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Author

Leaper, Campbell

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CHAPTER 19

Gender and Social-Cognitive Development

CAMPBELL LEAPER

OVERVIEW OF MAJOR THEORIES AND CONCEPTUAL MODELS 807

Cognitive-Developmental and Information-Processing Theories 808

Intergroup Theories 810

Motivation Theories 810

Theoretical Models of Person-Environment Interactions 811

Summary 812

CHILDREN'S GENDER COGNITIONS 812

Developmental Trends in Children's Understanding of Gender 812

Gender as a Social Gender Identity and Gender Segregation 815

Social Influences on Gender Stereotyping and Prejudice 819

GENDER-TYPED PLAY 821

Developmental Patterns in Children's Gender-Typed Play 821

Possible Influences on Gender-Typed Play Preferences 822

GENDER COMPARISONS OF PERFORMANCE AND ACHIEVEMENT 824

General Intelligence 824

Overall Academic Achievement 824

Verbal Skills and Achievement 825

Spatial Skills 825

Mathematical Skills and Achievement 825

Overall Science Achievement 826

Physical Sciences and Technology Achievement 826

Life Sciences Achievement 826

Musical and Artistic Achievement 827

Physical Performance and Athletic Achievement 827

Interpersonal Competencies 827

Intrapersonal Competencies 830

Summary 833

POSSIBLE EXPLANATIONS FOR GENDER-RELATED VARIATIONS IN PERFORMANCE AND ACHIEVEMENT 833

Individual Influences 833

Social-Relational Influences 838

Summary 842

CONCLUSIONS AND FUTURE DIRECTIONS 842

REFERENCES 843

Perhaps more consistently than any social category, gender shapes children's lives across the world. Other than concerns about a newborn's health, gender is the most fundamental question ascertained when someone is born. Based on whether a person is categorized a girl or a boy, parents typically mark their children's gender through names, hairstyles, colors, clothing, and toy purchases. In the ensuing years, different opportunities are apt to

follow girls and boys that coincide with the development of average gender differences in many aspects of cognition and behavior. Some differences are small and others are large. When average gender differences in behavior manifest, they are often due to interrelated biological, cognitive, interpersonal, and cultural processes.

This chapter presents an overview of contemporary theory and research on children's gender development from a social-cognitive perspective. Reviewing the literature on this topic becomes increasingly daunting with each new decade. Consider the research literature that existed

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at the times of four major reviews of gender development appearing since the 1970s: Maccoby and Jacklin's (1974) landmark *Psychology of Sex Differences* and the three *Handbook of Child Psychology* chapters on gender development published in subsequent decades (Huston, 1983; Ruble & Martin, 1998; Ruble, Martin, & Berenbaum, 2006). A PsycINFO search using the keywords "human sex differences" or "gender" and the age groups "childhood" or "adolescence" (retrieved December 5, 2013) revealed the following: For the period prior to 1974, the total number of sources was 1,221. Another 4,255 sources were added between 1974 and 1982; an extra 13,609 were listed between 1983 and 1997; and 14,141 new entries were seen between 1998 and 2005. Since 2006 when the previous *Handbook* was published, another 21,436 new reports have appeared. As a result, any review of the research literature on children's gender development must necessarily be incomplete.

The overarching goal of this chapter is to provide the reader with some key themes and patterns in children's gender development as well as an appreciation of the multiple social and cognitive processes that contribute to these patterns. Making sense of the research literature is a common challenge for scientists in all fields. The introduction of quantitative meta-analytic methods has provided researchers with systematic ways to summarize and interpret findings on particular topics. Accordingly, numerous meta-analyses testing for gender similarities and differences have been conducted. These reviews have proven helpful in sharpening our understanding of gender development (Hyde, 2005). First, meta-analyses point to more similarities than differences between females and males for many behaviors. Second, when significant gender differences are indicated in meta-analyses, the average effect sizes for many (but not all) behaviors are negligible or small. Finally, tests for moderator effects in a meta-analysis can reveal factors related to whether and how large a gender difference in behavior might occur.

The results from meta-analyses will be noted throughout the chapter when reviewing research on gender comparisons. Cohen's (1988) guidelines will be used for characterizing the magnitude of effect sizes based on the standardized difference between group means (i.e., the d statistic). A negligible or trivial effect occurs when d is below 0.20 even if the difference between the group means is statistically significant. A meaningful but small effect occurs when d is at least 0.20 (85% overlap in the distributions between two groups; 1% of explained

Overview of Major Theories and Conceptual Models 807

variance). A medium or moderate effect is implicated if d is at least 0.50 (66% overlap; 6% of explained variance). Finally, a large effect is inferred if d is at least 0.80 (53% overlap; 14% of explained variance).

Another convention applied in the chapter involves the usage of the terms *gender* and *sex*. Psychologists differ among themselves in the meanings they ascribe to these two terms. In this chapter, *gender* refers to the categorization of oneself or others as female or male (or possibly other categories). In this manner, use of the term *gender* is not meant to imply a social or a biological origin for any observed differences between groups. The term *sex* is reserved to refer more narrowly to the genetic distinction between males and females.

The chapter is divided into six sections. First, I present an overview of major social-cognitive theories pertinent to our contemporary understanding of gender development. Second, I summarize developmental patterns and variations in children's gender cognitions. Third, I examine the development of gender-typed play. Fourth, I review research comparing girls' and boys' competence and achievement in academic, athletic, socio-emotional, and other domains. Fifth, I consider possible explanations for these average differences. Finally, to close the chapter, I offer two recommendations for future theory and research.

