may be as strong, or stronger in some instances, than the relationship between testosterone and moods and behavior in boys. The lack of progression of research on estrogen and behavior reflects two issues. First, only males are included in the majority of studies on hormones and antisocial behavior as physical aggression and violence occur more frequently in men and violence in women rarely comes to the attention of the judicial system or the media. Second, testosterone was considered the major hormone associated with antisocial behavior until recently.

The relationship between estrogen and behavior in girls may parallel that of testosterone in boys. In adolescents, correlational studies and a recent clinical trial study show a connection between estrogen and self-reports of aggressive tendencies. Of note is that in 9- to 14-year-olds, girls with higher concentrations of estradiol were more dominant while interacting with their parents than were girls with lower levels of estradiol (Inoff-Germain et al., 1988). In the same study, estrogen was not related to aggressive or delinquent behavior problems (Susman et al., 1987). In both sets of findings, pubertal stage did not contribute to the findings. In a parallel study girls were grouped by pubertal breast stages and four stages of estradiol secretion (Brooks-Gunn & Warren, 1985; Warren & Brooks-Gunn, 1989). No significant mood or behavior changes were reported as a function of pubertal stages. The hormonal stages revealed a significant curvilinear trend for depressive affect (increase, then decrease), impulse control (decrease, then increase), and psychopathology (increase, then decrease; Warren & Brooks-Gunn, 1989), indicating significant differences in these indexes during times of rapid increases in hormone levels.

In the placebo-controlled, randomized, double-blind, cross-over design study just described, girls with delayed puberty were treated with physiological doses of estrogen. Significant increases in self-reported aggressive impulses and in physical aggression against both peers and adults were seen in girls at the low and middle doses but not at the high dose (Finkelstein et al., 1997). In contrast, in boys, significant increases in aggressive impulses and physical aggression against peers and adults were seen but only at the middle dose of testosterone. Problem behaviors also were assessed using the Child Behavior Checklist (CBCL; Achenbach, 1991). In girls, only withdrawn behavior increased with estrogen treatment and only after the low dose (Susman et al., 1998). Unfortunately, there were no objective measures of reports (arrests, school or police reports) of dangerous behaviors in these adolescents.

In a recent study, the relationship between depression and estradiol was linear, with depression increasing with increases in estrogen (Angold et al., 1999) as opposed to the nonlinear relationship in the Warren and Brooks-Gunn study. Slight differences in the manner in which estradiol was categorized may have led to the different findings in these two studies. Collectively, these results demonstrate a clear relationship

between estrogen and depression. Given the lack of relationships between physical maturation based on pubertal stage and emotions or behavior, hormonal changes appear to be more important than the physical changes as correlates of mood and behavior patterns at puberty.

Even though physical maturational changes at puberty were not directly related to depression, underlying hormone changes appear to have indirect effects on behavior, principally in girls. Stattin and Magnusson (1989) showed that morphological estrogen-related changes apparent in physical development, such as breast development, have life-long implications for development. Early maturation in girls was related to engaging in interactions with older peers and norm violation in midadolescence. In adulthood, the earlier maturers were likely to bear children earlier, have more children and more abortions, hold lower position employment, and have fewer years of education than were later maturers. In brief, the timing of physical maturational influences at puberty were potent predictors of later social development.

In summary, there is a significant relationship among sex roles, steroid hormones and depression symptoms, aggressive behavior, and mood in adolescents. Physical maturational status is related to emotions and aggressive behavior as well as to hormones. Adding hormones to a statistical model tends to account for variance above and beyond physical maturational status or to eliminate the relationship between physical maturation and behavior and emotions. Nonetheless, the relationships between physical maturation and adolescent behavior may be latent until adulthood, as evidenced by the outcome of early maturers (Stattin & Magnusson, 1989). When considering maturational influences, attention must be given to the contextual processes that may moderate or mediate maturation and emotions and behavior. Family and peer interactions are likely candidates as moderators of maturational effects as evidenced by the associations between high problem behavior and lack of parental monitoring and adolescent associations with deviant peers (Ary et al., 1999). In keeping with the developmental contextualism (Lerner, 1998) and holistic interaction (D. Magnusson, 1999) models described earlier, simultaneous consideration of emotions and individual behavior, biological influences, and the social context of development are essential for explaining individual development.

Adrenal Androgens

The adrenal androgens traditionally receive little attention in relation to behavior. The adrenal androgens are considered weak bonding androgens relative to testosterone (Bondy, 1985). Nonetheless, adrenal androgens are associated with aggressive behavior, affect, psychiatric disorder symptoms, and sexual behavior (Brooks-Gunn & Warren, 1989; Susman et al., 1987; Udry et al., 1985; Udry & Talbert, 1988). Higher levels of DHEA also predicted the onset of the first episode of major depression (Goodyer, Herbert, Tamplin, & Altham, 2000). Adrenal androgen actions may parallel those of testosterone and behavior because one of the adrenal androgens, Δ4-A, is a precursor of both testosterone and estrogens. The rationale for examining the connections between behavior and adrenal androgens stems from findings from both animal and human model studies. In the female spotted hyena, the adrenal androgen Δ4-A is present in high concentrations, and the females of the species are highly aggressive and highly anatomically masculinized (Glickman, Frank, Davidson, Smith, & Siiteri, 1987). High Δ4-A concentrations during pregnancy may organize or activate sex-reversed traits in female spotted hyenas (Yalcinkaya et al., 1993). The roles of Δ4-A and other adrenal androgens (DHEA, DHEAS) in humans are not as clear as in hyenas beyond their roles in the development of pubic hair, body odor, and acne during puberty.

In the last decade several studies of adolescents report relationships between adrenal androgens and antisocial behavior in adolescents. In healthy puberty-age girls (Brooks-Gunn & Warren, 1989), higher DHEAS correlated negatively with aggressive affect. The interaction between negative life events and DHEAS and aggressive affect also was significant. Girls with lower concentrations of DHEAS who experienced negative life events had more aggressive affect than did girls with fewer negative life events. The second study included 9- to 14-year-old healthy boys and girls. Reports from this study show a relatively consistent pattern of high adrenal androgens and low gonadal steroids associated with problem behaviors and negative affect (Nottelmann et al., 1987; Nottelmann, Inoff-Germain, Susman, & Chrousos, 1990; Susman et al., 1987; Susman, Dorn, & Chrousos, 1991). Adrenal androgens also correlate with dominance in interactions with parents (Inoff-Germain et al., 1988). This interaction supports the perspective of Raine, Brennan, and Farrington (1997) that biological factors interact with social factors to predispose an individual to antisocial behavior.

The third study demonstrates the contribution of adrenal androgens to sexual behavior and activities (Udry et al., 1985; Udry & Talbert, 1988). A fourth study with boys with conduct disorder reported significantly higher levels of DHEA and DHEAS and the intensity of aggression and delinquency (van Goozen, Matthys, Cohen-Kettenis, Thijssen, & van Engeland, 1998). Finally, DHEAS levels interact with timing of puberty and depression in girls. Girls with high levels of DHEAS and early maturation had the highest emotional arousal and depressive affect scores (Graber, Brooks-Gunn, &

Warren, in press). In brief, although adrenal androgens have a lower (weaker) binding affinity compared to testosterone, the relationship between adrenal androgens and antisocial behavior parallels the relationships between testosterone and antisocial behavior in adults.

TIMING OF PUBERTY AND PSYCHOSOCIAL DEVELOPMENT

Wide variation exists among individuals in the timing of the onset of activation of the HPG axis and pubertal growth spurt; therefore, there is a wide range of physiologic variations in sexual reproduction capability and normal growth at puberty. These variations are a result of genetic influences and nutritional status, resulting from self-induced restriction of energy intake and heavy exercise training (Rogol, Clark, & Roemmich, 2000). The variation in timing of puberty and psychological development constitutes one of the most often examined topics in the entire field of adolescent development.

Early and Late Pubertal Timing

The classic studies of the effects of timing of puberty were first reported in the 1930s (H. E. Jones, 1938; M. C. Jones, 1958; M. C. Jones & Bayley, 1950). Psychological consequences of timing of puberty continue to be of sustained interest. In general, for boys in the early studies, early maturation tended to be advantageous, particularly with respect to social development. In contrast, early maturation for girls often tended to be disadvantageous (Faust, 1969; Jones, Bayley, & Jones, 1948; Stolz & Stolz, 1944), although the results were not always consistent across studies.

With the rise of interest in biobehavioral research, beginning in the 1980s, two predominant hypotheses were formulated to explain the influence of physical maturation on primarily negative psychological outcomes. First, the *maturational deviance hypothesis* (e.g., Brooks-Gunn, Petersen, & Eichorn, 1985; Caspi, Henry, McGee, Moffitt, & Silva, 1995; Caspi & Moffitt, 1991; Petersen & Taylor, 1980; Tschann et al., 1994; Williams & Dunlop, 1999) suggested that adolescents who are off time (earlier or later) in their pubertal development, with respect to peers, experience more stress than on-time adolescents. Being an off-time maturer may result in an adolescent's lacking the usual coping resources and social support that characterize being on time in pubertal development. The added stress and lack of resources may increase vulnerability to adjustment problems. In brief, a maturational-deviance hypothesis predicts that early-maturing girls and late-maturing boys experience heightened emotional distress, which influences the initiation of antisocial behavior including use of illegal substances, sexual activity, and delinquent behavior.

The second hypothesis, the *early-maturational* or *early timing hypothesis* (e.g., Brooks-Gunn et al., 1985; Caspi & Moffit, 1991; Petersen & Taylor, 1980; Tschann et al., 1994) posited that being an early developer is especially disadvantageous for girls (Stattin & Magnusson, 1990). The disadvantage may result from the missed opportunity for completion of normal psychosocial developmental tasks of middle childhood (Brooks-Gunn et al., 1985). Early maturers may face greater social pressure to conform to adult norms and, importantly, to engage in adult behaviors. Earlier maturing adolescents look more physically mature than their chronological age, and hence society may view them as older and more socially, emotionally, and cognitively advanced (Brooks-Gunn et al., 1985; Caspi & Moffitt, 1991). However, the cognitive and social development of early maturers may lag far behind their seemingly adult status. With this mismatch, expectations are high for more adult-like behaviors and actions, yet the physically early maturing girls may not be ready for adult behaviors and roles. Thus, an early-maturation hypothesis predicts that early-maturing girls engage in more acting-out behavior or negative emotions than all other groups, independent of emotional distress.

Although not always consistent, the results from the early timing of maturation studies report that early maturation for boys appears to be positive, particularly with respect to social development, whereas for girls early maturation is related to more negative moods and behaviors (Faust, 1969; Ge, Conger, & Elder, 2001a; Jones & Bayley, 1938; Stolz & Stolz, 1944). For instance, early-maturing girls experienced significantly higher levels of psychological distress and were more vulnerable to prior psychological problems, deviant peer pressures, and fathers' hostile feelings when compared to on-time and late-maturing peers (Ge, Conger, & Elder, 1996). However, early-maturing boys also report more hostile feelings and internalizing behavior problems than do their later maturing peers (Ge, Conger, & Elder, 2001b). Other studies show that early timing is negative for both boys and girls. This finding was supported in studies of African American children as well (Ge, Brody, Conger, & Simons, in press). Tschann et al. (1994) reported that boys and girls who are earlier maturers reported more substance abuse compared to later maturers.

Earlier maturing boys and girls were more sexually active and participated in more antisocial behavior (Flannery, Row, & Gulley, 1993), and early-timing boys reported more antisocial behavior than on-time boys (Williams & Dunlop, 1999) compared to late maturers. Early-maturing boys also engaged in

more health risk behaviors (Orr & Ingersoll, 1995). In other studies, early-maturing girls were least satisfied with their height and weight, had poorer body image, or were less happy (Blyth, Simmons, & Zakin, 1985; Brooks-Gunn et al., 1985; Brooks-Gunn & Warren, 1989; Duncan, Ritter, Dornbusch, Gross, & Carlsmith, 1985; Petersen & Crockett, 1985) and had more internalizing problems (Hayward et al., 1997), more behavioral and emotional problems (Caspi & Moffitt, 1991), and more interactions with peers who were deviant (Silbereisen, Petersen, Albrecht, & Kracke, 1989).

Timing of puberty is related to a variety of health and risk behaviors. Eating problems were reported by 9th-, 10th-, and 11th-grade girls who perceived their pubertal timing to be earlier than that of peers (Swarr & Richards, 1996). Moreover, they report that interactions between pubertal timing and various experiences or perceptions of parents are related to eating problems. Similarly, early-maturing girls engaged in risk behaviors such as drinking, smoking, and sexual activity at an earlier age (D. Magnusson et al., 1985). In another study, girls with earlier puberty had their first alcohol experience and drank moderate amounts of alcohol sooner than those with later pubertal timing did (Wilson et al., 1994). Finally, the perception of earlier pubertal timing was a statistical predictor for future suicide attempts in Norwegian adolescents, and this relationship was stronger in girls than in boys (Wichstrom, 2000).

Other studies show that early timing in girls and late timing in boys are related to affective and behavior problems. For example, early timing of puberty in girls and late timing in boys were related to a higher incidence of psychopathology and depressed mood (Graber, Lewisohn, Seeley, & Brooks-Gunn, 1997), and poor body image was evident in boys (Siegel, Yancey, Aneshensel, & Schuler, 1999). Similarly, Andersson and Magnusson (1990) reported that both early- and late-maturing boys may be more likely to be alcohol users. Using hormone concentrations standardized for age as an index of timing of puberty, earlier maturing adolescents, based on adrenal androgen levels, tended to have poor adjustment; however, the findings varied depending on the hormone under consideration (Susman et al., 1985). Later maturing adolescents, based on sex steroids, tended to have poorer adjustment. The findings were more pronounced for boys than for girls.

Later maturation is not as consistently related to negative emotions and behavior problems as is earlier maturation. Later maturation in boys was related to lower achievement (Dubas, Graber, & Petersen, 1991), lower self-esteem or confidence, and less happiness (Crockett & Petersen, 1987; Simmons, Blyth, Van Cleave, & Bush, 1979). Other studies showed no effects of pubertal timing, either earlier or later, in relation to mood and behavioral outcomes. For example, Brooks-Gunn and Warren (1989) reported no relationship between pubertal timing and negative emotions in girls, and Angold, Costello, and Worthman (1998) reported no relationship between pubertal timing and the rates of depression in boys and girls.

In summary, there is support for both the maturational deviance hypothesis and the early-maturational hypothesis. Adolescents who are off time in pubertal timing generally report more adjustment problems, supporting the maturational deviance hypothesis. Early timing of puberty does appear to be more disadvantageous for girls than for boys (the early-maturational hypothesis), but boys are negatively affected by early timing as well. Nonetheless, there also is evidence that timing of puberty has no effect on adjustment and that earlier puberty is neither consistently disadvantageous for girls nor advantageous for boys. The effects of timing of puberty on adjustment and deviant behavior are made even more difficult to unravel by imprecise definitions and measurement of puberty and the inclusion of a wide age group of adolescents.

Theoretical and Methodological Issues

The studies just reviewed show both consistencies and major inconsistencies regarding the relationship among timing of puberty and behavior, adjustment, and psychopathology. Nonetheless, it is legitimate to conclude that both earlier and later timing of puberty has a major impact on multiple dimensions of psychological functioning in boys and girls. Of note is that timing of puberty has long-term implications. Later in adolescence or adulthood, early-maturing girls reported more psychopathology (Graber et al., 1997) and less educational achievement and career success than did later maturing girls (Stattin & Magnusson, 1990). The inconsistencies across studies of earlier and later puberty emerge from conceptual and methodological differences. The major theoretical interest appears to be on earlier timing of puberty given societal concerns regarding potential consequences of early maturation: precocious sexuality, substance use, and deviance. With some exceptions, few studies examine the longer term effects associated with earlier maturation. Earlier or later maturation has been theorized to be a stable characteristic of individuals rather than a dynamic concept that changes with changing age and contextual factors. The behaviors that are related to timing of puberty during adolescence, such as risky sexual behavior and other forms of externalizing problems, may disappear in late adolescence and adulthood. Nonetheless, the longer term implications of timing of puberty will emerge as transformed manifestations of these early behaviors as described by Stattin and Magnusson (1990). Specifically, early

maturers may become affiliated with older and deviant peers for a limited time period and engage in deviant behaviors that cease in late adolescence. The expense of engaging in these behaviors is reduced achievement and educational and occupational success.

Although the findings regarding early and late puberty seem inconsistent, there is consistency across studies. The consistency of findings showing earlier maturation and problems in adjustment suggests that adolescents are exquisitely sensitive to their early pubertal status. Such is not the case for later maturers. The fewer findings relating later maturation and psychological functioning indicate the ability of adolescents to adapt to differences between themselves and same-age peers as puberty progresses. Less theorizing has taken place regarding developmental implications of later maturation.

Methodological differences also contribute to the inconsistencies in findings. The chronological age when adolescents are assessed for effects of timing, the measure of timing (age of menarche, pubertal stage, or other measure) and the construct assessed (antisocial behavior, depression, parent-adolescent interactions) all may contribute to the discrepancies in how timing of puberty and psychological functioning co-occur. The method used to assess timing of puberty likely plays a major role in the discrepancies across studies. To a large degree, timing of puberty has been assessed utilizing a self-report measure of puberty (e.g., pubertal stage, age at menarche, appearance of body hair). Other studies use objective measures of physical development such as pubertal stage by physical examination (Tanner criteria; Marshall & Tanner, 1969, 1970) or hormone concentrations. The lack of reliability in self-reports of pubertal status (Dorn, Susman, Nottelmann, Inoff-Germain, & Chrousos, 1990) and age of menarche (Dorn et al., 1999) is likely a major source of error variance in assessing the multiple connections between timing of puberty and psychological functioning.

PUBERTY AND ADOLESCENT HEALTH: CULTURAL SIGNIFICANCE AND SECULAR CHANGE

Secular Changes in Timing of Puberty

Timing of puberty currently captures the interest of the public as well as the scientific community. *Time* (October 2000) magazine's front cover and accompanying article featured the problem of early timing of puberty in girls. There has been a decrease in age of menarche over the last century (Blythe & Rosenthal, 2000; Gerver, De Bruin, & Drayer, 1994; Grumbach & Styne, 1992; Tanner & O'Keeffe, 1962; Wyshak & Frisch, 1982). The secular (generational) trend in age at menarche has been evident from at least the mid 1800s to currently when a decrease in the age of menarche was noted from 15 years to 12.7 years (Garn, 1992). Age at menarche decreased by approximately 1 year for those women born from 1900 to 1950. A decrease in the age of menarche also is evident in international studies.

In a nationwide growth study in the Netherlands, age of menarche was assessed in two cohorts. The first cohort was enrolled in 1952–1956, and the most recent cohort was enrolled in 1996–1997. Age at menarche decreased to 13.15 years, which was a 6-month decline over four decades (Fredriks et al., 2000). Similarly, in two cohorts of American girls 14 years apart, age at menarche was found to decrease (Wattigney, Srinivasan, Chen, Greenlund, & Berenson, 1999). Cohort 1 included 1,190 girls (64% White) who were examined in 1978–1979. The second cohort was examined in 1992–1994 and included 1,164 girls (57% White). In Cohort 2 more than twice as many girls reached menarche before age 12 years than did in Cohort 1. Menarche occurred earlier in Cohort 2 for both Black and White girls. Furthermore, in both cohorts all of the obesity measures used in the study were correlated with age at menarche. The decrease in timing of menarche has generally been attributed to cultural factors, specifically, improved nutrition and socioeconomic conditions evident in the United States and numerous developing countries.

In 1997 a large-scale study of pubertal development in American girls received widespread attention in the media as well as in the health care and research arenas. Herman-Giddens et al. (1997) studied over 17,000 pre- and peripubertal-age girls (90.4% White) to determine age at onset of pubertal changes. They reported that African American girls began puberty on average between age 8 and 9 whereas White girls began puberty by age 10. For example, at age 9, 62.6% of African American girls had breast development at stage 2 or higher (indicative of puberty) compared to 32.1% of White girls. Similarly, age at menarche was 12.16 years for African American girls and 12.88 years for White girls (Herman-Giddens et al., 1997). In a follow-up article (Kaplowitz, Oberfield, & the Drug and Therapeutics and Executive Committees, 1999), based on the Herman-Giddens study, the suggestion was that breast or pubic hair development is not precocious unless under age 7 in White girls and 6 in African American girls. Thus, girls beginning puberty above that range need no medical follow-up. However, they further stress that no follow-up is needed only if other factors are not present (e.g., bone age >2 years ahead of chronological age and predicted height of 2 *SD* or more below target height or < 59 inches, underlying neurological finding, etc.; Kaplowitz et al., 1999). It appears prudent to seek medical advice in all instances of suspected early puberty.

Although, the Herman-Giddens et al. (1997) study is unique and important in that it includes a large number of girls, a number of important methodological considerations may have affected the findings and interpretations of secular trends in timing of puberty. These methodological considerations include the method of conducting the physical examination. Breast stage was determined by visual inspection and not palpation. Even with palpation conducted by an experienced clinician, it is difficult to distinguish between breasts and adipose tissue. Thus, some girls could have been classified as pubertal at Stage 2 when the actual cause of apparent breast development was obesity. Statistically controlling for body mass could have partially addressed the problem of overestimating the extent of breast development although the problem would not have been eliminated. Additionally, characteristics of the sample may have contributed to ratings of early puberty. Some of the girls in the sample likely were brought to their primary care provider for the evaluation of early pubertal development. In addition, nearly 7% of the sample had a chronic disease, and 3% were on medication. These percentages were higher in the African American sample. Finally, not all of the girls in the study had reached menarche (Emans & Biro, 1998), thereby possibly decreasing the average age of menarche. The authors are to be commended on the study, but the mean age of menarche reported may not truly be representative of the general population of adolescent girls. In spite of the earlier age of onset of puberty, there was little change in age at menarche noted in the Herman-Giddens et al. report compared to reports in the previous 25 years.

The report by Herman-Giddens et al. (1997) continues to remain controversial. In the fall of 2000, Rosenfield et al. (2000) emphasized that it is premature to state that puberty is occurring earlier in girls based on one study. Rosenfield et al. cited similar criticisms to those expressed earlier (e.g., stage of puberty was based on visual inspection versus palpation) but particularly emphasized the "fatal flaw" (p. 622) of utilizing a nonrandom sample. The authors concluded that regardless of race, when breast development or pubic hair appear before age 8 or 9 years, a diagnostic evaluation should be conducted for bone age and height prediction. Based on these results as well as the physical examination, decisions for further follow-up should then be made.

The exact decrease in the true onset of timing of puberty as opposed to the timing of menarche is difficult to assess as the timing of puberty is often indexed in girls by "age at menarche." Age at menarche is a relatively easy marker to obtain by self-report or parental report but is not an accurate index of timing of onset of puberty. Variability in accuracy of reports of onset of menarche (Dorn et al., 1999) contributes to the difficulty of estimating secular trends in the onset of puberty. Unfortunately, the data on secular trends in onset of puberty in boys are much less complete than for girls. Theoretically, the first nocturnal emission or spermarche is a comparable timing measure for boys; however, information on spermarche is difficult to obtain. Sanders and Soares (1986) reported that many adult men either had difficulty recalling their first nocturnal emission or were hesitant to reveal the information. Few psychosocial studies include the concept of spermarche as an index of timing of puberty (for exceptions, see Downs & Fuller, 1991; Gaddis & Brooks-Gunn, 1985; Kim & Smith, 1998; Kim, Smith, & Palermiti, 1997). Information regarding secular trends in timing of puberty is not easily gleaned from these studies because they include a wide age range of subjects (up to age 62) or small sample sizes. None provided normative data regarding average age of spermarche or reliability of the measurement of spermarche. In an earlier study, Kulin, Fronera, Demers, Barthlomew, and Lloyd (1989) reported the average age of spermarche to be age 14, and at that age gonadotropins were at adult concentrations. To our knowledge, this is the only study that simultaneously assessed self-reported age at spermarche and gonadotropin levels. Given the lack of information regarding onset of puberty in boys, there is no valid method of estimating secular trends in the onset of puberty in boys. A study of boys that parallels the Herman-Giddens et al. (1997) study of girls in a randomly selected representative sample could make a significant contribution to the literature.

Puberty and Adolescent Health

Puberty implies that an adolescent is becoming an adult. Contemporary culture is ambivalent about the desirability of this transition. On the one hand, puberty implies independence and adult roles and the emergence of a physical morphology and reproductive capability characteristic of adults. On the other hand, for girls the thin prepubertal physique is valued, whereas fat deposition at puberty is viewed as a less desirable characteristic of female adults. These changes in physical size and proportions have definite negative social signaling value. As boys and girls progress in physical development there are societal expectations for moodiness and disruptive behavior and opportunities for risky sexual behavior. With the engagement in sexual activities, there is added risk for sexually transmitted diseases (STDs; e.g., HIV transmission) and teen pregnancy (Udry, 1979; Udry & Cliquet, 1982). Puberty, then, is a period of development ripe for the emergence of major health risk behaviors and health problems. Public health policies tend to focus on preventing the occurrence of the health problems (substance use, risky sex, and accidents)

but at the same time ignore the role of puberty as a major factor affecting the onset and trajectory of risky health behaviors. The effects of timing of puberty on adult health are only now beginning to be identified.

Puberty and Adult Health

Health policies to reduce the risk of long-term implications of early timing of puberty are just beginning to be considered. This emphasis, based primarily on observational studies, regards the relationship between reported age of puberty and later health problems. Timing of puberty and later health have been understudied in males, so disorders linked with timing of puberty in males are yet to be identified. The lack of attention to long-term implications of pubertal processes (particularly, timing of puberty) represents a missed opportunity for possible public health prevention efforts.

Research on puberty and later health has focused primarily on cancer, obesity, and reproductive disorders. An increased risk of breast cancer is associated with early puberty based on age at menarche (Kampert, Whittemore, & Paffenbarger, 1988; C. M. Magnusson et al., 1999; Rockhill, Moorman, & Newman, 1998; Vihko & Apter, 1986; for a review, see Key, 1999). The increased risk of cancer in early maturers is attributed to the longer duration of exposure to circulating estrogens across the life span. Women who experience earlier menarche have higher levels of circulating free estrogen into at least the third decade of life compared to later maturers (Apter, Reinila, & Vikho, 1989). An additional indirect measure of estrogen, the timing of the pubertal growth spurt, is also associated with breast cancer risk. Women who attain their adult height at a later age have a lower risk of breast cancer, possibly due to their having lower levels of growth hormone (GH) and insulin-like growth factor (IGF1) during breast development (Li, Malone, White, & Daling, 1997). However, it is important to note that other studies do not show an increased risk of breast cancer with earlier menarche (e.g., R. G. Parker, Rees, Leung, & Legorreta, 1999) and that the cause of breast cancer is no doubt multifactorial.

Early maturing girls are at greater risk for obesity (Lovejoy, 1998; Ness, Laskarzewski, & Price, 1991). Obese girls also have an earlier timing of puberty, so the direction of the relationship between obesity and timing of puberty is unknown. Obesity in adolescence is related to major risk factors for cardiovascular disease (Morrison, Barton, Biro, Daniels, & Sprecher, 1999). In Black and White 10- to 15-year-olds, overweight status was related to lower high-density lipids and higher low-density lipids, a risk-profile for cardiovascular disease. Obesity is also linked to the high incidence of Type II diabetes mellitus in adolescents.

Reproductive disorders related to timing of puberty are evident primarily in ovarian pathophysiology. Polycystic ovarian syndrome (PCOS) is a disorder in adulthood reported to be related to early puberty. PCOS is a heterogenous disorder characterized by oligo/amenorrhea (few or no menstrual periods), insulin resistance or high insulin, and hyperandrogenism, which is associated with an increased risk of developing impaired glucose tolerance and Type II diabetes (Ibáñez et al., 1993). PCOS is reported in 5% to 10% of women of reproductive age. PCOS can begin to express itself during puberty and continue into the adult reproductive years with ensuing infertility.

One possible mechanism linking PCOS and early puberty is premature adrenarche. During adrenarche the adrenal androgens, DHEA and DHEAS, and Δ-4A begin to rise. When adrenarche occurs prior to age 8 in girls and 9.5 in boys, it is considered premature (Siegel, Finegold, Urban, McVie, & Lee, 1992; Siegel & Lee, 1992; see Reiter & Saenger, 1997, for review). Premature adrenarche is characterized by high adrenal androgen concentrations and pubic hair development with no evidence of breast development. Off-time activation of the adrenal glands is presumed to be the cause of premature adrenarche. Premature adrenarche has been considered a benign condition (Kaplowitz, Cockerell, & Young, 1985) representing a variation of puberty; therefore, treatment was deemed unnecessary (Reiter & Saenger, 1997). Recent research suggests that children with premature adrenarche may have long-term sequelae such as PCOS, anovulation in late adolescence (and potentially infertility), and insulin resistance (Ibáñez, de Zegher, & Potau, 1999; Ibáñez et al., 1993; Ibáñez, Potau, Zampolli, Street, & Carrascosa, 1997; Oppenheimer, Linder, Saenger, & DiMartino-Nardi, 1995; Richards et al., 1985). In adulthood, women with PCOS have an increased risk for cardiovascular problems (Birdsall, Farquhar, & White, 1997; Talbott et al., 1995) and complications from diabetes mellitus (Dunaif, 1997, 1999; Dunaif, Futterweit, Segal, & Dobrijansky, 1989). Thus, women with early adrenarche may be at risk for PCOS, resulting in significant physical morbidity. It is unknown if there is continuity of adjustment problems observed in premature adrenarche (Dorn et al., 1999) and severe psychopathology observed in adult women with PCOS.

The timing of puberty is considered to have implication for brain development. Saugstad (1989b) pointed out that the "onset of puberty coincides with the last major step in brain development: the elimination of some 40% of the neuronal synapses" (p. 157) and postulated that synaptic loss may have implications for the development of manic-depressive psychosis and schizophrenia. Secular, social class, and geographic trends in body build and mental disorders suggest

that early maturers may be more susceptible to manic-depressive psychosis and that late maturers may be more susceptible to schizophrenia (Saugstad, 1989a, 1989b). These hypotheses remain speculative until longitudinal studies provide more definitive findings.

Timing of Puberty and Stress

One of the most controversial issues regarding timing of puberty is whether stressors accelerate or delay the timing of puberty. Consistent with the theoretical perspectives discussed earlier, timing of puberty and behavior and experiences are considered dynamic and bidirectional processes (Susman, 1997). Experiences as well as genetic factors are speculative influences on the tremendous variations in the timing of puberty. Experiential-based sources of variation include disruptive behavior disorders (Schaal et al., 1996), family relationships (Steinberg, 1987, 1988), participation in intensive physical exercise such as ballet dancing (Warren et al., 1991), negative emotional states (Nottelmann et al., 1990; Susman et al., 1989), and family adversity (Belsky, Steinberg, & Draper, 1991). Interest in the mechanism for explaining the relationship between experience and timing of puberty began to emerge in the last decade.

The concept of stress is hypothesized to play a major role in timing of puberty. There are two opposing views on the relationship between stress and timing of puberty. The first perspective, advocated by Belsky et al. (1991), is based on an evolutionary model of psychosocial influences on the timing of puberty. The premise is that early on children develop an understanding of the availability of resources, the duration of close relationships, and the trustworthiness of adults. Exposure to these different types of resources and caretaking adults in the child's environment are hypothesized to influence the child's reproductive strategies. Environments characterized by stress are hypothesized to contribute to early reproductive development (Belsky et al., 1991). Three possible avenues are proposed whereby early stress accelerates reproductive development and subsequently earlier childbearing: (a) the stress of living in a conflicted family, (b) the stress of being reared in a single family home, especially with a single mother, and (c) exposure to the parental paramours if in a single parent home. Belsky et al. proposed that these early stressful experiences act by changing the child's view of the world in general and the child's view of relationships, in particular, as uncertain, unpredictable, and unstable. The uncertainty of living in a stressful environment has both psychological and physiological consequences. Early stress acts on psychological development via the individual's having adopted a view of the world as being uncertain. If individuals view the world as uncertain, reproducing early, while they still can, is an adaptive strategy to counteract the uncertainty of the difficult family environment. Uncertainty also leads these individuals to not count on their partners for resources, thereby creating unstable pair bonds. Early stress is proposed to act on physiological systems to accelerate pubertal development, although the exact mechanisms involved in acceleration of puberty are not addressed.

The hypothesis has received mixed support. Conflict in the family at age 7 predicted earlier menarche (Moffitt, Caspi, Belsky, & Silva, 1992). Divorce as a stressor and as a context for girls being raised in father-absent versus father-present homes also has been linked to timing of puberty. Girls in father-absent homes tend to reach puberty earlier than girls reared in father-present homes (Jones, Leeton, McLeod, & Wood, 1972; Moffitt et al., 1992; Surbey, 1990; Wierson, Long, & Forehand, 1993). The stress of living in a conflicted family has been extended to include having a father who is an alcoholic (Malo & Tremblay, 1997). Other studies show that greater marital and family conflict, as well as less marital and family harmony, are associated with pubertal timing in girls (Ellis & Garber, 2000; Ellis, McFadyen-Ketchum, Dodge, Pettit, & Bates, 1999; Graber, Brooks-Gunn, & Warren, 1995; Moffitt et al., 1992; Steinberg, 1988). Absence of positive parent-child relationships, rather than negative relationships, predicted early pubertal timing (Ellis et al., 1999). Positive interactions included greater supportiveness in the parental dyad and more father-daughter and mother-daughter affection.

Absence of positive parent-child relationships, rather than negative relationships, predicted early pubertal timing (Ellis et al., 1999). Positive relationships included greater supportiveness in the parental dyad and more father-daughter and mother-daughter affection. The quality of fathers' investments in the family emerged as the most important feature of the proximal family environment. Presence of fathers in the home, more time spent by fathers in child care, greater supportiveness in the parental dyad, more father-daughter affection, and more mother-daughter affection, as assessed prior to kindergarten, each predicted later pubertal timing by daughters in seventh grade. The positive dimension of family relationships, rather than the negative dimension, accounted for these relations (Ellis et al., 1999). The interpretation was that the findings are consistent with the Belsky model because positive dimensions were related to later timing of puberty. The findings could also be interpreted as inconsistent with the Belsky model because it predicts that negative aspects of the family will predict earlier timing of puberty.

The mechanisms linking earlier onset of puberty and family stress are not articulated in the existing research. In

contrast, the effect of father absence as a precipitant of earlier puberty is hypothesized to be mediated by endocrine mechanisms. Biological father absence frequently is replaced by a stepfather or mother's boyfriend. Exposure to pheromones of unrelated males is hypothesized to lead to earlier onset of puberty. Exposure to chemosignals and pheromonal systems in a variety of species, including humans, leads to changes in menstrual cycles (McClintock, 1998; Stern & McClintock, 1998) and timing of puberty (Sanders & Reinisch, 1990). Pheromonal systems and chemosignals may function as modulators or signaling substances that precipitate the onset of puberty.

The relationship between family stress and timing of puberty, as well as the psychobiological perspective, in particular, has generated controversy regarding the validity of theoretical perspectives and the imprecision of defining and assessing family stress. A primary criticism of the stress and early timing hypothesis focuses on the logic of the argument that stress is responsible for early onset of puberty. The physiology of the stress system is such that stress should attenuate timing and progression of puberty. This perspective is based on the physiological principle of adaptation to stressors. Adaptation is accomplished at both the physiological and behavioral levels. At the neuroendocrine and peripheral levels CRH is secreted by the hypothalamus, ACTH by the pituitary, and cortisol from the adrenal glands (Chrousos & Gold, 1992; Stratakis & Chrousos, 1997). These components of the HPA stress system down-regulate the reproductive HPG axis at the level of the hypothalamus, pituitary, and gonads. For instance, cortisol exerts inhibitory effects at the levels of the LHRH neuron, the pituitary gonadotroph (responsible for secreting luteinizing hormone and follicle stimulating hormone), and the gonad itself, thereby suppressing sex steroids (testosterone and estrogen) and maturation of reproductive function. Down-regulation or attenuation of secretion of HPG-axis hormones is accomplished either directly or via endorphin. CRH suppresses the LHRH neuron in the hypothalamus. Adaptation at a behavioral level involves a delay or cessation of sexual reproduction activities to conserve vital metabolic resources (Chrousos, 1998). Based on these physiological and behavioral processes, the onset of reproductive capability will be attenuated in children reared in stressful environments (Nottelman et al., 1990; Susman et al., 1989). Conditions that are physically stressful, such as malnutrition and physical stressors (e.g., intense exercise), also suppress reproduction.

In young adolescents stress reflected in behavior problems and self-image problems was related to later maturation based on hormone levels and stage of pubertal development (Tanner criteria, Marshall & Tanner, 1969, 1970; Nottelmann et al., 1987; Susman et al., 1987). Family stressors related to paternal alcoholism led to a delay of male pubertal onset, supporting the hypothesis that stress activates the HPA axis and inhibits the HPG axis (Malo & Tremblay, 1997). Additional longitudinal studies that include actual indexes of stress hormones, as well as adolescent and family stressors, are needed to explain further the links between stress and timing of puberty.

A set of papers (Hinde, 1991; Maccoby, 1991) that accompanied the publication of Belsky et al. (1991) raised additional criticisms regarding the family stress and evolutionary theory of socialization. Maccoby (1991) evoked the concepts of *quality* and *quantity* to argue against the Belsky et al. perspective. The quantity argument based on the Belsky et al. perspective is that unstable rearing environments will lead to early maturation and sexual activity, and presumably earlier and more frequent childbearing. Maccoby proposed that if males invest less, females must invest more in rearing the young and that if the male is not available, she recruits investment from her mother and sisters. Her basic strategy should be to select a mate who has the resources and the motivation to be a quality parent rather than a quantity parent. Maccoby further suggested that it does not seem plausible that evolution would have shaped psychological and physiological maternal characteristics such that she would have more children in the absence of a supportive family environment as each additional child increases the difficulty of raising each child. Thus, skepticism is warranted regarding the claim that females have evolved so as to take up a quantity reproductive strategy in the face of instability in childhood relationships. Finally, Maccoby suggested that evolutionary concepts are not essential for explaining contemporaneous functioning. Social learning could explain the effects of family functioning on early sexual activity. Girls from disorganized families likely have less surveillance, are more aware of sexual activity (especially if the mother has multiple sexual partners), or have relationships with older men who are viewed as avenues for escaping dysfunctional homes.

The evolutionary approach to timing of maturation brings together rich perspectives on puberty from animal and human models of adaptation and change. Nonetheless, this perspective is at odds with the two predominant theories articulated at the beginning of the chapter, developmental contextualism and holistic interactionism. Both perspectives acknowledge the importance of evolutionary and genetic contributions to development but include the contemporaneous dynamic interaction between psychological, biological, and contextual processes. Family context provides an arena within which parent-adolescent interactions evolve as a result of their past history together as well as current self-organizing properties.

Early maturation at puberty within these frameworks is a product of contextual factors (e.g., nutritional consumption and related obesity) and parent-adolescent interactions characterized by detachment or warmth. The relationship between timing of puberty and family processes is further clouded by the limited research on direction of relationships. Lewontin and Levins (2000) concurred with the contextualism and holistic interactionism developmental models in emphasizing that when considering systems of any complexity there are positive and negative feedback systems. Biological and psychological feedback loops at any time in development. Clear evidence based on models linking sequential and dynamic influences between family stability and instability and timing of puberty is essential to allow for an escape from current controversies regarding timing of puberty and family processes.

Puberty and Sexuality

One of the things that can be stated assuredly is that adolescence "is when most individuals first experience sexual intercourse" (Meschke, Zweig, Barger, & Eccles, 2000, p. 316). The Centers for Disease Control and Prevention (CDC; 1999) reported that in 1999 over 47% of the girls and 52% of the boys surveyed in grades 9 through 12 had had intercourse, and over one third of the sample had been sexually active in the previous three months; 4.4% of girls and 12.2% of boys reported experiencing intercourse before age 13. Trends in sexual activity vary by historical time. Singh and Darroch (1999) examined trends in sexual activity of American women across a 13-year period in three surveys. In the 1980s there was an increase in the proportion of adolescents who had ever had sexual intercourse, but by the mid-1980s and on into the 1990s this increased trajectory stabilized. On average, approximately 40% of adolescents in the 15- to 19-year-old age group had had sexual intercourse in the last three months. These percentages were equal across the three surveys. Kaufmann et al. (1998) reported similar trends.

There is some variation between subpopulations of adolescents. For example, Finkelstein et al. (1998) reported that delayed-puberty boys tended to engage in more advanced sexual behavior than did delayed girls of similar age. Halpern, Udry, and Suchindran (1997) found differences in the self-reported sexual behaviors of Black and White girls, with White girls more likely to report masturbation and Black girls more likely to report petting and coitus.

The influences on adolescent sexuality arise in many spheres: biological, psychological, social, and the media. Biologically, hormones are known to bring about sexual development at puberty and are also considered influences on adolescent sexual behavior. Hormones are thought to have both direct and indirect (e.g., via pubertal physical development) effects on sexuality (Halpern, Udry, & Suchindran, 1998). Androgens, in particular, are considered potent influences on sexuality in both boys and girls. The pubertal increase in male testosterone levels "is thought to provide a biological foundation for the increases in sexual interest and activity that occur during adolescence" (Halpern et al., 1998, p. 446). Studies have examined the relationship between testosterone and sexual activity using both randomized clinical trials and correlational and group difference designs. In a randomized clinical trial of sex hormone replacement therapy, intramuscular administration of mid-pubertal levels of testosterone to hypogonadal boys resulted in significantly increased self-reports of nocturnal emissions, touching girls, and being touched by girls (Finkelstein et al., 1998). Similarly, Halpern et al. (1998) found that adolescent boys with higher levels of salivary testosterone were more likely to initiate coitus and to participate in other partnered sexual behaviors. Within individuals, salivary testosterone increases were also associated with a greater likelihood of partnered sexual activity. Additionally, the study illustrated the importance of physical developmental influences on sexual activity. When the analysis of testosterone and partnered activity controlled for pubertal development, neither testosterone nor pubertal development reached statistical significance. These findings suggest that evaluations of the propensity to engage in sexual activity should consider multiple levels of influence by psychological, biological, and social functioning.

Testosterone and other androgens also have striking effects on sexuality in adolescent girls. Halpern et al. (1997) reviewed several lines of evidence for androgenic effects on female adolescent sexuality, including hormone replacement studies, female behavioral responsiveness to testosterone, and connections between testosterone levels and sexual activity during puberty (see also Hutchinson, 1995). Udry et al. (1986) reported that adolescent girls' androgen levels, namely testosterone and the adrenal androgens DHEA, DHEAS, and Δ-4A, predicted the girls' anticipation of future sex. Halpern et al. examined within-individual changes as well as differences between girls and found that higher plasma testosterone levels were associated with a higher incidence of transition to coitus in both Black and White girls. Frequency of attendance at religious services operated as a social control factor among White females. Testosterone was concluded to be a causal factor in female sexual activity, but biological effects were moderated by relevant social variables. Processes at both the social and biological levels appear to interact to influence sexual activity.