OVERVIEW OF MAJOR THEORIES AND CONCEPTUAL MODELS

When Maccoby and Jacklin's (1974) review was published 40 years ago, only a handful of theoretical approaches guided developmental research on gender development. In subsequent decades, theories and models have proliferated. I briefly review some of the major approaches relevant to the study of gender development. These include cognitive-developmental and information-processing theories, intergroup theories, motivation theories, and theoretical models of person–environment interactions. In subsequent sections, I elaborate on how these theories are relevant to our understanding of various facets of gender development.

To limit the scope of the chapter, the focus is on social and cognitive explanations, although it is important to acknowledge that genes, hormones, and the nervous system influence gender development. A separate chapter in the current *Handbook* addresses these processes (see Hines, Chapter 20, this *Handbook*, Volume 3).

808 Gender and Social-Cognitive Development

Cognitive-Developmental and Information-Processing Theories

Several cognitive theories relevant to children's gender development similarly address the importance of observation and making inferences about the world. According to these theories, children actively use their understandings of gender to guide behavior. In this manner, the theories characterize gender development as a process of self-socialization. They vary in some of their assumptions or the relative emphases they place on particular processes.

Cognitive-Developmental Theory

Based on Piaget's theory of cognitive development, Kohlberg (1966) postulated that children's understanding of gender undergoes qualitative changes during early childhood. These include the acquisition of gender labeling around 2½ years, gender identity around 3 years of age, and gender constancy around 6 years of age. As children's gender understandings progress at each stage, they are seen as increasingly likely to encode and interpret new information using their gender concepts. Kohlberg thereby stressed children are actively involved in their own gender development. Other researchers have identified cognitive-developmental changes during middle childhood and adolescence related to gender development. These include advances in multiple classification skill, perspective taking, and moral reasoning. All of these processes are discussed more fully later in the chapter.

Gender Schema Theory

Similar to Kohlberg's (1966) cognitive-developmental theory, gender schema theory is based on the premise that attaining a concept of gender subsequently influences how children view the world and think about themselves (Liben & Signorella, 1980; Martin & Halverson, 1981). Unlike cognitive-developmental theory, however, gender schema theory does not postulate stage-related changes in children's thinking. Instead, gender schema theory focuses on (a) how attaining a basic view of gender influences motivation to attend to one's gender group and (b) the encoding, interpretation, and memory of gender-related information. As reviewed later, children tend to pay more attention to events associated with their own gender because of in-group biases, and they interpret and recall events in relation to existing gender schemas. They strive for consistency between their gender schemas and their own behavior. Research also shows that children who have counterstereotypic interests tend to match their beliefs

and behavior (Martin & Dinella, 2012). Multiple facets of gender schemas have been advanced (see Liben & Bigler, 2002; Martin, 2000; Tobin et al., 2010), which will be addressed later.

Social Cognitive Theory

Recognizing some of the limitations of social learning theory, Bandura (1997) advanced a reformulated model known as social cognitive theory. The renaming of the theory underscored the added emphasis given to cognitive processes. The theory is premised on a triadic model of reciprocal causation whereby personal factors (cognitive, affective, and biological processes), environmental factors, and behavior patterns mutually influence one another. Learning is seen as developing through three cognitive modes of influence: *observation* (i.e., a child notices modeled behaviors and infers positive or negative consequences), *enactive experience* (i.e., a child has a positive or negative reaction after practicing a behavior), and *direct tuition* (i.e., someone guides a child in the performance of a behavior). Observational learning is considered the most common and efficient form of learning.

According to social cognitive theory, motivation to enact a gender-typed behavior depends on a combination of environmental events (e.g., external incentives and disincentives) and personal factors (e.g., matching a personal standard, feeling a sense of competence, intrinsic interest). Over time, external sanctions are normally internalized as personal standards. These personal standards become the basis of self-regulatory processes including *self-observation* (monitoring one's behavior), *self-evaluation* (judging whether personal standards have been met), and *self-reaction* (experiencing confidence and pride when standards are met). When individuals experience positive self-reactions, they attain a sense of personal agency known as self-efficacy. Bussey and Bandura (1999) presented a comprehensive review proposing how social cognitive theory can explain children's gender development. Several of the theory's applications are illustrated in later sections.

Executive Functions and Dual-Process Models of Cognition

Many cognitive psychologists and neuroscientists advocate a dual-process model of cognition, which distinguishes between automatic (i.e., implicit, intuitive) and controlled (i.e., explicit, reflective) cognitive processes (see Amodio & Ratner, 2011; J. S. Evans & Stanovich, 2013; Kahneman, 2011). Automatic processes are fast

Overview of Major Theories and Conceptual Models 809

and do not require working memory; hence, they typically operate outside of conscious awareness and are sometimes described as “bottom-up” processing. These processes appear especially susceptible to past and current emotional experiences. Automatic cognitive processes may involve priming (response bias to familiar stimuli and salient categories), conditioning (learned semantic and emotional associations from prior experiences), and procedural response biases (practiced skills, habits, and scripts represented as procedural memories). As explained later, automatic processes commonly affect gender stereotyping and attitudes.

In contrast to automatic processes, controlled processes are relatively slow, deliberate, and require concentration. These processes are also known as executive functions and are sometimes characterized as “top-down” processing (see A. Diamond, 2012; Zelazo & Carlson, 2012; see Müller & Kerns, Chapter 14, this *Handbook*, this volume). Two broad facets are self-regulation and cognitive flexibility. Self-regulation comprises the abilities to focus attention (i.e., selective attention) and inhibit emotional arousal (i.e., impulse control). Cognitive flexibility includes the abilities to consider other people’s viewpoints and mental states (i.e., perspective taking or theory of mind) and to adjust cognitive strategies to the context (i.e., appraisal, reasoning, and planning). Executive functions are partly tied to the development of working memory and language ability (Hughes, 2011).

Developmental researchers studying gender development are finding it helpful to distinguish between automatic and controlled cognitive processes development (e.g., Baron, Schmader, Cvencek, & Meltzoff, 2014; Tobin et al., 2010). Gender-related variations in automatic and controlled cognitive processes are involved in children’s gender stereotyping and attitudes. Also, average gender differences in executive function appear related to variations in academic achievement and socio-emotional functioning.

Unified Theory of Social Cognition

Much of the pioneering work applying a dual-process model to the study of gender has occurred in social psychology. Of particular note, Greenwald et al. (2002) proposed a unified theory of social cognition that addresses (a) how self-concepts, stereotypes, and attitudes are interrelated and (b) how they operate in both implicit (automatic) and explicit (deliberate) ways.

The theory is based on a triangular model whereby the self, group identities (e.g., gender), and attributes

(e.g., traits, activities, roles) are interrelated. The association between any two components can have a positive, negative, or neutral valence. A person’s *self-concept* reflects the association between the self and an attribute; and *self-esteem* is based on the valence associated with the attribute in a self-concept. A *stereotype* reflects the association between a group and an attribute; and an *attitude* is based on the valence associated with the stereotype. For example, doll play is commonly stereotyped for girls, and many individuals have positive attitudes about doll play for girls and negative attitudes about doll play for boys. Finally, a *group identity* or social identity is based on the association between the self and a group; the strength of a social identity is based on the valence ascribed to the group. Based on the principle that people tend to seek cognitive consistency, the model posits that individuals are motivated to reconcile their self-concepts, group identities, and attitudes.

According to the unified theory, the previously described model operates at both explicit and implicit levels. This is a potentially useful distinction because implicit associations and explicit beliefs are not always concordant. For example, some people show more implicit than explicit gender stereotyping. Based on an adult sample, Greenwald et al. (2002) found greater consistency across self-concepts, gender identities, and gender attitudes using implicit rather than explicit measures. Because implicit and explicit cognitions can differ, they may predict behavior differentially. Thus, a comprehensive sociocognitive model of gender development needs to incorporate both controlled and automatic processes.

Gender Self-Socialization Model

Perry and his colleagues (Egan & Perry, 2001; Tobin et al., 2010) have formulated a gender self-socialization model of gender identity that is based on Greenwald et al.’s (2002) unified theory of social cognition, social identity theory, gender schema theory, and other approaches. The gender self-socialization model advances three key hypotheses regarding ways that children actively internalize gender stereotypes, attribute self-perceptions, and gender identities (Tobin et al., 2010). First, the *stereotype emulation hypothesis* proposes that when children identify strongly with their gender group they are motivated to view themselves as typical of their gender (i.e., value what they perceive as gender-stereotypical attributes). Second, the premise of the *stereotype construction hypothesis* is that children who strongly identify with their gender group tend to use their own self-concepts to form expectations and stereotypes about members of their own gender. Finally, the

810 Gender and Social-Cognitive Development

assumption of the *identity construction hypothesis* is that when there is a strong concordance between children's self-perceived attributes and gender stereotypes children will be more likely to identify with their gender group. In addition to these three hypotheses, the model also presents a multidimensional model of gender identity. These dimensions are described later in the section on children's gender cognitions.

Intergroup Theories

Intergroup theories address the impact of belonging to a group on socialization and social interaction. These theories can also be considered cognitive approaches. For example, intergroup theories and gender schema theory similarly emphasize the influence of in-group gender identities on people's thinking and behavior. Intergroup approaches additionally address how social identities affect interactions between different group members.

Social Identity Theory and Self-Categorization Theory

According to social identity theory, self-categorization as a member of a social group commonly leads to several cognitive-motivational biases (e.g., Tajfel & Turner, 1979). Some key processes include *in-group favoritism* (positively evaluating persons and attributes associated with one's own group), *within-group assimilation* (conformity to in-group norms), *within-group differentiation* (specialization of roles within a group), *between-group contrast* (exaggerating group differences), *out-group homogeneity* (stereotyping out-group members as similar), and *out-group hostility* (competition with out-group). As elaborated in later sections, various factors moderate social identity processes. For example, in-group biases are more likely to occur when group identities are important for the individual. Also, out-group hostility is more likely to occur when there is perceived competition for resources.

Self-categorization theory (J. C. Turner, 1985) was later proposed to address the distinction between social and personal identities. Whereas *social identity* refers to one's self-categorization as a member of a group and the characteristics associated with the group, *personal identity* refers to how individuals define themselves as unique individuals. In general, social identities are more apt to guide behavior in public settings, whereas personal identities are more likely to steer actions during more private moments. Accordingly, children are likely to be more concerned about demonstrating gender-typed norms when interacting in same-gender groups, but they are more apt to express

personal interests when alone or when interacting in dyads with friends (Harris, 1995).

Developmental Intergroup Theory

Research on social identity theory was initially conducted with adult samples; however, the theory gained increasing interest among developmental psychologists—including those examining children's gender development (e.g., Bigler, 1995; Leaper, 1994; Powlishta, 1995). There also have been efforts to formulate developmental theories based on intergroup approaches (e.g., Bigler & Liben, 2006; Harris, 1995; Killen, Mulvey, & Hitti, 2013). Among them, Bigler and Liben's (2006) developmental intergroup theory integrates constructs from social identity theory, schematic-processing theory, and cognitive-developmental theory to explain children's development of gender-based and other prejudices. Their model highlights environmental factors that establish the psychological salience of social categories (e.g., perceptual discriminability, functional use) and social cognitive factors (e.g., in-group bias, essentialism) that can lead to stereotyping and prejudice. Furthermore, borrowing from cognitive-developmental theory, the model stipulates that age-related changes in children's classification skills will affect their categorization and stereotyping of group members.