Less research has examined the role of estrogens in adolescent sexuality, but there is some evidence for estrogenic effects on female adolescent sexual behavior. Finkelstein et al. (1998) found that administering oral conjugated estrogen to hypogonadal female adolescents resulted in significantly increased self-reports of necking behavior, but only at the highest dose used (intended to simulate the late stages of puberty). Of note is that when testosterone or estrogen is measured in blood or saliva and related to sexual activity, moods, or behavior, it is not known which of the hormones activates or is permissive of the expression of sexual behavior as testosterone can be converted to estrogen.

A plethora of nonhormonal factors also influences adolescent sexuality, but an additional factor is of note: body fat. Halpern, Udry, Campbell, and Suchindran (1999) examined the dating frequency and sexual behaviors of seventh- and eighth-grade girls in relation to measured body fat. Comparing girls with mean body fat levels to those 1 *SD* above or below showed that the lower body fat was associated with a greater chance of dating. This pattern was true for both Black and White girls, although the relationship was stronger for White girls. Additionally, this difference in dating frequency explained the relationship between higher body fat and lower incidence of coitus and petting. Halpern et al. warned, however, that these results must be taken in context because synchronous transitions (e.g., when dating begins at the same time as menarche and the transition to middle school) may exert unique pressures (as in Smolak, Levine, & Gralen, 1993). Other factors also influence dating such as late maturation in girls, with later maturers being less likely to date despite their lower levels of body fat.

Peer sexual activity is considered a potent influence on sexual activity. Udry et al. (1986) found that the strongest predictor of sexual behavior in pubertal girls was whether their close friends were sexually active. Meschke et al. (2000) supported these findings in a report showing that timing of first intercourse was associated with peer achievement levels and popularity for boys, along with "dating alone" and pubertal timing for girls. Siblings also influence sexual activity. Based on a social modeling theory, East and Shi (1997) proposed a sibling interaction hypothesis to explain sexual activity in pregnant or parenting teens and their younger sisters. Negative sibling relationship qualities, such as rivalry, competition, and conflict, were more closely related to younger sisters engaging in problem behavior and sexual behavior than were positive relationship qualities, such as warmth and closeness. Additionally, a shared friendship network with the older sister was found to be associated with extensive younger sister problem behavior and sexual behavior. Compared with the younger siblings of never-pregnant teenagers, the younger sisters of pregnant teenagers viewed school and career as less important, were more accepting of adolescent childbearing, perceived younger ages as appropriate for first intercourse, marriage, and childbearing, and engaged in more problem behavior (East, 1996). These attitudes are conducive to increasing the probability of early sexual activity and early childbearing. Collectively, these studies aptly demonstrate that a biopsychosocial model had greater statistical power for both boys and girls than do models that take fewer factors into account. In summary, hormones and pubertal development appear to impact strongly adolescents' sexual development, but sexuality occurs within the context of the adolescent's social development that incorporates peers and siblings.

Sexual Risk Taking

Sexual activity beginning sometime during puberty might be considered normative given the high number of adolescents engaging in early sexual activity. The danger inherent in considering sexual activity normative is that risky sexual behaviors are linked to high rates of morbidity and even mortality in adolescents. In a national survey of 10,645 youth, engaging in multiple health risk behaviors (including sexual behavior) increased across age in youth (Brener & Collins, 1998). For those in the 12–13 year age group, 1 in 12 engaged in two or more sexual behaviors, whereas one third of 14- to 17-year-olds and 50% of the 18- to 21-year-olds engaged in multiple sexual behaviors. There was a greater likelihood for males to engage in multiple health-risk behaviors. The predictive stability of early sexual behavior with regard to later mental and physical health problems is not well known. In one of the few longitudinal studies addressing this issue, women's reproductive experiences during adolescence had repercussions in adult life with regard to sexuality, self-image, and state of gynecological health (C. M. Magnusson et al., 1999). Women who had gynecological problems during adolescence experienced their adolescent sexual experiences as generally negative. In early adulthood these women had more recurrent and varied gynecological illnesses than did their comparison-group counterparts. Women's early sexual experience was also linked to an increase in norm-breaking behavior, lower educational attainment, and a younger age of adult responsibilities compared with the control women. These findings are unique in that they document long-term consequences of early sexual activity in diverse domains: health, adjustment, achievement, and socially sanctioned behavior. The lack of longitudinal information does not allow for sorting out whether early sexual activity is reflective of a constellation of behavior problems that persist

over time or whether sexual activity, per se, leads to unique mental health and gynecological problems that persist into adulthood.

Limitations of self-report of sexual debut are acknowledged and likely result in an overestimate in the age of onset as well as the frequency of sexual activity during adolescence. In the National Youth Survey (Lauritsen & Swicegood, 1997) there were inconsistencies in age at first intercourse from reports as an adolescent to reports as an adult by 28% to 32% of subjects. Those most likely to have consistent reporting across time were females (70%), whereas only 27% of Black males were consistent in reporting. Given the seriousness of risky sexual behavior it seem prudent to continue to press for programs to reduce risky sexual behavior even in the absence of quality statistics on onset and progression of sexual activity during adolescence.

IMPLICATIONS FOR RESEARCH AND SOCIAL POLICY

The rapid increase in research findings in the last two decades relating puberty to various domains of functioning provides an exceptionally strong platform for planning interventions to improve the well-being of adolescents and to prevent problems. Findings from basic and applied research have implications for the content of prevention and intervention programs, the timing and type of interventions, and the modalities for delivering the program message. In addition, in the past several decades the importance of adolescence has been the focus of attention of various organized groups, which have, in turn, directed programs or policy issues toward that age group. For example, the American Academy of Pediatrics (www.aap.org) has a section on adolescent health, founded in 1978. Additionally, the Society of Adolescent Medicine offers specialized health services to adolescents (www.adolescenthealth.org). These services include not only the assessment of normal growth and physical health problems of adolescents but also psychosocial issues, health promotion, disease prevention, and anticipatory guidance. Unfortunately, the problem of maldistribution of health professionals specializing in adolescent health is significant. Many practitioners of adolescent health are in academic medical centers located in urban areas. Rural areas of the country continue to lack support services for adolescents. A parallel scenario is noted for psychiatrists specializing in adolescent development.

Policy-related goals for adolescent health and development also have been articulated. In 1998 Brindis et al. reviewed 36 national documents that emerged over the last decade and focused on or pertained to the health of adolescents. Through the synthesis of these documents, the committee determined the following six policy-related goals for the health of adolescents: (a) improve access to health care for adolescents, (b) improve the adolescent environment, (c) increase the role of schools in improving adolescent health, (d) promote positive adolescent health, (e) improve adolescent transitions to adulthood, and (f) improve collaborative relationships. In addition to the six policies, the committee also provided several cross-cutting themes that emerged from their recommendations. Most germane to this chapter is the theme that a "greater programmatic focus on primary prevention and early intervention, which is substantiated and shaped by rigorous research, is needed" (p. 183). Currently, adolescent health care focuses on secondary rather than primary prevention, and there is a dearth of research that characterizes the effect of providing counseling or anticipatory guidance services in the health care visits of youth or the effect of content and quality of primary care visits.

Content of Programs on Puberty

Public health policy lags behind the sophisticated knowledge that is accumulating regarding puberty, especially with regard to the notion that puberty signals the onset of reproductive competence, sexual activity, and risky sexual behavior. The majority of citizens in the United States are unaware of the recent advances in understanding the physiological aspects of puberty as well as the positive dimensions of psychological development during puberty. The sexual reproductive aspects of puberty receive disproportional attention compared to the normative and positive aspects of development during adolescence. The result is that normative health and developmental concerns receive little attention from major social institutions: health care, education, and family. A public health focus on puberty might profitably be based on the following questions: What do parents, educators, and the public need to know about puberty? What do adolescents want to know? Research initiatives and prevention programs arise almost exclusively from adults with virtually no consultation from adolescents. Therefore, a wide gap may exist between what information is presented to adolescents and what they want to know. In a rare study on what adolescents want to know, a majority of the questions reflected biological topics (88%), such as genital physiology (26%) and sexuality and reproduction (26%). Only 6% addressed psychosocial questions (Ryan, Millstein, & Irwin, 1996). Both females and Asians (compared with other ethnic or racial groups) expressed greater interest in the differences between male and female development. Prepubertal males

were more concerned about general puberty than were boys in later Tanner stages.

In North America the study of puberty and reproduction is confused with sexual activity and the breaking of religious and social norms. Puberty and emerging sexuality take on negative societal connotations and thereby become shunned by the family and educational institutions. Adolescent sexuality is rarely viewed in the broader perspective as involving a social and cultural component. The interactions between boys and girls do not necessarily lead to sexual activity. Rather, these interactions reflect an arena whereby the social- and culture-based roles of males and females are learned and practiced.

Those entrusted with the care of adolescents should be cognizant of the broad range of emotional, behavioral, and even sexual activities that characterize the pubertal transition. Along with this awareness, those same persons should recognize that the diversity of acceptance or rejection of such functioning is often dictated by gender, ethnicity, age, and life history. Those involved in the health care system are in a prime position to educate the public and adolescents themselves about the range of new emotions and behaviors that will emerge by late puberty.

In addition to innovative content, positive attitudes about adolescents are critical elements of an effective program. Health care providers must recognize the specific challenges and rewards of providing services for adolescents. Quality care begins with the establishment of trust, respect, and confidentiality between the caregiver and the adolescent. Especially when providing care for the younger teen, caregivers must focus on involving a member of the family or another significant adult to provide needed support and guidance.

Anticipatory guidance for parents should focus on assessing their parenting styles and promoting supervision and monitoring. Although parents should strive to maintain open communication with their adolescents, they may estimate neither the depression and anxiety of their adolescents nor the sexual activity and the sexual risk experienced by their teenage children accurately. Most adolescents want to discuss sexual-related issues with health care providers and others and will welcome direct questions about sexual behaviors and possible risks when posed in a confidential and nonmoralistic manner. Discussion of the physical, emotional, familial, and social changes related to adolescence will encourage healthy sexual development.

Timing of Puberty and Prevention

A goal of prevention is to find a point in development when prevention efforts have some hope of success (Coie et al., 1993). With regard to puberty, the goal is to initiate interventions before or simultaneously with the biological changes. Puberty may be occurring at earlier ages than anticipated in girls (Herman-Giddens et al., 1997), which has important health care, educational, and social policy implications. Programs to improve adolescent mental and physical health problems should correspondingly begin earlier in ontogeny than in the past. All individuals responsible for any aspect of the well-being of adolescents—parents, teachers, and health system personnel—should be aware that puberty may be occurring earlier in American girls than it did a few decades ago. In earlier maturing adolescents, the effects of hormone changes can occur two to three years before they are anticipated by parents and teachers. Important to note is that much less is known about boys than girls and timing of puberty. Given that boys and girls find themselves together in multiple contexts, programs to prevent mental and physical health problems should be introduced simultaneously for boys and girls.

Prevention efforts to reduce early risky sexual behaviors and mental health problems, like depression, are likely to have a higher probability of success if initiated at a younger age than in the past, given the earlier age of puberty. Social policy with regard to the cognitive abilities of adolescents, parent training, and school health and sex education and guidance programs will need to be modified to take into account the early onset of puberty (Reider & Coupey, 1999). Body self-awareness and emotion recognition programs are especially important to implement early in gonadarche; otherwise, adolescents will be confused by body changes that accompany puberty. Similarly, parental monitoring in sexual possibility situations, as well as in other situations (e.g., when alcohol or drugs may be present), will need to occur earlier than in the past. In all cases, programs to prevent early sexual activity will present a challenge to program planners given the cognitive developmental status of the adolescents and the complexities of presenting information about the physiology and psychology of sexuality.

Research and Theory Development

Scholars of adolescent development have accepted the importance of the integration of biological, psychological, and contextual processes long before it was fashionable in other areas of developmental science. The theoretical frameworks discussed earlier (developmental contextualism and holistic interactionism) are hallmarks for the acknowledgment of the importance of integrated biological, psychological, and social perspectives on development. These theoretical perspectives are consistent with the emerging

perspective that processes of development can only be understood by considering the multiple systems that function at multiple levels of development, from the genetic, molecular, and cellular levels to the societal level (Susman, 1998). Given these complexities, the following principles might guide research in the future.

First, models that consider multiple biological, psychological, and contextual levels of functioning will be interdisciplinary, bringing together the expertise of multiple professionals. An example of such interdisciplinary research in the future is that offered by the Human Genome Project, which offers a myriad of possibilities for linking individual genes or patterns of genes to specific behaviors in specific contexts. Given that experiences affect the timing of puberty and that genes are responsible for the initiation of puberty, future interdisciplinary studies have the potential of identifying genes that link experience and the onset of puberty.

Second, the complexity of integrating multiple levels of analysis necessarily implies that the scale and scope of investigations will be larger than in the past. Nonetheless, hypothesis-driven, small-scale studies at specific levels of analysis are critically important to continue as well. If studies focus on one level of analysis, such as the biological level, it is critical to acknowledge the contribution of mediators and moderators at other levels as well.

Third, methodological innovations and the integration of biology and behavior are possible given the advances in statistical models in the last decade. In addition, theoretical innovations act in concert with methodological innovations. This premise is nowhere more apparent than in the new methodologies for considering the dynamic interplay between hormones and behavior. The dynamic and changing nature of physical maturation, hormones, and psychological characteristics at puberty now can be captured in longitudinal statistical models using estimates of how changes in one domain (hormones) can lead to changes in another domain (behavior). Additionally, perspectives like the holistic interaction model proposed by D. Magnusson (1999) capture dynamic holistic processes through related methodological strategies (e.g., longitudinal cluster analysis) developed by Bergman and Magnusson (1997). These methodological strategies look for patterns or configurations in developmental processes.

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CHAPTER 13

Cognitive Development in Adolescence

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COGNITIVE DEVELOPMENT 325
Age Changes in Structural and Functional Aspects 326
Gender and Ethnic Differences in Cognition 329
ACHIEVEMENT AND ACHIEVEMENT-RELATED BELIEFS 329
The Junior High School Transition 330
The High School Transition 334
GENDER AND ACHIEVEMENT 334
Gender and Academic Achievement 335
Eccles' Expectancy-Value Model of Achievement-Related Choices and Performance 336
Gender and Self-Esteem 342
RACIAL AND ETHNIC GROUP DIFFERENCES IN ACHIEVEMENT MOTIVATION 343
Ethnic Group Differences in Children's Competence, Control, and Attribution Beliefs 343
Ethnic Group Differences in Achievement Values and Goals 344
Ethnicity and Motivation at the Interface Between Expectancies and Values 344
SUMMARY 345
REFERENCES 345

In this chapter, we focus on two major aspects of adolescent development: cognitive development and both achievement and achievement motivation. First we discuss cognitive development, pointing out the relevance of recent work for both learning and decision making. Most of the chapter focuses on achievement and achievement motivation. We summarize current patterns of school achievement and recent changes in both school completion and differential performance on standardized tests of achievement. Then we summarize both the positive and negative age-related changes in school motivation and discuss how experiences in school might explain these developmental patterns. Finally, we discuss both gender and ethnic group differences in achievement motivation and link these differences to gender and ethnic group differences in academic achievement and longer-term career aspirations.

COGNITIVE DEVELOPMENT

In this section, we review work related to cognitive development. At a general level, the most important cognitive changes during this period of life relate to the increasing ability of youth to think abstractly, consider the hypothetical as well as the real, engage in more sophisticated and elaborate information-processing strategies, consider multiple dimensions of a problem at once, and reflect on oneself and on complicated problems (see Keating, 1990). Indeed, such abstract and hypothetical thinking is the hallmark of Piaget's formal operations stage assumed to begin during adolescence and to continue through young adulthood (e.g., Piaget & Inhelder, 1973; see the chapter by Feldman in this volume). Although there is still considerable debate about when exactly these kinds of cognitive processes emerge and whether their emergence reflects global stagelike changes in cognitive skills as described by Piaget, most theorists do agree that these kinds of thought processes are more characteristic of youth's cognition than of younger children's cognition.

At a more specific level, along with their implications for learning and problem solving, these kinds of cognitive changes affect individuals' self-concepts, thoughts about their future, and understanding of others. Theorists from Erikson (1968) to Harter (1990), Eccles (Eccles & Barber, 1999), and Youniss (Youniss, McLellan, & Yates, 1997) have suggested that the adolescent and emerging adulthood years are a time of change in youth'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.

Finally, during adolescence individuals also become more interested in understanding others' internal psychological

characteristics, and friendships become based more on perceived similarity in these characteristics (see Selman, 1980). Again, these sorts of changes in person perception reflect the broader changes in cognition that occur during adolescence. We turn now to a more detailed discussion of cognitive development during the adolescent years.

Are there age changes in the structural and functional aspects of cognition, and do these age-related trajectories in cognitive skills differ across gender and ethnic groups? In this section we summarize the research relevant to these questions. A fuller treatment can be found in sources such as Byrnes (2001a, 2001b), Bjorklund (1999), and Feldman (this volume).

Age Changes in Structural and Functional Aspects

Changes in Structural Aspects

Structural aspects of cognition include the knowledge possessed by an individual as well as the information-processing capacity of that individual. Structuralist researchers often focus on the following two questions: (a) What changes occur in children's knowledge as they progress through the adolescent period? and (b) What changes occur in the information-processing capacities of adolescents?

Knowledge Changes. The term *knowledge* refers to three kinds of information structures that are stored in long term memory: declarative knowledge, procedural knowledge, and conceptual knowledge (Byrnes, 2001a, 2001b). *Declarative knowledge* or "knowing that" is a compilation of all of the facts an adolescent knows (e.g., knowing that $2 + 2 = 4$; knowing that Harrisburg is the capital of Pennsylvania). *Procedural knowledge* or "knowing how to" is a compilation of all of the skills an adolescent knows (e.g., knowing how to add numbers; knowing how to drive a car). The third kind of knowledge, *conceptual knowledge,* is the representation of adolescents' understanding of their declarative and procedural knowledge. Conceptual knowledge is "knowing why" (e.g., knowing why one should use the least common denominator method to add fractions).

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

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

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

Do these kinds of changes in knowledge influence behavior? For example, do older adolescents make better life decisions because they know more? Are they better employees? Parents? College students? Lifelong learners? At some level, the answer to these questions has to be yes. Certainly expanded domain-specific knowledge makes it easier to solve problems and perform complex tasks in activities very closely linked to the same knowledge domain (Byrnes, 2001a, 2001b; Ericcson, 1996). But does expanded knowledge on its own increase the wisdom of more general life decisions? The answer to this question is less clear because

such decisions depend on many other aspects of cognitive as well as motivational and emotional processes that influence the likelihood of accessing and effectively using one's stored knowledge. For example, younger adolescents may have the knowledge needed to make decisions or solve problems (on achievement tests or in social situations) but may lack the processing space needed to consider and combine multiple pieces of information. We turn to these other aspects of cognition now.

Capacity Changes. Are there age-related increases in cognitive processing capacity? Processing space is analogous to random-access memory (RAM) on a computer. A very good software package may not be able to work properly if the RAM on a PC is too small. One key index of processing capacity in humans is working memory—the ability to temporarily hold something in memory (e.g., a phone number). It used to be assumed that working memory capacity changes very little after childhood. In fact, however, until quite recently this assumption had not been adequately tested. Several recent studies suggest that working memory does increase during adolescence. For example, Zald and Iacono (1998) charted the development of spatial working memory in 14- and 20-year-olds by assessing their memory for the location of objects that were no longer visible. They found that the introduction of delays and various forms of cognitive interference produced drops in performance that were sharper in the younger than in the older participants. Similarly, Swanson (1999) found monotonic increases in both verbal and spatial working memory between the ages of 6 and 35 in a large normative sample. Such increases should make it easier for older adolescents and adults to consider multiple pieces of information simultaneously in making important decisions. This hypothesis needs more extensive study.

Changes in Functional Aspects of Cognition

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

Deductive Reasoning. People engage in deductive reasoning whenever they combine premises and derive a logically sound conclusion from these premises (S. L. Ward & Overton, 1990). For example, given the premises (a) *Either the butler or the maid killed the duke* and (b) *The butler could not have killed the duke,* one can conclude *The maid must have killed the duke*. Adolescents are likely to engage in deductive reasoning as they try to make sense of what is going on in a context and what they are allowed to do in that context. Moreover, deductive reasoning is used when they write argumentative essays, test hypotheses, set up algebra and geometry proofs, and engage in debates and other intellectual discussions. It is also critical to decision making and problem solving of all kinds.

Although the issue of age differences in deduction skills is somewhat controversial, most researchers believe that there are identifiable developmental increases in deductive reasoning skills between childhood and early adulthood. Competence is first manifested around age 5 or 6 in the ability to draw some types of conclusions from "if-then" (conditional) premises, especially when these premises refer to fantasy or make-believe content (e.g., Dias & Harris, 1988). Several years later, children begin to understand the difference between conclusions that follow from conditional premises and conclusions that do not (Byrnes & Overton, 1986; Girotto, Gilly, Blaye, & Light, 1989; Haars & Mason, 1986; Janveau-Brennan & Markovits, 1999), especially when the premises refer to familiar content about taxonomic or causal relations. Next, there are monotonic increases during adolescence in the ability to draw appropriate conclusions, explain one's reasoning, and test hypotheses, even when premises refer to unfamiliar, abstract, or contrary-to-fact propositions (Klaczynski, 1993; Markovits & Vachon, 1990; Moshman & Franks, 1986; S. L. Ward & Overton, 1990). Again, however, performance is maximized on familiar content about legal or causal relations (Klaczynski & Narasimham, 1998). However, when the experimental content runs contrary to what is true (e.g., *All elephants are small animals. This is an elephant. Is it small?*) or has no meaningful referent (e.g., *If there is a D on one side of a card, there is a 7 on the other*), less than half of older adolescents or adults do well.

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

Decision Making. When people make decisions, they set a goal (e.g., get something to eat), compile options for attaining that goal (e.g., go out, find something in the refrigerator, etc.), evaluate these options (e.g., eating at home is cheaper and healthier than eating out), and finally implement the best option. Alternatively, they must decide whether to engage in a particular behavior that is made available to them in a specific situation (e.g., they decide whether to have sexual intercourse in an intimate encounter or to accept an offered alcoholic drink or illicit drug). Competent decision making entails the ability to identify the risks and benefits of particular behaviors as well as the ability to identify options likely to lead to positive, health-promoting outcomes (e.g., stable relationships, good jobs, physical health, emotional health, etc.) or promote one's short- and long-term goals. Clearly, good decision-making skills are among the most important cognitive skills adolescents need to acquire.

Given the centrality of decision making, it is surprising that so few developmental studies have been conducted (Byrnes, 1998; Klaczynski, Byrnes, & Jacobs, 2001). Considered together, the widely scattered (and sometimes unreplicated) findings suggest that older adolescents and adults seem to be more likely than are younger adolescents or children to (a) understand the difference between options likely to satisfy multiple goals and options likely to satisfy only a single goal (Byrnes & McClenny, 1994; Byrnes, Miller, & Reynolds, 1999), (b) anticipate a wider range of consequences of their actions (Lewis, 1981; Halpern-Felsher & Cauffman, 2001), and (c) learn from their decision-making successes and failures with age (Byrnes & McClenny, 1994; Byrnes, Miller, & Reynolds, 1999). There is also some suggestion that adolescents are more likely to make good decisions when they have metacognitive insight into the factors that affect the quality of decision making (D. C. Miller & Byrnes, 2001; Ormond, Luszcz, Mann, & Beswick, 1991). However, most of the studies that support these conclusions involved laboratory tasks, hypothetical scenarios, or self-reports. In real-world contexts, other emotional and motivational factors are likely to seriously affect the quality of adolescents' decisions. For example, adolescents may think they will find a particular outcome enjoyable, only to learn later that it was not, either because they had inadequate self-knowledge or because they failed to use the self-knowledge that they had. High states of emotional arousal or intoxication can also reduce an adolescent's ability and motivation to generate, evaluate, and implement success-producing options and to adequately assess the risks associated with various behavioral options. Hence, adolescents and adults who look good in the lab may nevertheless make poor decisions in the real world if they lack appropriate self-regulatory strategies for dealing with such possibilities (e.g., self-calming techniques, coping with peer pressure to drink, etc.). Additional studies are clearly needed to examine such issues. The recent work by Baltes and his colleagues on the selection-optimization-compensation (SOC) models of adaptive behavior provides one useful approach for such research (see Baltes, Lindenberger, & Staudinger, 1998).

In contrast to the dearth of studies on decision making in adolescents, there are quite a number of developmental studies in a related area of research: risk taking (Byrnes, 1998). If a decision involves options that could lead to negative or harmful consequences (i.e., anything ranging from mild embarrassment to serious injury or death), adolescents who pursue such options are said to have engaged in risk-taking (Byrnes, Miller, & Schaefer, 1999). Although all kinds of risk taking are of interest from scientific standpoint, most studies have focused on age changes in physically harmful behaviors such as smoking, drinking, and unprotected sex. Regrettably, these studies reveal the opposite of what one would expect if decision-making skills improve during adolescence; instead, these studies show that older adolescents are more likely than younger adolescents or preadolescents to engage in these behaviors (DiClemente, Hansen, & Ponton, 1995). Repeatedly, studies have shown that those who take such risks do not differ in their knowledge of possible negative consequences. Given that risk-takers and risk-avoiders do not differ in their knowledge of options and consequences, it is likely that the difference lies in other aspects of competent decision making (e.g., self-regulatory strategies, ability to coordinate health-promoting and social goals, etc.). This hypothesis remains to be tested.

Other Functional Aspects. In addition to finding age-related increases in deductive reasoning and decision-making skills, researchers have also found increases in mathematical reasoning ability, certain kinds of memory-related processes,

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

Summary

The literature suggests that there are changes in the intellectual competencies of youth as they progress through the adolescent period. However, there are many ways in which the thinking of young adolescents is similar to that of older adolescents and adults. Thus, before one can predict whether an age difference will manifest itself on any particular measure of intellectual competence, one needs to ask questions such as *"Does exposure to the content of the task continue through adolescence?", "Do many issues have to be held in mind and considered simultaneously?, "Are the ideas consistent with naive conceptions?",* and *"Does success on the task require one to suspend one's beliefs?"* If the answers to these questions are all "*no,*" then younger adolescents, older adolescents, and adults should perform about the same. However, if one or more "*yes*" answer is given, then one would expect older adolescents and adults to demonstrate more intellectual competence than younger adolescents.

Gender and Ethnic Differences in Cognition

It is not possible to provide a comprehensive summary of the vast literature on gender and ethnic differences in a single chapter or portion of a chapter. One can, however, provide an overview of some of the essential findings (see Byrnes, 2001a, 2001b, for a more complete summary). With respect to gender differences, male and female adolescents perform comparably on measures of math, science, and social studies knowledge (e.g., NAEPs) and also obtain nearly identical scores on measures of intelligence, deductive reasoning, decision making, and working memory. Two areas in which gender differences have appeared are risk taking and Scholastic Achievement Test (SAT) math performance. With regard to risk taking, the pattern is quite mixed: Males are more likely than females to take such risks as driving recklessly or taking intellectual risks; in contrast, females are more likely than males to take such health risks as smoking. The size of such gender differences, however, varies by age (Byrnes, Miller, & Schaefer, 1999). These findings seem to reflect differences in males' and females' expectations, values, and self-regulatory tendencies.

With regard to gender differences on SAT-math scores, male's scores are routinely slightly higher than are female's scores (De Lisi & McGillicuddy-De Lisi, 2002). It is still not clear why this difference obtains, given the fact that there are no gender differences in math knowledge or gender differences in other kinds of reasoning. Researchers have shown, however, that part of this difference reflects gender differences in test-taking strategies, confidence in one's math ability, ability and motivation to use unconventional problem-solving strategies, mental rotation skills, and anxiety about one's math ability, particularly when one's gender is made salient (see De Lisi & McGillicuddy-De Lisi, 2002, for review).

With respect to ethnic differences, European American and Asian American students perform substantially better than do African American, Hispanic and Native American students on standardized achievement tests, the SAT, and most of the NAEP tests. In contrast, no ethnic differences are found in studies of deductive reasoning, decision-making, or working memory. Moreover, ethnic differences on tests such as the SAT and NAEP are substantially reduced after variables such as parent education and prior course work are controlled (Byrnes, 2001). We know even less about the origins of these ethnic group differences than we know about the origins of gender differences in cognitive performance.

ACHIEVEMENT AND ACHIEVEMENT-RELATED BELIEFS

The picture of achievement for adolescents in the United States is mixed. More youth than ever are graduating from high school, and a large number are enrolled in some form of higher education (National Center for Educational Statistics, 1999; Office of Educational Research and Improvement, 1988). High school dropout rates, although still unacceptably large in some population subgroups, are at all-time lows (National Center for Educational Statistics, 1999; Office of Educational Research and Improvement, 1988). Comparable improvements in educational attainment over the last century characterize all Western industrialized countries as well as many developing countries.

In contrast to these quite positive trends in academic achievement, a substantial minority of America's adolescents are not doing very well in terms of academic achievement

and school-related achievement motivation: First and foremost, America's adolescents on average perform much worse on academic achievement tests than do adolescents from many other countries (National Center for Educational Statistics, 1995). Between 15 and 30% of America's adolescents drop out of school before completing high school; and many others are disenchanted with school and education (Kazdin, 1993; Office of Educational Research and Improvement, 1988). Both the rates of dropping out and disengagement are particularly marked among poor youth and both Hispanic and Native American youth.

There are also mean level declines in such motivational constructs as grades (Simmons & Blyth, 1987), interest in school (Epstein & McPartland, 1976), intrinsic motivation (Harter, 1981), and self-concepts (Eccles et al., 1989; Wigfield, Eccles, Mac Iver, & Reuman, 1991; Simmons & Blyth, 1987) in conjunction with the junior high school transition. For example, Simmons and Blyth (1987) found a marked decline in some young adolescents' school grades as they moved into junior high school—the magnitude of which predicted subsequent school failure and dropout (see also Roderick, 1993). Several investigators have also found drops in self-esteem as adolescents make the junior and senior high school transitions—particularly (but not always only) among European American girls (Eccles et al., 1989; Simmons & Blyth, 1987; Wigfield et al., 1991). Finally, there is evidence of similarly timed increases in such negative motivational and behavioral characteristics as focus on self-evaluation rather than task mastery (e.g., Maehr & Anderman, 1993), test anxiety (Hill & Sarason, 1966), and both truancy and school dropout (Rosenbaum, 1976; see Eccles, Wigfield, & Schiefele, 1998, for full review).

Few studies have gathered information on ethnic and social class differences in these declines. However, academic failure and dropout are especially problematic among African American and Hispanic youth and among youth from low-SES (socioeconomic status) communities and families (Finn, 1989). It is probable then that these groups are particularly likely to show these declines in academic motivation and self-perceptions as they move into and through the years of secondary school. We discuss this possibility more later in this chapter.

Although these changes are not extreme for most adolescents, there is sufficient evidence of gradual declines in various indicators to make one wonder what is happening (see Eccles & Midgley, 1989). A variety of explanations have been offered. Some scholars attribute these declines to the intrapsychic upheaval assumed to be associated with early pubertal development (see Arnett, 1999). Others have suggested that they result from the coincidence of multiple life changes. For example, drawing upon cumulative stress theory, Simmons and her colleagues suggest that declines in motivation result from the fact that adolescents making the transition to junior high school at the end of Grade 6 must cope with two major transitions: pubertal change and school change (see Simmons & Blyth, 1987). Because coping with multiple transitions is more difficult than coping with only one, these adolescents are at greater risk of negative outcomes than are adolescents who have to cope with only pubertal change during this developmental period. To test this hypothesis, Simmons and her colleagues compared the pattern of changes on the school-related outcomes of young adolescents who moved from sixth to seventh grade in a K–8, 9–12 system with the pattern of changes for those who made the same grade transition in a K–6, 7–9, 10–12 school system. They found clear evidence, especially among girls, of greater negative changes for those adolescents making the junior high school transition than for those remaining in the same school setting (i.e., those in K–8, 9–12 schools). The fact that the junior high school transition effects were especially marked for girls was interpreted as providing additional support for the cumulative stress theory, because at this age girls are more likely than boys are to be undergoing both a school transition and pubertal change. Further evidence in support of the role of the cumulative stress came from Simmons and Blyth's (1987) analyses comparing adolescents who experienced varying numbers of other life changes in conjunction with the junior high school transition. The negative consequences of the junior high school transition increased in direct proportion to the number of other life changes an adolescent also experienced as he or she made the school transition.

The Junior High School Transition

Eccles and her colleagues have focused on the school transition itself as a possible cause of academic-motivational declines. As noted previously, many of these declines coincide with school transitions. The strongest such evidence comes from work focused on the junior high school transition—for example, the work just discussed by Simmons and Blyth. Eccles and her colleagues have obtained similar results using the data from the National Educational Longitudinal Study. They compared eighth graders in K–8 school systems with eighth graders in either K–6, 7–9 systems or K–5, 6–8 systems. The eighth-grade students in the K–8 systems looked better on such motivational indicators as self-esteem, preparedness, and attendance than did the students in either of the other two types of school systems (Eccles, Lord, & Buchanan, 1996). In addition, the eighth-grade teachers in the K–8 system

reported fewer student problems, less truancy, and more student engagement than did the teachers in either of the other two types of school systems. Clearly, both the young adolescents and their teachers fared better in K–8 school systems than did those in the more prevalent junior high school and middle school systems. Why?

Several investigators have suggested that the changing nature of the educational environments experienced by many young adolescents helps explain these types of school system differences as well as the mean level declines in the school-related measures associated with the junior high school transition (e.g., Eccles, Midgley, Buchanan, Wigfield, Reuman & Mac Iver, 1993; Eccles & Midgley, 1989; Lipsitz, 1984; Simmons & Blyth, 1987). Drawing upon person-environment fit theory (see Hunt, 1979), Eccles and Midgley (1989) proposed that these motivational and behavioral declines could result from the fact that junior high schools are not providing appropriate educational environments for many young 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 (Hunt, 1979; see also the chapter by Lerner, Easterbrooks, and Mistry in this volume). Individuals are not likely to do very well or be very motivated if they are in social environments that do not fit their psychological needs. If the social environments in the typical junior high school do not fit very 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. Furthermore, Eccles and Midgley (1989) argued that this effect should be even more marked if the young adolescents experience a fundamental change in their school environments when they move into a junior high school or middle school—that is, if the school environment of the junior high school or middle school fits less well with their psychological needs than did the school environment of the elementary school.

This analysis suggests several questions. First, what are the developmental needs of the early adolescent? Second, what kinds of educational environment are developmentally appropriate for meeting these needs and stimulating further development? Third, what are the most common school environmental changes 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 are experiencing? Or is there a developmental mismatch between maturing early adolescents and the classroom environments they experience before and after the transition to middle or junior high school that results in a deterioration in academic motivation and performance for some children?

Eccles and Midgley (1989) argued that there are developmentally inappropriate changes at the junior high or middle 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 hypothesized that these changes contribute to the negative change in early adolescents' motivation and achievement-related beliefs.

Is there any evidence that such a negative change in the school environment occurs with the transition to junior high school? Most relevant descriptions have focused on school-level characteristics such as school size, degree of departmentalization, and extent of bureaucratization. For example, Simmons and Blyth (1987) point out that most junior high schools are substantially larger (by several orders of magnitude) than elementary schools, and instruction is more likely to be organized departmentally. As a result, junior high school teachers typically teach several different groups of students, making it very difficult for students to form a close relationship with any school-affiliated adult at precisely the point in development when there is a great need for guidance and support from nonfamilial adults. Such changes in student-teacher relationships are also 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. Finally, such changes are likely to decrease the probability that any particular student's' difficulties will be noticed early enough to get the student the help he or she needs, thus increasing the likelihood that students on the edge will be allowed to slip onto negative motivational and performance trajectories leading to increased school failure and dropout. Recent work by Elder and his colleagues (Elder & Conger, 2000) and classic work on the disadvantages of large schools by Barker and Gump (1964) provide strong support for these suggestions.

These structural changes are also likely to affect classroom dynamics, teacher beliefs and practices, and student alienation and motivation in the ways proposed by Eccles and Midgley (1989). Some support for these predictions is emerging, along with evidence of other motivationally relevant systematic changes (e.g., Maehr & Midgley, 1996; B. A. Ward et al., 1982).

First, despite the increasing maturity of students, junior high school classrooms—as compared to 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., Midgley & Feldlaufer, 1987; Moos, 1979). For example, junior high school teachers spend more time maintaining order and less time actually teaching than do elementary school teachers (Brophy & Evertson, 1976).

Similar differences emerge on indicators of student opportunity to participate in decision making regarding their own learning. For example, 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 1 year earlier.

Such declines in the opportunity for participation in decision making and self-control are likely to be particularly detrimental at early adolescence. This is a time in development when youth begin to think of themselves as young adults. It is also a time when they increase their exploration of possible identities. They believe they are becoming more responsible and consequently deserving of greater adult respect. Presumably, the adults responsible for their socialization would also like to encourage them to become more responsible for themselves as they move towards adulthood; in fact, this is what typically happens across the elementary school grades (see Eccles & Midgley, 1989). Unfortunately, the evidence suggests this developmentally appropriate progression is disrupted with the transition to junior high school.

In their stage-environment fit theory, Eccles and Midgley (1989) hypothesize that the mismatch between young adolescents' desires for autonomy and control and their perceptions of the opportunities in their learning environments will result in a decline in the adolescents' intrinsic motivation and interest in school. Mac Iver and Reuman (1988) provided some support for this prediction. They compared the changes in intrinsic interest in mathematics for adolescents reporting different patterns of change in their opportunities for participation in classroom decision-making items across the junior high school transition. Those adolescents who perceived their seventh-grade math classrooms as providing fewer opportunities for decision making that had been available in their sixth-grade math classrooms reported the largest declines in their intrinsic interest in math as they moved from the sixth grade into the seventh grade.

Second, junior high school classrooms (as compared to elementary school classrooms) are characterized by less personal and positive teacher-student relationships (Feldlaufer, Midgley, & Eccles, 1988). Furthermore, the transition into a less supportive classroom impacts negatively on early adolescents' interest in the subject matter being taught in that classroom, particularly among low-achieving students (Midgley, Feldlaufer, & Eccles, 1989b).

Such a shift in the quality of student-teacher relationships is likely to be especially detrimental at early adolescence. As adolescents explore their own identities, they are prone to question the values and expectations of their parents. In more stable social groups, young adolescents often have the opportunity to do this questioning with supportive nonparental adults such as religious counselors, neighbors, and relatives. In our highly mobile, culturally diverse society, such opportunities are not as readily available. Teachers are the one stable source of nonparental adults left for many American youth. Unfortunately, the sheer size and bureaucratic nature of most junior high schools—coupled with the stereotypes many adults hold regarding the negative characteristics of adolescents—can lead teachers to distrust their students and to withdraw from them emotionally (see Eccles et al., 1993; C. L. Miller et al., 1990). Consequently, these youth have little choice but to turn to peers as nonparental guides in their exploration of alternative identities. Evidence from a variety of sources suggests that this can be a very risky venture.

The reduced opportunity for close relationships between students and junior high school teachers has another unfortunate consequence for young adolescents: It decreases the likelihood that teachers will be able to identify students on the verge of getting into serious trouble and then to get these students the help they need. In this way, the holes in the safety net may become too big to prevent unnecessary "failures." Successful passage through this period of experimentation requires a tight safety net carefully monitored by caring adults—adults who provide opportunities for experimentation without letting the youth seriously mortgage their futures in the process. Clearly, the large, bureaucratic structure of the typical junior high and middle school is ill suited to such a task.

Third, junior high school teachers (again compared to elementary school teachers) feel less effective as teachers, especially for low-ability students. For example, the seventh-grade junior high teachers studied by Midgley, Feldlaufer, and Eccles (1988) expressed much less confidence in their teaching efficacy than did sixth-grade elementary school teachers in the same school districts. In addition, those students who experienced a decline in their teachers' sense of efficacy as they made the junior high school transition lowered their estimates of their math abilities more than did other students (Midgley, Feldlaufer, & Eccles, 1989a). This decline

in teachers' sense of efficacy for teaching less competent students could help explain why it is precisely these students who give up on themselves following the junior high school transition.

Fourth, junior high school teachers are much more likely than elementary school teachers are to use such teaching practices as whole-class task organization, public forms of evaluation, and between-classroom ability grouping (see Eccles & Midgley, 1989). Such practices are likely to increase social comparison, concerns about evaluation, and competitiveness (see Rosenholtz & Simpson, 1984), which in turn are likely to undermine many young adolescents' self-perceptions and motivation. These teaching practices also make aptitude differences more salient to both teachers and students, likely leading to increased teacher expectancy effects and both decreased feelings of efficacy and increased entity rather than incremental views of ability among teachers (Dweck & Elliott, 1983). These predictions need to be tested.

Fifth, junior high school teachers appear to use a more competitive standard in judging students' competence and in grading their performance than do elementary school teachers (see Eccles & Midgley, 1989). There is no predictor of students' self-confidence and sense of personal efficacy for schoolwork stronger 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; this is in fact what happens. For example, Simmons and Blyth (1987) found a greater drop in grades between sixth and seventh grade for adolescents making the junior high school transition at this point than for adolescents enrolled in K–8 schools. Furthermore, this decline in grades was not matched by a decline in the adolescents' scores on standardized achievement tests, supporting the conclusion that the decline reflects a change in grading practices rather than a change in the rate of the students' learning (Kavrell & Petersen, 1984). Imagine what this decline in grades could do to young adolescents' self-confidence, especially in light of the fact that the material they are being tested on is not likely to be more intellectually challenging.

Finally, several of the changes noted previously are linked together in goal theory. According to goal theory, individuals have different goal orientations when they engage in achievement tasks, and these orientations influence performance, persistence, and response to difficulty. For example, Nicholls and his colleagues (e.g., Nicholls, 1979b; Nicholls, 1989) defined two major kinds of goal orientations: ego-involved goals and task-involved goals. Individuals with ego-involved goals 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. In contrast, with task-involved goals, individuals focus on mastering tasks and increasing one's competence. Questions such as *"How can I do this task?"* and *"What will I learn?"* reflect task-involved goals. Dweck and her colleagues suggested two similar orientations: performance goals (like ego-involved goals), and learning goals (like task-involved goals; e.g., Dweck & Elliott, 1983). Similarly, Ames (1992), Maehr and Midgley (1996), and their students (e.g., Midgley, Anderman, & Hicks, 1995) distinguish between performance goals (like ego-involved goals) and mastery goals (like task-focused goals). With ego-involved (or performance) goals, students try to outperform others and are more likely to do tasks they know they can do. Task-involved (or mastery-oriented) students choose challenging tasks and are more concerned with their own progress than with outperforming others. All of these researchers argue—and have provided some support—that students learn more, persist longer, and select more challenging tasks when they are mastery-oriented and have task-involved goals (see Eccles et al., 1998, for review).