Intersectionality

Besides gender, people can form social identities based on other groups to which they might belong. Examples include group identities based on race/ethnicity, sexual orientation, social class, and religion. Accordingly, intersectional approaches emphasize the need to consider the intersection of multiple social identities when examining people's behavior (Cole, 2009). The relative salience of different social identities may vary across different settings. Furthermore, social identities can interact and lead to different experiences depending on their intersections.

Motivation Theories

Another set of theories emphasizes processes that influence children's motivation. The theories described in prior sections also address motivational influences. For example, gender schema theory and social identity theory posit that children are motivated to adopt behaviors associated with their in-group gender identities. Reciprocally, the theories described in this section can be considered cognitive because they address processes such as self-concepts,

values, and attributions. They are somewhat distinct from the other theories, however, in their explicit focus on factors related to children's motivation in achievement settings (see Eccles & Wigfield, 2002).

Expectancy-Value Theory

Eccles and her colleagues (e.g., Eccles & Wigfield, 2002) developed the expectancy-value theory of motivation that emphasizes the dual importance of children's *expectations for success* on a particular task as well as the *subjective value* they place on the task. Expectations for success reflect individuals' beliefs about their ability to do well in a task domain (e.g., math, art, sports). Task value includes four components: *attainment value* (i.e., importance of doing well), *intrinsic value* (i.e., personal enjoyment), *utility value* (i.e., perceived usefulness for future goals), and *cost* (i.e., competition with other goals). Motivation (choice, persistence, performance) on a task is posited to be greatest when children place high value on a task and expect to do well on it. Furthermore, the model stipulates that expectations for success and task value are shaped by a combination of child characteristics and environmental factors. Child characteristics include abilities, previous experiences, goals, self-concepts, beliefs, expectations, and interpretations. Environmental influences include the cultural milieu as well as the beliefs and behaviors of socialization agents (e.g., peers, parents, teachers, etc.).

Expectancy-value theory overlaps in some ways with Bandura's (1997) social cognitive theory and Harter's (2012) self-perception theory. Expectation for success is similar to self-efficacy in social cognitive theory and self-perceived competence in self-perception theory. Value is similar to perceived incentives in social cognitive theory and perceived importance in self-perception theory. In addition, all three theories acknowledge the importance of personal characteristics as potential moderators as well as the impact of others' expectations on motivation. As reviewed in later sections, theories of this kind have helped to explain gender-related variations in achievement.

Attribution Theoretical Approaches

Children's understanding of their own and others' abilities becomes more differentiated from early childhood into adolescence (Dweck, 2002). They increasingly come to understand that academic success depends on a combination of ability, effort, and situational factors. By late childhood (around 10 to 12 years of age), children typically form a concept of ability as a stable trait. During this period, they also may come to recognize that ability is

Overview of Major Theories and Conceptual Models 811

controllable. Building on an attribution theory framework, Dweck (2002) distinguished between entity and incremental beliefs about intelligence or ability. Entity beliefs emphasize the view that ability is fixed and cannot be affected by effort. Incremental beliefs are based on the view that ability can be improved with hard work. These different attribution orientations affect how children respond to failure and approach challenges. Those with entity beliefs tend to have a helpless orientation, and their motivation is more readily undermined by failure. To preserve their self-concept, they are apt to avoid challenging situations. In contrast, those with incremental beliefs about ability tend to have a mastery orientation. They are more apt to embrace failures or challenging situations as opportunities to learn and improve their competence. As reviewed later in the chapter, researchers have examined whether these attributions might be related to gender-related variations in achievement.

Theoretical Models of Person-Environment Interactions

Transactional models emphasizing the interaction between personal and environmental factors are now common in psychology (e.g., Bronfenbrenner & Morris, 2006). Theoretical models of person-environment interactions point to three major ways these transactions might occur in ways that are relevant to our understanding of gender development (Bussey & Bandura, 1999; Leaper, 2013; Scarr & McCartney, 1983).

First, some environments are imposed on the child (Bussey & Bandura, 1999). These are often contexts such as families and schools in which children learn the cultural practices of their community and the larger society (e.g., Rogoff, 1990). During childhood, same-gender peer groups often function as imposed environments (Maccoby, 1998). In these contexts, peer pressures may lead nearly all members of a gender to perform certain activities and to avoid others (e.g., most boys play sports but avoid doll play). Most children respond positively to the gender-linked pressures of family, school, and peer environments; and their gender-typed interests become strengthened over time (e.g., Martin & Fabes, 2001). However, as reviewed later, some children resist influences from imposed environments and do not conform to gender-role expectations.

Second, children may evoke environments by acting in particular ways that elicit reactions from others (Scarr & McCartney, 1983). For instance, highly active children

812 Gender and Social-Cognitive Development

are more likely than sedentary children to attract other active children, thus reinforcing their own behavioral dispositions (Pellegrini, 2010). The reaction that children elicit for a particular behavior, however, depends partly on how others view the behavior in relation to the children's gender. For example, many adults and peers react more negatively to physical aggression by girls than boys (Underwood, 2011).

Finally, as children become progressively more autonomous, they select and create particular environments that are compatible with their own interests and behavioral preferences (Bussey & Bandura, 1999; Scarr & McCartney, 1983). For example, during the preschool years, children increasingly favor same-gender peers who share similar activity interests (Martin et al., 2013). In some cases, children select particular environments because of difficulties in an imposed environment. For example, some boys join delinquent gangs because of adjustment problems at home or in school (e.g., G. R. Patterson, DeBaryshe, & Ramsey, 1989).

Children's capacity to select particular environments depends on the availability of opportunities, which often differ for girls and boys (Leaper, 2000b). The opportunity structure refers to the range of environments in a given cultural context from which children might select. The division of labor in a society by gender can limit the potential environments that children may find available (W. Wood & Eagly, 2012). Children may even be barred from certain opportunities based on their gender. To illustrate, girls in the United States did not have many options for athletic achievement until the passage of Title IX legislation in 1972 (Leaper, 2013). When more options become available to females and males in gender-egalitarian societies, studies have found a reduction in some gender differences (see W. Wood & Eagly, 2012; also see Schwartz & Rubel-Lifschitz, 2009, for an opposite trend).

Summary

Research psychologists have advanced several useful theories that address social and cognitive processes underlying children's gender development. I highlighted a few contemporary approaches here that variously emphasize cognitive, motivational, and intergroup processes. (As explained in Hines [Chapter 20, this *Handbook*, Volume 3], neuroscience research also helps us understand some aspects of gender development.) In addition, I described the types of individual-environment interactions that occur during gender development. Many of the reviewed theories

posit similar constructs or complement one another, and I address the need for more theoretical integration at the end of this chapter.

CHILDREN'S GENDER COGNITIONS

Given the importance of children's thinking about gender in most of the reviewed theories, some key developmental changes in children's gender-related cognitions are examined in the present section. First, I describe common developmental trends in children's understanding of gender. Second, I review the development of a gender-based social identity in the context of gender-segregated peer relationships. Finally, I consider possible social influences on children's gender stereotypes and attitudes.

Developmental Trends in Children's Understanding of Gender

Gender is the first group identity that children use to categorize themselves and others. Moreover, it is possibly the most pervasive basis for social categorization throughout life (Bem, 1993). Psychologists have identified some general patterns that typically occur as children develop their understandings of gender (see Blakemore, Berenbaum, & Liben, 2009; Halim & Ruble, 2010; Martin, Ruble, & Szkrybalo, 2002, for comprehensive reviews). In this section, I review the development of children's gender concepts and beliefs as well as how gender-related cognitions influence children's perception and understanding of events.

Acquisition of Gender Concept

Before children acquire a verbal concept of gender, they begin to recognize physical characteristics commonly associated with each gender group in their environment. Infants around 1 year of age are capable of making perceptual distinctions between female and male faces. Also, some toddlers around 2 years of age notice associations between people's gender (male or female faces) and certain gender-typed objects and activities (Poulin-Dubois & Serbin, 2006). Evidence of a verbal concept of gender is usually seen by 2 years of age when toddlers begin to use gender-linked words to refer to other people (i.e., gender labeling). This is followed by around 3 years of age when children are observed using gender to categorize themselves (i.e., gender identity). By around 7 years of age, children establish an understanding of gender constancy

(see Martin et al., 2002). This includes realizing that gender remains the same across time (i.e., stability) and across situations (i.e., consistency) around ages 5 and 7 years, respectively. Evidence suggests children can acquire gender constancy at younger ages if they learn gender categories are based on people's genitals (Bem, 1989).

The research on people's gender concepts is generally based on the dichotomous categorization of gender as female and male. However, anthropologists have pointed out alternative conceptualizations of gender in some cultures where more than two gender categories are recognized. For example, in some Native American cultures, "two-spirit" persons comprised a third gender category of individuals who did not fit into *female* or *male* categories (Wilson, 1996). In contemporary Western societies, the term *transgender* has also been used for individuals who do not wish to be classified on the basis of their biological sex (Bockting, 2014). Although acceptance of transgendered children may be increasing, many adults view these gender-nonconforming children as having a psychological disorder (discussed later in chapter).

Development of Executive Cognitive Functions

As explained earlier, the development of executive functions are related to increased flexibility in children's gender thinking about gender. Developmental changes in controlled or executive functions occur during infancy and continue into later adolescence (Hughes, 2011; Zelazo & Carlson, 2012; also see Müller & Kerns, Chapter 14, this *Handbook*, Volume 2). During early childhood (approximately 3 to 5 years), children become better at using verbal mediation to guide their behavior, which helps to increase self-regulation and cognitive flexibility. Greater efficiencies in cognitive strategies (e.g., selective attention, rehearsal, mental flexibility) are seen between 5 and 8 years of age (Hughes, 2011). Increases in these capacities may underlie the attainment of cognitive abilities such as decentration and multiple classification skills (e.g., Ionescu, 2001); in turn, these cognitive skills are related to gender constancy and gender stereotyping, respectively. Advances in executive strategies continue into middle childhood and adolescence as individuals normally become more self-controlled and show more cognitive flexibility (Hughes, 2011). Also, deliberate cognitive processes—such as goal setting, problem solving, and decision making—are associated with gender-related variations in social behavior (Ostrov & Godelski, 2010). As explained in later sections, the distinction between automatic and deliberate cognitive processes is helpful for

understanding several topics related to gender development (e.g., gender stereotyping and prejudice, average gender differences in academic achievement and socio-emotional competence).

Gender Stereotypes and Attitudes

As previously explained, stereotypes refer to group-attribute associations. Attitudes are based on any positive or negative valences tied to these associations (e.g., positive valence toward girls playing with dolls, negative valence toward boys playing with dolls). That is, stereotypes are *descriptive* (beliefs about what groups do), whereas attitudes are *prescriptive* or *proscriptive* (beliefs about what groups should or should not do, respectively).