Classroom practices related to grading practices, support for autonomy, and instructional organization affect the relative salience of mastery versus performance goals that students adopt as they engage in the learning tasks at school. The types of changes associated with the middle grades school transition should precipitate greater focus on performance goals. In support of this, in Midgley et al. (1995), both teachers and students reported that performance-focused goals were more prevalent and task-focused goals less prevalent in middle school classrooms than in elementary school classrooms. In addition, the elementary school teachers reported using task-focused instructional strategies more frequently than did the middle school teachers. Finally, at both grade levels the extent to which teachers were task-focused predicted the students' and the teachers' sense of personal efficacy. Not surprisingly, personal efficacy was lower among the middle school participants than among the elementary school participants.

In summary, changes such as those noted in the preceding discussion are likely to have a negative effect on many students' school-related motivation at any grade level. But Eccles and Midgley (1989) argued that these types of changes are particularly harmful during early adolescence, given what is known about psychological development during this stage of life—namely, 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 Simmons & Blyth, 1987). Simmons and Blyth (1987) have argued that adolescents need a reasonably safe, as well as an intellectually challenging, environment to adapt to these shifts—an environment that provides a "zone of comfort" as well as challenging new opportunities for growth (see Call & Mortimer, 2001, for expanded discussion of the importance of arenas of comfort during adolescence). In light of these needs, the environmental changes often associated with the transition to junior high school seem especially harmful in that they disrupt the possibility for close personal relationships between youth and nonfamilial adults at a time when youth have increased need for precisely this type of social support; 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 self-control and adult respect is growing; and they disrupt peer social networks at a time when adolescents are especially concerned with peer relationships and social acceptance. We believe the nature of these environmental changes—coupled with the normal course of development—is likely to result in a developmental mismatch because the "fit" between the early adolescents' needs and the opportunities provided in the classroom is particularly poor, increasing the risk of negative motivational outcomes, especially for those adolescents who are already having academic difficulties.

Based on these general issues and on the research underlying these conclusions, the Carnegie Foundation funded and helped to coordinate several school reform efforts aimed at making middle schools and junior high schools more developmentally appropriate learning environments. By and large, when well implemented, these reforms were effective at both increasing learning and facilitating engagement and positive motivation (Jackson & Davis, 2000).

Long-Term Consequences of the Junior High School Transition

The work reviewed in the previous section documents the immediate importance of school transitions during the early years of adolescence. Do these effects last? Are there long-term consequences of either a positive or negative experience during this early school transition? There have been very few studies that can answer this question. Some of the work reviewed earlier indicated that a decline in school grades at this point is predictive of subsequent high school dropout. Eccles and her colleagues have gone one step further towards answering this question. First they linked self-esteem change over the junior high school transition to changes in other aspects of mental health and well-being during the transitional period. Second, they linked changes in self esteem over this transition to indicators of mental health, academic performance, and alcohol and drug use in Grades 10 and 12 (Eccles, Lord, Roeser, Barber, & Jozefowicz, 1997). In both sets of analyses, there was a strong association between self-esteem change and other indicators of well-being.

In their first set of analyses, Eccles et al. (1997) found that those students who showed a decline in their self esteem as they made the junior high school transition also reported higher levels of depression, social self-consciousness, school disengagement, worries about being victimized, and substance abuse at the end of their seventh-grade school year. These same students also showed lower self-esteem and more depression during their 10th- and 12th-grade school years and were slightly less likely to be target for graduating from high school on time.

The High School Transition

Although less work has been performed on the transition to high school, the existing work is suggestive of similar problems (Jencks & Brown, 1975). For example, high schools are typically even larger and more bureaucratic than are junior high schools and middle schools. Bryk, Lee, and Smith (1989) provided numerous examples of how the sense of community among teachers and students is undermined by the size and bureaucratic structure of most high schools. There is little opportunity for students and teachers to get to know each other, and—probably as a consequence—there is distrust between them and little attachment to a common set of goals and values. There is also little opportunity for the students to form mentor-like relationships with a nonfamilial adult, and little effort is made to make instruction relevant to the students. Such environments are likely to further undermine the motivation and involvement of many students, especially those not doing particularly well academically, those not enrolled in the favored classes, and those who are alienated from the values of the adults in the high school. These hypotheses need to be tested.

Recent international comparative work by Hamilton (1990) also points to the importance of strong apprenticeship programs that provide good mentoring and solid links to post–high-school labor markets for maintaining motivation to do well in school for non–college-bound adolescents. By comparing the apprenticeship programs in Germany with those in the United States, Hamilton has documented how the vocational educational programs in the United States often do not serve non–college-bound youth very well, either while they are in high school or after they graduate and try to find jobs.

Most large public high schools also organize 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 interests (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 (Dornbusch, 1994; Lee & Bryk, 1989). Lee and Bryk (1989) documented 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 influences cognitive, motivational, and achievement outcomes is needed.

GENDER AND ACHIEVEMENT

The relation of gender to achievement is a massive and complex topic. Even defining what is included under the topic of achievement is complex. For this chapter, we limit the discussion to school-related achievement and both educational and career planning during the adolescent and young adult years, focusing on the gendered patterns associated with these objective indicators of achievement. But even within this limited scope, the relation of gender to achievement is complex. The patterns of gender differences are not consistent across ages and there is *always* greater variation within gender than across gender. The relation of gender to achievement is even more complex. To make sense of this heterogeneity, we present the findings in relation to the Eccles et al. "expectancy-value model of achievement-related choices," with a specific focus on the ways in which gender as a social system influences individual's self-perceptions, values, and experiences (see Eccles, 1987).

We also limit the discussion to studies focused primarily on European Americans because they are the most studied population. Studies on gender differences in achievement in other populations are just becoming available, and even these are focused on only a limited range of groups. In addition, none of the existing studies on other populations have the range of constructs we talk about in this entry—making comparisons of findings across groups impossible at this point in time. More work is desperately needed to determine the generalizability of these patterns to other cultural and ethnic groups.

Gender and Academic Achievement

Over the last 30 years, there have been extensive discussions in both the media and more academic publication outlets regarding gender differences in achievement. Much of this discussion has focused on how girls are being "shortchanged" by the school systems. Recently, the American Association of University Women (AAUW; 1992) published reports on this topic. This perspective on gender inequity in secondary schools has been quite consistent with larger concerns being raised about the negative impact of adolescence on young women's development. For example, in recent reports, the AAUW reported marked declines in girls' self-confidence during the early adolescent years. Similarly, Gilligan and her colleagues (Gilligan, Lyons, & Tammer, 1990) have reported that girls lose confidence in their ability to express their needs and opinions as they move into the early adolescent years—she refers to this process as losing one's voice (see also Pipher, 1994).

However, in the 1960s, the big gender equity concern focused on how schools were "shortchanging" boys. Concerns were raised about how the so-called "feminized culture" in most schools fit very poorly with the behavioral styles of boys—leading many boys to become alienated and then to underachieve. The contrast between these two pictures of gender inequities in school was recently highlighted by Sommers in an article in the May 2000 issue of the *Atlantic Monthly.*

So what is the truth? Like most such situations, the truth is complex. On the one hand, female and male youth (both children and adolescents) on average fare differently in American public schools in terms of both the ways in which they are treated and their actual performance. On the other, it is not the case that one gender is consistently treated less equitably than the other is: Female and male youth appear to be differentially advantaged and disadvantaged on various indicators of treatment and performance. In terms of performance, females earn better grades, as well as graduate from high school, attend and graduate from college, and earn master's degrees at higher rates than males. In contrast, males do slightly better than females do on standardized tests—particularly in math and science—and obtain more advanced degrees than do women in many areas of study, particularly in math-related, computer-related, engineering, and physical science fields. Men also are more likely than are women to obtain advanced graduate degrees in all fields except the social sciences and education. These patterns are more

extreme in European American samples than in samples of some other ethnic groups within the United States of America.

In terms of treatment, in most ethnic groups in the United States, boys are more likely than girls are to be assigned to all types of special-remedial education programs, and to either be expelled from or forced to drop out of school before high school graduation (National Center on Educational Statistics, 1999). Low-achieving boys (in both European American and African American samples) receive more negative disciplinary interactions from their teachers than do students in any other group—disproportionately more than their "fair" share. In addition, in most studies of academic underachievers, male youth outnumber female youth two to one (McCall, Evahn, & Kratzer, 1992). In contrast, high-achieving boys (particularly European American high-achieving boys) receive more favorable interactions with their teachers than do students in any other group and are more likely to be encouraged by their teachers to take difficult courses, to apply to top colleges, and to aspire to challenging careers (Sadker & Sadker, 1994).

More consistent gender differences emerge for college major and for enrollment in particular vocational educational programs. Here the story is one of gender-role stereotyping. European American women and men are most likely to specialize or major in content areas that are consistent with their gender–roles—that is, in content areas that are most heavily populated by members of their own gender. This gendered pattern is especially marked in vocational education programs for non–college-bound youth; for physical science, engineering, and computer science majors; and for professional degrees in nursing, social welfare, and teaching. Again this pattern is less extreme in other ethnic groups. Finally, there has been substantial movement of women into previously male-dominated fields like medicine, law, and business over the last 20 years (Astin & Lindholm, 2001).

Why do these gendered matters in educational and occupational aspirations exist? Discussing all possible mediating variables is beyond the scope of a single chapter. Instead, we focus on a set of social and psychological factors related to the Eccles' "expectancy-value model of achievement-related choices and performance" (see Figure 13.1).

Eccles' Expectancy-Value Model of Achievement-Related Choices and Performance

Over the past 20 years, Eccles and her colleagues have studied the motivational and social factors influencing such achievement goals and behaviors as educational and career choices, recreational activity selection, persistence on difficult tasks, and the allocation of effort across various achievement-related activities. Given the striking gender differences in educational, vocational, and avocational choices, they have been particularly interested in the motivational factors

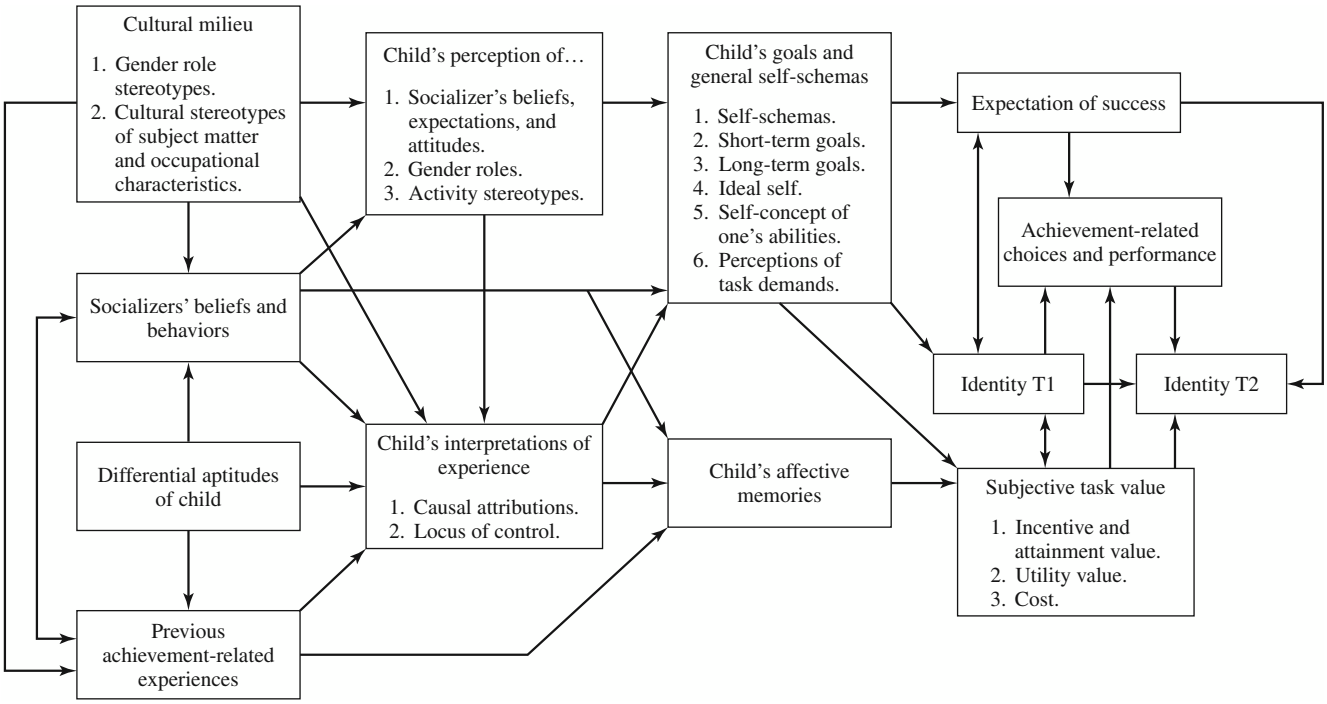

Figure 13.1 General model of achievement choices.

underlying males' and females' achievement-related decisions. Drawing upon the theoretical and empirical work associated with decision-making, achievement theory, and attribution theory, they elaborated a comprehensive theoretical model of achievement-related choices that can be used to guide subsequent research efforts. This model, depicted in Figure 13.1, links achievement-related choices directly to two sets of beliefs: the individual's expectations for success and the importance or value the individual attaches to the various options perceived by the individual as available. The model also specifies the relation of these beliefs to cultural norms, experiences, and aptitudes—and to those personal beliefs and attitudes that are commonly assumed to be associated with achievement-related activities by researchers in this field. In particular, the model links achievement-related beliefs, outcomes, and goals to interpretative systems like causal attributions, to the input of socializers (primarily parents, teachers, and peers), to gender-role beliefs, to self-perceptions and self-concept, to personal and social identities and to one's perceptions of the task itself.

For example, consider course enrollment decisions. The model predicts that people will be most likely to enroll in courses that they think they can master and that have high task value for them. Expectations for success (and a sense of domain-specific personal efficacy) depend on the confidence the individual has in his or her intellectual abilities and on the individual's estimations of the difficulty of the course. These beliefs have been shaped over time by the individual's experiences with the subject matter and by the individual's subjective interpretation of those experiences (e.g., does the person think that her or his successes are a consequence of high ability or lots of hard work?). Likewise, Eccles et al. assume that the value of a particular course to the individual is influenced by several factors. For example, does the person enjoy doing the subject material? Is the course required? Is the course seen as instrumental in meeting one of the individual's long- or short-range goals? Have the individual's parents or counselors insisted that the course be taken, or—conversely—have other people tried to discourage the individual from taking the course? Is the person afraid of the material to be covered in the course? The fact that women and men may differ in their choices is likely to reflect gender differences in a wide range of predictors, mediated primarily by differences in self-perceptions, values, and goals rather than motivational strength, drive, or both.

Competence and Expectancy-Related Self-Perceptions

In the last 30 years, there has been considerable public attention focused on the issue of young women's declining confidence in their academic abilities. In addition, researchers and policy makers interested in young women's educational and occupational choices have stressed the potential role that such declining confidence might play in undermining young women's educational and vocational aspirations, particularly in the technical fields related to math and physical science. For example, these researchers suggested that young women may drop out of math and physical science because they lose confidence in their math abilities as they move into and through adolescence—resulting in women who are less likely than are men to pursue these types of careers. Similarly, these researchers suggest that gender differences in confidence in one's abilities in other areas underlie gender differences across the board in educational and occupational choices. Finally, Eccles and her colleagues suggested that the individual differences in women's educational and occupational choices are related to variations among women in the hierarchy of women's confidence in their abilities across different domains (Eccles, 1994).

But do females and males differ on measures commonly linked to expectations for success, particularly with regard to their academic subjects and various future occupations? And are females more confident of their abilities in female gender-role stereotyped domains? In most studies, the answer is yes. For example, both Kerr (1985) and Subotnik and Arnold (1991) found that gifted European American girls were more likely to underestimate their intellectual skills and their relative class standing than were gifted European American boys—who were more likely to overestimate theirs.

Gender differences in the competence beliefs of more typical samples are also often reported, particularly in gender-role stereotyped domains and on novel tasks. Often these differences favor the males. For example, in the studies of Eccles, Wigfield and their colleagues (see also Crandall, 1969), high-achieving European American girls were more likely than were European American boys to underestimate both their ability level and their class standing; in contrast, the European American boys were more likely than were European American girls to overestimate their likely performance. When asked about specific domains, the gender differences depended on the gender-role stereotyping of the activity. For example, in the work by Eccles and her colleagues, European American boys and young men had higher competence beliefs than did their female peers for math and sports, even after all relevant skill-level differences were controlled; in contrast, the European American girls and young women had higher competence beliefs than did European American boys for reading, instrumental music, and social skills—and the magnitude of differences sometimes increase and sometimes decrease following puberty (Eccles, Adler, & Meece, 1984; Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002).

Furthermore, in these studies, the young women, on average, had greater confidence in their abilities in reading and social skills than in math, physical science, and athletics; and, when averaged across math and English, the male students had lower confidence than did their female peers in their academic abilities in general. By and large, these gender differences were also evident in preliminary studies of African American adolescents (Eccles, Barber, Jozefowicz, Malanchuk, & Vida, 1999). This could be one explanation for the fact that the young men in these samples—as in the nation more generally—are more likely to drop out of high school than were the young women.

Finally, the European American female and male students in the Eccles and Wigfield studies ranked these skill areas quite differently: for example, the girls rated themselves as most competent in English and social activities and as least competent in sports; the boys rated themselves as most competent by a substantial margin in sports, followed by math, and then social activities; the boys rated themselves as least competent in English (Eccles et al., 1993; Wigfield et al., 1998). Such within-gender, rank-order comparisons are critically important for understanding differences in life choices. In the follow-up studies of these same youths, Jozefowicz, Barber, and Eccles (1993) were able to predict within-gender differences in the young women's and men's occupational goals with the pattern of their confidences across subject domains. The youth who wanted to go into occupations requiring a lot of writing, for example, had higher confidence in their artistic and writing abilities than in their math and science abilities. In contrast, the youth who wanted to go into science and advanced health-related fields (e.g., becoming a physician) had higher confidence in their math and science abilities than in their artistic and social abilities (see Eccles et al., 1997).

One of the most interesting findings from existing studies of academic self-confidence is that the gender differences in self-perceptions are usually much larger than one would expect, given objective measures of actual performance and competence. First, consider mathematics: With the exception of performance on the most anxiety-provoking standardized test, girls do as well as boys do on all measures of math competence throughout primary, secondary, and tertiary education. Furthermore, the few gender differences that do exist have been decreasing in magnitude over the last 20 years and do not appear with great regularity until late in the primary school years. Similarly, the gender difference in perceived sports competence is much larger (accounting for 9% of the variance in one of our studies) than was the gender difference in our measures of actual sport-related skills (which accounted for between 1–3% of the variance on these indicators).

So why do female students rate their math and sports competence so much lower than their male peers do and so much lower than they rate their own English ability and social skills? Some theorists have suggested that female and male students interpret variations in their performance in various academic subjects and leisure activities in a gender-role stereotyped manner. For example, females might be more likely to attribute their math and sports successes to hard work and effort and their failures in these domains to lack of ability than males; in contrast, males might be more likely than females to attribute their successes to natural talent. Similarly, females might be more likely to attribute their English and social successes to natural ability. Such differences in causal attributions would lead to both the between- and within-gender differences in confidence levels reported in the preceding discussion.

The evidence for these differences in causal attributions is mixed (Eccles-Parsons, Meece, Adler, & Kaczala, 1982; see Ruble & Martin, 1998). Some researchers find that European American females are less likely than European American males are to attribute success to ability and more likely to attribute failure to lack of ability. Others have found that this pattern depends on the kind of task used—occurring more with unfamiliar tasks or stereotypically masculine achievement tasks. The most consistent difference occurs for attributions of success to ability versus effort: European American females are less likely than are European American males to stress the relevance of their own ability as a cause of their successes. Instead, European American females tend to rate effort and hard work as a more important determinant of their success than ability. We find it interesting that their parents do also (Yee & Eccles, 1988). There is nothing inherently wrong with attributing one's successes to hard work. In fact, Stevenson and his colleagues stress that this attributional pattern is a major advantage that Japanese students have over American students (Stevenson, Chen, & Uttal, 1990). Nonetheless, it appears that within the context of the United States, this attributional pattern undermines students' confidence in their ability to master increasingly more difficult material—perhaps leading young women to stop taking mathematics courses prematurely.

Gender differences are also sometimes found for locus of control. For example, in Crandall et al. (1965), the girls tended to have higher internal locus of responsibility scores for both positive and negative achievement events, and the older girls had higher internality for negative events than did the younger girls. The boys' internal locus of responsibility scores for positive events decreased from 10th to 12th grade. A result of these two developmental patterns was that older girls accepted more blame for negative events than the older

boys did (Dweck & Repucci, 1973). Similarly, Connell (1985) found that boys attributed their (negative) outcomes more than girls did to either powerful others or unknown causes in both the cognitive and social domains.

This greater propensity for girls to take personal responsibility for their failures, coupled with their more frequent attribution of failure to lack of ability (a stable, uncontrollable cause) has been interpreted as evidence of greater learned helplessness in females (see Dweck & Elliott, 1983). However, evidence for gender differences on behavioral indicators of learned helplessness is quite mixed. In most studies of underachievers, boys outnumber girls two to one (see McCall et al., 1992). Similarly, boys are more likely than girls are to be referred by their teachers for motivational problems and are more likely to drop out of school before completing high school. More consistent evidence exists that females (compared to males) select easier laboratory tasks, avoid challenging and competitive situations, lower their expectations more following failure, shift more quickly to a different college major when their grades begin to drop, and perform more poorly than they are capable of on difficult, timed tests (see Dweck & Elliott, 1980; Parsons & Ruble, 1977; Ruble & Martin, 1998; Spencer, Steele, & Quinn, 1995).

Somewhat related to constructs like confidence in one's abilities, personal efficacy, and locus of control, gender differences also emerge regularly in studies of test anxiety (e.g., Douglas & Rice, 1979; Meece, Wigfield, & Eccles, 1990). However, Hill and Sarson (1966) suggested that boys may be more defensive than are girls about admitting anxiety on questionnaires. In support of this suggestion, Lord, Eccles, and McCarthy (1994) found that test anxiety was a stronger predictor of poor adjustment to junior high school for boys, even though the girls reported higher mean levels of anxiety.

Gender-role stereotyping has also been suggested as a cause of the gender differences in academic self-concepts. The extent to which adolescents endorse the European American cultural stereotypes regarding which gender is likely to be most talented in each domain predicts the extent to which European American females and males distort their ability self-concepts and expectations in the gender-stereotypical direction. S. Spencer, Steele, and Quinn (1999) suggested a mechanism linking culturally based gender stereotypes to competence through test anxiety: stereotype vulnerability. They hypothesized that members of social groups (like women) stereotyped as being less competent in a particular subject area (like math) will become anxious when asked to do difficult problems because they are afraid the stereotype may be true of them. This vulnerability is also likely to increase females' vulnerability to failure feedback on male-stereotyped tasks, leading to lowered self-expectations and self-confidence in their ability to succeed for these types of tasks. To test these hypotheses, S. Spencer, Steele, and Quinn gave college students a difficult math test under two conditions: (a) after being told that men typically do better on this test or (b) after being told that men and women typically do about the same. The women scored lower than the men did only in the first condition. Furthermore, the manipulation's effect was mediated by variations across condition in reported anxiety. Apparently, knowing that one is taking a test on which men typically do better than women do increases young women's anxiety, which in turn undermines their performance. This study also suggests that changing this dynamic is relatively easy if one can change the women's perception of the gender-typing of the test.

In sum, when either gender differences or within-gender individual differences emerge on competence-related measures for academic subjects and other important skill areas, they are consistent with the gender-role stereotypes held by the group being studied (most often European Americans). These differences have also been found to be important mediators of both gender differences and within-gender individual differences in various types of achievement-related behaviors and choices. Such gendered patterns are theoretically important because they point to the power of gender-role socialization processes as key to understanding both girls' and boys' confidence in their various abilities. And to the extent that gender-role socialization is key, it is important to study how and why young women differ in the extent to which they are either exposed to these socialization pressures or resist them when they are so exposed.

But even more important is that all of the relevant studies have documented extensive variation within each gender. Both females and males vary a great deal among themselves in their intellectual confidence for various academic domains. They also vary considerably in their test anxiety, their attributional styles, and their locus of control. Such variations within each gender are a major set of predictors of variation among both young men and young women in their educational and occupational choices. European American adolescent males and females who aspire to careers in math and science and who take advanced courses in math and physical science have greater confidence in their math and science abilities than those who do not. They also have just as much—if not more—confidence in their math and science abilities as in their English abilities (see Eccles et al., 1998).

Gendered Differences in Achievement Values

Achievement values are related to the different purposes or reasons individuals have for engaging in different activities.

Eccles et al. (1983) defined four components of task value: attainment value, intrinsic value, utility value, and cost. They defined attainment value as the personal importance of doing well on the task. They also linked attainment value to the relevance of engaging in a task for confirming or disconfirming salient aspects of one's self-schema or identity. Because tasks provide the opportunity to demonstrate aspects of one's actual or ideal self-schema, such as masculinity, femininity, or competence in various domains, tasks will have higher attainment value to the extent that they allow the individual to confirm salient aspects of these self-schemas (see Eccles, 1984, 1987). *Intrinsic value* is the enjoyment the individual gets from performing the activity or the subjective interest the individual has in the subject. This component of value is similar to the construct of intrinsic motivation as defined by Harter (1981) and by Deci and his colleagues (e.g., Deci & Ryan, 1985; Ryan, Connell, & Deci, 1985). *Utility value* is determined by how well a task relates to current and future goals, such as career goals. A task can have positive value to a person because it facilitates important future goals, even if he or she is not interested in task for its own sake. In one sense, then, this component captures the more "extrinsic" reasons for engaging in a task; but it also relates directly to individuals' internalized short- and long-term goals. Finally, cost is conceptualized in terms of the negative aspects of engaging in the task, such as performance anxiety and fear of both failure and success as well as the amount of effort that is needed to succeed and the lost opportunities that result from making one choice rather than another.

Eccles, Wigfield, and their colleagues have found gender-role stereotypical differences in both children's and adolescents' valuing of sports, social activities, and English (e.g., Eccles et al., 1989; Eccles et al., 1993; Wigfield et al., 1991, Wigfield et al., 1998). Across these studies, boys value sports activities more than girls do, whereas girls value reading, English, and instrumental music more than boys do. It is interesting to note that in the studies they conducted prior to the 1990s, high-school girls valued math less than did high-school boys (Eccles, 1984); this gender difference, however, has disappeared in more recent studies (see Jacobs et al., in press). Although it is encouraging that boys and girls now value math equally, the fact that adolescent girls have less positive views of their math ability is problematic because these differences probably contribute to girls' lower probability of taking optional advanced-level math and physical science courses and of entering math-related scientific and engineering fields, thus contributing to gender-differentiated cognitive outcomes and career choices (see Eccles, 1994). We return to career choice issues later in this chapter.

Values also can be conceived more broadly to include notions of what are appropriate activities for males and females to do. Sometimes such values can conflict with engagement in achievement. The role of conflict between gender roles and achievement in gifted girls' lives is well illustrated by results of an ethnographic study of a group of gifted elementary-school girls. Bell (1989) interviewed a multiethnic group of third- to sixth-grade gifted girls in an urban elementary school regarding the barriers they perceived to their achievement in school. Five gender-role related themes emerged with great regularity: (a) concern about hurting someone else's feelings by winning in achievement contests; (b) concern about seeming to be a braggart if one expressed pride in one's accomplishments; (c) overreaction to nonsuccess experiences (apparently, not being the very best is very painful to these girls); (d) concern over their physical appearance and what it takes to be beautiful; and (e) concern with being overly aggressive in terms of getting the teacher's attention. In each case, the gifted girls felt caught between doing their best and appearing either feminine or caring.

Gender differences have also been found on many of the psychological processes proposed by Eccles and her colleagues to underlie gender differences in subjective task value. For example, Eccles-Parsons et al. (1983) predicted that the attainment value of particular tasks would be linked to (a) conceptions of one's personality and capabilities, (b) long-range goals and plans, (c) schemas regarding the proper roles of men and women, (d) instrumental and terminal values (Rokeach, 1979), (e) ideal images of what one should be like, and (f) social scripts regarding proper behavior in a variety of situations. If gender-role socialization leads males and females to differ on these core self- and role-related beliefs, then related activities will have differential value for males and females. In support, in a study of the link between personal values and college major, Dunteman, Wisenbaker, and Taylor (1978) identified two sets of values that both predicted college major and differentiated the genders: the first set (labeled *thing-orientation*) reflected an interest in manipulating objects and understanding the physical world; the second set (labeled *person-orientation*) reflected an interest in understanding human social interaction and a concern with helping people. Students with high thing-orientation and low person-orientation were more likely than were other students to select a math or a science major. Not surprisingly, the females were more likely than were the males to major in something other than math or science because of their higher person-oriented values. Similarly, the young women in the Jozefowicz et al. (1993; see Eccles, Barber, & Jozefowicz, 1999) study placed more value than did the young men on a variety of female-stereotyped career-related skills and interests, such as doing

work that directly helps people and meshes well with child-rearing responsibilities. These values along with ability self-concepts predicted the gender-stereotyped career plans of both males and females (see Eccles & Harold, 1992, for review of the gender-role stereotypical patterns for personal values, occupational values, and personality traits).

Explanations for these gender differences in interests and task values have focused on several things, including adolescents' understanding of what is appropriate for each gender to do. To the extent that adolescents know and have internalized the gender-role stereotypes of their cultures, they are likely to place greater value on activities consistent with their gender's gender role than on activities consistent with the opposite gender's gender role (see Eccles, 1984; Ruble & Martin, 1998).

Gender differences in academic values could also reflect the confluence of both gender-role stereotypes and gender differences in perceived competence. Drawing on the writings of William James (1892/1963), Eccles and her colleagues suggested that children would lower the value they attach to particular activities or subject areas—if they lack confidence in these areas—in order to maintain their self-esteem (Eccles, 1994; Eccles et al., 1998; Harter, 1990). To the extent that girls feel less competent in math than in other subject areas, they may reduce the value they attach to math versus other academic subject areas. This in turn might lead them to be less likely than males to consider future occupations in math-related fields. S. Spencer, Steele, and Quinn (1999) suggested a similar phenomenon related to stereotype vulnerability. They hypothesized that women would disidentify with those subject areas in which females are stereotyped as less competent than males. By disidentifying with these areas, the women will not only lower the value they attach to these subject areas, they will also be less likely to experience pride and positive affect when they are doing well in these subjects. Consequently, these subjects should become less relevant to their self-esteem. These hypotheses remain to be tested. As we noted earlier, girls and young women do not report valuing math less than do boys and young men, at least through the early high-school years. What they do value less than males do are physical science and engineering. Because math is required for both of these fields, this gender difference in values could explain the differential course taking in these fields during both high school and college (Updegraff, Eccles, Barber, & O'Brien, 1996).

In summary, as with competence beliefs, there are gender differences in children's and adolescents' valuing of and interest in different activities. These differences are important for understanding the development of gender differences in cognition and performance. In our research, children's and adolescents' valuing of different activities relates strongly to their choices of whether to continue to pursue the activity (Eccles-Parsons et al., 1983; Meece et al., 1990; Updegraff et al., 1996). Such choices should have an impact on changes in actual competence and subsequent performance, with participation leading to greater increases than nonparticipation.

Gender and Occupational Ability Self-Concepts

Eccles and her colleagues have extended the work on academic and athletic self-concepts by looking at European American and African American adolescents' competence ratings for skills more directly linked to adult occupational choice. As their samples moved into and through high school, these investigators asked the students a series of questions directly related to future job choices. First, they asked them to rate how good they were compared to other students at each of several job-related skills. Second, they asked the students to rate the probability that they would succeed at each of a series of standard careers. On the one hand, the results are quite gender-role stereotyped: The young women (both African American and European American) were less confident of success than were their male peers in both science-related professions and male-typed skilled labor occupations. In contrast, the young men (both African American and European American) were less confident of their success than were their female peers in health-related professions and female-typed skilled labor occupations. On the other hand, there were no gender differences in these 12th graders' ratings of either their confidence of success in business and law or their leadership, independence, intellectual, and computer skills. Furthermore, although the young men were more confident of success in physical science and engineering fields, the young women were more confident than were their male peers of success in health-related fields that involve extensive scientific training (Eccles et al., 1997).

The within-gender patterns were equally interesting. On the average, these young women saw themselves as quite competent in traditionally female-typed jobs and skills related to human service, particularly in comparison to their confidence for science-related jobs and mechanical skills. An interesting finding was that these young women also saw themselves as quite competent in terms of their leadership, intellectual skills, and independence.

Gender and Occupational-Choice–Related Values

Do women and men make gender-role stereotypical life choices because they have gender-role stereotypical values? In most studies, the answer is "yes" for the populations most

studied (European Americans and to a lesser extent African Americans). Gender-role stereotypical patterns in adolescents' valuing of sports, social activities, and English have emerged consistently. It is interesting to note that the gendered pattern associated with the value of math does not emerge until high school. Finally, the gendered pattern of valuing math, physics, and computer skills has emerged as the key predictor of both gender differences and individual differences among female students in adolescents' plans to enter math-related scientific and engineering fields (see Eccles et al., 1997).

It is important to note, however, that these gendered patterns have decreased over time for women of most ethnic groups in the United States. Young women today are more likely to aspire to the male-stereotyped fields of medicine, law, and business than were their mothers and grandmothers. And although the numbers are not nearly as large, young women today are also much more likely to seek out occupations related to engineering and physical science. Finally, young women today are also much more involved in athletic activities than were their mothers and grandmothers (see Astin & Lindholm, 2001; Gill, 2001).

Because of their interest in understanding career choice, Eccles and her colleagues asked their African American and European American senior high-school participants to rate how important each of a series of job-related and life-related values and a series of job characteristics were to them (see Eccles et al., 1997). As was true for the job-related skills, they found evidence of both gender-role stereotypical differences and of gender-role transcendence. In keeping with traditional stereotypes, the young women rated family and friends as more important to them than did their male peers; the young women were also more likely than the male peers were to want jobs that were people-oriented. In contrast, but also consistent with traditional stereotypes, the young men placed a higher value on high-risk and competitive activities and wealth; they also were more interested in jobs that allowed for work with machinery, math, or computers. However, counter to traditional stereotypes, there were no gender differences in careerism (focus on career as critical part of one's identity), and the women and men were equally likely to want jobs that allowed flexibility to meet family obligations, that entailed prestige and responsibility, and that provided opportunities for creative and intellectual work.

Evidence of both gender-role typing and transcendence was also evident in the within-gender patterns. Although these young women still, on the average, attached most importance to having a job with sufficient flexibility to meet family obligations and with the opportunity to help people, they also placed great importance on the role of their career for their personal identity (careerism) and on the importance of both prestige-responsibility and creativity as key components of their future occupations.

Predicting Occupational Choice

Eccles and her colleagues next used these values and ability self-concepts to predict the young men's and women's occupational aspirations (see Eccles et al., 1997). As expected, ability self-concepts were key predictors of both between- and within-gender differences in career aspirations. Also as predicted by the Eccles expectancy-value model of achievement-related choices, the lifestyle and valued job characteristics were significant predictors of career aspirations. The within-gender analyses were especially interesting. Values did an excellent job of discriminating between these young women's occupational plans. Perhaps most interesting was that the value placed on helping other people predicted which women aspired to advanced-level health-related professions (e.g., a physician) and which women aspired to doctoral-level science careers. Both of these groups of women had very high confidence in their math and science abilities. In contrast, they differed dramatically in the value they placed on helping others: The women aspiring to the health-related fields placed more importance on this dimension than on any other value dimension; in contrast, the women aspiring to doctoral-level science careers placed less importance on this dimension than on any other dimension, particularly less than on the value of being able to work with math and computers.

In summary, there is still evidence of gendered patterns in the valuing of different academic subject areas and activities. And although it is encouraging that girls value math during elementary school, the fact that European American young women have less positive views of both their math ability and the value of math is problematic because these differences lead young European American women to be less likely than young European American men to take optional advanced-level math and physical science courses.

Gender and Self-Esteem

Work on gender differences in self-esteem among European Americans also has produced some interesting findings. During the middle childhood years, boys and girls report similar levels of self-esteem. By the early adolescent years, however, European American girls tend to report lower self-esteem than do European American boys. Although self-esteem tends to rise as children move through adolescence (Dusek & Flaherty, 1981), the gender difference remains

(Kling, Hyde, Showers, & Buswell, 1999). Further, young women seem more likely than do young men to develop more serious negative self-evaluations such as depression during the adolescent years (see Eisenberg, Marin, & Fabes, 1996; Harter, 1998; Nolen-Hoeksema & Girigus, 1994).

A variety of explanations have been offered for these gender differences in the self-esteem of European Americans. European American boys have been described as being more likely to handle difficulties by engaging in "externalizing" behavior such as aggression. European Americans girls, by contrast, tend to "internalize" problems to a greater extent (see Eisenberg et al., 1996). Nolen-Hoeksema and Girigus (1994) suggested that females' self esteem is based more on the approval of others and on pleasing others, making it more difficult for them to maintain self-approval, especially when they encounter difficulties.

Physical appearance issues are likely to be central as well, particularly for European American females. Harter (1990, 1998) made three essential points about physical appearance and self-esteem, based on her own work and on that of others. First, as European American boys and girls go through childhood and move into adolescence, the girls (relative to boys) become increasingly less satisfied with their own appearance. Second, society and the media place an incredibly strong emphasis on physical appearance as a basis for self-evaluation, and this is especially true for European American women. There are clear (and often unrealistic) standards for women's appearance that young women strive to attain, often unsuccessfully. Third, Harter's empirical work clearly has shown that for both European American males and females, satisfaction with physical appearance is the strongest predictor of self-esteem. Taking these three points together, European American girls are increasingly unhappy about an aspect of themselves that seems to be the primary predictor of self-esteem. Hence, European American girls are more likely to develop lower self-esteem at this time.

RACIAL AND ETHNIC GROUP DIFFERENCES IN ACHIEVEMENT MOTIVATION

As is the case in many areas of psychology (see Graham, 1992), less is known about the motivation of adolescents from non-European American racial and ethnic groups. However, work in this area is growing quickly, with much of it focusing on the academic achievement difficulties of many African American youth (see Berry & Asamen, 1989; Eccles et al., 1998; Hare, 1985; Jencks & Phillips, 1998; Slaughter-Defoe, Nakagawa, Takanishi, & Johnson, 1990). Recent work has also focused on other minority groups within the United States and on recent immigrant populations, some of whom are doing much better in school than both European American middle-class children and the third- and fourth-generation members of their same national heritage (e.g., Chen & Stevenson, 1995, Kao & Tienda, 1995; Slaughter-Defoe et al., 1990).

Ethnic Group Differences in Children's Competence, Control, and Attribution Beliefs

Graham (1994) reviewed the literature on differences between African American and European American students on such motivational constructs as need for achievement, locus of control, achievement attributions, and ability beliefs and expectancies; she concluded that these differences are not very large. She also argued that many existing studies have not adequately distinguished between race and SES, making it very difficult to interpret even those differences that did emerge. Cooper and Dorr (1995) did a meta-analysis of some of the same studies reviewed by Graham in order to compare more narrative and more quantitative types of reviews. Although there were some important points of agreement across the two reviews, Cooper and Dorr concluded that there were significant race differences in need for achievement favoring European Americans, especially in lower-SES and younger samples.

In their study of educational opportunity, Coleman et al. (1966) reported that perceived control was a very important predictor of African American children's school achievement. Graham (1994) found some evidence that African Americans are more external than European Americans. However, she also noted that studies looking at relations of locus of control to various achievement outcomes have not shown this greater externality to be a problem; indeed, in some studies greater externality is associated with higher achievement among African Americans.

Research on competence beliefs and expectancies has revealed more optimism among African American children than among European American children, even when the European American children are achieving higher marks (e.g., Stevenson et al., 1990). A more important result, however, was that in Stevenson et al. (1990), the European American children's ratings of their ability were related to their performance, whereas the African American children's were not. Graham (1994) suggested the following explanations: (a) African American and European American children may use different social comparison groups to help judge their own abilities; and (b) African American children may say they are doing well to protect their general self-esteem, and they may also devalue or disidentify academic activities

at which they do poorly in order to protect their self-esteem. However, neither of these explanations has been adequately tested, and more work is needed to determine whether and when Stevenson et al.'s results replicate. More recent studies suggest that this ethnic group difference is less extreme than reported by Stevenson et al. (Winston, Eccles, Senior, & Vida, 1997; Winston, 2001).

Ethnic Group Differences in Achievement Values and Goals

There are few ethnic comparative studies specifically focused on the kinds of achievement values measured by Eccles, Wigfield, and their colleagues, or on the kinds of achievement goals measured by Ames, Dweck, Midgley, and their colleagues (see earlier discussion). Researchers studying minority children's achievement values have focused instead on the broader valuing of school by minority children and their parents. In general, these researchers find that minority children and parents highly value school (particularly during the elementary school years) and have high educational aspirations for their children (e.g., Stevenson et al., 1990). However, the many difficulties associated with poverty (see Duncan, Brooks-Gunn, & Klevbanov, 1994; Huston, McLoyd, & Coll, 1994; McLoyd, 1990) make these educational aspirations difficult to attain. It is important for researchers to extend this work to more specific value-related constructs.

Ethnicity and Motivation at the Interface Between Expectancies and Values

Researchers interested in ethnic and racial differences in achievement have proposed models linking social roles, competence-related beliefs, and values. For example, Steele has proposed stereotype vulnerability and disidentification to help explain the underachievement of African American students (e.g., Steele & Aronson, 1995): Confronted throughout their school career with mixed messages about their competence and potential as well as the widespread negative cultural stereotypes about their academic potential and motivation, African American students should find it difficult to concentrate fully on their schoolwork due to the anxiety induced by their stereotype vulnerability (for support, see Steele & Aronson, 1995). In turn, to protect their self-esteem, they should disidentify with academic achievement, leading to both a lowering of the value they attach to academic achievement and a detachment of their self-esteem from both positive and negative academic experiences. In support, several researchers have found that academic self-concept of ability is less predictive of general self-esteem among African-American youth than among European American youth (Bledsoe, 1967; Winston, Eccles, Senior, & Vida, 1997).