Once children acquire a gender identity, they actively seek to understand what it means to be a girl or a boy. For instance, they show increased interest in gender-typed toys (Zosuls et al., 2009). Also, children start to learn gender stereotypes about physical characteristics, traits, activities, and occupational roles. In their meta-analysis, Signorella, Bigler, and Liben (1993) confirmed significant increases in children's gender stereotypes between approximately 3 and 7 years of age ($d = .76$).

During the preschool years, children usually hold rigid gender attitudes based on essentialist thinking; that is, gender-typed characteristics (e.g., appearance, activities) are believed to be inherent to a person's gender identity (Gelman, Taylor, & Nguyen, 2004). However, gender attitudes become more flexible following the acquisition of gender stability around 5 years of age. Children increasingly recognize that individuals vary in the degrees to which they might exhibit particular gender-typed attributes (see Halim & Ruble, 2010). Signorella et al. (1993) found age-related increases in gender attitude flexibility during early childhood in their meta-analysis. Other studies have observed increases in gender-attitudinal flexibility throughout middle childhood (see Halim & Ruble, 2010). On average, girls tend to demonstrate greater flexibility than do boys. In Signorella et al.'s (1993) meta-analysis, there was a significant average gender difference in that direction ($d = .21$).

Continued increases in attitudinal flexibility during middle childhood are related to changes in cognitive development. First, this includes the acquisition of multiple classification skill, which allows children to recognize that individuals can be simultaneously classified using multiple categories (e.g., Bigler & Liben, 1992). For example, a child can understand that a person could be both a woman and a firefighter (even though this might violate

814 Gender and Social-Cognitive Development

her or his gender-stereotyped expectations). As a consequence, gender stereotyping and prejudice can be reduced when children focus on a common group identity that they might share with cross-gender peers (see Blair, 2002). However, multiple classification ability also enables children to create subtypes to account for stereotype violations (described later).

Advances in moral reasoning during middle childhood also can facilitate increased flexibility in gender attitudes. Children become better at understanding that gender-typed behaviors might reflect social conventions or personal preferences as opposed to innate qualities (e.g., Stoddart & Turiel, 1985). However, as children approach adolescence and begin to form their own values, they may view social conventions regarding gender roles as appropriate. Hence, for some youth, gender attitudes may actually become more rigid during adolescence—but not due to limitations in cognitive flexibility as is the case during early childhood (e.g., Stoddart & Turiel, 1985).

Developmental changes in children's moral understanding and perspective taking contribute to children's ability to perceive gender-based discrimination when it occurs (Brown & Bigler, 2005). Children become better able to make moral judgments regarding fairness and equity (Killen et al., 2013). Furthermore, they may become capable of looking beyond their own personal experiences and view things from a societal perspective (Selman, 1980). Both of these developments may help enable children to recognize sexism in their personal lives and in society more generally (Brown & Bigler, 2005). In addition to having necessary cognitive skills, individual factors (e.g., gender-egalitarian attitudes) and contextual moderators (e.g., social support) influence the likelihood of perceiving sexism (Brown & Bigler, 2005).

Applying Gender Cognitions to Self and Others in Multiple Domains

Children form gender schemas about the self (gender identities and self-concepts) and about others (gender stereotypes and attitudes). Furthermore, these gender schemas are applied across a variety of domains in people's lives (Liben, Bigler, & Hilliard, 2014; Serbin, Powlishta, & Gulko, 1993; Tobin et al., 2010). Some examples include appearances, personality traits, recreational activities, academic interests, household work, and occupations. Within any domain, children might hold gender-stereotyped beliefs in a variety of ways. Thus, two given children might each endorse several gender stereotypes, but they might differ in the specific stereotypes that they support

(Tobin et al., 2010). As reviewed in later sections, gender stereotypes and self-concepts influence social interactions with peers and may contribute to the development of average gender differences in various achievement and socio-emotional domains.

Gender Cognitions During Encoding and Interpretation

A fundamental premise of both cognitive-developmental theory and gender schema theory is that children use their concepts of gender to encode and interpret information. Research generally supports this supposition (see Blakemore et al., 2009; Halim & Ruble, 2010; Martin, 2000). Information is generally encoded as truthful or false based on judgments of its reliability as well as its compatibility with existing knowledge and values (Ladowsky-Brooks & Alcock, 2007). Accordingly, children are generally more likely to pay attention and to remember information that they perceive as relevant for their own gender and consistent with existing beliefs.

Signorella, Bigler, and Liben (1997) conducted a meta-analysis of studies indicating a small yet meaningful overall effect favoring recall of own-gender information. That is, girls were more likely than boys to recall feminine-labeled materials ($d = .35$), whereas boys were more likely than girls to remember masculine-labeled items ($d = .34$). Furthermore, effect sizes were larger when longer recall delays were used, which suggests gender-schematic information tends to become increasingly consolidated over time.

Besides focusing more on events that are relevant to one's gender in-group, many children ignore or discount counterstereotypical models because they are seen as nonrepresentative of what most group members do (Perry & Bussey, 1979). In many instances, children may simply ignore counterstereotypical events. Alternatively, they may invoke a form of subtyping whereby counterstereotypical instances are rationalized as special exceptions to the rule (R. J. Green, Ashmore, & Manzi, 2005). Children also may distort memories of counterstereotypic instances and events by recalling them as stereotypical (e.g., Martin & Halverson, 1983).

Children vary in how likely they are to summon gender schemas when encoding and interpreting events (Serbin et al., 1993). In this regard, Liben and Bigler (2002) distinguished between attitudinal and personal pathways in the development of gender schemas. The attitudinal pathway is basically the same process as described in Martin and Halverson's (1981) model. In this pathway, events are initially encoded using gender-based categories.