Fordham and Ogbu (1986) made a similar argument linking African American students' perception of limited future job opportunities to lowered academic motivation: Because 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, some African American youth may create an oppositional culture that rejects the value of academic achievement. Ogbu (1992) argued that this dynamic should be stronger for involuntary minorities who continue to be discriminated against by mainstream American culture (e.g., African Americans) than for voluntary minority immigrant groups (e.g., recent immigrants from Southeast Asia). Although voluntary minorities have initial barriers due to language and cultural differences, these barriers can be overcome somewhat more easily than the racism faced by involuntary minorities, giving voluntary minorities greater access to mainstream culture and its benefits.

Contrary to this view, several investigators have found no evidence of greater disidentification with school among African American students than among other groups including European Americans (e.g., Eccles, 2001; Steinberg, Dornbusch, & Brown, 1992; Taylor, Casten, Flickinger, Roberts, & Fulmore, 1994). Nonetheless, several studies show that disidentification—particularly as a result of inequitable treatment and failure experiences at school—can undermine achievement and academic motivation (e.g., see Finn, 1989; Taylor et al., 1994). It is likely that some students, particularly members of involuntary minority groups, will have these experiences as they pass through the secondary school system. Longitudinal studies of the process of disidentification—and of ameliorating intervention efforts—are badly needed.

Any discussion of performance and motivational differences across different ethnic groups must take into account larger contextual issues. For example, M. B. Spencer and Markstrom-Adams (1990) argued that many minority children—particularly those living in poverty—have to deal with several difficult issues not faced by majority adolescents, such as racist prejudicial attitudes, conflict between the values of their group and those of larger society, and scarcity of high-achieving adults in their group to serve as role models. Such difficulties can impede identity formation in these adolescents, leading to identity diffusion or inadequate exploration of different possible identities (Taylor et al., 1994). Similarly, Cross (1991) argued that one must consider the development of both personal identities and racial group identity. 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 have positive orientations toward their group. Cross argued that many researchers have confounded these two constructs, leading to confusion in our understanding of identity development in—and its motivational implications for—African Americans.

Finally, it is critical to consider the quality of the educational institutions that serve many of these youth. Thirty-seven percent of African American youth and 32% of Hispanic youth—compared to 5% of European American and 22% of Asian American youth—are enrolled in the 47 largest city school districts in this country; in addition, African American and Hispanic youth attend some of the poorest school districts in this country. Twenty-eight percent of the youth enrolled in city schools live in poverty, and 55% are eligible for free or reduced-cost lunch, 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 do teachers in other school districts, dropout rates are highest, and achievement levels at all grades are the lowest (Council of the Great City Schools, 1992). Finally, schools that serve these populations are less likely than schools serving more 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. Even children who are extremely motivated may find it difficult to perform well under these educational circumstances (Lee & Bryk, 1989).

Graham (1994) made several important recommendations for future work on African American children's motivation. We think these recommendations can be applied more broadly to work on different racial and ethnic groups. Two particularly important recommendations are (a) the need to separate out effects of race and social class; and (b) the need to move beyond race-comparative studies to studies that look at individual differences within different racial and ethnic groups and at the antecedents and processes underlying variations in achievement outcomes among minority youth (e.g., Connell, Spencer, & Aber, 1994; Luster & McAdoo, 1994; Schneider & Coleman, 1993; Steinberg, Lamborn, Dornbusch, & Darling et al., 1992; Kao & Tienda, 1995). Studies of recent immigrant populations and comparative studies of different generations of immigrant populations move in these directions. For example, work by Stevenson and his colleagues, by Tienda and her colleagues, and by Fuligni all demonstrate the power of the types of motivational constructs discussed thus far in explaining both within- and between-group variation in academic achievement (e.g., Chen & Stevenson, 1995; Fuligni, 1997; Kao & Tienda, 1995; Lummis & Stevenson, 1990).

SUMMARY

In this chapter, we focused on two major aspects of adolescent development: cognitive development and both achievement and achievement motivation. First we discussed cognitive development, pointing out the relevance of recent work for both learning and decision making. We pointed out that more research is needed on ethnic group differences and on the link between decision-making skills and actual-decision making behaviors in complex situations. Next we summarized current patterns of school achievement and recent changes in both school completion and differential performance on standardized tests of achievement. We pointed out the educational gains that have been made over the last century as well as the continuing ethnic group and national differences in test performance. We then summarized both the positive and negative age-related changes in school motivation and discussed how experiences in school might explain these developmental patterns. Recent efforts at middle-school reform have supported many of the hypotheses discussed in that section of the paper. More efforts at understanding the difficulty of school reform are badly needed. Finally, we discussed both gender and ethnic group differences in achievement motivation and linked these differences to gender and ethnic group differences in academic achievement and longer-term career aspirations. We now have a very good understanding of the psychological and social origins of gender differences in achievement patterns. More work is desperately needed on the influences on academic performance and both educational and occupational choices of adolescents of color. It is encouraging that the rate of such work has increased dramatically over the last 10 years. We look forward to being able to summarize this new and exciting work in future chapters.

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CHAPTER 14

Emotional and Personality Development in Adolescence

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EMOTIONAL DEVELOPMENT 352
Indicators of Adaptive Emotion Regulation 353
Indicators of Emotion Dysregulation 354
PERSONALITY DEVELOPMENT 356
The Structure of Personality 357
The Origins of Personality in Temperament 358
Continuity in Temperament and Personality 358
The Goodness-of-Fit Model of Temperament 359
EMERGING TRENDS AND FUTURE DIRECTIONS 360
A Focus on Optimal Development 360
Cultural Variations in Emotional and Personality Development 361
Integration of Temperament Into the Study of Adolescent Adjustment 362
Person Approaches to Understanding Emotion and Personality 364
SUMMARY 365
REFERENCES 366

What is personality? How is temperament related to personality? Where does emotion fit in? What is the significance of emotion, personality, and temperament for understanding behavior and emotional well-being in adolescence? How does culture influence the expression of emotion and personality? These are critical and challenging questions that underlie the study of individual differences in emotional and personality development. Emotional and personality development are complicated, interrelated processes that occur across the life span. The story of emotion and personality in adolescence is essentially a study in identifying indicators and predictors of adolescents' emotional well-being and distress, ascertaining core personality traits seen in adolescence, documenting the evolution of personality characteristics across time, and investigating the links among emotion, emotional well-being and distress, personality, and temperament.

There is a vast array of theory and research on emotion and personality across the life span. This chapter focuses on recent research into the emotional well-being and distress of adolescents, as well as personality and temperament development in adolescence. The examination of emotion and personality in adolescence is interesting for at least two reasons. First, it is in the period of adolescence that we may begin to observe not only the crystallization of emotional and personality styles, but also how emotion and personality will shape the course of individuals' lives. Perhaps for the first time, interested observers such as parents can be more confident in predicting what kind of adult the individual is likely to become. Continuities in emotional well-being and personality across time are the source for these predictions about future behavior, but to be sure, discontinuities can make those predictions wrong. Second, the field of research on adolescent development that has burgeoned in the last few decades has demonstrated not only that there are significant biological, cognitive, social, and behavioral changes that occur during adolescence, but also that these changes are inextricably linked with one another. It is crucial to understand the role of emotion and personality in producing and affecting these changes.

Given the large amount of research in each of the areas of emotion, personality, and temperament, it is not possible within the confines of this chapter to conduct a comprehensive review of relevant studies. Several excellent books and reviews suit this purpose (e.g., Caspi, 1998; Kagan, 1998; Larson & Richards, 1994; Rothbart & Bates, 1998; Sanson & Rothbart, 1995; Shiner, 1998; van Lieshout, 2000). In this chapter we aim to identify the major issues seen in research on emotional and personality development pertaining specifically to adolescence, to provide examples of illustrative research in these domains, and to explore how future research can increase our understanding of adolescent emotion and personality. In the first section of this chapter we present research on some important issues in emotional development

during adolescence. In the second section we discuss some of the key issues related to personality and temperament in adolescence. In the third and final section we identify four emerging themes in research on emotion and personality that will shape the direction of research for some time to come.

EMOTIONAL DEVELOPMENT

Guided by G. Stanley Hall's *storm and stress hypothesis* (the view that adolescence is filled with hormone-induced emotional turmoil), one focus of research on emotions in adolescence has been to examine variability in emotional or mood states (Brooks-Gunn, Graber, & Paikoff, 1994). Larson and Lampman-Petraitis (1989), for example, charted hour-to-hour changes in mood over a week in a sample of preadolescent and adolescent children. It is interesting to note that there was little evidence of variability in the mood states of adolescents compared to preadolescents. The average adolescent, however, was more likely than the average preadolescent to report more mildly negative mood states and fewer extremely positive mood states. Although overall mood may take on a slightly different character in adolescence, rapid mood swings were not evidenced in this research. Another focus of research has examined direct links between hormonal levels in adolescence and emotions such as aggression and depression (Susman, 1997; see chapter by Susman, Dorn, & Schiefelbein in this volume). Some consistent associations have been found between specific hormones and feelings of aggression (particularly among boys) and depression (Brooks-Gunn et al., 1994; Buchanan, Eccles, & Becker, 1992), but only small proportions of variance in emotion (up to 6%) are attributable to hormones (Susman, 1997). More complicated models of hormone-emotion relationships have been proposed, based on research indicating that hormones interact with personality and contextual characteristics to affect emotional states and behavior (Richards & Larson, 1993). These models, which require the use of longitudinal designs, will lead to a better understanding of how hormones are linked to adolescents' emotions indirectly through their impact on the outward physical changes of puberty, the adolescents' responses to these changes and their implications, and others' reactions to the changing adolescent (Brooks-Gunn et al., 1994; Susman, 1997).

Often implicit in the research on the link between hormones and emotion is the assumption that emotions may be something to be feared, that they are linked directly to negative and irrational behavior. Increasingly, though, the conceptualization of emotions in contemporary research has moved away from viewing emotions as sources of negative and irrational behavior toward a view of emotions as adaptive and capable of organizing behavior in ways that can enhance as well as disrupt functioning (Cole, Michel, & Teti, 1994; Thompson, 1994). A dominant paradigm for studying emotions and emotion-related phenomena is emotion regulation.

Emotion regulation may be broadly defined as the way in which a person uses emotional experiences to provide for adaptive functioning (Thompson, 1994). The construct of emotion regulation has been used to refer to both outcome and process. In terms of outcome, some researchers define emotion regulation as the extent to which an individual shows emotional control versus emotional reactivity (Maedgen & Carlson, 2000). In this view, important components of emotion regulation include emotional lability, maladaptive emotional displays, and negative mood states. Others focus more on process variables such as the coping strategies that individuals employ to modify emotional reactions (Contreras, Kerns, Weimer, Gentzler, & Tomich, 2000; Rossman, 1992; Underwood, 1997). Emotion regulation in this sense refers to how the individual deals with each experience of emotion (Campos, Mumme, Kermoian, & Campos, 1994; Gross & Muñoz, 1995). This view of emotion regulation focuses not only on the modulation of distress but also on attempts to stimulate positive emotions or improve emotional arousal to achieve important interpersonal goals (Calkins, 1994; Thompson, 1994).

A variety of skills are necessary for effective emotion regulation, including flexibility and responsiveness to changing situational demands (Cole et al., 1994; Thompson, 1994). Other skills include an awareness of one's emotional state, the capacity to detect emotions in other people, knowledge of cultural display rules for emotions, and the ability to empathize with others' emotional states (Saarni, 1990; cited in Underwood, 1997). These skills are initially primarily externally supported, such as when a parent helps a child label and talk about their emotions, selectively reinforces adaptive emotional displays, and models effective emotion regulation. With development, socialization influences on emotion regulation give way to more internally mediated emotion regulation processes (Calkins, 1994; Thompson, 1994). By adolescence, individuals are better able to structure their own environment as a way of regulating their emotions, and they are capable of cognitively sophisticated emotion regulation strategies such as reframing and taking another's point of view (Gross & Muñoz, 1995).

This broader view of emotion regulation—that is, as the behavioral strategies one uses to modify, intensify, diminish, or transform emotional reactions—is an integral part of the functionalist perspective on emotion (Campos et al., 1994; Thompson, 1994). The functionalist perspective highlights several characteristics of emotion regulation. For instance, optimal emotion regulation is best conceptualized as context

dependent, rather than as a stable feature of individual functioning (Thompson, 1994). Different contexts present diverse emotional challenges, and optimal emotion regulation varies depending on the goals of the individual in specific situations (Thompson, 1994). Accordingly, individuals have different goals depending on the interpersonal context (friend vs. stranger vs. authority figure), and the most adaptive way of dealing with emotions such as anger in each of these situations may differ (Underwood, 1997). Similarly, individuals may show effective emotion regulation in one context (e.g., with peers) but not in another (e.g., with siblings; Thompson, 1994; Whitesell & Harter, 1996). A related emphasis in the functionalist perspective is that emotion regulation is an interpersonal phenomenon more than an intrapsychic phenomenon (Campos et al., 1994). For instance, core emotions such as happiness, guilt, pride, and shame all reflect core relationship themes (Campos et al., 1994). In addition, beliefs about the availability of support and the likely response of others can facilitate or hamper effective emotion regulation (Thompson, 1994). In turn, emotion regulation skills can facilitate or hamper the achievement of important interpersonal developmental tasks, such as forming secure relationships with others (Cole et al., 1994).

Most research on emotion regulation has focused on infants (e.g., Field, 1994) and young children (e.g., Shields & Cicchetti, 1997; Underwood, 1997). Less attention has been directed at how emotion regulation operates in adolescence. Despite this lack of formal theorizing about emotion regulation in adolescence, the emotion regulation framework can be useful for conceptualizing and integrating a variety of constructs that have been the subject of much empirical attention in the literature on adolescence. For instance, indicators of adolescents' psychological well-being (e.g., self-esteem, positive mood) can be interpreted from an emotion regulation perspective as illustrative of the successful regulation of emotions, or adaptive emotional functioning. Likewise, indicators of psychological distress (e.g., depression) can be viewed as capturing emotion dysregulation. In this section we examine research that bears on adaptive emotional regulation, followed by research important to understanding emotion dysregulation.

Indicators of Adaptive Emotion Regulation

How do we know when adolescents are doing well? By what measure can we achieve some level of confidence that teens are successfully negotiating their way around their world, mastering important developmental tasks, and learning to regulate their emotions in ways that will ensure their eventual success in adulthood? Throughout the empirical literature on adolescence, there are a host of constructs and indicators of emotional well-being, including, but not limited to, a high self-esteem (Haney & Durlak, 1998; Zimmerman, Copeland, Shope, & Dielman, 1997), a positive self-concept and stable sense of identity (Harter, 1990; Nurmi, 1997), a high level of ego development (Allen, Hauser, Bell, & O'Connor, 1994; Hauser & Safyer, 1994), social competence (Bustra, Bosma, & Jackson, 1994; Gullotta, Adams, & Montemayor, 1990), a positive mood or emotional tone (Larson & Richards, 1994; Petersen et al., 1993), school engagement and competence (Sandler, Ayers, Suter, Schultz, & Twohey, in press; Wigfield & Eccles, 1994), and feelings of attachment to parents and friends (Allen, Moore, Kuperminc, & Bell, 1998; Greenberger & McLaughlin, 1998; Paterson, Pryor, & Field, 1995). Although each of these indicators alone is the subject of a large body of research, studies have found that these measures of emotional well-being are typically positively correlated with one another (e.g., DuBois, Bull, Sherman, & Roberts, 1998; Paterson et al., 1995; Petersen et al., 1993). A review of each of these indicators is beyond the scope of this chapter. However, many of these constructs have been generally incorporated into larger integrative models that represent the adolescent's overall level of adaptation. From the perspective of emotion regulation, models of the self-system and psychosocial maturity are particularly appropriate to consider.

The Self-System

In decades of research, many aspects of self have been defined and measured. One of the most common is *self-esteem,* which is typically defined as an affective evaluation of the self, involving feelings of self-worth (DuBois & Hirsch, 2000). A long history of research shows that high levels of global self-esteem are linked with positive adjustment in adolescents, including higher academic achievement and lower levels of internalizing and externalizing problems (DuBois et al., 1998; Haney & Durlak, 1998; Zimmerman et al., 1997). *Self-concept* is typically seen as a cognitive representation of the self, or perceptions of one's personal and interpersonal characteristics (Haney & Durlak, 1998). Although there is no single definition or understanding of self-concept, self-concept is increasingly seen to be multidimensional in nature, incorporating elements of self-evaluation in specific domains, such as the school, peer, and athletic contexts (Harter, 1990; Harter, Bresnick, Bouchey, & Whitesell, 1997).

Self-system is a term recently used to describe in a broad sense the many elements of adolescents' representations of self, including self-esteem, perceived self-efficacy, possible selves, standards for self, values, and motivations (DuBois & Hirsch, 2000; Harter et al., 1997). There is no question that adolescents' positive self-attributions and closer connections

between their multiple actual and ideal selves are linked with positive developmental outcomes (DuBois & Hirsch, 2000; Harter et al., 1997). With respect to *identity* development, the establishment of a stable sense of identity (the integration of a coherent sense of self that persists over time) is a key developmental task of adolescence (Erikson, 1968; Harter, 1990). Identity formation requires not only the consolidation of self-attributes into an organized system but also the integration of self with societal roles (Harter, 1990).

Haviland, Davidson, Ruetsch, Gebelt, and Lancelot (1994) have argued that emotion is a central part of identity structures, with adolescents' self-descriptions varying in the extent to which positive and negative emotions are represented. Thus, constructs such as self-esteem, self-concept, and identity fall under the general rubric of the self-system and speak to the issue of successful emotional regulation.

Psychosocial Maturity

Indicators of emotional well-being are also a key feature of psychosocial maturity, as defined by Greenberger and colleagues (Greenberger, Josselson, Knerr, & Knerr, 1975; Greenberger & Sørenson, 1974). This model encompasses three major domains of development, each consisting of multiple dimensions, which must be fostered if the child is to become a productive adult. The first domain is *autonomy,* or the individual's ability to function independently. The achievement of autonomy is characterized by self-reliance (the capacity to take initiative and to have a sense of control over one's life and activities), identity (a coherent self-concept, complete with life goals and internalized values), and work orientation (standards for competence and taking pleasure in work). The second domain is *interpersonal adequacy,* or the individual's ability to communicate and interact well with others. This requires effective communication skills, such as empathy and the ability to understand and receive messages, a sense of trust in others, and knowledge of role-appropriate behavior. The third domain of psychosocial maturity is *social responsibility,* or the individual's capacity to contribute to the well-being of society. This involves a sense of social commitment to the good of the community, an openness to social and political change to achieve higher order goals, and a tolerance and acceptance of individual and cultural differences (Greenberger & Sørenson, 1974). It is easy to observe that specific indicators of emotional well-being (e.g., social competence, attachment to parents and peers, school engagement, strong ego development, and a coherent identity) overlap with elements in this model of psychosocial maturity.

Aside from the fact that various indicators of emotional well-being are contained within larger models of the self and of psychosocial maturity, how can the diverse array of constructs, such as school engagement, self-esteem, identity, positive mood, and attachment to parents and peers, be indicators of "emotional" well-being? What do they have in common? According to Cole et al. (1994), children have a number of emotion-based developmental tasks that they must accomplish, including tolerance for frustration, establishing and enjoying friendships, defending the self, and acquiring interest in learning. In adolescence, major developmental tasks are to search for and establish an identity, pursue and succeed in intimate friendships, accept responsibility for oneself, and prepare for an education and career (Arnett, 2000). Cole et al. argued that the accomplishment of tasks such as these involves the ability to regulate emotions. Emotional regulation, therefore, is a tie that links together and perhaps underlies constructs such as self-esteem, mood, school engagement, identity, social competence, and feelings about parents and peers.

The importance of emotion regulation to the basic task of maturing and becoming an adult is recognizable in adolescents' descriptions of what it means to be "grown up." In a qualitative study (Tilton-Weaver, Vitunski, & Galambos, 2001) examining adolescents' implicit theories of maturity, sixth- and ninth-grade adolescents were told, "Please think of *someone your age* who seems more 'grown up' than most other kids (do not name him or her). What are some words that describe the ways in which this person seems grown up?" Half of the adolescents described what appeared to be genuinely mature adolescents. Incorporated into these adolescents' rich descriptions of genuine maturity were behaviors indicative of emotional regulation: "Doesn't let anger get in the way of good judgment," "if someone wants to fight him, he just walks away," "they are very calm, are helpful, do not get agitated easily," "can control and explain his feelings," and "he talks about feelings instead of hiding them." Not only was control of one's own emotions important in their descriptions of genuinely mature adolescents, but so was the ability to deal with others' strong emotions, as in this description of a peacemaker: "she is very calm when people are fighting, she tries to break it up or get them back together." Tolerance is another feeling that came across in these adolescents' descriptions: "Respects others' feelings, opinions, decisions, character" and "the person doesn't judge people by what they look like . . . which I think is good." Emotion regulation may not be the only hallmark of psychosocial maturity, but it is an important one.

Indicators of Emotion Dysregulation

The construct of emotion regulation not only unites the literature on emotional well-being just reviewed, but it also is central to the study of emotional distress. Emotion-related

symptoms are a defining feature of most categories of psychopathology, and the development of emotion regulation is an implied goal of most psychological treatments (Cole et al., 1994). Emotion dysregulation refers to strategies that individuals use to cope with emotions that are maladaptive, such as restricted or inflexible emotional responding (Cole et al., 1994). Examples of emotion dysregulation include not having access to a full range of emotions, an inability to modulate the intensity or duration of emotions, not conforming to cultural display rules for emotions, an inability to integrate mixed emotions, and an inability to think and talk about emotions (Cole et al., 1994).

Emotion dysregulation is not the same as an absence of regulation; dysregulated emotions such as anger or withdrawal serve some adaptive purpose in the short term even though they may interfere with optimal development in the long term (Cole et al., 1994). However, dysregulated emotional styles are considered a vulnerability because maladaptive short-term strategies may become characteristic coping styles and develop into internalizing or externalizing disorders over time (Calkins, 1994; Cole et al., 1994).

Much research into adolescent emotional development has focused implicitly on emotion dysregulation by examining predictors and consequences of internalizing and externalizing disorders. Internalizing problems generally refer to subjective emotions such as depressive feelings and anxiety, whereas externalizing problems refer to more objectively disruptive behaviors such as overt aggressive and antisocial conduct. Although there is a high degree of comorbidity between the two and difficulties such as peer problems and low school motivation may be excluded from the internalizing-externalizing dichotomy (Wångby, Bergman, & Magnusson, 1999), the distinction is still a useful heuristic device for considering maladaptive adjustment patterns in adolescence. Because the development of externalizing problem behaviors is covered elsewhere in this volume (e.g., see chapter by Lerner, Easterbrooks, & Mistry in this volume), we focus our review on the experience of internalizing problems in general and in major depressive disorder (MDD) in particular. An emotion regulation perspective provides a framework for integrating the diverse theoretical orientations related to the experience of depression (see Gross & Muñoz, 1995, for a review).

The Emergence of Internalizing Disorders During Adolescence

Adolescence has traditionally been viewed as a time of increased negative emotions and emotional lability (Arnett, 1999). Reviews of adolescent depression indicate that adolescents report depressed mood at a higher rate than do preadolescents or adults (Petersen et al., 1993). Longitudinal studies of emotion development consistently find that negative affect increases from preadolescence to adolescence (Buchanan et al., 1992) and that depressed mood increases in early adolescence and decreases around late adolescence (Chen, Mechanic, & Hansell, 1998).

Epidemiological studies of the incidence of formal psychiatric disorders also point to adolescence as a time of increased emotional distress relative to later points in the life span. For instance, in the U.S. National Comorbidity Study, the 12-month prevalence of psychiatric disorders was highest in the youngest cohort (ages 15–24 years; Kessler et al., 1994). Similarly, Canada's National Population Health Survey found that major depressive episodes were highest in women ages 12 to 24 compared to males and older women (Beaudet, 1999).

Generally, the point prevalence of psychiatric disturbance in adolescence is about 1 in 4 or 5 (Casper, Belanoff, & Offer, 1996; Offer, Ostrov, Howard, & Atkinson, 1992). Newman et al. (1996) interviewed almost 1,000 adolescents five times over a 10-year period in a nonselected cohort in New Zealand. They found that internalizing disorders were among the most prevalent diagnoses. For instance, at age 21, 16.8% of the sample was diagnosed with MDD. Significantly, they found a sharp increase in depressive disorders during mid- to late adolescence (ages 15 to 18), which suggests that this may be a critical time for studying vulnerability to depression (Hankin et al., 1998).

Similar increases in the rate of depression during adolescence were found in the Oregon Adolescent Depression Project, a longitudinal study of over 1,700 adolescents (Lewinsohn, Rohde, & Seeley, 1998). In this study approximately 28% of adolescents had experienced an episode of MDD by age 19, with a mean age of onset of 14.9 years. Almost half (43%) of adolescents with MDD had a comorbid diagnosis, and in 80% of the cases the MDD was secondary to the comorbid condition. An important finding was that subthreshold levels of depressive symptoms were associated with almost as much psychosocial impairment as clinical levels of depression.

Gender Differences in Internalizing Disorders

Studies of both nonclinical levels of depressed and anxious mood, as well as studies of clinical levels of depression, all report higher rates of distress for females compared with males in adolescence (Chen et al., 1998; Leadbeater, Kuperminc, Blatt, & Hertzog, 1999; Nolen-Hoeksema, 1994). Prospective longitudinal studies indicate that internalizing symptoms remain high or increase for females, whereas they remain

at relatively lower levels for males across adolescence (Leadbeater et al., 1999; Scaramella, Conger, & Simons, 1999). Gender differences in clinical levels of depression follow similar patterns. Gender differences in MDD are nonexistent in preadolescence, first emerge in early adolescence (ages 12–14), and increase dramatically in middle to late adolescence (ages 15–18; Hankin et al., 1998; Lewinsohn et al., 1998). By midadolescence the prevalence of MDD among females is more than double that of males; by age 18 approximately 11% of males compared with 24% of females are diagnosed with depression (Hankin et al., 1998; Lewinsohn et al., 1998).

Several explanations for these gender differences have been proposed. According to Nolen-Hoeksema (1994), gender differences in the emotion regulation strategies that males and females use to cope with distress partially account for differential rates of depression. In particular, she argued that females tend to employ passive, ruminative coping styles that place them at greater risk for depression compared with the more active and distracting coping styles of males. Other factors that may be related to gender differences in depression are adolescents' self-representations. For instance, females report lower levels of self-competence than males, and these differences partially account for differences in symptoms of depression and anxiety (Ohannessian, Lerner, Lerner, & von Eye, 1999). In addition, females show more preoccupation with relationships, threats of abandonment, and loss of nurturing compared with males, and these interpersonal vulnerabilities are associated with increased internalizing symptoms (Leadbeater et al., 1999). In general, the quality of relationships with parents and peers shows a stronger relationship to internalizing symptoms in females than males (Leadbeater et al., 1999), and females may feel more pressure to conform to the expectations of parents and peers (Nolen-Hoeksema, 1994). Finally, gender differences in the experience of depression may be related to the finding that females experience greater stress during adolescence (Nolen-Hoeksema, 1994). For instance, the changes in body shape and size that females experience during puberty are generally unwelcome, whereas the pubertal changes to male body shape and size are generally valued. In addition, females experience dramatically greater rates of sexual abuse in early adolescence compared with males, which is associated with elevated rates of depression.

Predictors and Correlates of Internalizing Disorders

Depressed mood has been associated with poor school motivation and performance, marital discord and family conflict, the experience of stressful life events, low popularity, and, for females, both early- and late-onset puberty (Leadbeater et al., 1999; Lewinsohn et al., 1998; Petersen et al., 1993; Roeser, Eccles, & Sameroff, 1998). Many studies highlight the importance of the interpersonal context of adolescent depressive disorders. For instance, the quality of attachment between parents and adolescents plays a role in internalizing adjustment problems. Adolescents with secure attachments experience fewer symptoms of depression and anxiety, whereas adolescents with preoccupied, anxious, or avoidant attachment relationships experience relatively more psychological distress (Allen et al., 1998; Cooper, Shaver, & Collins, 1998; Marton & Maharaj, 1993; Noom, Dekovic, & Meeus, 1999). Furthermore, interactions in families with a depressed adolescent are observed to be less cohesive and supportive compared with families with well-adjusted adolescents (Sheeber & Sorensen, 1998). In addition, inept and inadequate parenting, characterized by less warmth and acceptance, more hostility, greater psychological control, and less consistent discipline, is associated with increased risk for internalizing symptoms and clinical depression across adolescence (Conger, Conger, & Scaramella, 1997; Ge, Conger, Lorenz, & Simons, 1994; Marton & Maharaj, 1993; Scaramella et al., 1999). For males, greater psychological control by siblings is also associated with increases in internalizing symptoms over time (K. Conger et al., 1997).

These disruptions in parenting and parent-adolescent relationships may affect depressive symptoms through their effects on adolescents' self-representations. For instance, lower maternal acceptance and greater psychological control are associated with lower levels of self-worth, which in turn are associated with elevated levels of depression (Garber, Robinson, & Valentiner, 1997). Similarly, disrupted parent-adolescent relationships (i.e., separation-individuation conflicts, parental rejection, or excessive dependency) are associated with greater self-critical and interpersonal vulnerabilities, which in turn are associated with increased depressed mood (Frank, Poorman, Van Egeren, & Field, 1997). Other intrapsychic variables, such as lower levels of attitudinal and emotional autonomy (Noom et al., 1999) and greater self-awareness (Chen et al., 1998), are also associated with increased depressed mood.

PERSONALITY DEVELOPMENT

Much of what we know about personality development is actually based on research with either young children or adults. These have been largely disconnected lines of inquiry

with a long history of research on young children devoted to studying temperament and a great deal of research on adults examining personality. These separate lines of inquiry are now being joined as researchers attempt to understand the overlap and the connections between temperament in childhood and personality in adulthood (Sanson & Rothbart, 1995). As the transition period between childhood and adulthood, adolescence is perhaps an ideal time for considering personality and temperament. In research on adolescent personality and temperament, several key issues have been identified. These issues include (a) the core structure of personality, (b) the origins of personality, (c) continuity in personality across the life span, and (d) the fit between temperament/personality dimensions and the social context. These issues as they pertain to research on adolescence are elaborated in this section.

The Structure of Personality

The search for core features of personality has a long history. In personality research across the twentieth century, a myriad of personality traits has been identified, measured, examined, and linked to each other as well as to the individual's psychosocial adjustment. Given the large array of possible personality constructs, the search for a taxonomy, or descriptive model, of core personality traits has occupied the efforts of many researchers, particularly those examining personality in adults (John, 1990). One taxonomy, the *Big Five,* is a comprehensive model consisting of five broad personality traits or factors under which most if not all other descriptors of personality are subsumed (Goldberg, 1993). This model is based largely on clusters of adjectives that people use to describe themselves. The five factors and examples of adjectives attached to these factors are Extroversion (assertive, enthusiastic, outgoing), Agreeableness (generous, kind, sympathetic), Conscientiousness (organized, planful, responsible), Neuroticism (anxious, self-pitying), and Openness/Intellect (curious, imaginative, wide interests; Caspi, 1998; Goldberg, 1993; John, 1990). Growing support for the Big Five as a meaningful framework for understanding personality dispositions has emerged over the years. This support is based on accumulating empirical evidence that the five-factor structure is robust across many studies and cultures and that it can be used to predict behaviors such as job performance (Goldberg, 1993; McCrae et al., 1999). Nevertheless, there are other models of personality structure, some with two or three factors and some with many more (Church, 1994; Eysenck, 1992; Goldberg, 1993).

Given that most research on the Big Five has been conducted on samples of adults, an important question has been whether these five factors describe the personality structures of children and adolescents. Studies examining this issue in American and Dutch samples have appeared in the last decade, with a five-factor model finding support in samples of individuals ranging in age from early childhood through adolescence, including girls and boys (Digman, 1989; Graziano & Ward, 1992; Havill, Allen, Halverson, & Kohnstamm, 1994; Kohnstamm, Halverson, Havill, & Mervielde, 1996; van Lieshout & Haselager, 1994). One study of 12- to 13-year-old African American and Caucasian boys, rated by their mothers on a set of personality characteristics, found evidence that the Big Five replicated in this ethnically diverse sample (John, Caspi, Robins, Moffitt, & Stouthamer-Loeber, 1994). The results were suggestive also of two additional dimensions of personality at this age: irritability (whines, feelings are easily hurt, has tantrums) and positive activity (energetic, physically active). This research also found that the five factors were linked differentially with indicators of adolescents' emotional well-being. For example, adolescent boys with externalizing problems were less agreeable, less conscientious, and more extroverted than were those not showing externalizing behavior. Boys with internalizing disorders were high on neuroticism and low on conscientiousness. Poorer school performance was seen among boys who scored lower on conscientiousness and lower on openness (e.g., curiosity).

There are several advantages to identifying a comprehensive model of personality. If researchers agree on and measure the same set of core dimensions of personality in their research, the results of their studies are more directly comparable. Essentially, acceptance of a model such as the Big Five ensures that researchers are speaking the same language. A body of research based on a similarly shared understanding of constructs can lead to clearer and more integrated knowledge of the origins, course of development, and implications of personality (John, 1990). Without a common set of constructs that can be measured across the life span, it is more difficult to draw conclusions about how personality develops from infancy through adulthood—a key question in developmental psychology. The field of research on adolescence generally has not been driven by such a model. Rather, there is wide diversity in the personality constructs that have been measured in research on adolescence. Typically, selected personality traits such as self-restraint, aggression, and sensation seeking have been measured, often in isolation from other personality characteristics (Shiner, 1998). These selected characteristics are then related to individual differences in adolescent behaviors such as risk taking, early childbearing, and delinquency

(e.g., Black, Ricardo, & Stanton, 1997; Feldman & Weinberger, 1994; Underwood, Kupersmidt, & Coie, 1996). The Big Five is a promising model that could be used by researchers of adolescent development as a way to understand links between adolescents' personalities and their behaviors and emotional well-being.

The Origins of Personality in Temperament

Whereas the study of personality has been located largely in the empirical literature on adults, the study of temperament has been confined mostly to infants and children (for exceptions, see Tubman & Windle, 1995; Wills, DuHamel, & Vaccaro, 1995; Windle, 1992). Only recently has research on personality and temperament begun to be integrated (Sanson & Rothbart, 1995). Although researchers concur neither on a single definition of temperament nor on a core set of temperamental dimensions, it is generally assumed that a child's temperament is composed of multiple behavioral attributes present at birth (Kagan, 1998). Moreover, there is purported evidence from twin and adoption studies of a substantial genetic influence on temperamental and personality attributes in childhood and adolescence, although there are nonshared environmental influences as well (Braungart, Plomin, DeFries, & Fulker, 1992; Caspi, 1998; Rowe, Almeida, & Jacobson, 1999; Saudino, McGuire, Reiss, Hetherington, & Plomin, 1995). Many authors believe that temperament forms the substrate of personality. Specifically, through the influence of the child's increasing capacities and interactions with the environment, temperament evolves or becomes elaborated across childhood into a set of differentiated personality traits (Caspi, 1998; Goldsmith et al., 1987; Sanson & Rothbart, 1995; Shiner, 1998).

The modern study of temperament began with the classic work of Thomas and Chess (1977; see also Chess & Thomas, 1999), who followed a group of infants into adulthood. Based on observations of the behavioral styles of these infants, Thomas and Chess identified nine dimensions of temperament along which infants varied. Among these dimensions were activity level, adaptability, intensity of reaction, quality of mood, rhythmicity, and approach. Thomas and Chess also classified children as having "difficult" or "easy" temperaments on the basis of their patterns on a select set of temperamental dimensions. Their pioneering work recognized that early individual differences in temperament were an influential source of individual differences in parent-child relations and in later emotional well-being.

Other models of temperament followed, most of which identified several core dimensions of temperament (Buss & Plomin, 1984; Goldsmith & Campos, 1986; Rothbart & Derryberry, 1981). For instance, Buss and Plomin's (1984) *EAS model* identified Emotionality (primarily negative emotions), Activity, and Sociability as basic dimensions of temperament. Rothbart and Derryberry (1981) defined temperament as individual differences in two broad dimensions: reactivity to internal and external stimulation (or the arousability of one's behavioral, emotional, and biological responses) and self-regulation (or processes such as attention, approach, withdrawal, and self-soothing that modulate reactivity). Models of temperament have undergone modifications and development as research has accumulated (Buss & Plomin, 1984; Windle & Lerner, 1986). Rothbart and colleagues have reported that across a number of studies from early childhood to adulthood, three broad factors of temperament emerge (Ahadi & Rothbart, 1994; Capaldi & Rothbart, 1992; Sanson & Rothbart, 1995). The first, labeled Positive Emotionality, Surgency, or Sociability, is captured by higher scores on approach, high-intensity pleasure, and activity subscales. The second, labeled Negative Emotionality or Affectivity, is based on feelings of fear, anger, discomfort, and sadness. A third factor, called Effortful Control or Persistence, is defined by inhibitory control, attentional focusing, low-intensity pleasure, and perceptual sensitivity.

Generally, personality is seen to be broader and more differentiated than temperament, with personality incorporating behavior, motives, emotions, attitudes, and values (Digman, 1994). Because early-emerging temperamental characteristics are believed to mature and become elaborated over time into distinct personality traits (Caspi, 1998), researchers have attempted to delineate how dimensions of temperament converge with the Big Five personality dimensions (Halverson, Kohnstramm, & Martin, 1994). Interestingly, the three factors of Positive Emotionality, Negative Emotionality, and Effortful Control appear to map onto three of the Big Five personality dimensions. Specifically, Positive Emotionality maps onto the Extroversion personality dimension in the Big Five, Negative Emotionality maps onto Neuroticism, and Effortful Control maps onto Conscientiousness (Ahadi & Rothbart, 1994; Sanson & Rothbart, 1995). Other scholars, too, have pointed to the overlap between early emerging dimensions of temperament and adolescent and adult personality structure (Caspi, 1998; Digman, 1994; John et al., 1994; Shiner, 1998).

Continuity in Temperament and Personality

The assumption that temperamental attributes present in childhood are predictive of later temperamental or personality

attributes leads us to ask whether there is continuity in these attributes—a question that can only be answered with longitudinal studies following the same individuals from childhood to adulthood. Such studies have examined stability coefficients, that is, correlations between specific temperamental attributes in infancy or childhood and those same aspects of temperament at a later point. Earlier studies of temperamental stability indicated only moderate stability across time, but more recent studies that have controlled for conceptual and methodological problems show relatively high stabilities (in the .70s to .80s) in temperamental characteristics such as sociability and irritability from infancy to age 7 or 8 years (Pedlow, Sanson, Prior, & Oberklaid, 1993; Sanson & Rothbart, 1995). Thus, there is evidence for continuity in temperamental characteristics, although there is also room for change.

Insight into the issue of continuity is also gained by examining how early temperament is linked with later personality traits. One study, conducted in New Zealand, followed individuals from age 3 to young adulthood (Caspi, 2000; Caspi & Silva, 1995). At the age of 3, analyses identified three replicable groups of children based on ratings of their behavior. These groups were labeled as Undercontrolled (e.g., impulsive), Inhibited (e.g., fearful), and Well Adjusted (e.g., coped well, friendly). At the age of 18, these groups were reassessed for personality traits. There were clear and significant associations between temperamental styles at age 3 and personality at age 18. For example, children who were undercontrolled at age 3 had similar characteristics at age 18: They were characterized as impulsive, danger-seeking, high on negative emotionality, and engaged in conflict with others. Inhibited children became rather cautious as young adults, showing a restrained behavioral style: harm-avoidant, not aggressive, and not interpersonally assertive. Well-adjusted children became normal young adults, showing no extreme scores on any personality dimension.

Thus, this study provided evidence for continuity in behavioral styles from early childhood through adolescence. Moreover, in the longer term the early temperamental characteristics of these children were predictive of a wide variety of aspects of functioning, including the quality of interpersonal relations, the availability of social support, unemployment, psychiatric disorders, and criminal behavior (Caspi, 2000). Other studies, too, demonstrate continuities in temperament and personality characteristics such as behavioral inhibition and shyness (Kagan, 1989; Katainen, Räikkönen, & Keltikangas-Järvinen, 1998). Continuities in personality may result from a kind of snowballing effect in which early temperamental styles create consequences, situations, and interactions with others that serve to reinforce natural tendencies (Caspi & Silva, 1995).

The Goodness-of-Fit Model of Temperament

Even though there are clear links between one's early personality and later functioning, some authors assert that the import of temperament is best understood by examining the context in which it takes place. A goodness-of-fit model of temperament posits that the impact of children's temperament on their development is a function of how well their temperamental characteristics fit the demands of the social context (Chess & Thomas, 1999; Thomas & Chess, 1977). When the child's temperament matches those demands, there is a greater likelihood that social interactions will be favorable to the child's development. A poor fit, however, may jeopardize his or her social interactions and subsequent psychosocial adjustment (Chess & Thomas, 1999; Lerner & Lerner, 1983; Nitz, Lerner, Lerner, & Talwar, 1988; Talwar, Nitz, & Lerner, 1990; Thomas & Chess, 1977). In one study (East et al., 1992), young adolescents' fit with their peer group was measured by assessing the difference between adolescents' own temperamental characteristics and their classroom peers' judgments of preferred temperamental characteristics in classmates. These difference or fit scores were then correlated with measures of adolescents' psychosocial competence. As expected, the adolescent's fit with peer group demands for particular temperamental attributes was linked with a variety of measures. For instance, adolescents whose characteristics of adaptability (mood, flexibility, and approach behaviors) matched their peers' demands for adaptability received favorable nominations from peers on sociometric measures. Fit scores for adaptability and rhythmicity also were linked with self- and teacher-rated psychosocial competence. Moreover, some of the relations between fit and psychosocial competence were found consistently across three times of measurement from the beginning to the end of Grade 6. These findings provide evidence that a closer match between the adolescent's temperament and the social context is linked with more desirable psychosocial functioning.

Goodness-of-Fit in Parent and Adolescent Temperaments

One way to conceptualize adolescents' fit with the social context is to consider how adolescents' and parents' temperaments work together. That is, both members of a parent-adolescent dyad bring to their relationship temperamental characteristics that may be complementary—or that may clash. In this sense, one family member's temperament imposes demands on the other, whose own temperament may not fit with those demands (Kawaguchi, Welsh, Powers, & Rostosky, 1998). For example, an adolescent who is rigid with respect to approaching new situations might have a

more harmonious relationship with a parent who is flexible than with a parent who is equally rigid. Mismatched temperamental styles might eventuate in conflicted or perhaps even hostile relations. Few researchers have examined parent-adolescent relations as a joint function of the temperaments of parents and adolescents, although there are such studies of younger children (Belsky, 1996; Kawaguchi et al., 1998).

In a test of a goodness-of-fit model in parent and adolescent temperaments, Galambos and Turner (1999) examined in 7th-grade adolescents and their parents whether two broad dimensions of parent and adolescent temperaments (i.e., adaptability and activity level) combined or interacted to predict the quality of parent-adolescent relations. There were significant interactions between parent and adolescent dimensions of temperament in the prediction of some aspects of the parent-adolescent relationship. For example, mother-son conflict was highest in dyads comprised of mothers low on adaptability and their low-activity sons. The authors speculated that low activity levels in sons were not interpreted happily by less adaptable mothers who might have expected boys to be highly active (in keeping with sex stereotypes). On the other hand, mother-daughter conflict was highest in dyads in which mothers were less adaptable and daughters were more active. Again, less adaptable mothers may have had difficulties with girls whose patterns of high activity were not in keeping with traditional sex stereotypes of appropriate female behavior. Another set of results demonstrated that the combination of low adaptability in both fathers and daughters was associated with more psychologically controlling behavior in the fathers. Moreover, less adaptable daughters reported higher levels of conflict with their less adaptable fathers than did other daughters. Low adaptability may be a risk factor for less optimal parent-adolescent relations, particularly when found in both members of the parent-adolescent dyad. Although these results were based on correlational data, they are consistent with a goodness-of-fit model. Selected aspects of parent and adolescent temperaments fit better with each other than do others, as indicated by the quality of parent-adolescent relations.

EMERGING TRENDS AND FUTURE DIRECTIONS

In the previous sections we have reviewed contemporary research related to emotional well-being, emotional distress, personality, and temperament during adolescence. In this final section we would like to highlight four emerging areas of investigation in research on emotions and personality in adolescence. These trends include (a) a more explicit focus on indications of optimal emotional adjustment in adolescence, (b) an examination of cultural variations in emotions and personality during adolescence, (c) an integration of temperament into the study of adolescent adjustment, and (d) the increasing use of person approaches to studying emotion and personality.

A Focus on Optimal Development

The first emerging theme in research on adolescents' emotional and personality development is a focus on positive adolescent development (Lerner, Fisher, & Weinberg, 2000; Lerner & Galambos, 1998). Adolescent research has been criticized for focusing too much on adolescent problem behaviors and distress, or defining positive development as the absence of difficulties, rather than focusing explicitly on the development of positive, adaptive qualities (Galambos & Leadbeater, 2000; Larson, 2000; Schulenberg, Maggs, & Hurrelmann, 1997; Wagner, 1996). However, research into healthy adolescent development is emerging. Some of this work identifies the protective factors that enable youth in high-risk environments to reach their full potentials. For example, a review of programs designed to promote healthy youth development (Roth, Brooks-Gunn, Murray, & Foster, 1998) highlights the diverse ways in which communities and schools are working to build strengths among adolescents.

Other research in this area explores the development of specific positive qualities among all adolescents. For instance, Wentzel and McNamara (1999) examined the development of prosocial behaviors among early adolescents. Prosocial behaviors, such as cooperation, sharing, and helping, were assessed through peer nominations. They found that prosocial behaviors are facilitated by feelings of peer acceptance. The role of family support in the development of prosocial behaviors was indirect, mediated by emotional distress. Thus, adolescents who are accepted by their peers and who are able to regulate their emotions effectively may have more opportunities to learn prosocial skills. Larson (2000) focused on the development of initiative during adolescence. He defined initiative as the internal motivation to pursue a challenging goal and saw it as a prerequisite for the development of other positive qualities such as leadership and altruism. Adolescents who display initiative feel invested in and excited about their futures. Larson's research highlights the types of contexts that promote initiative and other positive qualities. These contexts consist of structured extracurricular activities, such as sports or organized hobbies, which provide the intrinsic motivation and concentrated attention that are believed to foster initiative.

In order to examine positive adolescent development systematically, a model or definition of the components of

optimal development is necessary. Lerner et al. (2000) outlined a model of adolescent development in which five broad features of positive adolescent development are identified. These five characteristics include (a) Caring/Compassion (e.g., empathy), (b) Competence (cognitive, behavioral, and social), (c) Character (e.g., integrity), (d) Connection (e.g., positive bonds with others and with society), and (e) Confidence (e.g., self-efficacy). Similarly, Wagner (1996) developed a model of optimal development in adolescence. He defined aspects of optimal development within six domains: Biological, Cognitive, Emotional, Social, Moral, and Vocational. Within the Emotional domain, for example, optimal development is indicated by qualities such as emotional awareness, self-confidence, optimism, and resilience. Such attention to positive adolescent development holds great promise to increase our understanding of the developmental factors and assets that enable adolescents not just to survive but to thrive (Scales, Benson, Leffert, & Blyth, 2000).

Cultural Variations in Emotional and Personality Development

A second theme that is emerging in research on adolescents' emotional and personality development concerns the role of culture and ethnicity in adolescent development. It is beyond the scope of this chapter to review all of the literature on cultural influences and differences in adolescent development. However, here we survey some of the major areas of inquiry.

The past decade has seen increasing interest in examining the emotional well-being of ethnically diverse adolescents (e.g., Luster & McAdoo, 1994; McAdoo, 1993). Among Asian and Asian American adolescents, researchers have investigated indicators of adjustment such as psychosocial competence (Mantzicopoulos & Oh-Hwang, 1998; Sim, 2000), autonomy (Juang, Lerner, McKinney, & von Eye, 1999), and self-esteem (Watkins, Dong, & Xia, 1997), as well as indicators of maladjustment, such as anxiety (Hishinuma, Miyamoto, Nishimura, & Nahalu, 2000), depression (Ying, Lee, Tsai, Yeh, & Huang, 2000), and psychological distress (Chiu, Feldman, & Rosenthal, 1992). Because most theories of emotional development in adolescence were developed based on research with European American participants, research with ethnically diverse participants is necessary to evaluate whether theories of adolescence generalize to other segments of the population. Some of this literature highlights similarities in the predictors of adolescent emotional development across ethnic groups. Using Chinese adolescents as an example, many aspects of positive parenting, such as warm parent-child relationships, firm control, monitoring, and the absence of coercive exchanges, are related to higher levels of adolescent emotional well-being in locations such as Hong Kong (Shek, 1997a, 1997b) and Shanghai (Chen, Dong, & Zhou, 1997; Chen, Liu, & Li, 2000; Chen, Rubin, & Li, 1997). However, within North America the evidence is mixed. Some researchers find similar relationships between parenting and adolescents' emotional adjustment across cultural groups (Greenberger & Chen, 1996; Kim & Ge, 2000), whereas others find that these relationships do not replicate in different cultural groups (e.g., Barrett Singer & Weinstein, 2000) or that the specific domains of adolescent adjustment that are affected vary by cultural group (e.g., Bradley & Corwyn, 2000). An important area for future research is to continue to evaluate whether the cultural context within North America moderates the effects of external factors on adolescent's emotional well-being and distress (e.g., Collins, Maccoby, Steinberg, Hetherington, & Bornstein, 2000).

Research with adolescents from ethnically diverse backgrounds also highlights the need to consider emotional development in a cultural context. For instance, Costigan and Cauce (in press) examined developmental changes in adolescent autonomy and parent-adolescent conflict across adolescence among a sample of African American mothers and daughters. Although past literature has described African American mothers as restrictive or authoritarian, findings from this study suggested that mothers were appropriately selective in their willingness to relinquish control and grant autonomy. For example, mothers retained a higher amount of decision-making authority around important safety-related issues, despite a high level of conflict, whereas they allowed greater adolescent autonomy around personal issues such as hairstyles. These findings illustrate the challenge that African American mothers face in balancing the demands of protecting children while also fostering a sense of competence. For African American families such parenting challenges may be met through the assistance of an extended family network that provides goods, services, and emotional support to its members (McAdoo, 1997). Clearly, how the cultural contexts helps shape adolescents' emotional development merits further attention.

Another way in which culture may affect adolescents' emotional development is by influencing adolescents' tendencies to express different emotions and the strategies used to regulate emotions. Emotions are managed in culture-specific ways (Thompson, 1994). First, there are cultural differences in how adolescents construe emotional events. For example, Liem, Lim, and Liem (2000) argued that the emotional responses of Asian Americans are generally more other oriented, focusing on interdependence, whereas European

Americans are generally more self-oriented, focusing on independence. They find that these self-construals change as a result of acculturation. Second, cultures differ in their expectations for emotional displays (Campos et al., 1994). Chinese parents, for example, view dependency, caution, behavioral inhibition, and self-restraint in children more favorably than do parents in Western cultures (Chen, Rubin, & Li, 1997). Finally, cultures have varying emotional baselines and tolerances for the expression of emotions such as support, disagreement, and disapproval (Stillars, 1995). When there is a higher overall baseline for an emotion, there is also a greater tolerance for its expression, so that its expression in any given instance carries less impact. Alternatively, the impact of expressing an emotion for which there is less tolerance is accentuated (Stillars, 1995). This may be one mechanism by which culture moderates the effects of external events, such as parenting, on adolescent adjustment. For example, if lower levels of emotional expressiveness are more normative in Chinese culture, then Chinese parents may not be experienced as less warm by their children (e.g., Chao, 1994). In comparison with Western adolescents, an objectively lower amount of warmth may need to be present before the Chinese adolescents experience it as such.

A consideration of cultural influences also highlights culture-specific predictors of emotional well-being and culture-specific domains of emotional development. For example, for African American adolescents, perceptions of differential treatment based on race are associated with increases in depression and anger over time (Roeser et al., 1998). Furthermore, issues such as family obligations (e.g., Fuligni, Tseng, & Lam, 1999), parental respect (e.g., Chao, 2000), intergenerational value discrepancies (e.g., Phinney, Ong, & Madden, 2000), and acculturative stress are important constructs to examine in order to gain a full understanding of the emotional adjustment of immigrant and minority adolescents (e.g., Fuertes & Westbrook, 1996; Hovey & King, 1996; Kwan & Sodowsky, 1997; Thompson, Anderson, & Bakeman, 2000).

Perhaps the most salient culture-specific domain of emotional adjustment for ethnically diverse adolescents is ethnic identity. Ethnic identity is an important component of overall identity formation, and adolescence is a crucial time for ethnic identity exploration and commitment (Phinney, 1992). Spencer and colleagues (Spencer, Dupree, & Hartmann, 1997) proposed a phenomenological variant of ecological systems theory (PVEST) model to explain the development of stable identities (including ethnic identity) and other aspects of healthy youth development. This model suggests that ethnic identity formation results from an interaction between the stressors that youths encounter in daily life and the subjective understanding or meaning that adolescents ascribe to these experiences.

Ethnic identity is comprised of two primary factors: ethnic identification (e.g., pride in one's ethnic group) and exploration (e.g., trying to find out more about one's ethnic group; Spencer, Icard, Harachi, Catalano, & Oxford, 2000). Adolescence is a key time for ethnic identity development because of advancing cognitive abilities as well as specific ethnic socialization experiences (Quintana, Castañeda-English, & Ybarra, 1999; Spencer et al., 1997). The salience of ethnic identity changes with changes in context, such as moving to a location where one is a minority member (Ichiyama, McQuarrie, & Ching, 1996). However, greater acculturation to a host culture does not necessarily mean a decrease in ethnic identification (Liu, Pope-Davis, Nevitt, & Toporek, 1999). Finally, ethnic identity has implications for adolescents' emotional well-being. In general, a stronger sense of one's ethnic identity is related to higher feelings of self-esteem (Gray-Little & Hafdahl, 2000; Phinney, Cantu, & Kurtz, 1997; Phinney & Chavira, 1992) and self-efficacy (Smith, Walker, Fields, Brookins, & Seay, 1999). However, the relationship between ethnic identity and psychological adjustment is not always consistent and may depend on other factors such as one's identification with the host culture and the ethnic density of one's community (Eyou, Adair, & Dixon, 2000; McAdoo, 1993).

Integration of Temperament Into the Study of Adolescent Adjustment

A third emerging theme in research on adolescents' emotional and personality development concerns integrating the role of temperament into models of adolescent adjustment. Research in this area has accelerated as the construct of emotion regulation has gained prominence in the study of adolescent development. The first step in integrating temperament into this research is to differentiate temperament from related constructs such as mood and emotion regulation. For instance, as outlined by Kagan (1994), the concept of emotion has been used to refer to acute and temporary changes in feeling, more permanent affective states that endure over years, and temperamentally based predispositions to react to events in certain ways. Kagan argues that we need to distinguish between chronic mood states and temperamental characteristics. Individuals with various temperaments differ in the ease with which they experience different emotions, and the emotions experienced may be qualitatively different. Indeed, Kagan (1998) concluded that variation in temperamental characteristics helps to explain why some children do not experience trauma-related symptoms even in the face of major stressors such as kidnapping or divorce. Rothbart and Bates (1998)

proposed a number of possible models of the direct, indirect, and interactive effects of multiple temperamental traits on multiple adjustment indicators. Their explication of such linkages provides an abundance of possible processes that can and should be investigated.

Furthermore, we need to differentiate between temperament and emotion regulation skills (Underwood, 1997). Temperament affects the intensity of emotional experience. As a result, an individual who experiences emotions more intensely faces a greater challenge in emotion regulation. Similarly, individuals with different temperaments experience different levels of arousability. Because of differences in arousability, it is difficult to determine whether an adolescent who is apparently effectively managing an emotionally challenging situation is superior at emotion regulation compared with an adolescent who is having more difficulty, or whether that adolescent is simply less reactive (Kagan, 1994). Future research needs to distinguish purposeful emotion regulation from low arousability.

The concept of emotion regulation highlights the role of temperament in socialization processes (e.g., Contreras et al., 2000). Much attention has been directed at the environmental antecedents of different emotional states, positive and negative. For instance, as reviewed earlier, parenting behaviors influence the development of adaptive emotion regulation, such as self-esteem and psychosocial maturity, as well as dysregulated emotions such as depression. However, adolescent adjustment and maladjustment are affected not only by an interpersonal environment that encourages or discourages certain qualities, but also by a person's temperamental dispositions (Kagan, 1994). Future research needs to assess how temperament and socialization work together to influence the development of emotion regulation (Underwood, 1997).

Different models for considering both temperament and socialization in adolescent adjustment are emerging. For instance, Calkins (1994) integrated research on the developmental consequences of temperament and parenting styles in her model of the development of social competence in childhood. She examines the relative contributions of internal and external sources of individual differences in emotion regulation. Internal factors include temperamental characteristics such as physiological regulation (e.g., heart rate) and behavioral tendencies (e.g., soothability, reactivity). External factors include parents' explicit training in emotion regulation skills as well as more global parenting styles (e.g., responsiveness, control). In this model, these internal and external factors independently influence a child's emotion regulation style, which in turn affects subsequent interpersonal functioning such as relationships with peers (Calkins, 1994).

Other models highlight the transactional, bidirectional relationship between temperament and socialization (Collins et al., 2000; Wills et al., 1995). Reciprocal models of parent and child effects (e.g., Bell & Chapman, 1986) are not new to the study of child development. These models consider not only how parenting practices affect child development but also how children's behavioral qualities affect the type of parenting they receive. Some of the research in this area has focused specifically on temperament. For instance, children with impulsive and irritable temperaments elicit more negative parenting than do children with less difficult temperaments (Dix, 1991). A longitudinal study found that parental punitive reactions to children's negative emotions at ages 6 to 8 were linked to increases in these children's problem behaviors and negative emotions by early adolescence (ages 10 to 12; Eisenberg et al., 1999). Such bidirectional models are rare, but much needed, in the study of emotions and socialization in adolescence.

Another model of how temperament can be integrated into studies of adolescent adjustment is emerging from research demonstrating how temperamental traits affect adolescents' susceptibility to parenting and other external events (e.g., Colder, Lochman, & Wells, 1997). What might promote positive adjustment for one adolescent, or most adolescents, may be relatively ineffective with other adolescents. In childhood, evidence is accumulating that different children may require and respond to different levels of structure and support based on their temperamental characteristics (e.g., Belsky, Hsieh, & Crnic, 1998). For example, a hyperactive child may respond well to the type of strict limit setting that would stifle the competence of a shy child. Thus, temperament may moderate the association between parenting practices and adolescent adjustment.

Recent work with youth in late childhood and early adolescence examines these models. For instance, Lengua and colleagues (Lengua & Sandler, 1996; Lengua, Wolchik, Sandler, & West, 2000) have examined the role of temperament in early adolescents' adaptation to parental divorce. In one study the temperamental trait of approach-flexibility (one's orientation toward change and new situations) moderated relationships between adolescents' coping styles and their psychological symptoms. In particular, active coping strategies were related to less anxiety for adolescents with flexible temperaments but was unrelated to adjustment for adolescents with less flexible temperaments. Avoidant coping styles were related to greater anxiety and conduct problems for adolescents with less flexible temperaments but were unrelated to adjustment for adolescents with more flexible temperaments. Thus, certain temperamental styles appear to be protective.

In another study of adolescent adjustment to parental divorce, Lengua et al. (2000) found that early adolescents' temperaments moderated the relationship between parenting practices and their psychological adjustment. Specifically, they found that inconsistent discipline and parental rejection were related to adolescent depression only for adolescents with more difficult temperaments (high on impulsivity and low on positive emotionality). Similarly, inconsistent discipline and parental rejection were related to conduct problems for adolescents low in positive emotionality and high on impulsivity. These parenting styles were unrelated to conduct problems for adolescents with easier temperaments (high on positive emotionality and low on impulsivity).

Finally, in a sample of fourth- and fifth-grade boys, Colder et al. (1997) found that temperament (i.e., fear and activity levels) moderated the relationship between parenting behaviors and children's adjustment. For example, harsh parenting was related to high levels of aggression only for boys with highly fearful temperaments, and poor parental monitoring was related to higher levels of aggression only for boys with highly active temperaments. In addition, both harsh parenting and overinvolved parenting were related to greater symptoms of depression only for boys with highly fearful temperaments.

Overall, the previous studies illustrate some of the challenges faced by researchers who wish to incorporate adolescent temperament into the study of adolescent adjustment, as well as some of the theoretical models that are being used to study these effects. Future research that continues to integrate temperament will likely lead to important advances in our understanding of how to promote healthy adolescent adjustment.

Person Approaches to Understanding Emotion and Personality

A fourth emerging theme is captured by the increasing number of empirical studies of adolescent emotional and personality development that are based on person (or pattern) approaches (e.g., Caspi, 2000; Salmivalli, 1998; Schulenberg, Wadsworth, O'Malley, Bachman, & Johnston, 1996). The person approach considers individuals in a holistic manner, as organisms consisting of multiple attributes (e.g., cognitive, biological, behavioral) that are integrated into an organized system (Block, 1971; Magnusson & Törestad, 1993; see also chapter by Kerr, Stattin, & Ferrer-Wreder in this volume). Advocates of the person approach argue that the individual's pattern or profile across a number of indicators (the total configuration of variables) may carry more meaning for understanding that individual's development than do single variables (Magnusson & Cairns, 1996). The person is the unit of analysis, and individuals who share similar profiles are grouped together (Stattin & Magnusson, 1996). These groups may then be compared on other relevant variables and developmental trajectories.

The person approach can be contrasted with the traditional variable approach, on which most research on adolescence is based. The variable approach examines interrelations among single variables, assuming that these interrelations justify inferences about how variables function in individuals (Magnusson & Cairns, 1996). Magnusson and Törestad (1993) argued, however, that the variable approach masks qualitative differences among people and is limited with respect to delineating how variables operate together within subgroups of individuals. Indeed, in a longitudinal study following individuals from childhood to early adulthood, Stattin and Magnusson (1996) showed that more variance in adult externalizing behaviors was explained by the constellation of characteristics present in adolescence (i.e., a combination of the adolescent's involvement in multiple risk behaviors such as truancy and family background risks such as father's alcoholism) rather than by individual predictor variables.

The person approach can be applied to many phenomena in the study of adolescent emotional and personality development. It may be one way to answer the frequent call for more examination and integration of multiple levels of adolescent development, including the biological, psychological, cognitive, and contextual (e.g., Susman, 1997; chapter by Susman, Dorn, & Schiefelbein in this volume).

Consider a recent study by Galambos and Tilton-Weaver (2000). These authors were intrigued by speculation in the literature on psychosocial maturity that some adolescents, rather than being psychosocially mature, were actually pseudomature: They maintained the appearance of maturity through *behavioral* means (e.g., engagement in problem behaviors such as drinking) without showing genuine *psychological* maturity (e.g., a stable sense of identity, self-reliance, and a strong work ethic; Greenberger & Steinberg, 1986). Galambos and Tilton-Weaver were also intrigued by previous findings showing that adolescents who engaged in higher levels of problem behavior also had older *subjective* ages (i.e., they felt older than their chronological ages), indicating a possible mismatch between their subjective levels of maturity and their actual behavior (Galambos, Kolaric, Sears, & Maggs, 1999). Following a person approach, Galambos and Tilton-Weaver hypothesized that pseudomaturity could be defined by high levels of problem behavior, an older subjective age, and low levels of psychological maturity—a constellation of behavioral, psychological, and subjective attributes. Indeed, in a sample of Canadian adolescents ranging in age from 10 to 17, 13%

emerged as pseudomature (high problem behavior, older subjective age, low psychological maturity). There was also a mature cluster (43% of the sample) who were low on problem behavior, felt slightly older than their chronological ages, and scored high on psychological maturity. The final cluster, immature adolescents, comprised 44% of the sample. They reported low levels of problem behavior, were psychologically immature, and felt relatively young.

The three clusters of adolescents who emerged differed in other ways as well (Galambos & Tilton-Weaver, 2000). Compared to the mature and immature adolescents, the pseudomature adolescents were more advanced with respect to pubertal status, reported a stronger desire to be older and to attain adult privileges, were more socially active, and reported more conflict with mothers (among boys). Compared to mature adolescents, immature adolescents reported a stronger desire to be older, more conflict with mothers, and less acceptance from mothers. The authors concluded that both pseudomature and immature adolescents had a poorer fit with their social environments than did the mature adolescents.

This and similar research speak to the advantages of using person approaches to understand the adolescent as a whole person with multiple, interrelated attributes. Some research questions demand that researchers attempt to integrate biological (including hormonal), cognitive, emotional, psychological, and contextual characteristics in seeking to understand adolescents' lifelong development. The person approach is an exciting paradigm that will add much to our accumulating knowledge of emotional and personality development in adolescence.

SUMMARY

In this chapter we highlighted research on adolescents' emotional development, describing emotion regulation as a useful framework for viewing and uniting broad areas of research on emotional well-being and distress. Theory on adolescents' self-systems and their psychosocial maturity were discussed as models that integrate a variety of indicators of adaptive emotion regulation. The general concepts of internalizing and externalizing problems were discussed as indicative of adolescents' emotional distress and reflective of the experience of emotional dysregulation. Given the significant gender difference in the prevalence of internalizing disorders (with more adolescent girls affected), we reviewed recent research on predictors and correlates of internalizing symptoms.

We also reviewed some recent research on personality and temperament in adolescence, identifying major issues in the structure of personality, the origins of personality, and continuity in personality and temperament across time. Recent research shows that the Big Five model of personality, based on years of research with adult samples, replicates in samples of adolescents. Moreover, links have been established between dimensions of temperament in childhood and later personality traits. The goodness-of-fit model of temperament was reviewed as a way of understanding how temperament may be shaped, viewed, and responded to differently depending on the social context.

Finally, we identified four exciting themes in recent research on emotion and personality development. The first is a focus on adolescents' optimal development, with a call for better measurement of successful outcomes. The second refers to cultural variations in emotional and personality development, a trend that has burgeoned over the last several years. The third theme involves studies that integrate knowledge of temperament into studies of adolescent adjustment, focusing on the role that temperament may play in emotional expression and regulation. The fourth emerging theme involves increasing interest in conducting studies of adolescents' emotional and personality development from a person approach, which considers intra-individual constellations of multiple attributes in the search for understanding developmental trajectories.

Knowledge emerging from research on these themes has potentially important implications for the targeting, design, and effectiveness of prevention and intervention programs. The identification of emotion regulation as a salient marker of positive youth development means that school- and community-based programs can be designed to help young people regulate and cope with their emotions. Emotion regulation is a strength that consists of a set of skills and strategies, and this asset can be acquired. Teaching effective emotion regulation fits with the goals of prevention programs designed to promote healthy youth development by increasing youth strengths (e.g., Roth et al., 1998).

But do all children and adolescents need training in effective emotion regulation? The research examined here suggests that successful emotion regulation is more of a challenge for some children and adolescents than for others, for example, those with a set of individual risk factors, such as a temperament characterized by negative emotionality and strong reactivity. Thus, in addition to general school- and community-based programs for adolescents at large, some intervention programs could be designed to target at-risk children and adolescents (e.g., those who have been identified as having anger control problems or being easily distressed). If deficits in emotion regulation are caught and addressed early enough, it is likely that the individual will have a more positive developmental trajectory into adulthood.

Prevention and intervention programs should incorporate the important role of parents in promoting positive youth development. Research on the interaction between parenting and temperament is moving toward a clearer understanding of parenting behaviors that are more or less suited to particular temperaments (i.e., goodness of fit). Given the central role of parenting in promoting positive youth development, a wide range of family strengthening and parent-training programs has been developed (for a review, see Kumpfer, 1999). The goals of these programs are to decrease the risk factors associated with developmental problems and increase protective family factors, including supportive parent-child relations. The promotion of emotion regulation strategies and prevention of emotional dysregulation among parents and adolescents could be included as important components of these programs.

In designing effective interventions and social policies, we need to know more about how families, peers, schools, and cultural contexts moderate the relationships among temperament, emotional regulation, and adolescent adjustment. Attention to diverse cultural contexts is particularly important in this regard. For instance, we need to know more about the contexts that promote the achievement of stable ethnic identities, the stressors that challenge ethnic identity development, and the relationship of ethnic identity to other indicators of well being. In addition, we need to identify ways in which models of healthy youth development apply to culturally diverse adolescents (e.g., universal protective factors) and the ways in which they need to be modified to fit unique experiences (e.g., incorporating the experience of racism).

The four emerging themes that we have identified are just beginning to provide the specific empirical knowledge we need to design effective prevention and intervention efforts. To accomplish this, however, it is essential that social policies support (a) the view that the emotion regulation is an issue of health promotion, (b) funding for basic research in the general area of emotion regulation, (c) funding for research and programming that explicitly addresses similarities and differences in the needs and strengths of adolescents from diverse ethnic backgrounds, and (d) funding for applied research that evaluates the effectiveness of prevention and intervention programs designed to increase effective emotion regulation.

As this chapter has shown, researchers have learned a great deal about adolescents' emotional and personality development. The field of research on adolescence is a very active and exciting one, with promising new developments that bring us ever closer to obtaining a more comprehensive understanding of the interacting forces that shape adolescent behavior. With a more complete picture, we will be better able to influence adolescents' lives in ways that will be of benefit to them as they mature into adulthood.

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CHAPTER 15

Positive Behaviors, Problem Behaviors, and Resiliency in Adolescence

DANIEL F. PERKINS AND LYNNE M. BORDEN

RISK BEHAVIORS AND RISK FACTORS 373
TEENAGE SEXUAL ACTIVITY 374
Individual Characteristics 375
Contextual Characteristics 375
ALCOHOL AND SUBSTANCE USE/ABUSE 376
Individual Characteristics 376
Contextual Characteristics 377
DELINQUENCY AND ANTISOCIAL BEHAVIOR 377
Individual Characteristics 378
Contextual Characteristics 379
SCHOOL UNDERACHIEVEMENT AND FAILURE 380
Individual Characteristics 380
Contextual Characteristics 381
CO-OCCURRENCE OF RISK BEHAVIORS 382
RESILIENCY 383
PROTECTIVE FACTORS AND RESILIENCY 385
Models of Protective Factors and Processes 385
Identified Protective Factors 386
Kumpfer's Resiliency Framework 386
FUTURE DIRECTIONS AND CONCLUSIONS 388
REFERENCES 389

Adolescence is a time of life marked by change and rapid development. In fact, few developmental periods are characterized by so many changes at so many different levels as is adolescence. These changes are associated with pubertal development and the emergence of reproductive sexuality; social role redefinitions; cognitive, emotional, and moral development; and school transitions (e.g., Hamburg, 1974; Lerner, 1995; Simmons & Blyth, 1987).

The purpose of this chapter is to examine risk and protective factors within adolescents and their environments and the manifestation of those factors in terms of risk behaviors or resiliency. Presented first is a detailed exploration of four major risk behaviors in adolescents (i.e., teenage sexual activity, alcohol and substance use/abuse, delinquency and antisocial behavior, and school failure) and the risk factors found to be associated with them. The comorbidity of those behaviors and factors is also discussed. The chapter then investigates the beginning of resiliency research and follows the field's development through to its current status and theoretical understanding of resiliency. Also discussed are the empirical findings related to protective factors and their interaction with risk factors. Finally, directions for future research are presented.

We hope that readers will gain a clearer understanding of the factors that enhance positive development and those factors that inhibit positive development. This chapter strives to provide specific attention to the major risks as well as their comorbidity. Understanding risk behaviors forms a foundation that fosters our understanding of the influence of risk behaviors on the developmental trajectory of young people. Moreover, specific attention to major risk behaviors also offers a basis for understanding the importance of multiple ecological influences, multiple constitutional influences, and the interactions that occur between them. These interactions are critical to the overall development of adolescents, both in positive and negative directions. In addition, understanding why so many are able to overcome adversity provides us with some direction in intervention efforts. Clearly, the ability to intervene within contexts that comprise the adolescents' world is essential if we are to create opportunities that will promote the positive development of young people.

RISK BEHAVIORS AND RISK FACTORS

The term *risk behavior* refers to any behaviors or actions that have the potential to compromise the biological and psychosocial aspects of a developmental period. Involvement in risk behaviors jeopardizes several areas of human

development: (a) physical health, physical growth; (b) the accomplishment of normal developmental tasks; (c) the fulfillment of expected social roles; (d) the acquisition of essential skills; (e) the achievement of a sense of adequacy and competence; and (f) the appropriate preparation for the next developmental period of the life span, (i.e., young adulthood for adolescents; e.g., Jessor, Turbin, & Costa, 1998).

The literature provides evidence that risk pertains to the relationship between the individual and the context (e.g., Elliott & Eisdorfer, 1982; Masten, 2001; Werner & Smith, 1992). Moreover, research has found that possession of a particular instance or level of either individual characteristics or embeddedness in a specific context affords different probabilities of experiencing risk (e.g., Dohrenwend, Dohrenwend, Pearlin, Clayton, & Hamburg, 1982; Garbarino, 1994). Risk characteristics refer, then, to those individual and contextual characteristics associated with a decreased likelihood of healthy psychosocial and physical development. Outcome behaviors might include dropping out of high school, delinquency, teen pregnancy, violence, and crime (e.g., Dryfoos, 1990; Masten, 2001; Schorr, 1988); these behaviors may result in outcomes such as unemployability, prolonged welfare dependency, incarceration, and a shortened life span.

Conducting a meta-analysis of the risk behavior research, Dryfoos (1990) found four distinct categories of risk behavior during adolescence: delinquency, crime, and violence; substance use; teenage pregnancy and parenting; and school failure and dropout. Moreover, Irwin and Millstein (1991) provided support for the findings of Dryfoos's research regarding substance use and teenage pregnancy as major risk behaviors.

Social scientists have progressed through several stages in their approach to understanding covariates of risks (e.g., Luthar, Cicchetti, & Becker, 2000; Masten & Coatsworth, 1998; Werner & Smith, 1992). In the initial stage of investigation, researchers emphasized simple bivariate associations, such as a link between factors like low birth weight or a stressful life event (e.g., parental discord) and a single risk behavior (e.g., drug use). Borrowing from the field of epidemiology, several social scientists moved beyond bivariate associations and employed an approach to studying risk behaviors and their covariates that suggested that there are probably many diverse paths that lead to the development of particular risk behaviors (e.g., Irwin & Millstein, 1991; Masten, 2001; Newcomb, Maddahian, Skager, & Bentler, 1987). Indeed, efforts to find a single covariate may not be useful because most behaviors have multiple covariates (e.g., Perry, 2000). Thus, researchers in the social sciences have moved from a bivariate model of risk/vulnerability to a multivariate model, one that emphasizes the possibility of interactions among variables, such as the co-occurrence of parental addiction (e.g., alcoholism), poverty, and youth problem behaviors (e.g., aggression and school problems; e.g., Masten, 2001; Werner & Smith, 1992).

Although there are variations in the definitions of risk, risk factors, and risk behavior correlates, the research on risk behaviors provides support for the presence of associations among certain individual and contextual characteristics with adolescents' involvement in risk behaviors. These two types of characteristics are examined here in terms of their relationship to the above-mentioned four categories of risk behavior specified by Dryfoos (1990): teenage sexual activity, alcohol and substance use/abuse, delinquency and antisocial behavior, and school failure.

TEENAGE SEXUAL ACTIVITY

The 1970s and 1980s saw a steady increase in the number of teenagers in the United States who were sexually active (Child Trends, 2001). However, the most recent trend data from the National Center for Health Statistics show a steady decline in the teen birthrate (Child Trends, 2001). The 2000 rate of 48.7 births per 1,000 females ages 14 to 19 is 22% lower than the 1991 rate of 61/1,000 (Child Trends, 2001). Despite these declines the United States has one of the highest teen birthrates of all the developed countries (Child Trends, 2001). For example, a recent report concerning the incidence of sexual intercourse among adolescents younger than age 15 reported rates ranging from 12% to 55% (Meschke, Bartholomae, & Zentall, 2000). By age 19 there is a marked increase in these rates: 85% of males and 77% of females have had sexual intercourse at least once (Moore, Driscoll, & Lindberg, 1998).

This increase in sexual experimentation during adolescence has been coupled with adolescents' frequent use of contraception. By 1995 three quarters of teens reported using some form of contraception at *first* sex (Abma, 1999). However, youth who are sexually active fail to engage in safe sex (e.g., sex with a condom). Thus, they are more likely to contract AIDS and other sexually transmitted diseases (STDs) and become pregnant during adolescence (Abma, 1999; Meschke et al., 2000). The number of cases of STDs has been increasing since the 1970s, and adolescents account for one quarter of the estimated 12 million cases of STDs that occur annually (e.g., Meschke et al., 2000). Research has further identified the antecedents and correlates of sexual intercourse during the adolescent years, the onset of sexual intercourse, and the use of contraception (e.g., Brooks-Gunn &

Furstenberg, 1989; Catalano, Bergund, Ryan, Lonczak, & Hawkins, 1999; Dryfoos, 1990; Jessor, 1998; Luster & Small, 1994).

Individual Characteristics

Numerous individual characteristics are associated with adolescent sexual activity. Generally, boys have sexual intercourse at an earlier age than girls (e.g., Dryfoos, 1990; Perry, 2000). Timing of pubertal maturation has also been linked to early sexual activity (e.g., Brooks-Gunn & Furstenberg, 1989; Irwin & Millstein, 1991). Not surprisingly, both males and females who undergo maturation earlier than their peers initiate sexual intercourse earlier than their age-related peers (e.g., Brooks-Gunn & Furstenberg, 1989). The earlier the age of initiation, the more likely it is that an adolescent female will become pregnant or contract an STD. Likewise, the earlier the age of initiation, the more likely an adolescent male is to impregnate a female or contract an STD because both are less likely to use any type of contraception (e.g., Luster & Small, 1994; Ozer, Brindis, Millstein, Knopf, & Irwin, 1998; Perry, 2000).

Ethnicity has also been found to be associated with early sexual activity (Irwin & Millstein, 1991). There is a disproportionate representation of African American adolescents who are sexually active and who experience negative outcomes of sexual activity (e.g., teenage pregnancy or STDs; Ozer et al., 1998). On average, African American and Hispanic male adolescents initiate sexual intercourse earlier than their European American counterparts (e.g., Moore et al., 1998; Perkins, Luster, Villarruel, & Small, 1998; Terry & Manlove, 2000). African American females are the most likely to become teen mothers, followed by Latina adolescents and European American adolescents, respectively (e.g., Ozer et al., 1998). It should be noted that ethnicity and socioeconomic status (SES) covary. When ethnicity is controlled statistically, SES remains associated with adolescent sexual activity. Indeed, low SES is associated with earlier onset of sexual activity (e.g., Brooks-Gunn & Furstenberg, 1989; Perry, 2000).

Several studies have found a linkage between low aspirations or poor school performance and early engagement in sexual activity (e.g., Brooks-Gunn & Furstenberg, 1989; Luster & Small, 1994). In addition, adolescents who lack hope and a positive view of the future are more likely to participate earlier in sexual activity than are those who have a positive view of the future (e.g., Dryfoos, 1990; Perry, 2000). Adherence to conventional religious values is associated with decreased sexual initiation and behavior (e.g., Jessor & Jessor, 1977; Perkins et al., 1998). Some evidence suggests that self-esteem is usually not reported as a significant factor associated with sexual activity in adolescence (Luster & Small, 1994; Perkins, 1995). However, Orr, Wilbrandt, Brack, Rauch, and Ingersoll (1989) found gender differences in regard to the linkage between teenage sexual activity and self-esteem. Adolescent males who had high self-esteem also had the highest levels of sexual activity; however, the opposite was true for females (Orr et al., 1989). Moreover, adolescent sexual behavior is generally associated with or often preceded by other risk behaviors, such as alcohol and drug use and truancy (e.g., Irwin & Millstein, 1991; Jessor, 1998; Jessor & Jessor, 1977; Perry, 2000).

Contextual Characteristics

Research has provided evidence for the association between characteristics of the context and engagement in sexual activity. Adolescents who perceive themselves as having parental support (i.e., communication, accessibility) are less likely to get involved in sexual activity. A similar association has been found between parental monitoring and engagement in sexual activity (e.g., Dryfoos, 1990; Jessor & Jessor, 1977; Meschke et al., 2000). Thus, adolescents who are monitored are less likely to engage in sexual activity (e.g., Dryfoos, 1990; Furstenberg & Hughes, 1995).

Family structure has also been linked with adolescent engagement in sexual activity. Adolescents from single-parent families are more likely to engage in sexual activity and to engage in those activities at an earlier age than are their age-related peers from two-parent homes (e.g., Brooks-Gunn & Furstenberg, 1989; Ketterlinus, Lamb, & Nitz, 1994). However, this association may be confounded by the fact that single-parent families have, on average, considerably lower incomes than two-parent families, as well as the fact that a higher percentage of single-parent families are ethnic minorities than is the case with two-parent families (Calhoun Davis & Friel, 2001). As noted previously, SES (in particular poverty) and ethnicity have been linked to adolescents' engagement in sexual activity. Studying a sample of 8,266 adolescents living in single-parent families, Benson and Roehlkepartain (1993) found that the association between family structure and adolescent sexual activity exists even when income and ethnicity are held constant. Moreover, a history of sexual or physical abuse has also been found to be associated with adolescent engagement in sexual activity (e.g., Benson & Roehlkepartain, 1993; Perkins et al., 1998).

There is some evidence that peer relations are associated with sexual behavior in adolescence (e.g., Masten & Coatsworth, 1998; Perry, 2000; Stättin & Magnusson, 1990).

However, peer influence is more strongly related to perceived sexual behavior than to actual behavior (Perry, 2000). Indeed, adolescents (especially girls) who perceive their best friends as sexually active are more likely to be sexually active themselves (e.g., Billy & Udry, 1985). However, Small and Luster (1994) did not find a significant correlation between peer conformity and sexual behavior in adolescence. They suggested that researchers may overestimate the role that peers play in influencing sexual behavior.

Poor neighborhood characteristics are associated with the increased probability of adolescents' early engagement in sexual activity (e.g., Duncan & Aber, 1997; Kowaleski-Jones, 2000). Adolescents who live in neighborhoods with low monitoring were more likely to become sexually active at an earlier age than were their peers who lived in neighborhoods characterized by high monitoring; thus, nonparental adults in the neighborhood can play an important role in supervising the behavior of adolescents (Small & Luster, 1994).

ALCOHOL AND SUBSTANCE USE/ABUSE

In recent years there have been declines in most alcohol and drug use among adolescents (Johnson, O'Malley, & Bachman, 2001; Kandel, 1991). However, according to data derived from a national sample of high school seniors (Johnson et al., 2001), 52% of 8th graders, 71% of 10th graders, and 80% of 12th graders had tried alcohol, and 15% of 8th graders, 24% of 10th graders, and 31% of 12th graders had smoked cigarettes. Indeed, in that same study over half had tried an illicit drug, and over one third had used an illicit drug other than marijuana. Furthermore, the article stated that "by the end of eighth grade, nearly four in every ten (35%) American eighth graders have tried illicit drugs" (p. 33). Moreover, many adolescents will experiment with cigarettes, chewing tobacco, alcohol, and marijuana (Johnson et al., 2001).

The statistics pertinent to adolescents about frequent or heavy use of alcohol (e.g., having more than two drinks per day or binge drinking, which is five or more drinks in a row three or more times during the past two weeks), about heavy use of cigarettes (smoking five or more cigarettes a day), and about heavy use of illicit drugs (e.g., smoking marijuana 20 times or more in the past 30 days or using cocaine, crack, heroin, or LSD once a week) reflect alarmingly high rates (Johnson et al., 2001). The Centers for Disease Control and Prevention (1998) found that 70.2% of 9th through 12th graders have tried smoking. The Monitoring the Future Study found that "marijuana use rose substantially among secondary school and college students between 1992 and 2000, but somewhat less so among young adults. Nearly one in seventeen (6.0%) twelfth graders is now a current daily marijuana user" (Johnson et al., 2001, p. 45). As noted previously, the abuse of any one of these substances can have harmful short-term and long-term effects on an individual's physical and mental health (e.g., Hawkins, Catalano, & Miller, 1992; Kandel, 1991).

For adolescents who get heavily involved in drugs (either with one or multiple drugs), the consequences can be devastating, both physically and psychologically. Drug use can severely limit educational, career, and marital success (e.g., Hawkins et al., 1992; Perry, 2000) and has been associated with many societal problems (Dryfoos, 1990; Perry 2000). Indeed, over one third of all automobile fatalities are alcohol related (Perry, 2000). Frequent use of alcohol in the short term is also associated with impaired functioning in school, family problems, depression, and accidental death (e.g., drowning; Perry, 2000).