If the information is perceived as relevant to one's gender in-group, interest in the event increases (i.e., attitudinal pathway). In other instances, the personal pathway may ensue, whereby children initially encode an event primarily based on its intrinsic interest or perceived importance. Once something is encoded as interesting or valued, it might (or might not) subsequently shape children's gender schemas.

When environmental events make gender highly salient, individuals are more likely to use gender categories to encode information (Bigler & Liben, 2006). Hence, in these situations, the attitudinal pathway may be more common. Also, children vary in the importance that they attach to gender as an organizing construct in their thinking (Tobin et al., 2010). The attitudinal pathway may be more likely for children who are highly gender schematic (i.e., strongly identify with their gender in-group and endorse many gender stereotypes); conversely, the personal pathway may be more common for children who are less gender schematic (Liben & Bigler, 2002).

Automatic and Controlled Gender Cognitions

Although children commonly use gender concepts to guide encoding and interpretation of information, some children demonstrate gender-typed behaviors (e.g., play preferences) before the acquisition of a gender concept. Although this point has been used to discount the validity of gender schema theory and cognitive-developmental theory (Bussey & Bandura, 1999), cognitive-developmental and gender schema theorists do not consider this problematic because they acknowledge that no single process or factor accounts for every facet of gender development (Martin et al., 2002). Consistent with this idea, allowing for both automatic and deliberate cognitive processes helps to explain more fully how cognitions influence gender development.

Automatic cognitive processes can result from priming, conditioned associations, and habits. First, when the salience of gender is primed in the environment, children are more likely to use gender stereotypes to interpret events (see Bigler & Liben, 2006). Second, when certain attributes (e.g., traits, activities, roles) are repeatedly paired with a particular gender, children form semantic associations linking gender with the attributes. Positive or negative associations may be made if these associations additionally coincide with social approval and personal enjoyment or with social sanctions and displeasure, respectively. Third, when children themselves repeat certain actions, they can become scripts (e.g., Levy & Fivush, 1993)

or procedural memories that are automatically engaged when prompted.

The influence of automatic processing is further implicated in studies illustrating ways that children's gender schemas can bias information processing. For example, studies find children tend to distort their memories of previously observed counter-stereotypical events by recalling them as stereotypical (e.g., Martin & Halverson, 1983).

As explained earlier, people's explicit and implicit gender beliefs sometimes differ (see Greenwald et al., 2002). For example, a person may consciously express nonstereotypical views when explicit measures are used, but the same person may demonstrate evidence of automatic gender stereotyping when implicit measures are applied. In one study, when school-age children's explicit and implicit gender stereotypes about math ability were assessed, some children who explicitly viewed girls and boys as equal in math ability additionally demonstrated implicit gender stereotypes associating math more with boys than girls (Cvencek, Meltzoff, & Greenwald, 2011). These findings imply that some persons may unconsciously internalize cultural gender stereotypes through repeated exposure despite consciously rejecting them.

Gender as a Social Gender Identity and Gender Segregation

Between 2 and 3 years of age, children begin to develop a gender identity and recognize gender as a social category used to organize the world around them. These developments occur around the same period that most children start preferring to affiliate more with same-gender peers (Maccoby, 1998). Gender-segregated peer relationships become the basis for the development of gender as a social identity. In this section, I review the development of gender segregation, gender as a social identity, and gender-related intergroup processes.

Development of Gender Segregation

Preference for same-gender peers begins to emerge between 2 and 3 years of age, steadily increases during the preschool years, and then remains stable during middle childhood. According to one set of observations in the United States, the ratio of same-gender to mixed-gender interactions went from 3:1 around 4 years of age to 11:1 around 6 years (see Maccoby, 1998). Although gender segregation is common across the world, there are cultural variations in the relative degrees that children affiliate with same-gender peers (Whiting & Edwards, 1988).

816 Gender and Social-Cognitive Development

The early emergence of same-gender preferences may be based initially on seeking out peers with compatible behavioral styles (Maccoby, 1998). Compared on average to boys, girls tend to demonstrate more impulse control (Else-Quest, Hyde, Goldsmith, & Van Hulle, 2006) and tend to be more talkative (Leaper & Smith, 2004). Also, children are beginning to form gender-typed play preferences (Maccoby, 1998). Hence, young children may start to prefer same-gender companions because they are more likely to have similar behavioral styles and activity interests. However, children increasingly focus on their peers' gender category when selecting play partners. By around 5 years of age, they appear to be favoring peers based on both their gender category and behavioral compatibility—with relatively more of the variance in peer preference accounted by the former factor (Martin et al., 2013). That is, as they get older, children's social identities as girls or boys may ultimately take priority over behavioral compatibility as a motivating force toward gender segregation (Martin, Fabes, Hanish, Leonard, & Dinella, 2011). Indeed, between 3 and 6 years of age, children increasingly anticipate social approval for selecting same-gender play partners; and holding this belief is correlated with children's own same-gender peer preferences (Martin, Fabes, Evans, & Wyman, 1999).

During adolescence, gender segregation usually relaxes (e.g., Poulin & Pedersen, 2007). One obvious example of increased cross-gender contact includes the beginning of heterosexual dating for many adolescents. Furthermore, boys and girls in many cultures begin to spend time in mixed-gender cliques, and this can facilitate dating and may lead to the establishment of cross-gender friendships for some youth (Mehta & Strough, 2009). However, there are some cultural contexts, such as Orthodox Jewish, Muslim, and Amish communities, wherein strict boundaries are imposed on adolescents' cross-gender contact.