The heavier the use of a seemingly harmless substance in the early years, the more likely it is that multiple use will occur later (e.g., Johnson et al., 2001; Kandel, 1991). Alcohol and smoking are characterized as gateway drugs because they often lead to more serious substance abuse (e.g., Johnson et al., 2001; Kandel, 1991; Perry, 2000). As with heavy alcohol use, frequent use of marijuana has been linked with the following short-term consequences: impaired psychological functioning, impaired driving ability, and loss of short-term memory.

Over the past 20 years research has identified the antecedents and correlates of alcohol and drug use/abuse during the adolescent years (e.g., Jessor & Jessor, 1977; Johnson et al., 2001; Kandel, 1991). Several studies have identified the individual and contextual characteristics that appear to be associated with alcohol and substance use/abuse in adolescence (e.g., Catalano et al., 1999; Dryfoos, 1990; Jessor & Jessor, 1977; Lerner, 1995; Newcomb et al., 1987).

Individual Characteristics

Several individual characteristics have been associated with adolescents' use of alcohol and drugs. Investigators have presented data suggesting that experimentation at an early age leads to a higher risk of using more dangerous drugs (e.g., Dryfoos, 1990; Johnson et al., 2001; Perry, 2000). The link between ethnicity and alcohol and drug use/abuse is complicated by the underrepresentation of adolescent minorities in empirical research (e.g., African American inner-city youth; Barnes & Farrell, 1994; Dryfoos, 1990). In general, however, European American and Native American adolescents, especially those in urban areas, report the highest rates of alcohol and drug use/abuse, whereas Latino and African American

adolescents report intermediate rates of use, and Asian American adolescents report the lowest rates of use (e.g., Barnes & Farrell, 1994; Newcomb et al., 1987; Ozer et al., 1998).

Low grades in school (especially in junior high school) are associated with an increased likelihood of engagement in alcohol and substance use/abuse (e.g., Hawkins et al., 1992; Ketterlinus et al., 1994; Masten, 2001). Indeed, Hundleby and Mercer (1987) found that good school performance reduced the likelihood of frequent drug use in ninth graders.

However, adolescents who have low educational aspirations are more likely to participate in alcohol and substance use/abuse than those youth who are interested in scholastic achievement, such as attending a postsecondary institution (e.g., Catalano et al., 1999; Newcomb et al., 1987). Several studies have found a linkage between low attendance at church services and the likelihood that adolescents will engage in substance use/abuse (e.g., Barnes & Farrell, 1994; Perry, 2000).

Involvement in two specific risk behaviors, school failure and antisocial behavior/delinquency, has been associated with alcohol and substance use/abuse. For instance, adolescents who perform poorly in school and who possess low educational aspirations are more likely to become involved in alcohol and substance use/abuse (Dryfoos, 1990; Hawkins et al., 1992). Not surprisingly, then, school failure (defined as being two or more grades behind in school) has been linked with engagement in alcohol and drug use/abuse (e.g., Hawkins et al., 1992; Ketterlinus et al., 1994; Newcomb et al., 1987). School dropout is also related to alcohol and drug use/abuse (Lerner, 2002).

The relationship between antisocial behavior (delinquency) and alcohol and drug use/abuse has been well established (e.g., Farrington, 1998; Jessor, 1998; Johnson et al., 2001). For example, antisocial behavior that is exhibited through fighting, school misbehavior, and truancy in adolescence is linked to an increased likelihood of alcohol and substance abuse (e.g., Dryfoos, 1990; Farrington, 1998; Jessor & Jessor, 1977). Moreover, several investigators have found that antisocial behavior in the form of lack of law abidance (i.e., delinquency) is associated with alcohol and drug abuse in adolescence (Hawkins et al., 1992).

Contextual Characteristics

A large number of investigations have found evidence for a relationship between the context within which an adolescent is embedded and alcohol and drug use/abuse. Parental-adolescent communication that is characterized by negative patterns (e.g., criticism and lack of praise) has been linked with adolescent engagement in alcohol and drug use/abuse (e.g., Barnes & Farrell, 1994; Hawkins et al., 1992). In addition, lack of parental monitoring and discipline are related to an increased likelihood of adolescent alcohol and substance use/abuse (e.g., Dryfoos, 1990; Hawkins et al., 1992; Scheer, Borden, & Donnermeyer, 2000).

Adolescents who have one or both parents who are addicted to a substance are more likely to engage in alcohol and substance use/abuse than are adolescents who do not have an addicted parent or parents (e.g., Dryfoos, 1990; Masten & Coatsworth, 1998; Resnick et al., 1997). In addition, adolescents who have an older addicted sibling are more likely to get involved in such use than are adolescents who do not have such a sibling (Dryfoos, 1990). There is also a link between parental involvement in a youth's activities and a decrease in the probability that the adolescent will engage in alcohol and drug use/abuse (e.g., Jessor, 1998; Jessor & Jessor, 1977; Resnick et al., 1997).

Consistently, one of the most powerful predictors of adolescent alcohol and drug use/abuse is the behavior of a youth's best friend (e.g., Borden, Donnermeyer, & Scheer, 2001; Jessor & Jessor, 1977; Newcomb et al., 1987). Adolescents whose friends use alcohol and drugs are much more likely to use/abuse them than are those adolescents whose peers do not engage in such behavior. In fact, there is evidence that initiation of alcohol and drug use is through friends rather than strangers (Kandel, 1991).

DELINQUENCY AND ANTISOCIAL BEHAVIOR

The terms *antisocial behavior* and *delinquency* suggest a wide range of behaviors, from socially unacceptable but not necessarily illegal acts to violent and destructive illegal behaviors. Two types of offenses will be presented here in regard to criminal acts. First, status offenses are those offenses that are illegal acts due to the age of the individual who commits them. Status offenses are sometimes classified as juvenile offenses, such as running away, truancy, drinking under age, sexual promiscuity, and uncontrollability. Second, index offenses are offenses that are always illegal and are not dependent on age. Thus, index offenses are criminal acts whether they are committed by juveniles or adults and, as categorized by the Federal Bureau of Investigation, include offenses such as robbery, vandalism, aggravated assault, rape, and homicide (Dryfoos, 1990).

Although most individuals with a history of juvenile delinquency do not go on to become convicted criminals, most convicted criminals do have a history of juvenile delinquency (Dryfoos, 1990). Antisocial behavior has been found

to be prevalent in general community samples of adolescents (e.g., Tolan, 1988). For example, the FBI reported that juveniles accounted for 17% of all arrests and 16% of all violent crime arrests in 1999. The substantial growth in juvenile violent crime arrests that began in the late 1980s peaked in 1994. Between 1994 and 1999 the juvenile arrest rate for Violent Crime Index offenses fell by 36% (Snyder, 2000).

Approximately one third of juvenile arrests involved younger juveniles (under age 15). The types of crimes committed included arson (67%), followed by sex offenses (51%), vandalism (44%), and other assaults (43%). "Of all the delinquency cases processed by the Nation's juvenile courts in 1997, 58% involved juveniles younger than 16" (Office of Juvenile Justice and Delinquency Prevention, 2001, p. 22). In fact, in the course of a year, an estimated 500,000 to 1.5 million young people run away from or are forced out of their homes, and an estimated 200,000 are homeless and living on the streets (Administration on Children, Youth, and Families, 2001). Past research suggests that the majority of these youth are female (Dryfoos, 1990). Moreover, "in 1999, 27% juvenile arrests involved female offenders arrested. Between 1990 and 1999, the number of female juvenile offenders arrested increased more or decreased less than the number of male juvenile offenders arrested in most offense categories" (Office of Juvenile Justice and Delinquency Prevention, 2001, p. 22).

The proportion of violent crimes attributed to juveniles has declined in recent years. The proportion of violent crimes that occurred by juvenile arrests grew from 9% in the late 1980s to 14.2% in 1994 and then declined to 12.4% in 1999. Arrest rates are much higher for African American males than for any other group. African American youths experience rates of rape, aggravated assault, and armed robbery that are approximately 25% higher than those for European American adolescents. Rates of motor vehicle theft are about 70% higher for African Americans, rates of robbery victimization are about 150% higher, and rates of African American homicide are typically between 600% and 700% higher (e.g., National Research Council, 1993; Snyder, 2000).

Self-report data by adolescents indicate a wide gap between rates of self-reported antisocial behavior and juvenile arrest and conviction rates (National Research Council, 1993). The rates of self-report are consistently much higher than are the arrest rates (Dryfoos, 1990). Indeed, a review of the literature on self-report surveys concluded that no more than 15% of all delinquent acts result in police contact (Farrington & West, 1982). The majority of adolescents report that they have participated in various forms of delinquent behavior (Dryfoos, 1990). Dryfoos suggested that the number of index offenses committed by adolescents may be 10 times greater than the number of cases that are discovered and end up in juvenile court. An estimated six million 10- to 17-year-olds reported that within a one-year period they had participated in an act that was against the law; of these, 3.3 million youth were under the age of 14 (Dryfoos, 1990).

Delinquency and antisocial behavior can have harmful short-term and long-term effects on individuals' physical *and* mental health. Antisocial behavior has been linked with psychiatric problems, early and heavy alcohol and drug use/abuse, and school problems. Over the long term, antisocial behavior is associated with an increased likelihood of adult criminal behavior, unemployment, low occupational status and low income, poor marital adjustment and stability, out-of-wedlock parenting, impaired offspring, and reliance on welfare (e.g., Jessor, 1998; Perry, 2000; Werner & Smith, 1992).

Research has identified the antecedents and correlates of antisocial behavior and delinquency during the adolescent years (e.g., Dryfoos, 1990; Glueck & Glueck, 1968; Hawkins et al., 2000; Jessor & Jessor, 1977; Pakiz, Reinherz, & Frost, 1992). These studies identified the individual and contextual characteristics that appear to be associated with antisocial behavior and delinquency during adolescence. Consensus among researchers about these antecedents and correlates is substantial (Hawkins et al., 2000; Herrenkohl, Maguin, Hill, Hawkins, & Abbott, 2001).

Individual Characteristics

Numerous individual characteristics have been associated with antisocial behavior and delinquency during adolescence. Age of initiation in antisocial behaviors has been found to be related to antisocial behavior and delinquency during adolescence. Early onset of adolescent antisocial behavior is associated with high rates of more serious criminal offenses in later adolescence (e.g., Dodge, 2001; Farrington, 1998; Hawkins et al., 2000).

Studies that have utilized self-reports and arrest statistics have consistently demonstrated that there are large gender differences in the prevalence and incidence of most antisocial and delinquent behaviors. Adolescent males engage in considerably more delinquent behaviors than do adolescent females (e.g., Dryfoos, 1990; Farrington, 1998; Hawkins et al., 2000). This difference is more pronounced in serious and violent crimes. Girls, then, are more likely to be involved in status offenses (e.g., running away) than in serious or violent crimes.

Within the studies using arrest statistics, there is a consistent finding that African Americans are disproportionately represented in the arrest data, victimization reports, and incarceration statistics (e.g., Dodge, 2001; Farrington, 1998;

Herrenkohl et al., 2001). However, self-report measures have yielded minimal racial differences in antisocial and delinquent behaviors (National Research Council, 1993).

There is consistent evidence from both cross-sectional and longitudinal research that poor performance in school is associated with antisocial and delinquent behavior (e.g., Dahlberg & Potter, 2001; Hawkins et al., 2000; Herrenkohl et al., 2001). School failure (being two or more years behind in school or dropping out of school) has been found to be associated with antisocial and delinquent behaviors (e.g., Barnes & Farrell, 1994; Hawkins et al., 2000; Herrenkohl et al., 2001). Furthermore, low educational expectations and aspirations have been linked with an increased likelihood of antisocial and delinquent behaviors in youth (e.g., Hawkins et al., 2000; Herrenkohl et al., 2001).

Employment can provide a legitimate means for obtaining material possessions, acquiring status and career paths, and attenuating the negative effects of poor academic achievement (Duster, 1987). Studies have produced inconsistent data on the association of part-time employment and delinquency. Cross-sectional data provide support for an association between employment and lower levels of antisocial and delinquent behaviors during adolescence (e.g., Dodge, 2001; Tolan, 1988). In the longitudinal literature, however, there is little evidence supporting this association, and, in fact, part-time employment may have deleterious effects on adolescent behaviors (e.g., Mortimer & Johnson, 1998; Perry, 2000).

The research findings are mixed with regard to the individual characteristics of self-esteem. Comparison between delinquents and nondelinquents has provided evidence that delinquent adolescents have lower self-esteem (Arbuthnot, Gordon, & Jurkovic, 1987). However, some studies do not provide evidence for the association between self-esteem and delinquency (e.g., Dodge, 2001; Herrenkohl et al., 2001). In his review of the literature, Henggeler (1989) suggested that the association between self-esteem and delinquency is due to association with a third variable (e.g., intelligence quotients, family relations, or school performance).

As noted in the previous section, numerous studies have established the relationship among antisocial and delinquent behaviors and alcohol and drug use/abuse (e.g., Dryfoos, 1990; Hawkins et al., 2000; Herrenkohl et al., 2001; Jessor, 1998). Indeed, antisocial and delinquent behaviors are associated with early and heavy alcohol and substance use/abuse (e.g., Hawkins et al., 2000; Herrenkohl et al., 2001; Jessor & Jessor, 1977; Kandel, 1991).

Contextual Characteristics

Research on antisocial and delinquent behavior has provided support for the association among several contextual characteristics and the presence or development of antisocial or delinquent behavior in adolescence. In general, researchers have found a negative linear relationship between parental support (e.g., positive communication, affection) and adolescent antisocial and delinquent behaviors, such that the more parental support that exists, the less likely the adolescent is to be involved in antisocial or delinquent behaviors (e.g., Barnes & Farrell, 1994; Farrington, 1998; Hawkins et al., 2000; Herrenkohl et al., 2001). In addition, many of the already-noted studies found that a significant relationship exists between parental control (e.g., monitoring, discipline) and antisocial and delinquent behaviors (e.g., Barnes & Farrell, 1994; Dahlberg & Potter, 2001; Farrington, 1998; Henggeler, 1989; Herrenkohl et al., 2001; Mahoney & Stättin, 2000). Higher parental monitoring is associated with low instances of antisocial and delinquent behaviors. Moreover, lax or markedly inconsistent discipline has been linked to high rates of antisocial behavior and delinquency (e.g., Farrington, 1998; Glueck & Glueck, 1968; Herrenkohl et al., 2001; Hirschi & Stark, 1969).

Parental practice of high-risk behaviors is another characteristic of the parent-adolescent relationship that has been linked to antisocial and delinquent behaviors (e.g., Barnes & Farrell, 1994; Farrington, 1998; Glueck & Glueck, 1968; Hawkins et al., 2000). Furthermore, parental physical and sexual abuse of children and adolescents has been found to be associated with antisocial and delinquent behavior (Brown, 1984). Adolescents who are physically or sexually abused by their parent or parents are more likely to participate in delinquent acts (Brown, 1984; Hawkins et al., 2000; Herrenkohl et al., 2001).

In addition to the parent-adolescent relationship, other characteristics of the family have been linked with antisocial behaviors and delinquency. For example, there is an association between adolescent antisocial and delinquent behaviors and family support. Low family support, as measured by low warmth and affection among family members, has been linked with antisocial behaviors during adolescence (e.g., Farrington, 1998; Hawkins et al., 2000; Henggeler, 1989; Herrenkohl et al., 2001). In addition, several studies have found that antisocial and delinquent behavior is associated with low family cohesion and high family conflict (e.g., Farrington, 1998; Herrenkohl et al., 2001; Pakiz et al., 1992; Tolan, 1988).

An association has been found between family structure (whether the household is headed by one or two parents) and antisocial behaviors and delinquency (Barnes & Farrell, 1994; Farrington, 1998). For example, adolescents living in mother-only homes and natural parent-stepparent homes were more susceptible to negative peer pressure and engaged in more antisocial behaviors and delinquent acts than did

their age-related peers living in homes with two natural parents (Steinberg, 1987). No data have been presented with regard to father-only homes. However, family structure is not as significant in predicting antisocial behavior and delinquency as is the quality of the parent-adolescent relationship (e.g., Dryfoos, 1990; Farrington, 1998).

For many adolescents, involvement with deviant peers has become a critical aspect of their own delinquent behavior (e.g., Dahlberg & Potter, 2001; Hawkins et al., 2000; Herrenkohl et al., 2001; Mahoney & Stättin, 2000; Perry, 2000). Thus, researchers have found evidence for an association between antisocial behavior and delinquency and engagement with peers who participate in antisocial behaviors and delinquent acts (e.g., Farrington, 1998; Hawkins et al., 2000; Herrenkohl et al., 2001). In fact, there is evidence that a high percentage of antisocial and delinquent behavior is carried out with peers (Emler, Reicher, & Ross, 1987).

Certain types of neighborhoods are linked to adolescent antisocial behaviors, to delinquent behaviors, and to delinquent gang activities (e.g., Dahlberg & Potter, 2001; Duncan & Aber, 1997; Herrenkohl et al., 2001; Taylor, 1990). Neighborhoods that are located in an area with high crime rates, poverty, and dense living conditions are associated with an increased likelihood of adolescent antisocial behavior and delinquent acts, including the emergence of gangs (e.g., Duncan & Aber, 1997; Henggeler, 1989; Taylor, 1990).

Finally, it should be noted that the impact of SES is unclear. Studies have found evidence for a link between low SES and an increased likelihood of adolescent antisocial behavior and delinquency (e.g., Gorman-Smith & Tolan, 1998). However, recent studies have not found SES to be of primary importance in predicting adolescent antisocial and delinquent behavior (e.g., Dahlberg & Potter, 2001; Tolan, 1988).

SCHOOL UNDERACHIEVEMENT AND FAILURE

As noted earlier, low achievement in school has been linked to the three previously mentioned risk behaviors—adolescent sexual activity, alcohol and drug use/abuse, and antisocial behavior and delinquency. In addition, many of the individual and contextual characteristics previously mentioned are linked to school underachievement and failure.

Low school achievement, poor grades, and being overage for grade are often associated with dropping out (e.g., Dryfoos, 1990; Rumberger, 2001). Yet not everyone who has low grades or is overage drops out. The consequences for poorly equipped high school graduates, however, may inhibit their chances of getting into a postsecondary school, and this, in turn, may limit their chances of getting a well-paying job. High school dropouts are two to three times more likely to be in marginal jobs and to be employed intermittently (Eccles, 1991). Conversely, each added year of secondary education reduces the probability of public welfare dependency in adulthood by 35% (Berlin & Sum, 1988).

School failure here will be defined as possessing poor grades (e.g., half of a student's grades are D or less in regard to academic content areas) and being retained one or more grades. Although some recent studies have suggested that retention may have some positive effects on academic achievement (Roderick, Bryk, Jacob, Easton, & Allensworth, 1999), falling behind one's age-related peers has been found in numerous studies to be strongly predictive of dropping out (e.g., Goldschmidt & Wang, 1999; Jimerson, 1999; Roderick et al., 1999; Rumberger, 2001); even when achievement, SES, and gender are controlled, being held back increases the probability of eventually dropping out of school by 20% to 30% (Smith & Shepard, 1988). Each year, about 5% of all high school students drop out of school (Kaufman, Kwon, Klein, & Chapman, 1999). The majority of adolescents who do eventually drop out of school will encounter long-term employment problems. In 1998 the unemployment rate for dropouts was 75% higher than for high school graduates (United States Department of Education, National Center for Education Statistics, 2000b, Figure 24). Over their lifetimes, each year's class of dropouts will cost $260 billion in lost earnings and foregone taxes (Catterall, 1987). Thus, there are devastating long-term effects of school failure and dropout.

Individual Characteristics

Several individual characteristics have been found to be related to school failure and dropout. Many studies have found that older adolescents who have been retained (held back) from advancing to the next grade level with their age-related peers are more likely to do poorly in school and to drop out (e.g., Eccles, 1991; Powell-Cope & Eggert, 1994; Rumberger, 2001; Wang, Haertel, & Walberg, 1999). Furthermore, in general, adolescents' average course grades decline as they move from primary school into secondary school; that decline is especially marked at each of the school transition points (Simmons & Blyth, 1987).

Females are less likely to be involved in behavior problems in school, and problem behaviors have been linked to school failure and dropout (e.g., Barnes & Farrell, 1994; Hawkins et al., 2001; Jessor, 1998; National Research Council, 1993). For example, in 1995 males were two-thirds more likely to be retained in a grade than were females (United

States Department of Education, National Center for Education Statistics, 1997).

Ethnicity has been linked with trends in achievement, inasmuch as being a member of an ethnic minority increases the probability of school failure and dropout (except for Asian American youth; Eccles, 1991; Kaufman et al., 1999; National Research Council, 1993). Indeed, African American and Latino adolescents have a greater probability of being left behind a grade than do European American students (United States Department of Education, National Center for Education Statistics, 1997; National Research Council, 1993). Simmons and Zhou (1993) obtained similar findings when they examined African American and European American sixth to ninth graders. They found that African American males showed the highest degrees of school problem behavior in general, and probation and suspensions in particular. This higher frequency of minority adolescents failing in school or dropping out may be confounded by the greater incidence of poverty and lower SES among ethnic minorities, especially African Americans and Latinos. Indeed, lower levels of resources and poorer learning environments are more common in high-poverty schools, which are more likely to be attended by minority students (United States Department of Education, National Center for Education Statistics, 1997).

Adolescents who value school less or who have a negative attitude about school are more likely to fail or drop out than are adolescents who value school and possess a positive attitude about school (e.g., Goldschmidt & Wang, 1999; Powell-Cope & Eggert, 1994; Rumberger, 2001; Simmons & Blyth, 1987). Simmons and Zhou (1993), for example, found that at transitions to junior high school and to high school, African Americans' attitudes toward school dropped relatively precipitously. Not surprisingly, adolescents who have low educational aspirations are more likely to fail at school or to drop out of school (e.g., Goldschmidt & Wang, 1999; Rumberger, 2001; Simmons & Blyth, 1987). Moreover, a lack of basic skills and problem-solving abilities has been linked with school failure and dropout; adolescents who are deficient in basic skills and problem-solving skills have an increased probability of failing or dropping out of school (e.g., Dryfoos, 1990; Goldschmidt & Wang, 1999; Rumberger, 2001).

Steinberg and Darling (1993) found that time spent on homework was associated with school failure. They found that adolescents who spent little or no time on their homework were likely to fail at school. However, Dryfoos (1990) did not find lack of time spent on homework to be a significant correlate of school failure or dropout. Thus, more research is needed to test the association between time spent on homework and school failure or dropout. In turn, other investigations have found that potential school failures and dropouts spend more time socializing, dating, and riding around in cars (e.g., Rumberger, 2001).

An association has been found between self-esteem and school failure and dropout (e.g., Powell-Cope & Eggert, 1994; Simmons & Blyth, 1987). Adolescents who have low self-esteem are more likely to do poorly in school and to drop out. Several researchers have identified an association between involvement in school activities and school failure and dropout. Low interest in school activities and low participation in school activities are linked with an increased likelihood of school failure and dropout (e.g., Eccles, 1991; Eccles & Barber, 1999; Goldschmidt & Wang, 1999; Rumberger, 2001).

Research has also found a link between school failure and dropout and other risk behaviors, such as antisocial behavior and delinquency, alcohol and drug use/abuse, and adolescent sexual activity (e.g., Barnes & Farrell, 1994; Hawkins et al., 1992; Jessor, 1998; Jimerson, 1999; National Research Council, 1993). As noted previously, adolescent pregnancy is a significant antecedent of dropping out. However, dropping out is also an antecedent of teenage childbearing (e.g., Eccles, 1991; Luster & Small, 1994; Perry, 2000). In addition, antisocial behavior and delinquency have been shown to be associated with an increased likelihood of school failure or dropout (e.g., Farrington, 1998; Hawkins et al., 2000; Henggeler, 1989; Herrenkohl et al., 2001). Furthermore, adolescents who frequently use and abuse alcohol and drugs have been found to have a higher probability of failing or dropping out of school (e.g., Dryfoos, 1990; Hawkins et al., 2000; Hawkins et al., 1992). The overlapping of these risk behaviors is discussed in the final section of this literature review.

Contextual Characteristics

Several contextual characteristics have been associated with school failure and dropout. Investigators have found a link between parental support (e.g., positive communication, affection) and school failure and dropout. Adolescents who have parental support and are able to discuss issues with their parents are less likely to fail or drop out of school (e.g., Barnes & Farrell, 1994; Dryfoos, 1990; Goldschmidt & Wang, 1999; Rumberger, 2001). Moreover, authoritatively reared adolescents are less likely to fail or drop out of school (e.g., Simmons & Blyth, 1987; Steinberg & Darling, 1993). Low parental monitoring is associated with failing school and dropping out (Barnes & Farrell, 1994; Rumberger, 2001). Parental education is also strongly related (Rumberger, 2001). Adolescents whose parents have low levels of education have an increased likelihood of school failure and

dropout (e.g., Eccles, 1991; McNeal, 1999; Pong & Ju, 2000; Rumberger, 2001).

There has been inconsistent evidence that family structure is associated with school failure and dropout. Adolescents who are from larger families (e.g., more than two siblings) are more likely to fail or drop out of school than are adolescents from smaller families (McNeal, 1997). This association may be related to the consistently low SES of large families. Adolescents who live in single-parent homes have a higher probability of failing or dropping out of school than do adolescents who live in two-parent homes (e.g., Goldschmidt & Wang, 1999; McNeal, 1999; Rumberger, 2001). However, several studies found that the association of family structure with school failure and dropout was minimal when SES was accounted for in the analysis (e.g., National Research Council, 1993; Pong & Ju, 2000). Thus, the relationship between family structure and school failure and dropout is not clear.

Adolescents who have affiliations with peers who have low expectations for school or have friends who have dropped out are more likely to fail or drop out of school than are adolescents whose peers have high expectations and positive attitudes toward school (e.g., Powell-Cope & Eggert, 1994; Rumberger, 2001; Wang et al., 1999). Moreover, Steinberg and Darling (1993) found that, for Asian American, African American, and Latino adolescents, peers are relatively more influential in their academic achievement than are parents. For European American adolescents, parents were a more potent source of influence (Steinberg & Darling, 1993).

Larger schools and larger classrooms are associated with increased likelihood of school failure and dropout (e.g., Rumberger & Thomas, 2000). In addition, school climate has been found to be associated. Schools that emphasize competition, testing, and tracking and have low expectations have a higher number of school failures and dropouts than do schools that have high expectations, encourage cooperation, and have teachers who are supportive (e.g., Powell-Cope & Eggert, 1994; Rumberger & Thomas, 2000; Rutter, 1979). However, McNeal (1997) found no effect of academic or social climate on high school dropout rates after controlling for the background characteristics of students, social composition, school resources, and school structure.

There has been a lack of consensus and consistency of findings regarding the association between adolescents' part-time employment and school failure and dropout (e.g., Steinberg & Darling, 1993). For example, D'Amico's (1984) analysis of the National Longitudinal Study (NLS) youth data demonstrated that employment at low intensity (less than 20 hours per week) lessened dropout rates. However, Steinberg and Avenevoli (1998) found that those who worked more than 20 hours a week were more likely to become disengaged from school. Furthermore, Mortimer and Johnson (1998) found no association between adolescent employment and school failure or dropout.

A few studies have found some evidence of a positive link between stress/depression and school failure and dropout, such that high stress is associated with school failure and dropout (e.g., Dryfoos, 1990; Eccles, 1991; Rumberger, 2001; Simmons & Blyth, 1987). For example, Brack, Brack, and Orr (1994) found that females who were failing at school had higher levels of reported stress/depression than those females who were doing average or better; however, they did not find a similar relationship for males.

In his extensive review, Rumberger (2001) provided evidence from several studies that communities influence students' withdrawal from school. For example, neighborhood characteristics seemed to predict differences in dropout rates among communities, apart from the influence of families (e.g., Brooks-Gunn, Duncan, Klebanov, & Sealand, 1993).

Neighborhoods that are characterized as urban, high-density, and poverty-stricken are associated with adolescent school failure and dropout (e.g., Brooks-Gunn et al., 1993; Dryfoos, 1990; Eccles, 1991; Schorr, 1988). For example, students in urban areas appeared to drop out at a higher rate than students in rural areas; however, the difference between the rates for these two groups is not statistically significant (United States Department of Education, National Center for Education Statistics, 2000a).

Finally, there is consistent evidence from both cross-sectional and longitudinal research that school failure and dropout are associated with low SES (e.g., Eccles, 1991; National Research Council, 1993; Rumberger, 2001; Schorr, 1988). For example, adolescents from low-income families are three times more likely to drop out of school than are children from middle-income families, and they are nine times more likely to drop out of school than students from high-income families (e.g., United States Department of Education, National Center for Educational Statistics, 2000b).

CO-OCCURRENCE OF RISK BEHAVIORS

As evidenced earlier, risk behaviors do not exist in isolation; they tend to covary (e.g., Dryfoos, 1990; Hawkins et al., 2000; Jessor & Jessor, 1977; Masten, 2001; Perry, 2000). Moreover, among the previously noted risk behaviors there are common individual and contextual characteristics with

TABLE 15.1 Common Individual and Contextual Characteristics Associated With the Four Risk Behaviors

Source	Characteristic
Individual	Age of initiation. Gender. Ethnicity. Poor school performance. Low educational aspirations. Lack of involvement in activities. Negative view of the future. Lack of religiosity. Low self-esteem.
Family	Poor parent-adolescent communication. Poor parental monitoring. Parental addiction (e.g., alcohol and drugs). Lack of family support. Family structure.
Extrafamilial context	Negative peer relations. Large school. Negative school climate. Poor neighborhood quality. Low socioeconomic status. Nonparental adult relations.

Source. Adapted from Perkins (1995).

which they are associated (e.g., early age of initiation, school underachievement, school misconduct, negative peer behaviors, inadequate parent-adolescent relationships, and low quality neighborhoods). The list of common characteristics has been corroborated by several researchers and is presented in Table 15.1 (e.g., Hawkins et al., 2000; Jessor, 1998; Perry, 2001). In her meta-analysis of the literature on the four risk behaviors noted earlier, Dryfoos (1990), for example, found six overarching characteristics associated with involvement in the four risk behaviors.

First, heavy involvement in risk behaviors and more negative consequences from those behaviors are linked with early initiation or occurrence of any of the risk behaviors. Second, common to all problem behaviors is doing poorly in school and having low expectations of future performance. Third, misconduct in school and other conduct disorders are related to each of the risk behaviors. Fourth, adolescent involvement in any of the risk behaviors is increased when youth have peers that engage in the risk behaviors or when adolescents have a low resistance to peer influence. Fifth, an inadequate parent-adolescent relationship is common to all risk behaviors. Areas that characterize an inadequate relationship are lack of communication, lack of monitoring, inadequate discipline, role modeling of problem behaviors (e.g., exhibiting risk behaviors), and low parental education. Sixth, low quality neighborhoods are associated with involvement in risk behaviors. These neighborhoods are characterized by poverty, violence, urbanization, and high-density conditions.

Several other studies have assessed the co-occurrence of risk behaviors (e.g., Bingham & Crockett, 1996; Farrington & West, 1982; Zucker, Fitzgerald, & Moses, 1995). For instance, in their extensive review of research on alcohol use and alcoholism, Zucker et al. (1995) found that antisocial behavior in adolescence is consistently related to alcoholic behavior. Moreover, findings from the 18-year-long Michigan State University Longitudinal Study have provided evidence that difficulty in achievement-related activity in adolescence is consistently found in youths who later become alcoholics (e.g., Zucker et al., 1995). Bingham and Crockett (1996), who examined adolescent sexual activity longitudinally, have found similar relationships among adolescent sexual activity, antisocial behavior, underachievement, and alcohol use. In addition, they found that the later in ontogeny that adolescents initiated sexual intercourse, the lower was their involvement in other problem behaviors (e.g., antisocial behaviors, alcoholism, and school misconduct).

Clearly, research has found a link between certain characteristics (see Table 15.1), risk factors, and adolescents' participation in risk behaviors. Yet many adolescents exposed to a context containing some or all of the stated risk factors do not engage in risk behaviors and, in fact, appear to adapt well and live successful lives. Moreover, evidence exists demonstrating that some children thrive despite their high-risk status. This phenomenon has been the focus of much research in the last 30 years.

RESILIENCY

Social scientists have gone through several stages in their approach to understanding vulnerability and resiliency (Werner & Smith, 1992). Generally, researchers have studied individuals exposed to biological risk factors and stressful life events as the major focus of vulnerability and resiliency research. In the initial stages of research, investigators emphasized the association between a single risk variable, such as low birth weight or a stressful life event (e.g., parental discord), and negative developmental outcomes. Borrowing from the field of epidemiology, several social scientists have more recently employed an approach suggesting that many diverse paths lead to the development of particular risk behaviors (Newcomb et al., 1987) and that efforts to find a single cause may not be useful because most behaviors have multiple causes (e.g., Small & Luster, 1994). Thus, researchers in the social science field have moved from a "main effect" model of vulnerability research to a model that emphasizes interactional effects among multiple stressors, for example, as in the literature that stresses the co-occurrence

of parental psychopathology (e.g., alcoholism or mental illness) and poverty (Masten & Coatsworth, 1998; Werner & Smith, 1992).

Finally, resiliency research has shifted its focus from the emphasis on negative developmental outcomes (e.g., risk behaviors) to an emphasis on successful adaptation in spite of childhood adversity (Luthar, 1991; Masten & Coatsworth, 1998; Werner & Smith, 1992). Indeed, in the last 25 years developmental psychopathologists and other social scientists have increasingly explored the concept of invulnerability rather than focusing predominantly on vulnerability and maladjustment (Luthar et al., 2000). For example, in the mid-1970s, Anthony (1974), a child psychiatrist, introduced the concept of the psychologically invulnerable child into the literature of developmental psychopathology to describe children who, despite a history of severe or prolonged adversity and psychological stress, managed to achieve emotional health and high competence (Werner & Smith, 1992).

However, Rutter (1985) noted that resistance to stress in an individual is relative, not absolute. Thus, an individual's ability to overcome stress is dependent on the level of the stress not exceeding the level of the individual's resiliency characteristics. In addition, the bases of resistance to stress are both environmental and constitutional, and the degree of resistance varies over time according to life circumstances (e.g., Luthar et al., 2000; Masten, 2001; Rutter, 1985). Invulnerability may imply an unbreakable individual, one able to conquer any level of stress. Therefore, the concept of resilience or stress resistance, rather than invulnerability, is preferred by many researchers (e.g., Masten & Garmezy, 1985; Rutter, 1985; Werner & Smith, 1992) because it acknowledges a history of success while also implying the possibility of succumbing to future stressors.

The assumption in these investigations is that resiliency can be displayed or detected only through an individual's response to adversity, whether it is a stressful life event or a situation of continuous stress (e.g., war, abuse; Masten & Coatsworth, 1998). Accordingly, resilient individuals are well adapted despite serious stressors in their lives (Luthar et al., 2000; Masten, 2001). Indeed, resilient individuals are those who cope effectively with stresses arising as consequences of their vulnerability; and a balance, congruence, or fit, among risk, stressful life events, and protective characteristics of the individual and the individual's ecology accounts for the diversity of developmental outcomes (Ford & Lerner, 1992; Kumpfer, 1999). Therefore, studying resiliency involves an examination of the link between the person and the demands of the context in variables, factors, and processes that will either promote or subvert adaptation.

An individual's ability to adapt to the changes within the environment and to alter the environment is basic to that individual's survival. Whether situations are marked by high stress or by low stress found in the challenges of daily life, adaptation is a basic function of human development. Resiliency, then, is the organism's ability to adapt well to its changing environment, an environment that includes stressors (e.g., accidents, death of a loved one, war, and poverty) and daily hassles (e.g., negative peer pressures and grades). Thus, studies of resiliency and risk are investigations about human adaptation to life or about competence. Competence is a generalization about adaptation that implies at the least "good" effectiveness (Masten & Coatsworth, 1998).

Human adaptation or competence is composed of the interplay between the context/ecology and the developing organism (Lerner, 2002; Schneirla, 1957). In resiliency the processes involved in the context/ecology interplay are composed of the interaction over time between the protective factors or risk factors at multiple levels that contributes to the direction of the developmental outcomes, whether positive or negative. This interaction is complex and requires a holistic, comprehensive perspective in order to be adequately examined and understood. Models derived from this perspective posit that there are reciprocal influences between the organism and the context/environment (Schneirla, 1957) and that development occurs through these mutual influences (Bronfenbrenner, 1979; Ford & Lerner, 1992; Kumpfer, 1999; Lerner, 2002). Moreover, these models assert that any single explanation of risk-taking behaviors with regard to protective factors and risk factors is too simplistic, in that such explanations are likely to ignore the importance of multiple ecological influences, multiple constitutional influences, and the interactions that develop among them. In fact, several scholars have suggested that the use of the term *factor* may in fact suggest too static a relationship between risk characteristics, protective characteristics, and risk behaviors (Kumpfer, 1999; Rutter, 1985). *Process* may be a better way to describe the dynamic nature of risk and protective characteristics.

Resiliency involves competence in the face adversity, but more than that, it involves an assessment based on some criteria of the adaptation as "good" or "OK" (Masten, 2001). These assessment criteria are based on specific cultural norms within the historical and social contexts for the behavior of that age and situation (Luthar & Cushing, 1999). Borrowing from Masten (2001), resiliency is defined "as a class of phenomena characterized by good outcomes in spite of serious threats to adaptation or development" (p. 228).

Moreover, resiliency is multidimensional in nature. Thus, one may be resilient in one domain but not exhibit resiliency in another domain. As Luthar et al. (2000) stated, "some high-risk children manifest competence in some domains but exhibit problems in other areas" (p. 548). In a study by Kaufman, Cook, Arny, Jones, and Pittinsky (1994), for

example, approximately two thirds of children with histories of maltreatment were academically resilient; however, when examining these same children in the domain of social competence, only 21% exhibited resiliency.

PROTECTIVE FACTORS AND RESILIENCY

Risk and resiliency research provides evidence that specific variables and factors are involved in safeguarding and promoting successful development. That is, research has identified particular variables that are responsible for adolescent resiliency in spite of adverse contexts, while, in turn, other variables have been found to promote failure and to encourage participation in risk behaviors (e.g., Garmezy, 1985; Kumpfer, 1999; Luthar, 1991; Luthar et al., 2000; Masten, 2001; Rutter, 1985; Werner & Smith, 1992). As noted previously in this chapter, risk factors are defined, then, as individual or environmental hazards that increase an individual's vulnerability to negative developmental behaviors, events, or outcomes (e.g., Masten, 2001; Werner & Smith, 1992). However, the presence of risk factors does not guarantee that a negative outcome will occur; rather, it simply increases the probability of its occurrence (e.g., Garmezy, 1985; Masten, 2001; Werner & Smith, 1992).

The probabilities of a negative outcome vary as a consequence of the presence of protective factors. Such factors buffer, modify, or ameliorate an individual's reaction to a situation that, in ordinary circumstances, would lead to maladaptive outcomes (Kumpfer, 1999; Masten, 2001; Werner & Smith, 1992). According to this definition, then, a protective factor is evident only in combination with a risk variable. Thus, a protective factor has no effect in low-risk populations, but its effect is magnified in the presence of the risk variable (e.g., Rutter, 1987; Werner & Smith, 1992). In turn, Rutter (1987) suggested that while protective factors may have effects on their own, such factors have an impact on adjustment by virtue of their interaction with risk variables. However, still another possibility is that protective factors can be defined as variables that are linked with an individual experiencing positive developmental outcomes as compared to negative developmental outcomes.

Although there are variations in the definitions of risk, endangerment, risk factors, and protective factors, the research on resilient or stress-resistant children, adolescents, and young adults provides support for the existence of specific individual and contextual characteristics, namely protective factors (e.g., temperament and social support networks, respectively; Garmezy, 1985; Rutter, 1987; Werner & Smith, 1992). Protective factors are incorporated into adolescents' lives and enable them to overcome adversity. On the other hand, some individual and contextual variables (e.g., difficult temperament, poverty, and lack of adult support) are risk factors that increase the probability of involvement in risk behaviors (e.g., Garmezy, 1985; Luthar et al., 2000; Masten & Coatsworth, 1998; Werner & Smith, 1992).

Models of Protective Factors and Processes

It is not known whether protective variables or protective processes have any effect on low-risk populations because the research has focused on high-risk groups (Masten & Coatsworth, 1998). Rutter (1987) suggested that a protective variable's effect may be magnified in high-risk situations. According to this idea, vulnerability and protection are the negative and positive poles of the same processes. Thus, the potential for involvement in risk behaviors is crucial to this definition because without the risk behavior's presence there is no method of differentiating risk processes from protective processes. Consequently, most resiliency and risk studies have investigated individuals who are living in high-stress situations and life events (e.g., born with low birth weight or living in poverty, war, or economic depression) or who have experienced highly stressful situations (e.g., separation from a parent due to divorce or death, or the experience of physical or sexual abuse; Garmezy, 1985, Masten, 2001). The reason for this focus is that individuals experiencing a lot of stress have a higher probability of involvement in maladaptive behaviors, that is, involvement in risk behaviors (Rutter, 1993). The level of resiliency needed differs depending upon the stressfulness of the ecology of an adolescent. Adolescents who are under severe, multiple stresses (e.g., poverty, parental discord, and maltreatment) will need a higher degree of resiliency or a larger number of protective processes in order to develop positively than would another person who is experiencing mild stress (e.g., difficulty in school). However, the level of stress is also somewhat dependent on the individual's perception of stress (e.g., Kumpfer, 1999).

Using different models, researchers have described several mechanisms through which protective factors help reduce or offset the adverse effects of risk factors (Zimmerman & Arunkumar, 1994). Three models have been developed by Garmezy (1985): (a) the compensatory model, (b) the inoculation model, and (c) the protective factor model. In the compensatory model, the protective factor does not interact with the risk factor; rather, it interacts with the outcome directly and neutralizes the risk factor's influence. In the inoculation model each risk factor is treated as a potential enhancer of successful adaptation provided that it is not excessive (Rutter, 1987). This occurs when there is an optimal level of stress that challenges the individual and, when overcome, strengthens the individual. Thus, the relationship between stress and

competence is curvilinear: At low or moderate levels of stress competence increases, but at higher levels of stress it decreases (Wang et al., 1999). In the third model the protective factor interacts with the risk factor in reducing the probability of a negative outcome (Zimmerman & Arunkumar, 1994). Thus, the protective factor is acting as a moderator. Although the protective factor may have a direct effect on an outcome, its effect is stronger in the presence of a risk factor. These three models of interaction describe a process that emphasizes the dynamic nature of the relationship between risk characteristics and protective characteristics. Thus, the term *process* may provide a more adequate description of protective characteristics than the term *factor,* since the latter implies a static condition.

Identified Protective Factors

In their longitudinal study of a cohort of children from the island of Kauai, Werner and Smith (1992) described three types of protective factors that emerge from analyses of the developmental course of high-risk children from infancy to adulthood: (a) dispositional attributes of the individual, such as activity level and social ability, at least average intelligence, competence in communication skills (language and reading), and internal locus of control; (b) affectional ties within the family that provide emotional support in times of stress, whether from a parent, sibling, spouse, or mate; and (c) external support systems, whether in school, at work, or at church, that reward the individual's competencies and determination and provide a belief system by which to live.

Bogenschneider (1998) derived similar conclusions in her review of resiliency literature. She concluded that variables operated as protective factors in adolescence at various levels of the ecosystems of youth: (a) individual level—such as well-developed problem-solving skills and intellectual abilities; (b) familial level—for example, a close relationship with one parent; (c) peer level—a close friend; (d) school level—positive school experiences; and (e) community level—required helpfulness (e.g., as it occurs when the adolescent is needed to bring in extra income or help manage the home), and a positive relationship with a nonparental adult (e.g., neighbor, teacher).

In their extensive review of resiliency research, Masten and Coatsworth (1998) summarized the findings from over 25 years of research. As shown in Table 15.2, they noted that similar protective factors are found across resiliency studies that have been conducted in a wide variety of situations throughout the world (e.g., war, living with parents who have severe mental illness, family violence, poverty, and natural disasters).

TABLE 15.2 Characteristics of Resilient Children and Adolescents

Source	Characteristic
Individual	Good intellectual functioning (e.g., high verbal skills, divergent thinking). Appealing, sociable, easygoing disposition. Self-efficacy, self-confidence, high self-esteem. Talents. Faith.
Family	Close relationship to caring parent figure. Authoritative parenting: warmth, structure, high expectations. Socioeconomic advantages. Low family stress. Orderly household environment. Connections to extended, supportive family networks. Prosocial family values. Positive role models.
Extrafamilial context	Bonds to prosocial adults outside of the family. Connections to prosocial organizations. Attending effective schools (see Wang et al., 1999).

Source: Adapted from Kumpfer (1999) and Masten & Coatsworth (1998).

Kumpfer's Resiliency Framework

In her recent examination of resiliency, Kumpfer (1999) integrated the work of others into a resiliency framework that employs a transactional model based on the social ecological model (Bronfenbrenner, 1979) and the person-process-contextual model (Ford & Lerner, 1992). According to Kumpfer (1999), this framework is composed of (a) environmental characteristics that are antecedents (i.e., risk and protective factors), (b) characteristics of the resilient person, and (c) the individual's resilient reintegration or positive outcome after a negative life experience, as well as the dynamic mechanisms that mediate between the person and the environment and the person and the outcome.

Many of the risk factors presented earlier in this chapter reside in the environment. Indeed, high-risk youth are often labeled as such due to a high-risk environment rather than internal high-risk characteristics (Kumpfer, 1999). Protective factors are also found in that same environment. According to Garmezy (1985), microniches of support with adequate growth opportunities for some individuals exist even in these high-risk environments. As noted earlier, protective factors interact with risk factors to act as buffers. The interaction between risk and protective factors describes the first oval of the resiliency framework found in Figure 15.1. Generally, youth adjust reasonably well to one or two risk factors, but beyond two risk factors the likelihood for damage and maladjustment increases rapidly (e.g., Jessor, 1998; Masten, 1999; Rutter, 1993). Conversely, increasing the number of protective processes can help buffer those risk factors (e.g., Masten, 2001; Rutter, 1993, 1997).

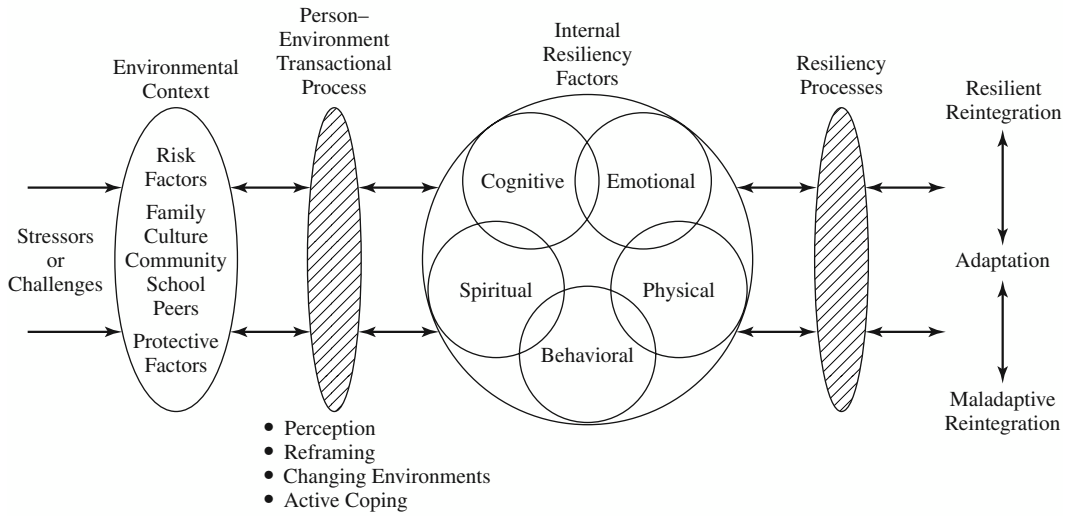

Figure 15.1 Kumpfer's (1999) resiliency framework.

The second oval of the resiliency framework shown in Figure 15.1 involves the transactional processes that mediate between a person and his or her environment. This involves the ways a person consciously or unconsciously modifies his or her environment or selectively perceives the environment. Kumpfer (1999) explains this notion thus:

> Resilient youth living in high drug and crime communities seek ways to reduce environmental risk factors by seeking the prosocial elements in their environment. They maintain close ties with prosocial family members, participate in cultural and community events, seek to be school leaders, and find non-drug using friends and join clubs or youth programs that facilitate friendships with positive role models or mentors. (p. 191)

Kumpfer (1999) identified some transactional processes that help high-risk youth transform a high-risk environment into a more protective environment. These include selective perception, cognitive reframing, planning and dreaming, identification and attachment with prosocial people, active environmental modifications by the youth, and active coping. For example, Kumpfer suggested that resilient youth seek out nurturing adults who facilitate and foster protective processes by positive socialization or caregiving. According to Kumpfer (p. 192), these caring adults provide that positive socialization through "1) role modeling, 2) teaching, 3) advice giving, 4) empathetic and emotionally responsive caregiving, 5) creating opportunities for meaningful involvement, 6) effective supervision and disciplining, 7) reasonable developmental expectations, and 8) other types of psychosocial facilitation or support."

Therefore, a transactional process occurs between the environmental context (risk and protective factors) and internal resiliency factors to create the resiliency process or outcome. Through her review, Kumpfer (1999) found that internal resiliency factors involve the following internal characteristics: cognitive (e.g., academic skills, intrapersonal reflective skills, planning skills, and creativity), emotional (e.g., emotional management skills, humor, ability to restore self-esteem, and happiness), spiritual (e.g., dreams/ goals and purpose in life, religious faith or affiliation, belief in oneself and one's uniqueness, and perseverance), behavioral/social competencies (e.g., interpersonal social skills, problem-solving skills, communication skills, and peer resistant skills), and physical well-being and physical competencies (e.g., good physical status, good health maintenance skills, physical talent development, and physical attractiveness).

The far right of the resiliency framework (Figure 15.1) presents three potential outcomes for the resiliency process (Kumpfer, 1999). Resilient reintegration outcomes involve being made stronger and reaching a higher state of resiliency. Homeostatic reintegration outcomes involve bouncing back to the original state that existed before the stress or crisis occurred. Maladaptive reintegration outcomes involve not demonstrating resiliency, in that the individual functions at a lower state.

The research on resiliency to date has focused on the factors that place individuals at greater risk and the factors that counteract those risk factors. In addition, the insightful criticisms of several scholars (e.g., Masten, 1999; Luthar et al., 2000) have advanced our thinking about the construct, methods, and findings of this work. This research is very useful in that it directs researchers toward potential processes that are worth investigating and toward instruments for analyzing resilience (Masten, 1999). The resiliency research, thus far, also provides us with a greater awareness of the

complexity of the concept or resilience (Masten, 2001) because of its integration within the human adaptation system. Indeed, Masten (2001) states,

> The great surprise of resilience research is the ordinariness of the phenomena. Resilience appears to be a common phenomenon that results in most cases from the operation of basic human adaptational systems. If those systems are protected and in good working order, development is robust even in the face of severe adversity; if these major systems are impaired, antecedent or consequent to adversity, then the risk for developmental problems is much greater, particularly if the environmental hazards are prolonged. (p. 227)

FUTURE DIRECTIONS AND CONCLUSIONS

The research being conducted in the area of risk factors, risk behaviors, protective factors, and resiliency points to new directions for future study. According to Rutter (1997), a main topic for future research is to examine the interplay between nature and nurture in development. Thus, future topics include how adolescents' exposure to adversity is related to parent behaviors, peer behaviors, and other significant individuals' behaviors and also how that exposure shapes cognitive and emotional development. These topics include the need for longitudinal studies, interdisciplinary research teams, and robust applied research.

There is a strong need for transactional, cross-lagged longitudinal studies that focus on elucidating the developmental processes underlying the protective and risk factors and the dynamic interactions of those factors, as well as the developmental pathways of individuals. These longitudinal studies and normative samples need to incorporate multifactorial designs and large samples (Masten, 1999). This design and methodology will enable an examination of the individual in the context and an investigation of transactional systems simultaneously. Studies would enable investigators to direct their inquiries toward discovering how assets, moderators, and other mechanisms work, that is, how they confer protective or risk characteristics and how these processes change as a function of development. Through examining mediators and moderators, an investigation could provide insight into the degree to which various mechanisms might influence the effects of a specific risk or protective factor or the interaction of those characteristics (Luthar et al., 2000).

The longitudinal studies proposed previously require integrated teams of researchers that comprise multiple disciplines and address multiple risk factors, protective factors, and outcomes (e.g., prosocial behaviors and risk behaviors). Research has provided ample evidence of the co-occurrence of risk factors, protective factors, and risk behaviors (Jessor, 1997; Lerner, 1995; Masten, 1999; Perkins, 1995), thus making the notion of single-issue studies seem unwise and inefficient. From the multiple processes (e.g., psychological, sociological, biological), varied pathways to resilience may result in the same effect as well as those that eventuate in multifinality among at-risk individuals (Luthar & Cushing, 1999). Therefore, the complex nature of this research necessitates expertise from various disciplines.

In the short term, comprehensive multivariate studies could be implemented to examine sets of the risk and protective factors simultaneously. These types of studies would enable an investigation of the extent to which one context (e.g., school, peer group, neighborhood) can compensate for another high-risk context or can detract from an enhancing context. Moreover, case studies of adolescents who demonstrate resiliency or engagement in risk behaviors would further elucidate the processes and mechanisms involved in multiple developmental pathways (Wang et al., 1999).

Applied research is needed that employs the accumulated knowledge of basic research to develop and test interventions. Multifaceted and longitudinal interventions need to target multiple risk and protective processes involving various levels of the ecology: micro system (organism, family, peers, schools), macro system (community and culture), and meso system (family and peer interaction; Masten, 1999). Indeed Masten (1999) states,

> Intervention and prevention efforts can be conceptualized as deliberate protective efforts. The key to intervention could lie in triggering or facilitating natural protective systems. A crucial question for the future is whether such efforts are best modeled on naturally occurring resiliency or not. (p. 293)

Experimental designs are required to test intervention and prevention strategies and to further enhance our understanding of the dynamic interactions of risk factors, protective factors, and the outcomes (e.g., engagement in risk behaviors or prosocial behaviors). This research also needs to explore the importance of the timing of the intervention; that is, there may be targeted interventions that will be most efficacious at particular times in an adolescent's life (Perry, 2000). Given the co-occurrence of risk factors, protective factors, and risk behaviors, intervention and prevention efforts must have a triadic focus of increasing multiple protective factors at multiple levels of the ecology, decreasing multiple risk factors at multiple levels of the ecology, and increasing competencies of individuals and systems. Indeed, recent research provides evidence that in communities where the citizens and institutions focus their attention on increasing

both competencies of youth and external supports at all levels of the ecology, there is a great likelihood for successfully creating conditions that enable the development of strong and resourceful youth (Furstenberg & Hughes, 1995; Perkins, Haas, & Keith, 1997).

The review of literature on risk factors, risk behaviors, protective factors, and resiliency presented here indicates that we have increased our scientific knowledge and understanding. However, we still have much to learn from the lives of adolescents who succumb to the adverse effects of risk factors, as well as those who do attain normal developmental trajectories despite significant threats to their development.

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CHAPTER 16

Relationships With Parents and Peers in Adolescence

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CURRENT MODELS AND RESEARCH 395
Parenting Models 395
Peer Relationships 402
Parent and Peer Models: A Need for Integration 407
EXPLAINING THE CONNECTIONS BETWEEN PARENT RELATIONSHIPS, PEER ASSOCIATION, AND ADOLESCENT ADJUSTMENT 408
Parent and Peer Relationships and Their Contexts 408
Structural Features of Parent and Peer Contexts 410
Context Choice 410
CONCLUSIONS 412
REFERENCES 412

How do parents and peers influence adolescent development? At the beginning of the twenty-first century, what is *unknown* about this topic far outweighs what is known; in this chapter, we argue that this is partly because of the question itself. As it is phrased, the question assumes that parents and peers influence adolescent development separately in a unidirectional fashion. These assumptions might actually block the way to a true understanding of the roles of parents and peers in adolescent development; such assumptions ignore the interrelatedness between parent and peer relationships and the roles that adolescents play as active agents in these relationships.

In this chapter, we start with certain assumptions about adolescents' relationships with parents and peers—assumptions that have not necessarily been incorporated into the research in these areas. First, we assume that these relationships are *bidirectional,* meaning that adolescents are not just passively influenced by the important people in their lives; they are active agents in choosing with whom they spend time, and they evoke certain reactions from people. Second, we assume that relationships are not simply related to adjustment but are themselves forms of adjustment. Parenting behaviors and peer relations do not just *produce* adjustment; they are also indicators and results of adjustment. Finally, we assume that parent and peer relationships are linked to each other. The form and quality of relationships with parents will determine which peer contexts the adolescent chooses, and that choice will evoke reactions from parents that will affect the parent-child relationship. In short, we argue that adolescents play active roles in choosing and shaping their relationships with parents and peers.

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CURRENT MODELS AND RESEARCH

There are large bodies of research on both parenting and peer relationships. Several well-defined causal models are currently used in research on parenting, but this is less true in peer research. The peer literature is defined less by clear causal models and more by characteristics of the particular peers that are considered, such as peer groups and best friends. Because these literatures are largely separate, we deal with them separately in the following sections.

Parenting Models

In this section, we discuss several of the most influential theoretical models dealing with parenting of adolescents. We do not endeavor to review all of the research that has been done on parenting of adolescents. Rather, we focus on models that have had the widest influence on the broad conclusions that have been drawn about parenting of adolescents—which parenting strategies are effective and why—and which lie behind the practical advice that parents often receive. In turn, for each model we take the most influential research as representative of the model.

The Parenting Styles Model

The parenting styles model has spawned a vast literature related to both child and adolescent development. Different parenting styles instruments have been created, and scores of empirical studies have been done. For the present purposes, we focus on the work that has been the most influential for adolescent research. This, of course, means the theoretical and empirical work of Baumrind and the theoretical work of Maccoby and Martin. We consider, in addition, the empirical work on adolescence that has appeared in flagship developmental journals such as *Child Development* and *Developmental Psychology,* and much of that has come from the Steinberg and Dornbusch research groups.

Background. The parenting styles model is based on the theoretical ideas originally presented by Baumrind (1967) and later revised by Maccoby and Martin (1983). Baumrind grouped nursery-school children according to their social adjustment and then determined how the parents of those groups differed. Her initial results were that (a) "children who were most self-reliant, self-controlled, explorative, and content" had parents who were "controlling and demanding; but they were also warm, rational, and receptive to the child's communication;" (b) "children who . . . were discontent, withdrawn, and distrustful" had parents who were "detached and controlling, and somewhat less warm than other parents;" and (c) "the least self-reliant, explorative, and self-controlled children" had parents who were "noncontrolling, nondemanding, and relatively warm" (Baumrind, 1971, pp. 1–2). Baumrind termed these three groups of parents *authoritative, authoritarian,* and *permissive,* respectively. Believing that parental control was particularly important, she further articulated the qualititative differences between authoritative and authoritarian parents' control strategies (Baumrind, 1968). Authoritative parents, according to Baumrind, communicated with the child about the demands that they placed on the child, whereas authoritarian parents tended to shut down communication about their demands.

Later, Maccoby and Martin (1983) argued that Baumrind's three styles and a wealth of other findings in the parenting literature could be roughly subsumed into a four-field table, with one axis contrasting parents who are controlling and demanding with those who are not and the other contrasting parents who are warm, responsive, and child-centered with those who are not. To their credit, Maccoby and Martin related these constructs more broadly to the psychological literature, and they suggested mechanisms through which such constructs might work. For instance, responsiveness, according to them, meant a willingness to respond to the child's signals. It was closer to the ideas of contingent responsiveness in attachment theory, to Pulkkinen's (1982) child centeredness, or to the concept of reinforcement in learning theory than it was to warmth in the sense of unconditional, noncontingent expressions of love and support. Based on Seligman's (1975) learned-helplessness studies, they suggested that parents' responsiveness should give the *child* a sense of control that—in authoritative families—would be balanced by the control that parents exerted over the child. Bidirectional communication between parents and child was an essential part of this process.

Yet although the four-field table has been widely used in the parenting styles research that has followed, in conceptual discussions of authoritativeness, communication has faded as an important feature and the concepts of warmth and responsiveness have been blurred. In this body of work, the major conceptual difference between authoritative and authoritarian parents is the presence or absence of warmth along with the high levels of control that both types of parents are thought to exert over their children.

Extensions of the Parenting Styles Model. More recently, parenting styles have been distinguished from parenting practices in an attempt to conceptually refine the model and improve the possibilities for discovering mechanisms (Darling & Steinberg, 1993). The argument was that parenting style should be thought of as the general emotional climate that parents create, whereas practices should be recognized as the goal-directed behaviors in which parents engage in order to change or shape the child's behavior. Practices can be more or less effective depending upon the emotional climate that parents have set up, because the emotional climate will make the child more or less receptive to being shaped by the practices.

In the empirical research that has followed this original, theoretical work, however, the differentiation between styles and practices is unclear. Sometimes, exactly the same full scales as had previously been used to measure styles are used again and labeled *practices* (e.g., Avenevoli, Sessa, & Steinberg, 1999). Other times, the majority of items in the measures of practices are identical or nearly identical to items previously used to measure parenting styles (e.g., B. B. Brown, Mounts, Lamborn, & Steinberg, 1993). Furthermore, it is difficult to look at these measures and determine whether they are conceptually tapping styles or practices.

Limitations of the Parenting Styles Model. We introduce the limitations of the parenting styles model with a history of parenting styles research that might have been. The story is fiction, but we tell it in order to point out how far the actual history of parenting styles research is from ideal. Our story anticipates the critique that follows, but it also points

out that the division of that critique into subtopics is somewhat artificial because the different limitations are all interrelated.

A Tale of Parenting Styles Research That We Wish We Could Tell. Once upon a time, more than 30 years ago, a researcher named Baumrind published her first works on parenting style. During the years that have followed, the original ideas have been refined so much that they are barely recognizable, but they are universally seen as the beginning of what is now a rich understanding of the parent-child interaction processes that are involved in development. These processes used to be called *parenting,* but that term is now recognized as simplistic and misleading because it denotes only part of the process. The search for knowledge in this area proceeded much like one would expect of a scientific endeavor. Baumrind's first studies were somewhat descriptive. She reported that in a small sample of mostly wealthy, white families, there was a covariation between broad patterns of parents' behaviors and broad patterns of children's behaviors. Her explanations of these findings assumed that parents with certain features had shaped certain behaviors in their children, mainly through behavioral mechanisms. Naturally, the untested assumptions and missing links in her logic were immediately pointed out, and researchers began working swiftly to (a) break down the global, conceptually heterogeneous parenting styles into their simplest, most basic elements; (b) develop construct-valid measures of those basic elements and clear, testable explanations of the mechanisms involved; (c) determine whether any of the children's characteristics—or any unrecognized third variables—might be driving Baumrind's correlational findings; and (d) determine whether any causal relations existed between parents' and children's characteristics, what the directions of effects were, whether they should be seen as main effects or interactions, and what mechanisms were involved, including moderating and mediating effects. These efforts helped to build an understanding of the complex links between parents' behaviors and children's adjustment—and everyone lived happily ever after. In the following section we present a detailed discussion of the more serious shortcomings in the parenting styles research. We limit our critique to the major theoretical works and the empirical studies that have been published in major journals. In the vast literature that exists outside of these major works, the same problems exist, often in more extreme forms.

What's Causing What? Correlation does not prove causality. This is what students learn in their first psychology course. Yet one of the most striking features of the parenting styles literature, from Baumrind's early works to the present, is the assumption that causality is known—parents, through their attitudes and behaviors, shape, mold, or otherwise produce children with certain characteristics. Examples can be found in the introduction and discussion sections of nearly every article on parenting styles—sometimes even in the titles. (Italics ours in these quotations.)

> "*Effects* of Authoritative Parental Control on Child Behavior." (Baumrind, 1966, title)
>
> "The *Influence* of Parenting Style on Adolescent Competence and Substance Use." (Baumrind, 1991, title)
>
> "The success of authoritative parents in *protecting* their adolescents from problem drug use and in *generating* competence should be emphasized . . . Unlike any other pattern, authoritative upbringing . . . consistently *generated* competence and *deterred* problem behavior." (Baumrind, 1991, p. 91)

Multiple examples can easily be found in a single article (e.g., Glasgow, Dornbusch, Troyer, Steinberg, & Ritter, 1997):

> "the beneficial *influence* of authoritative parenting does not diminish during adolescence" (p. 508)
>
> "authoritative parenting *promotes* academic success through a positive effect on adolescents' psychological orientation toward work" (p. 509)
>
> "Different constellations of parental behaviors and affective expressions *produce* variations in adolescents' perceptions of their own performance capacities . . . Among the four distinct parenting styles, authoritative parenting is the most successful in *fostering* personal and social responsibility in adolescents, without *limiting* their emerging autonomy and individuality" (p. 521)
>
> "characteristics of authoritative parenting *contribute* to the development of instrumental competence" (p. 511)
>
> "Indulgent parenting *fosters* instrumental competence . . . but to a lesser degree than authoritative parenting" (p. 511)
>
> "[this] characteristic of authoritarian parents *thwarts* the development of instrumental competence in adolescents" (p. 511)
>
> "use of extrinsic reinforcements . . . *undermines* adolescents' perceptions of competence" (p. 511)

The causality assumption began with Baumrind's original identification of parenting styles, because she identified parenting behaviors and child characteristics that covaried and then gave explanations for that covariation that implicitly and explicitly made parents the causal agents (e.g., Baumrind, 1966; Baumrind & Black, 1967). Perhaps this was a reflection of the behaviorist leanings of Baumrind and other parenting styles researchers, or perhaps it was a reflection of the assumptions of the broader culture, as has been suggested earlier (Bell, 1968). At any rate, the assumption that causality is known has continued, and the language seems to have gotten progressively stronger with time, as though the

accumulation of correlational results could somehow prove causality.

Although longitudinal studies of parenting styles have been conducted, rarely have the data been used to determine whether causality might be bidirectional. They have instead focused on arguing for parent-to-child effects. For example, a cross-lagged design with parenting and child-behavior measures at two points in time could potentially be used to provide information about whether the correlations between adolescent adjustment and parenting represent unidirectional or bidirectional effects. When only half of this pattern is tested with only parenting as the earlier predictor (e.g., Steinberg, Lamborn, Darling, Mounts, & Dornbusch, 1994), it is impossible to find a bidirectional effect. The use of this design reveals a disinterest in potential bidirectional effects.

Parenting styles researchers have held to a unidirectional, causal interpretation of their correlational findings in spite of growing literatures that present convincing alternative views. For instance, a number of scholars have offered alternative interpretations of the correlations between parents' and children's behaviors that exist in the literature, including—but not limited to—the parenting styles literature (e.g., Bell, 1968; C. Lewis, 1981; Harris, 1995, 1998). At about the same time that Baumrind published her first parenting styles study, Bell (1968) published a review paper questioning the unidirectional interpretations that had been made in socialization studies in general. He cited many examples of experimental findings in which parents' and other adults' behaviors had changed in response to certain children's behaviors; he argued that because of these findings, parent-child correlations should not be interpreted as only parent-to-child effects.

Later, C. Lewis (1981) questioned the directionality assumption in Baumrind's published studies—particularly Baumrind's claim that parental control produced well-adjusted children. She pointed out that in Baumrind's studies it was impossible to tell whether the parental control measures tapped control or simply harmonious relationships, for which the child's temperament could be as important as the parents' ways of dealing with the child (see Baumrind, 1983, for a reply). Furthermore, Lewis pointed out that in Baumrind's published studies the items that really distinguished the parents of competent children from all other groups of parents had nothing to do with the use of control. The strongest predictors were "respect the child's decision," "use reason to obtain compliance," "encourage verbal give and take," and "satisfy child," (C. Lewis, 1981, p. 562), which leaves open the possibility that competence had developed through some process other than parental control. This is especially evident because items such as *respect* and *use reason* may depend on child characteristics.

More recently, Harris (1995, 1998) offered a controversial critique of the assumption that parents influence children in unidirectional fashion. Her critique 'like Bell's and Lewis's, covered the parenting literature more broadly, and was not limited to parenting styles. Concerning the parenting styles findings, however, she offered a reverse-causality explanation for the correlations between authoritative parenting and good child adjustment. She argued that most parents in Western cultures try to be authoritative because they know that is what parents "should" be. If the child behaves well (i.e., is well-adjusted), then parents have no reason to change their strategy. If the child is difficult to manage (i.e., not well-adjusted), however, then they have to become more controlling and less democratic (i.e., more authoritarian). Hence, according to this reinterpretation, parents adjust to the child's behavior rather than producing it, and this adjustment explains the correlation between parenting styles and children's behavior.

In addition, in the parenting literature more broadly there are now numerous experimental and longitudinal studies—from which causality can actually be inferred—that show very clearly that parents and other adults do sometimes react to children's characteristics and adjust their behavior accordingly (e.g., Anderson, Lytton, & Romney, 1986; Bell & Chapman, 1986 for a review; Buss, 1981; Dix, Ruble, Grusec, & Nixon, 1986; Lerner & Spanier, 1978; M. Lewis & Rosenblum, 1974; Mulhern & Passman, 1981; Passman & Blackwelder, 1981) or that show good evidence for bidirectional effects (e.g., Hastings & Rubin, 1999; Kochanska, 1998; Lytton, 1990, 2000; Mink & Nihira, 1986; Stice & Barrera, 1995).

Finally, behavioral genetic studies also cast reasonable doubt on the unidirectional assumption (e.g., Ge et al., 1996; Reiss, Neiderhiser, Hetherington, & Plomin, 2000). They offer evidence that the links between parenting behaviors and children's adjustment are affected by the child's genetic makeup from both directions. First, the child's genetic makeup—expressed in temperament and dispositions—evokes certain parenting behaviors, which then influence the child's adjustment. Second, the child's genetic makeup—again expressed in temperament and dispositions—affects adjustment directly, and that influences how parents react to the child (parenting behaviors). Twin, adoption, and sibling studies also suggest that parents react to their child's unique genetic makeup in that children's unique experiences are more predictive of adjustment than are the experiences they share with their siblings (i.e., parenting factors; Plomin & Daniels, 1987; Plomin, Reiss, Hetherington, & Howe, 1994).

Let us be clear. We are *not* arguing that solely child-to-parent effects are driving the correlations between parenting

styles and child adjustment. We do argue, however, that there is enough evidence that child-to-parent effects exist and that they cannot be discounted. In our view, a bidirectional model of parent-adolescent relationships is needed. Any model that takes a unidirectional view—parent-to-child or child-to-parent—is of limited usefulness.

What's Driving the Results? This is another question that has not been pursued rigorously. Actually, it is a whole complex series of questions about the basic constructs, the measures, and the mechanisms through which the basic constructs are thought to work. Concerning the *basic constructs*, even if one limits oneself to the major publications in this area, one can end up wondering *what* is *authoritative parenting?* Is it as complex as Maccoby and Martin (1983) theorized, involving firm control, demands for mature behavior, emotional warmth, responsiveness to the child's expressed needs and desires, being encouraging of bidirectional communication and devoted to democratic decision-making, and being child- rather than parent-centered? Or is it as simple as warmth-involvement and strictness-supervision (e.g., Lamborn, Mounts, Steinberg, & Dornbusch, 1991; Steinberg et al., 1994)? Concerning the *measures*, if authoritative parenting is as simple as warmth-involvement and strictness-supervision, then why do items that specifically tap communication appear on both types of scales? And why, for example, is knowing a lot about who the child's friends are a warmth-involvement item, whereas knowing a lot about what the child does after school and in his or her free time is a strictness-supervision item (e.g., Lamborn et al., 1991; Steinberg et al., 1994)? Indeed, how is knowing (an end product) a measure of either warmth or strictness? Moreover (although a more detailed discussion of this issue is beyond the scope of this chapter), one gets an even more confusing picture if one looks at the parenting styles literature as a whole—and not just at the major theoretical works and the empirical studies in flagship journals.

Then, concerning *mechanisms,* without having these construct and measurement issues sorted out, it is difficult to begin to sort out the influences of the various elements, how many of the features of the different styles are really important, the direction of effects, and whether they work additively or interactively. Indeed, parenting styles researchers have seemed fairly unconcerned about demonstrating empirically *why* or *how* authoritative parenting might work. The literature abounds with post hoc explanations and untested assumptions. Baumrind clearly favored learning explanations. In her view, authoritative parents modeled desirable behavior through their willingness to communicate; created classically conditioned good feelings through their warmth and acceptance that would improve their ability to reinforce their children's desirable behavior; and provided appropriate reinforcements and limits through their firm behavioral control (Baumrind, 1971). Still, these explanations remained untested.

The rare studies that have tried to look at mechanisms have been weak in terms of design. For instance, one study tried to test the idea that the connection between authoritative parenting and school performance was due to the fact that authoritative parents foster the right attributional styles in children, which in turn are linked to school performance (Glasgow et al., 1997). But the hypothesized mechanism, *fostering,* was never examined. Only the concurrent correlation between styles and attributions was examined; again, this correlation between a parenting measure and a child behavior was assumed to represent a causal connection in which parents had fostered the attributional style. Hence, this study was not really a test of a mechanism.

Summary. The parenting styles model is a static, unidirectional view of socialization in the family context. It is static in that it assumes that parents *are* a certain way throughout the child's life, and that their way of being produces—at some undefined point in time—a child with certain characteristics. Furthermore, parents are assumed to have the same style with each child. There is no recognition that parenting might be a developmental process in which parents learn what works and does not work with each child, or in which they develop certain undesirable parenting behaviors through repeated frustrations with a difficult child—as stated by one of the most prominent parenting styles research groups: "Parenting style is a characteristic of the parent (i.e., it is a feature of the child's social environment), independent of characteristics of the developing person" (Darling & Steinberg, 1993, p. 487). Under assumptions such as these, the parenting styles paradigm can bring us no further toward understanding the bidirectional processes operating over time between parents and children that are inextricably linked to the child's adjustment.

The Attachment Model

Attachment theory (Bowlby, 1969/1982) does offer a way of looking at relationships that could be truly dyadic. It views the emotional bond between parents and children as a feedback system, controlling a balance between children's desires for closeness with parents and those for exploring the world. This has been likened to the physiological control systems that maintain physiological measures—such as blood pressure and body temperature—within set limits

(Bowlby, 1988). According to this theory, optimally, during times of stress, infants and adolescents will seek comfort from their caregivers, and parents will give their children a sense of security—a feeling that all is well (Ainsworth, 1990). The need to be close to parents in times of distress—and for parents to respond to their children's distress—are theorized to be biologically based to promote survival of the species. The attachment system draws parents and children together, therefore, to protect children from harm. The positive emotions that can be derived from closeness, such as a sense of security, make attachment behaviors rewarding to both parents and children.

A balance between emerging independence and closeness with parents is a central feature of attachment theory and particularly relevant as children grow into adolescence. Children and parents are increasingly able to take each other's perspectives into consideration and to negotiate in their relationship. Adolescents continue to use parents as a secure base for exploration, using temporary returns to the safe haven of parents to help them, particularly in times of distress, illness, fear, or stress (Marvin & Britner, 1999). The emotional availability of the attachment figure rather than physical proximity becomes the more frequent goal of the attachment system. Attachment experiences not only provide a secure base for adolescents to explore their talents and experiences in a variety of contexts, but such experiences also prepare adolescents to become socially connected with others and to learn how to be caregivers for others (Crittenden, 1992).

Not all attachment relationships, however, provide a truly secure base. The security of attachment relationships can be distinguished by the ways that members of the dyad—such as a parent and child—respond to each other during times of distress. Attachment theory predicts that parents of securely attached children respond consistently and sensitively (Ainsworth, Blehar, Waters, & Wall, 1978). Secure attachments are characterized by open, flexible communication between parents and children around emotion signals, promoting a balance and range of positive and negative emotions (Bowlby, 1988; Cassidy, 1994). Insecure attachments, in contrast, reveal problematic ways of communicating emotions—partners may exhibit a restricted range of emotions or heighten their displays of emotion (Bowlby, 1988; Cassidy, 1994). Parents of insecurely attached children, for example, may respond inconsistently to expressions of distress, ignore them, or act punitively.

Attachment theory suggests that the quality of individuals' interactions with caregivers over time creates a model of how relationships work and of their own value in relationships (Bowlby, 1969/1982; Bretherton, 1985). These cognitive models are thought to guide feelings, behaviors, and how information about the world is processed. Bowlby described these representations of attachment relationships as *working models* because he viewed them as being open to new input and modification as circumstances and relationships change. Individuals are believed to learn both sides of the attachment relationship, and children are motivated to reenact both sides of their attachment relationship in their other relationships with peers, teachers, and others (Sroufe & Fleeson, 1986). Children learn, for instance, whether important people in their lives will come to their aid when they need help and ways of responding to the distress of others.

This aspect of attachment theory offers a perspective to understanding relations among relationships with parents, peers, and other significant people in children's lives. As adolescents begin to spend more time with peers of their own choosing, working models are hypothesized to influence their selection of friends and the quality of their peer interactions. Adolescents are likely to choose friends as attachment figures who fit with their existing working models. The central importance of peers in the lives of adolescents has received a great deal of attention (Allen, Moore, Kuperminc, & Bell, 1998; Csikszenthmihalyi & Larson, 1984), with intimacy in friendships being described as one of the defining characteristics of this age group (Buhrmester, 1990; Sullivan, 1953). The exceptional intensity of adolescent peer relationships has in fact been likened to that of attachment relationships (Ainsworth, 1989; Ainsworth & Marvin, 1995; Allen et al., 1998; Bowlby, 1988).

Furthermore, ways of communicating in attachment relationships appear relevant to understanding adolescents' adjustment (Allen, Aber, & Leadbeater, 1990; Cooper, Shaver, & Collins, 1998; Engels, Finkenauer, Meeus, & Dekovic, 2001) and emotion regulation (Biesecker, 2001; Kobak & Sceery, 1988; Zimmermann, Maier, Winter, & Grossmann, 2001). Adolescents using insecure attachment strategies may have difficulties understanding their own and others' emotions, leaving them more vulnerable to misinterpreting ambiguous situations as hostile and less able to repair disruptions in relationships (Kobak & Cole, 1994). These misinterpretations may lead to hostile or aggressive actions, withdrawal from peers, or other behaviors that undermine the formation of healthy relationships and foster negative feelings about the self. Therefore, understanding the role of these insecure attachment strategies—or ways of communicating and responding to feelings of distress—may shed some light on certain adolescents' "problem behaviors" (Allen et al., 1990) such as substance abuse and conduct disorder.

The attachment model has come further than the other models reviewed here have in portraying the adolescent as an

active agent in his or her own adjustment and in trying to explain the links between parent and peer relationships. This model, however, suffers from some of the same limitations as the other parenting models. First, until recently there has been a tendency to view parent relations separately from other relationship experiences. We need more information about how attachment relationships with mothers *and* fathers, siblings, extended family, peers, and romantic partners relate, interact, and possibly modify each other over time.

A second issue is that the different measures used to assess attachment at different ages—particularly after early childhood—have not always demonstrated conceptual equivalence or construct validity. A variety of techniques have been developed to tap attachment in adolescence and adulthood, most of which are based on interviews and self-reports (e.g., Bartholomew & Horowitz, 1991; Brennan, Clark, & Shaver, 1998; Collins & Read, 1990; C. George, Kaplan, & Main, 1985; Hazan & Shaver, 1987; Kenny, 1987), but there is a lack of convergence about a common, reliable method. Although adult measures share theoretical links with measures used in infancy and childhood, the underlying approaches can differ radically between them; little research has been conducted or published to address relations between these different measures. These sorts of psychometric issues make it difficult for attachment researchers to ensure that they are communicating about the same constructs (Brennan et al., 1998). A piece of this problem is an overly broad use of the term *attachment* to encompass more general qualities of the parent-child relationship. Although attachment may be associated with other aspects of parenting, researchers need to make sure that they mean the same thing when they measure it.

Last, attachment researchers are as likely as other parenting researchers are to look almost exclusively at parent effects unless the focus of research is to study certain child influences on the attachment relationship, such as infant temperament (Calkins & Fox, 1992; Crockenberg, 1981; Goldsmith & Alansky, 1987; Susman-Stillman, Kalkose, Egeland, & Waldman, 1996) or Down Syndrome (Ganiban, Barnett, & Cicchetti, 2000; Thompson, Cicchetti, Lamb, & Malkin, 1985). Otherwise, the direction of causality between the quality of attachment relationships and other constructs is almost always examined in one way, suggesting attachment as a predictor of child psychopathology (Greenberg, 1999), for example. The possibility of reverse effects on working models remains largely unknown; for instance, do insecure attachments to parents cause a youth to become delinquent, or do parents who know that their child is delinquent disengage emotionally, perpetuating a pattern of insecurity? Although the attachment system is said to reside within the individual—the child—considering it as a feedback system makes it reasonable to consider the effects of the child's ways of responding to situations of distress on the parent. How do adolescents, for example, give parents a sense that all is well, and how do they activate their parents' attachment systems? How do parents respond when the stressor activating their attachment system is their own adolescent's behavior? How do parents' attachment histories with their own parents and partners color their reactions to adolescents' behaviors? Who sets the thermostat of the attachment system when?

The Direct Parental Control Model

The main assumption behind this model is that parents need to control their adolescents' behavior and that they will have their influence through direct supervision and control of the adolescents' activities and associations (e.g., Laub & Sampson, 1988; Leibner & Wacker, 1997; Wells & Rankin, 1988). The criterion variables are usually delinquency, drug use, and other problem behaviors. Studies of delinquency in the criminality literature often lean heavily on this model.

There is a problem inherent in the direct control idea, however, which is that parents are seldom physically present when their adolescents are away from home (Csikszentmihalyi & Larson, 1984; Hirschi, 1969; Nye,1958). Therefore, direct control of their behavior is not usually possible. Another problem with this literature lies in the assumptions that are made about intervening processes that are not studied directly. The literature on parental monitoring, which rests on the direct parental control model, provides an illustration. The main idea is that parents' tracking and control efforts are necessary to keep youths from engaging in problem behavior and away from deviant peers who would draw them into problem behavior. A large literature links high parental monitoring to lower levels of (a) delinquency, (b) associations with deviant peers, (c) drug and alcohol use, (d) cigarette smoking, and (e) risky sexual activity (for a review of early work, see Patterson & Stouthamer-Loeber, 1984; for some of the many empirical examples, see Biglan, Duncan, Ary, & Smolkowski, 1995; Cernkovich & Giordano, 1987; Chassin, Pillow, Curran, Molina, & Barrera, 1993; Crouter, MacDermid, McHale, & Perry-Jenkins, 1990; Dishion, Capaldi, Spracklen, & Li, 1995; Flannery, Vazsonyi, Torquati, & Fridrich, 1994; Fletcher, Darling, Steinberg, & Dornbusch, 1995; Fridrich & Flannery, 1995; McCord, 1986; Metzler, Noell, Biglan, Ary, & Smolkowski, 1994; Romer et al., 1994; Sampson & Laub, 1994; Weintraub & Gold, 1991; White & Kaufman, 1997).

This literature involves at least two untested assumptions. The first is that if parents have knowledge, it is

because they have done tracking and surveillance to get it. This assumption is inherent in the operationalization of monitoring in this whole literature. Even though monitoring has been conceptualized as tracking and surveillance, which are actions, it has almost universally been operationalized as knowledge, which is not an action but an end result. This literature involves a second untested assumption regarding why parents' knowledge might be important or why it is linked to fewer adolescent problem behaviors and better overall adjustment. The assumption is that if parents have knowledge about their youths' activities and associations, they will be aware if small infractions of rules occur or if dangerous associations with deviant peers start to develop, and they can step in with direct control to stop these small problems before they become large problems. Hence, direct control is an intervening process that is assumed to explain the connection between parents' knowledge and adolescent behavior.

In our research, we have questioned both of these assumptions. We have pointed out this mismatch between the conceptualization of monitoring as tracking and surveillance and its operationalization as parents' knowledge, and we have presented empirical evidence to suggest that parents get most of their information about adolescents' day-to-day activities through the youth's free, spontaneous disclosure of information (Stattin & Kerr, 2000). Parents' active efforts to get information, in contrast, are only weakly related to their knowledge. We have shown, further, that children who tell their parents a lot about their daily activities, rather than those who are strongly controlled by their parents, are better adjusted in a number of different ways (Kerr & Stattin, 2000). In our work, high disclosure of daily activities was linked to less involvement in antisocial behavior, less school maladjustment, less depressed mood, higher self-confidence, better relationships with both parents, and fewer friends with undesirable characteristics. Parents' active efforts showed few links to adjustment. In fact, they were sometimes related to poorer rather than better adjustment. We went on to show that parents' direct control strategies (controlling adolescents' freedom to come and go as they please without informing parents and getting their permission ahead of time or explaining themselves afterward) were correlated with youths' feelings of being overly controlled—which in turn were linked to poor adjustment on all the measures mentioned previously.

These results suggest that the link between parents' knowledge and adolescent adjustment does not exist because surveillance prevents undesirable behavior, as has so often been claimed. Rather, it is because child disclosure is heavily represented in parents' knowledge, and children who talk openly with their parents tend to be better adjusted. Hence, this raises the larger theoretical question of whether parents' knowledge in and of itself is actually important. Does it play any causal role in adolescent adjustment? If it does, and if that role is not what has been assumed—allowing parents to know when to intervene with direct control—then what is it? Or alternatively, is this just a classic example of an apparent cause-and-effect relation that only appears because there is a third variable that is producing both the apparent cause and the apparent effect? In our research, we have suggested that parents' knowledge *is* important, but not for the reasons that researchers have assumed (so that parents will know when to intervene with direct control). We have theorized instead that knowledge underlies trust, and trust is an important part of a complex, ongoing, bidirectional process within the family in which parents and children react to each other. This process in turn influences the child's adjustment both directly and indirectly through mechanisms that we describe later in this chapter.

Conclusions

The major views of parenting that have dominated research on adolescence during the past 20 years have concentrated on two broad classes of parenting behaviors. One concerns the relational side of parenting—emotional warmth and responsiveness to the youth's needs. The other concerns the regulatory-supervisory side of parenting—active regulation of the youth's activities and associations. Both these classes of parenting behaviors are considered important, particularly the regulatory-supervisory behaviors. All of these models are limited by an assumption that causality resides in parents' behavior, and some models are further limited by measures that have questionable construct validity.

Peer Relationships

In current thinking, the adolescent peer context is regarded as a prime instigator of new behaviors and lifestyles. Friendships are considered more egalitarian than are adult-child relations and are thought to provide young people with approval and support in daily life; experiences of sharing and cooperating; standards for social comparison; opportunities to try out adult roles; leisure time recreation; and forums for personal and intimate disclosure of experiences, thoughts, and ideas (Bagwell, Newcomb, & Bukowski, 1998; Cairns & Cairns, 1994; Hartup, 1983; Parker, Rubin, Price, & DeRosier, 1995).

Friendships are voluntary and self-initiated, but they are also constrained by the broader physical context. Hence, peer networks, cliques, and friendships all describe social associations between individuals of roughly the same age who share about the same ecological conditions, interests, and activities (Kirchler, Palmonari, & Pombeni, 1996; Ladd, 1989; Reisman, 1985). They live in the same neighborhood, are members of the same clubs and associations, and attend the same school or class. They also tend to be of the same sex and ethnicity (Hartup, 1983; Kandel, 1978). These features, however, say more about the physical environment in which adolescents live than about the actual content of the friendships.

Adolescents also tend to choose peers who are attitudinally and behaviorally similar to themselves (Dishion, Patterson, & Griesler, 1994; Hartup, 1983, 1996; Kandel, 1978, 1986). Yet to focus only on similarities is to ignore one of the possible developmental functions of peer association—that it forces youths to understand differences between themselves and others. We should expect that young people choose peers who are different from themselves in certain ways and who satisfy different needs—peers whom they admire for some reason, who have talents they do not have or interests that are different from theirs, and whom they can talk with, learn from, and gain insights from (Eder, 1985; Smith & Inder, 1990).

The theoretical models of peer influences that have been used in research have mainly been the social-cognitive development model and the social learning model. The first rests on the ideas of theorists such as Piaget, Cooley, Mead, Sullivan, and—to some extent—Erikson and Vygotsky. The main idea is that peer relationships help adolescents gain a more sophisticated social understanding and develop cognitively because negotiating relationships and disagreements with peers forces them to take another person's point of view and develop empathy and understanding. Sullivan's clinically derived theory of interpersonal relations was one of the first approaches to directly address the developmental function of peer groups and friendships. From Sullivan's perspective, "chums" or best friends were essential for the evolution of the self-system, cognitive-emotional development, and good adjustment. From a contemporary life span developmental perspective, Youniss (1980) proposed a theory of relationships and self-development that was drawn from the writings of Sullivan and Piaget. The social learning model rests on the ideas of theorists such as Bandura, Cairns, Patterson, Dishion, and colleagues, Coleman, and Bronfenbrenner. The main idea is that peers socialize each other by modeling, imitating, encouraging, and rewarding certain behaviors. This general idea can be seen in much of the research on peer influences.

Research on Peer Relationships

Research on peer relationships addresses questions that derive directly from the particular peers under consideration. Research on dyadic peer relationships examines how friendships develop. Research on groups of peers in predefined settings such as school classrooms looks at how adolescents acquire peer-group status and how that status and the characteristics of the peers influence the individual's behavior. Research on peers in self-chosen settings looks at how peer groups are formed in the natural ecology and how these groups influence individual behavior.

Dyadic Peer Relationships. Many scholars agree that close friends have the potential to serve unique functions in development. Friendships help adolescents build social skills and learn that others think and feel differently from the way they do. Most adolescents have a good friend—often several (Hartup, 1992). A huge literature suggests that intimacy and empathy, self-disclosure, and mutual responsiveness emerge within these friendships. Friendships are self-initiated and are based on openness, affection, empathy, loyalty, and reciprocity, and they make adolescents sensitive to others' perspectives, roles, and feelings (Berndt, 1982; Marcus, 1996; Sullivan, 1953). The behavioral interactions that differentiate friends from nonfriends typically involve positive engagement, conflict management, and ability to engage in tasks together (Hartup, 1996). Similarity and dissimilarity; friendship selection, maintenance, and dissolution; and gender differences in friendships also have all been addressed in the literature on best friends.

Relationships With Groups of Peers: The Peers in Predefined Social Settings. Most studies of peer relations and interactions have been done in the classroom or school, a setting that is predefined for adolescents. During the 1970s and 1980s, hundreds of studies were conducted that examined the relationship between peer status (popular vs. unpopular, neglected, controversial, and rejected) and coping and problem solving, social skills and competence, school adjustment and achievement, personality, emotions, loneliness, prosocial and agonistic behavior, and more (Parker, et al., 1995). These studies showed a strong link between peer status and individual behavior at school and indicated that status and behavior are correlated with later school dropout, delinquency, and mental health problems. These studies present a

unidirectional view of causality, however, because they assume that peer status plays a causal role in these correlations.

Relationships With Natural Groups of Peers: The Peers in Self-Chosen Settings. Demographic and ecological investigations have provided insights into how peer groups naturally evolve over time, how broader networks are formed, and how and when cliques and crowds emerge (B. B. Brown et al., 1993; Dunphy, 1963). They have shed light on the role of social networks for adolescents with behavioral problems—and on how deviant peer groups and gangs are formed and maintained (Goldstein, 1994). They have dealt with group processes and behavior stability (Sarnecki, in press). Studies in this domain have shown the close connection between leisure settings and transition behaviors (Silbereisen & Noack, 1988) and between choosing to enter a particular activity such as sports and encountering new friendship experiences (B. B. Brown, 1990; Fine, 1980). These studies have provided some information about properties of peer groups; bases of peer group selection, maintenance, and dissolution; and gender- and age-related differences in peer group configurations.

Peer Associations: Unidirectional Effects?

Historically, adolescents have been portrayed as being receptive to the influence of peers. In view of (a) the number of empirical studies that have claimed to demonstrate that peers influence adolescents' behaviors, (b) existing theoretical models that depict peers as a major socialization influence (cf. differential association, Sutherland & Cressey, 1978; and social control theories, Hirschi, 1969), (c) the many textbooks that support the argument that peers have a pervasive socializing influence on behavior of adolescents, and (d) layman's views, undoubtedly peers should be viewed as having an important steering influence on adolescents' behavior and development. Indeed, one finding that consistently turns up in empirical studies is that peer characteristics are outstanding correlates of individuals' transition behaviors. For smoking, sexuality, delinquency, and drinking or drug use, there is a strong link between individual behavior and peer behavior. In the majority of studies that have looked at the relative roles of parent and peer characteristics in social behavior, peer relationships turn out to be the most predictive.

Factors That Interfere With the Ability to Infer Causality

Researchers refer to peer association with causal terms such as *influence, impact,* or *pressure*. But many studies do not take adequate account of selection factors, do not control appropriately for relevant individual differences, are not based on independent reports of peers, are ecologically questionable, fail to consider alternative explanations, or suffer from any combination of these problems.

Cross-Sectional Designs. It goes without saying that a correlation between characteristics in subjects and their friends in any cross-sectional study cannot be interpreted causally. The direction of influence may go both ways. For more firm conclusions about causality, longitudinal designs are needed. But causal language—implying a unidirectional peer impact on individual behavior and development—is frequently used in studies that look at concurrent correlates.

Shared Activities. If we focus on behaviors that usually occur in groups, high subject-peer group correlations are not in and of themselves evidence of peer influence. Consider one example: Because delinquent acts are most often performed in groups, one would be very surprised *not* to find an association between delinquency in the adolescent and delinquency in his or her peer group. However, this association does not indicate whether the adolescent was pressured to offend, tended to be the active instigator, or was an active part of planning these offenses (Farrington, 1998).

Perceptual Biases. Many studies deduce peer influences from adolescents' self-reports of peer behavior. For example, many investigations have reported that self-reports of friends' deviance are strongly linked to the subject's own delinquency. Indeed, based on findings from peer perception measures, delinquent peers have been referred to as the best predictor of delinquency (Dishion et al., 1994; Oetting & Donnermeyer, 1998). This raises the old problem of shared method-variance. High correlations between one's own and one's peers' behavior might be partly explained by the fact that adolescents project their own behavior onto friends or justify or rationalize their own behaviors, thereby misreporting their friends' deviance (Conger & Rueter, 1996; Kandel, 1996; Urberg, Degirmencioglu, & Pilgrim, 1997). Studies suggest that self-reports of peers' behaviors are more strongly associated with individuals' own behavior than are independent measures of peers' behaviors (cf. Iannotti, Bush, & Weinfurt, 1996). Hence, data from self-reports of peer behavior are likely to systematically overestimate the role of peer association in individual development (Kandel, 1985).

School as the Analytic Unit. Adolescent peer studies have typically dealt with peer groups in one setting—the school—and the ecological validity of this practice is questionable (Adler & Adler, 1998; Campbell, 1980; T. P. George & Hartmann, 1996; Giordano, Cernkovich, & Pugh, 1986;

Hartup, 1983). A school is an administrative system. Although circumstances can vary with the type of school, students usually have little choice about their classmates and they cannot influence the social environment much. Undoubtedly, the school context should be considered the major breeding ground for peer associations from childhood into late adolescence (Parker & Asher, 1993). But many leisure-time friends are not classmates (T. P. George & Hartmann, 1996; Smith & Inder, 1990). Out-of-school peers are more heterogeneous than in-school peers in both age and gender (cf. Allen, 1989; T. P. George & Hartmann, 1996; Smith & Inder, 1990), and they might have more important implications for individual behavior—concurrently or predictively (Krappmann et al, 1993). It is likely that peers outside of school will be particularly important for adolescents who do not consider school as a valued context or who for reasons such as being rejected by their classmates are not part of the activities of the majority in their class (Ladd, 1983). T. P. George and Hartmann (1996) reported that unpopular 11- to 12-year-olds had more friends outside of school than did average and popular subjects, and the unpopular youths in the class had almost twice as many friends of a different age as the popular youths had. In their investigations of the implications of pubertal maturation on transition behaviors, Stattin and Magnusson (1990) showed that the peers who were most strongly associated with the social behaviors of early-developing females were not conventional types of peers. Most influential were the peers who were chronologically older and those who were in other classes or had quit school—particularly older males. Classroom-based studies would exclude these important peer contacts.

Little is known about leisure-time peer groups or the differences between in-school and out-of-school friends. For example, one of the common questions about deviant peers is the proportion of close friends that the individual has (from none, to half, to all) who engage in delinquent acts (Elliot, Huizinga, & Menard, 1989). This question is standard in research on juvenile delinquency, but it is not informative about who these peers are, where and when they interact with the youth, or what their support or influence is. More research on relationships with peers outside of school is needed for a more accurate picture of how the individual influences and is influenced by his or her peers across contexts.

Peer Selection and Peer Socialization. Kandel (1978, 1985) first questioned the common practice of interpreting peer association causally and unidirectionally when in studies of homophily, she differentiated peer selection from peer socialization processes. According to a peer socialization interpretation, youths become similar to their peers as they gradually conform to the behaviors, fashions, values, and attitudes that are normative in the peer group. In contrast, according to a peer selection interpretation, similarity exists because youths choose to engage with peers who are similar to themselves. If selection is a major operating factor, then correlations between peer association and individual behavior are spurious (Hartup, 1983, 1992).

Cross-sectional studies cannot possibly differentiate peer selection from peer socialization; this requires longitudinal data. Kandel's studies on juvenile drinking (1978; 1985) were based on best friend nominations at two time points, and they showed that both these processes operated to produce similarities between adolescents and their friends. Other studies have confirmed Kandel's findings. In the domains of drinking and smoking, peer selection is as important as peer socialization (Engels, Knibbe, de Vries, Drop, & van Breukelen, 1999; Engels, Knibbe, Drop, & de Haan, 1997; Ennet & Bauman, 1994; Farrell & Danish, 1993; Fisher & Bauman, 1998; Mounts & Steinberg, 1995; Urberg et al., 1997). These studies clearly show that peer socialization is not the whole story behind the often-found associations between measures of individual and peer behavior.

Other longitudinal studies support this view. For example, they reveal that peer associations change greatly in adolescence, but aggressiveness and antisocial behavior are quite stable (Loeber, 1991; Olweus, 1979; Stattin & Magnusson, 1989), and this pattern of findings argues for selection. Also, several strong longitudinal studies that have looked into complex networks of peer relations over time suggest a reciprocal relationship between peer selection and peer socialization (Patterson, Reid, & Dishion, 1992). Peer association, it appears, is best viewed as a process that includes selection, deselection, and socialization in the peer group (Kandel, 1985, 1986).

In the delinquency literature, studies have looked more closely at the conditions under which selection versus socialization operates. They suggest that the common view that teenagers are drawn into delinquency because of "bad peers" is too simple. Rather, active selection of deviant peers by problem-prone adolescents seems to be particularly pronounced during the early stages of engaging in delinquency and other risk behaviors (Conger & Rueter, 1996; Galambos & Silbereisen, 1987; Kandel, 1985; Maggs & Galambos, 1993; Patterson, DeBaryshe, & Ramsey, 1989). During the later stages, interactions with deviant friends and the mutual reinforcement of common activities accelerate and diversify the criminal activities of adolescents who have a previous history of problematic adjustment (Dishion, French, & Patterson, 1995). According to the *deviancy training hypothesis,* collective antisocial talk among peers in these circles

reinforces antisocial talk and antisocial behavior, thereby escalating the level of delinquent behavior for the group members over time (Dishion et al., 1994).

Other studies in the literature show that peer influence is an issue of individual characteristics, youths' prior experiences, and peer characteristics (Agnew, 1991; Fergusson, Lynskey, & Horwood, 1996; Moffitt, 1993; Mounts & Steinberg, 1995; Vitaro, Tremblay, Kerr, Pagani, & Bukowski, 1997). For example, association with deviant friends is considered more likely to predict future delinquency among late starters or transitory delinquents, but it is less likely to affect the behavior of early starters or life-course persistent delinquents. In support of this suggestion, Vitaro et al. (1997) found that having deviant friends was associated with an increase in delinquent behavior among moderately disruptive youths but not among highly disruptive youths.

Still, the general problem of using the school context in peer research prevails. The conclusions about peer selection and peer socialization processes discussed previously were based on data taken from friends at school (Kandel, 1978, 1985). There is little information about peer selection and socialization in out-of-school settings. To our knowledge, a study conducted by Kiesner (2000) is unique in that it included peers in the school context as well as neighborhood friends; this was accomplished by studying an entire community at once. Kiesner's results suggested that in-school and out-of-school peer groups both contribute to the concurrent prediction of individual problem behavior and homework and curfew compliance, whereas only the out-of-school group explained individual involvement in sports (which in Italy take place outside the school) and social activities. Moreover, in-school and out-of-school peer status (defined as the number of nominations received as a member of the other participants' in-school and out-of-school groups) interacted in explaining individual differences in depressed mood, even after controlling for a traditional measure of in-class peer status. Specifically, frequent nominations as an out-of-school group member appeared to buffer individuals from the negative emotional effects of low peer status within the school.

Peer Relations and Community Settings. When parents buy a new house or rent an apartment in a certain area, they mark out the limits of the future life courses of all family members (Barker, 1964; G. W. Brown, Harris, & Peto, 1973; Magnusson & Stattin, 1998). The availability of social situations in a local community determines the possibilities for particular social activities and for the functioning and development of individuals and peer groups. Within these limits, individuals determine their own peer associations by selecting certain types of leisure settings and recreational contexts over others (Brook, Nomura, & Cohen, 1989). On the group level, the local society to some extent shapes the social activities of peer groups by providing or failing to provide settings that promote prosocial activities.

Adolescent research has only recently started to gain insights into how broader sociocultural influences—as they are represented in the community, the neighborhood, and in particular leisure-time settings—affect peer relations. A few examples of this work in naturalistic settings are Fine and Glassner's (1979) study of baseball little leagues, Mahoney and Stattin's (2000) examination of youth recreation centers, Jackson and Csikszentmihalyi's (1999) studies of the role of sports in adolescent life, and the Berlin Youth Longitudinal Study, which revealed the dual quality of many adolescent behaviors—both compromising momentary or future psychosocial health and being tools in the pursuit of satisfying important personal and social goals of the individual (Silbereisen & Noack, 1988).

A variety of mechanisms have been proposed by which leisure activities may enhance individual competence and protect against adjustment problems. A distinction can be made between structured and unstructured leisure-time activities. A common finding in the literature is that well-adjusted adolescents tend to be more actively involved in structured leisure-time activities and settings such as organized sports, hobbies, religious activities, music, theater, art, and politics. These activities occur during scheduled hours, are often led by an adult, and aim explicitly at skill building. By contrast, adolescents with more problematic personal and social adjustment are more likely to hang out on the streets, attend public drinking places, and be less involved in organized activities (Cochran & Bo, 1987). These more spontaneous or unstructured activities are seldom under direct adult supervision. Although it is likely that different individuals benefit from leisure pursuits for different reasons, high levels of structure, skill-building aims, exposure to conventional values, and the presence of nondeviant peers appear to be particularly strongly linked to lower levels of antisocial behavior (Agnew & Peterson, 1989; Allen, Philliber, Herrling, & Kuperminc, 1997; Csikszentmihayli, 1990; Csikszentmihalyi, Rathunde, Whalen, & Wong, 1993; Fletcher, Elder & Mekos, 2000; Hirschi, 1969; Jones & Offord, 1989; Kinney, 1993; Mahoney, 2000; McCord, 1978).

Studies of Swedish youth recreation centers show that the same principles of selection and socialization that are commonly found in peer research also apply to leisure settings (Mahoney & Stattin, 2000; Mahoney, Stattin, & Magnusson, 2001). These government-supported centers are available to

adolescents age 13 and older. The overall philosophy for the youth centers has remained constant across the last three decades—that youths should be allowed to develop their own interests. An explicit aim of centers has been to reduce antisocial activities by keeping adolescents away from certain settings during the evening. The centers are usually accessible every evening of the week, opening around dinnertime and closing as late as 11:30 p.m. on weekends and during the summer. Attendance and activity participation are strictly voluntary. The activities are typically low in structure and do not aim at skill building; they include pool, ping-pong, video games, darts, TV, music, and coffee drinking. Adults are present at the center, but they do not direct or place demands on the youths' activities.

Investigations in different regions have shown that as a group, youths who attended the centers regularly were more antisocial, had more antisocial peers, had more conflicted parent relations, and had parents who knew less about their activities than did those who did not attend the centers (Mahoney & Stattin, 2000). In fact, youths who attended the centers were overrepresented among those with problematic personal and social adjustment on almost all measures studied. Using a longitudinal design, and following 500 boys in a middle-sized Swedish town from ages 10 to 30, clear indications of selection effects for attending these centers were documented (Mahoney et al., 2001). Boys with a multiple problem profile of social and academic deficits at age 10 were most likely to attend the youth centers at age 13. But—even after controlling for relevant factors at age 10 (family and demographic factors and several aspects of child social-academic competence prior to involvement in the centers)—the youths who attended these centers at age 13 had significantly higher rates of criminal offenses up to the age of 30 than did those who did not attend the centers. The findings are consistent with the proposition that the combination of unstructured leisure and socialization influences among problem-oriented peers may promote antisocial behavior, but detailed investigations have not yet addressed the issue of mechanisms: whether these differences are due to low structure of the activities at the centers and associated preference for unstructured leisure pursuits of the youths involved, little or no adult supervision, deviancy training, few opportunities for skill building, and so forth. Such analyses have to be conducted to determine why some leisure activities are associated with criminal behavior. In comparison, North American studies have shown that youth centers can operate in highly effective and potentially beneficial ways for disadvantaged youths (Heath & McLaughlin, 1993; McLaughlin, Irby, & Langman, 1994). However, the Swedish studies suggest that community-sponsored gathering places for youths should not by default be viewed as beneficial.

Conclusions. The available empirical evidence suggests that peer relations, activities, and contexts are related and considerably self-chosen by the individual within the confines of the existing social milieus in the local community. This view of the adolescent as active and self-determining and this contextualized view of peer relations are in line with recent theoretical discussions in developmental, social, and personality psychology (Bronfenbrenner, 1988; Lerner, 1996; Magnusson & Stattin, 1998). The literature suggests that an agency perspective is needed to understand peer relations in everyday life. Adolescents have much freedom to select their own lifestyles, activities, and interpersonal contexts; peer relations are voluntary and self-chosen.

Empirical data also suggest that to understand adolescent behavior, one must understand the contexts in which adolescents interact with others. A contextual perspective is needed to understand how peer relationships are formed, stabilized, and broken. The choice of peer activities is confounded with the available settings. Attending a particular leisure setting with particular types of activities implies meeting certain (rather than other) kinds of peers. In a *Journal of Adolescent Research* special issue on adolescent socialization in context, Eccles, Early, Frasier, Belansky, and McCarthy (1997) acknowledged the widespread recognition in models of adolescent development that adolescents live their everyday lives in multiple settings, that these contexts are linked to each other, and that each has its special implications for youths. At the same time they noted that almost no systematic research had been done to examine simultaneously the roles of these contexts for personal and social adjustment and for adolescents' social relations. Despite decades of research on the role of peers for individual functioning and development, researchers have only started to clarify how peer relations, activities, and settings are interrelated, and few empirical studies actually test the causal links.

Parent and Peer Models: A Need for Integration

Adolescents have close relationships with parents and peers simultaneously, and certain aspects of both these relationships are linked to adjustment. Most relevant theories have been developed to explain one type of relationship—parents or peers—and they have largely viewed youths as being shaped by parent or peer influences. Thus, they suffer from two weaknesses: a failure to theorize about the possible

importance of connections between parent relationships and peer relationships and a failure to consider the active role of youths themselves.

EXPLAINING THE CONNECTIONS BETWEEN PARENT RELATIONSHIPS, PEER ASSOCIATION, AND ADOLESCENT ADJUSTMENT

As revealed in the preceding discussion, adolescent adjustment such as involvement in delinquency has been linked to both parenting factors and peer factors, but the connection between the two has not been adequately explained. The explanation that parents who are effective monitors are able to keep their youths from associating with deviant peers falls apart when one uses construct-valid measures of monitoring rather than relying on parental knowledge measures (Kerr & Stattin, 2000; Stattin & Kerr, 2000). Similarly, authoritative parenting has been said to work by making youths open to their parents' socialization efforts (Darling & Steinberg, 1993), but the effects often seem to be connected more to the neglectful style than to the authoritative style (e.g., Glasgow et al., 1997; Lamborn et al., 1991; Steinberg et al., 1994), and neither the direction of effects nor the mechanisms are clear. The construct validity of these measures can also be questioned. As a theoretical explanation for the findings that delinquent youths have poor emotional bonds to their parents (e.g., Elliot, Huizinga, & Ageton, 1985; Hawkins & Weiss, 1985; Hirschi, 1969), it has been proposed that interactions with parents can undermine youths' self-esteem, which causes them to choose deviant friends who are different from their parents (Kaplan, 1982; Kaplan, Johnson, & Bailey, 1986; Kaplan, Martin, & Johnson, 1986). But there are many missing links in this theoretical chain. For instance, why would youths with low self-esteem choose deviant friends? Why would they not instead choose very nurturing friends who would build up their self-esteem? What kinds of interactions with parents produce low self-esteem? And is self-esteem the really important factor, or could it be a marker for something else?

In what follows, we offer a theoretical explanation for these and other findings that family and parenting factors are linked to youths' choices of friends, such as deviant or delinquent friends. The mechanism that we propose leans on the ideas that (a) adolescents have little choice about their parents, their parent context, or interactions with their parents that evoke strong feelings, but they have much more choice about their peers and peer contexts; (b) peers and peer contexts are inseparably linked; and (c) when adolescents choose certain types of peers and peer activities, they might be choosing the context as much as they are choosing the peers.

Parent and Peer Relationships and Their Contexts

Over the past two decades, person-context models have received much theoretical attention (see Magnusson & Stattin, 1998, for a review). These models advance the ideas that individuals live and develop in multiple settings that change over time and are active agents in their own development. We draw upon these ideas as well.

Relationships Can Evoke Strong Feelings That Are Psychologically Important

Interactions with others can evoke a variety of emotions such as shame, anger, resentment, love, disappointment, and pride. In addition to bringing about these emotions, other people also can give us the sense that we have some degree of control over the environment or can make us feel that we are largely under their control. Whether this is emotional or cognitive is debatable, but the psychological literature—broadly speaking—suggests that individuals experience the loss of personal control negatively. In Rodin and Langer's (1977) classic nursing home study, nursing home patients who were allowed to make their own choices about the details of small privileges such as seeing a weekly movie and having a plant in their rooms were happier and healthier on a whole host of measures than were patients who got the same benefits without being able to exert control over them. In social psychology, reactance theory and other research suggests that when people feel as though someone is trying to control their freedom of action, they react against the threatened loss of control by adopting attitudes or taking actions that are strongly against the would-be controller (Brehm & Brehm, 1981; Heilman, 1976; Nail & Van Leeuwen, 1993). In Seligman's learned-helplessness study (Overmier & Seligman, 1967), dogs who could not control the end of an electrical shock by jumping out of the cage eventually exhibited behavior similar to that of depressed people. The same lack of control over one's circumstances seems to underlie some forms of depression (Klein & Seligman, 1976; Peterson & Seligman, 1984; Seligman, 1975). Interactions with others, then, can evoke emotions that have obvious implications for people's psychological well-being and feelings such as being overly controlled that also have strong implications for well-being.

A Working Model of Parent-Child Interactions and the Feelings They Evoke

In our own recent work, we have developed a model, shown in Figure 16.1, of some of the family interaction processes that are related to parents' knowledge of their youths' daily activities. The model also shows the role of negative and

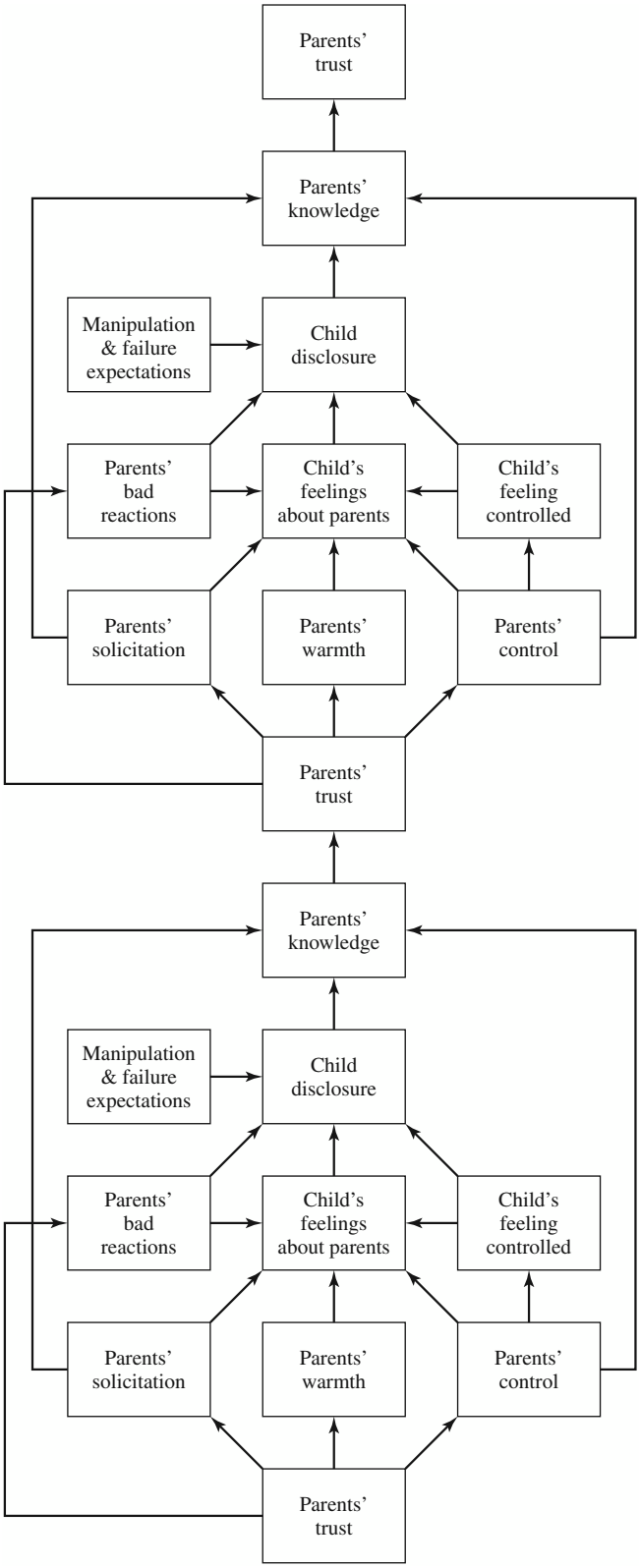

Figure 16.1 A model of bidirectional, ongoing communication and control processes within the family.

positive feelings that interactions with parents can evoke in the child, including the feeling of being overly controlled by parents. We have empirically tested most of the links in this model with cross-sectional and short-term longitudinal data. Hence, this working model has considerable empirical support.

Child disclosure of information about daily activities has a central position in this model, because our studies suggest that parents get most of their information this way and little through their own monitoring efforts (Kerr & Stattin, 2000; Stattin & Kerr, 2000). Because parents' knowledge is strongly linked to adolescent adjustment, explaining why youths do or do not disclose has become a crucial concern for us and for others (Darling, Cumsille, Hames, & Caldwell, 2000; Darling & Dowdy, 2000; Stattin, Kerr, & Ferrer-Wreder, 2000).

As shown in the figure, there is much that we know about adolescents who disclose a lot to their parents about their daily lives. Their parents seldom react negatively (with sarcasm, judgment, or ridicule) to their spontaneous disclosure, and these adolescents do not feel overly controlled by their parents (Kerr & Stattin, 2000). In addition, high-disclosing adolescents expect success on difficult tasks and do not interact with people in deceptive, manipulative ways, whereas secretive adolescents tend to expect failure and to be deceptive and manipulative (Stattin et al., 2000). High-disclosing youths are also low on depression, high on self-esteem, and high on self-reported warm feelings toward parents (Kerr & Stattin, 2000). Taken together, these findings suggest that high-disclosing adolescents have positive experiences in the parent context, and high disclosure could be seen as a marker for positive feelings about the parent context.

As seen in the model, child disclosure provides parents with knowledge, and knowledgeable parents tend to be trusting (Kerr, Stattin, & Trost, 1999). Trusting parents in turn do not react negatively to their adolescents' disclosure (with sarcasm, ridicule, or negative judgments), but untrusting parents do tend to do so (Kerr et al., 1999). The model proposes that parents' trust or mistrust will affect the way they relate to and communicate with the adolescent in the future, and that will affect the adolescent's willingness to disclose his or her feelings and everyday life experiences. Thus, the ongoing process continues, as shown in the upper part of Figure 16.1. The process is bidirectional in that parents act, children react, and parents react back. For the present purposes, it is important to note that the child's feelings—feelings of being overly controlled and positive or negative emotions toward parents—are important links in this chain of actions and reactions.

Structural Features of Parent and Peer Contexts

We argue that over time, children will connect the feelings that interactions with parents evoke with the context in which those interactions take place. Some features of those parent and peer contexts are what we call *structural,* meaning that they are not unique to the particular family or peer group, but they are part of parent or peer contexts themselves.

Structural Features of Parent Contexts Are Fixed

There are some features that are similar across families, regardless of the particular parenting practices or the interactions that take place in the family. We think of them as the structural features of a family context in the same way that walls and windows can be thought of as the structural features of a room. Nearly all rooms have walls and windows, even though they vary in details such as size and shape, and nearly all family contexts have features such as close interactions with adults, the presence of authority figures, the need to share scarce resources, a certain degree of supervision by higher-status others, some rules and structure, and the presence of behavioral values, for want of a better term, or assumptions about how people should behave—in general and in relation to each other. There will of course be individual variations in the expression of these structural features both in degree and in kind (e.g., some families have more rules and structure than others do; some parents believe that they should make all the decisions, whereas others give children a democratic voice in decisions). Nonetheless, these basic structural features still exist in families.

Structural Features of Peer Contexts Vary

There are many different peer contexts, and there are two important ways in which peer contexts differ from each other. First, some peer contexts are not *just* peer contexts because they exist within adult-controlled settings that include structural features that are determined by adults. For instance, the school classroom, extracurricular activities, and other organized activities such as adult-coached sports are usually thought of as peer contexts, but they all have features that are very similar to the family context: interaction with adults, rules and structure, the need to share resources, authority figures, supervision, and behavioral expectations. In contrast, peer settings such as street corners, arcades, cafes, and neighborhood playgrounds have few or none of the same structural features as the parent context.

A second important distinction among peer contexts is that the peers one encounters in different contexts will differ systematically from each other. For instance, the peers who play an organized sport at school will on average be better adjusted and will have internalized their parents' behavioral values to a greater degree than will those playing the same sport in an unstructured setting such as a neighborhood playground (Mahoney & Stattin, in press; Mahoney et al., in press). Similarly, youths who are hanging out in arcades, cafes, and street corners will probably have internalized their parents' behavioral values to a lesser degree and will be less well adjusted than will those in more structured, adult-supervised situations such as theater groups, bands, orchestras, or choirs. Hence, different peer settings bear different degrees of structural similarity to the parent context, and the different peers that one encounters in those settings will show different degrees of social adjustment, according to adult standards.

Context Choice

The crux of our argument about family contexts and the feelings associated with them is that adolescents use these associations as a basis for gravitating toward some peer contexts and away from others.

Adolescents Can Choose

With adolescence comes increasing freedom and independence. For the first time, adolescents are able to choose their contexts, and they make two types of choices. First, they choose how to divide their time between their parents and their peers—to spend more or less time at home with the family as opposed to being away from home with their peers. Second, they decide *which particular* peers with whom to associate. Although talents, interests, and long- and short-term goals affect the types of activities that adolescents choose, the same activities can be pursued in different peer contexts. Because a variety of behaviors can be socialized in those contexts, it is important to understand why youths choose particular peer contexts over others. We suggest that one important factor is that the feelings that are evoked in the parent context become associated in the child's experience with the structural features of the family context. Then those feelings generalize to some peer contexts and not to others, making some peer contexts more appealing than others.

The Choice of a Peer Context Can Depend Upon Feelings About the Parent Context

Because emotions are easily classically conditioned to contexts, it is reasonable to believe that positive or negative emotions that arise in relationships will become linked, in the

child's experience, to parents, peers, and the broad and specific features of the contexts in which interactions with them take place. It is also reasonable to believe that these emotions generalize to similar situations. Most of us can verify this from our own experience, because we have known people with whom we have felt particularly valued and secure (a trusted best friend, perhaps, or a grandparent), and we have noticed that elements of situations in which we spent time with that person (e.g., the smell of a backyard where we used to play or of something that Grandmother used to bake) have the power to evoke those good emotions even years later.

We suggest that the structural features of the parent context that we previously described become linked to specific emotions, and those emotions then generalize to settings with similar features. Thus, a child who has bad experiences such as feeling overly controlled in the parent context connects those negative feelings with contexts that have similar structural features (e.g., close interaction with adults, rules and structure, authority figures, etc.). There are many reasons that negative emotions might arise. Parents might have an authoritarian or parent-centered philosophy that does not lead them to respond well to the child's wishes or demands. The child might have a difficult temperament or be overly active or impulsive, thus leaving parents believing that they have no choice but to exert a lot of control. Or there might be some combination of or interaction between the parents' characteristics and the child's that results in bad feelings. Whatever the cause, the child will undoubtedly end up associating negative feelings with the parents' particular behavioral values and styles of interacting, and we suggest that the child will also associate negative feelings with the broader structural features of the parent context—features such as close interaction with adults, supervision, the presence of authority figures, rules and structure, and the need to share resources.

In our formulation, this association of negative or positive feelings with the parent context becomes important when the child reaches adolescence and is able to choose among different peer contexts. At that time, those who have associated negative experiences with the structural features of the parent context find that those negative feelings generalize to peer contexts that have similar features. Naturally, they gravitate away from such contexts. Avoiding those situations might then become reinforcing in its own right because it could bring a pleasant relief from the negative feelings that are linked to the parent context. In our view, avoiding situations that make one feel bad could be an important reason that some youths choose to hang out on the streets with poorly adjusted peers while others choose to participate in organized activities with better-adjusted peers. It also helps to explain why those who choose to hang out on the streets with poorly adjusted peers have been found to have poor relationships with their parents.

Context Choice as an Ongoing Process

Through the direct and indirect processes outlined previously, parents can influence an adolescent's *initial engagement* with certain types of peers. Adolescents will choose certain peer groups or leisure settings on the basis of their relationships—good or bad—with parents. After the adolescent is a regular part of a specific setting or peer group, the parents' *reactions* can then maintain, escalate, or inhibit the adolescents' activities. For example, interactions could develop between (even well-meaning) parents and children that leave the child with negative feelings about the parent context. That child might then seek to avoid those feelings in the peer context by gravitating away from school activities and other adult-led, structured activities. In doing so, the child might encounter other peers who are also gravitating away from adult influences.

Our data support this idea in that low child disclosure, negative feelings toward parents, and feelings of being overly controlled by parents are all concurrently linked to higher delinquency, to belonging to deviant peer groups, and to doing poorly in school both socially and academically (Kerr & Stattin, 2000; Stattin & Kerr, 2000). After the child has joined a group of peers who have bad feelings about authority, rules and structure, and adult contact, these peers might coax or reinforce each other into more and more deviant activities, as suggested by the work of Dishion and colleagues (Dishion, McCord, & Poulin, 1999; Dishion, Spracklen, Andrews, & Patterson, 1996; Poulin, Dishion, & Haas, 1999). Parents' disapproving responses to the child's association with deviant peers and the slide into delinquent behavior might make the child feel even more negative about the parent context, thus exaggerating the contrast between the negative feelings that are associated with the parent context and the relief from negative feelings that is associated with the peer context; this could only serve to reinforce the child's ties to those particular peers. This prediction is consistent with Fuligni and Eccles's (1993) finding that what they called "extreme peer orientation" in early adolescence was associated with believing that parents were not loosening their control and not allowing the youth a voice in decision-making.

What is likely to happen next is consistent with past research on parental monitoring (operationalized as parents' knowledge of the youth's activities) and on adolescent life values. If youths become entrenched in a peer context that bears minimal resemblance to the parent context, they will probably avoid telling their parents whom they are with and

what they are doing, thus limiting their parents' knowledge of their activities in the peer context—which can help explain why low knowledge is so robustly correlated with delinquency (see Dishion & McMahon, 1998, for a review). Furthermore, these adolescents will probably place greater value and importance on these peer activities and the things that get attention and respect from these peers (Cohen & Cohen, 1996; Stattin & Kerr, in press; see also Bear & Rys, 1994). One can easily imagine that parents' efforts to track or control these adolescents' activities will be ineffective (Kerr & Stattin, 2000; Stattin & Kerr, 2000). In the most extreme scenario, even well-meaning parents might give up on such a child, withdrawing both their emotional support and their communication and control efforts; this provides an interpretation different from that usually offered for the common finding that delinquents tend to have disengaged or uninvolved parents.

Thus, we argue that peers and parents can both contribute to a certain type of behavior at different points in time in ways that do not show up in cross-sectional studies. For many behaviors, peers seem to have more influence than parents do; but parents might have played a critical role in the adolescent's choice of a particular peer context, and parents' reactions to that choice might stabilize a negative trajectory. Longitudinal data are needed to provide a more complete understanding of these processes.

CONCLUSIONS

In a recent presidential address, the president of the Society for Research on Adolescence declared optimistically that "we can stop asking what type of parenting most positively *affects* [italics added] adolescent development. We know the answer to this question." (Steinberg, 2001, p. 13). In this chapter, we too have argued that researchers should stop asking about unidirectional *effects* concerning both parenting and peer relationships, but not because we already know the answers; they were the wrong questions.

What exists in the parent and peer literatures extant are basically snapshot views of parent, peer, and individual characteristics and their correlations with certain aspects of adjustment (or with each other). These views are beneficial in that they have illuminated the global aspects of family and peer relationships that are likely to be linked to behavior problems and psychopathology. They have not, however, provided much knowledge about the mechanisms involved, the processes operating over time, or possible bidirectional effects. Construct validity can be a problem, as can the assumptions that the intervening processes are known. Another problem is that these studies are sometimes based on simplifying assumptions that restrict the generalizability of the findings, such as when studies of friendships are based solely on peers in the classroom.

In this chapter, we have advanced the notion that adolescents are active agents in their own development. Within the constraints of the surrounding physical and social ecology—and based on their personalities, interests, and talents—they choose their different leisure contexts. We argue that this choice has been largely ignored in the literatures on both parenting and peer relationships, and we have offered a theoretical explanation of why youths' choices of peer contexts are not independent of their home environments.

Overall, in order to advance knowledge in this area, researchers must be willing to do the difficult studies. By *difficult studies,* we mean studies that (a) begin with bidirectional or recursive models; (b) take the person-context idea seriously and include it in the design; (c) are longitudinal in order to capture development and experimental in order to test causality and hypothesized mechanisms; (d) specifically measure and study processes and mechanisms rather than rely on assumptions about them; and (e) go to extra lengths to capture the phenomena that actually exist, in ecologically valid contexts, even when that makes data collection difficult (e.g., adolescent peer groups outside of the classroom).

Adolescence is a time of choices. Adolescents are free for the first time to make individual choices that they have never had the freedom to make before, and they face many opportunities to go astray. The ultimate goal of research is to understand why some adolescents do go astray and how that could have been prevented. Undoubtedly, there will be many different answers to the question *why*—each with its own implications for prevention and intervention. But these answers will come from an understanding of adolescents in their complexity as both active and reactive agents who are choosing their contexts for complex reasons. Developing this understanding is the challenge that lies ahead.

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