Gender as a Social Identity

Once gender becomes a central social identity, the processes articulated in social identity theory can be observed in same-gender peer groups (see Leaper, 1994; Powlishta, 1995). First, social norms define a group. In this regard, some researchers have characterized children's same-gender peer groups as "gender cultures" (see Maccoby, 1998; Underwood, 2004). Two important processes that typically follow when children establish ties to same-gender peer groups are in-group favoritism and in-group assimilation. In-group favoritism has been demonstrated through children's more positive ratings of

same-gender than cross-gender peers on likeability and favorable traits (Powlishta, 1995; Robnett & Susskind, 2011; Zosuls et al., 2011). The esteem gained from children's ties to their gender in-group can strengthen their motivation to conform to the group's norms (Tobin et al., 2010). To this end, Martin and Fabes (2001) documented a "social dosage effect" in young children's gender-segregated peer groups: The amount of time that preschool or kindergarten children spent with same-gender peers predicted subsequent increases in gender-typed behaviors over 6 months. Thus, children tended to assimilate to the gender in-group's behavioral norms.

Social cognitive theory and social identity theory offer helpful models for understanding how the social dosage effect occurs in gendered peer groups. First, peer groups provide children with opportunities and incentives to practice gender-typed behaviors and to avoid cross-gender-typed behaviors. By practicing behaviors that are sanctioned in the peer group, children may gain feelings of self-efficacy in those domains (Bussey & Bandura, 1999). Furthermore, as children internalize the group's norms, gender-typed behaviors become more internally motivated (i.e., based on personal standards and interests) and less externally motivated (i.e., based on others' approval or disapproval). In this manner, children's gender-typed values serve a self-regulatory function as described in social cognitive theory (Bussey & Bandura, 1999), gender schema theory (Martin, 2000), and the gender self-socialization model (Tobin et al., 2010).

Investment in an in-group also increases children's sensitivity to how others view them. That is, social identities become more salient in peer groups and personal identities may be more easily expressed in dyadic relationships (Deaux & Major, 1987; Harris, 1995). To the extent that boys tend to spend more time in peer groups and less time in dyads or triads compared to girls (Benenson, Apostoleris, & Parnass, 1997), boys may be subjected more frequently to conformity pressures that inhibit some facets of their personal identities; conversely, by participating in more dyadic friendships, girls may experience more flexibility to pursue a wider range of interests associated with their personal identities (see Harris, 1995).

Although children primarily affiliate with same-gender peers during childhood, there are certain contexts when cross-gender interactions are seen (Sroufe, Bennett, Englund, Urban, & Shulman, 1993; Strough & Covatto, 2002). Competitive cross-gender interactions regularly occur to maintain group boundaries (e.g., cross-gender insults and teasing). However, cooperative cross-gender

contacts also are seen in two kinds of settings (based on studies of American children). First, in private settings, such as children's homes, girls and boys commonly engage in cooperative cross-gender play when companion choices are limited (Strough & Covatto, 2002). Second, in public settings, such as classrooms, children are usually comfortable interacting positively with cross-gender peers when they can attribute the contact to an external cause (e.g., a teacher assigns students to a mixed-gender collaborative group). Otherwise, children who violate these conventions risk peer rejection (Sroufe et al., 1993).

Dimensions of Social Identities

Perhaps the most fundamental dimension underlying children's social gender identity is membership knowledge (i.e., self-labeling). In many earlier studies, this was the sole criterion for defining gender identity. Some developmental and social psychologists, however, have identified several evaluative dimensions influencing the degree and manner that children identify with their gender in-group. Many of them are incorporated into the gender self-socialization model (Tobin et al., 2010). As described next, some dimensions posited to shape social gender identities include gender typicality, gender contentedness, felt pressure, public regard, attachment security, and centrality.

First, self-perceived *gender typicality* refers to the perceived concordance between self-perceived attributes (e.g., abilities, values) and same-gender stereotypes. Children appear less likely to view themselves as typical of their gender when they prefer cross-gender-typed activities (Egan & Perry, 2001) or they endorse gender-egalitarian values (Leaper & Brown, 2008; M. M. Patterson, 2012). Gender typicality is also positively correlated with self-esteem (e.g., Egan & Perry, 2001), although this association may be partly mediated by peer acceptance (Jewell & Brown, 2014; T. E. Smith & Leaper, 2006).

A second dimension of children's social gender identity is *gender contentedness*. Most children appear to be content with their gender (e.g., Egan & Perry, 2001), but some may be disaffected with the constraints on their gender in-group. For instance, researchers noted low gender contentedness was common (a) among girls who liked physical activities and identified as tomboys (Ahlqvist, Halim, Greulich, Lurye, & Ruble, 2013) and (b) among girls who experienced sexual harassment and other forms of sexism (Leaper & Brown, 2008).

When children stray from their group's social norms, they may feel pressure to conform. Accordingly, a third evaluative feature of a social gender identity is *felt*

conformity pressure, which reflects the degree that one experiences pressure to adhere to conventional norms. Felt gender-conformity pressure is usually more likely for children who engage in cross-gender-typed activities and do not consider themselves typical for their gender in-group (Egan & Perry, 2001). Conversely, children who favor gender-typed activities and view themselves as typical for their gender may not experience conformity pressures.

A fourth dimension underlying social identities is *public regard*, which refers to the perceived status of one's in-group relative to other groups (Halim & Ruble, 2010). Members of higher-status groups tend to be more rigid about maintaining in-group boundaries than are members of lower-status groups (e.g., Bigler, Brown, & Markell, 2001). In patriarchal societies, males generally have higher status than do females (W. Wood & Eagly, 2012). Accordingly, boys tend to be stricter than girls in maintaining gender boundaries and enforcing gender conformity (e.g., Sroufe et al., 1993). Also, the attributes associated with a high-status group are typically valued more than those of a low-status group. Thus, masculine-stereotyped attributes (e.g., assertiveness) are usually valued more than feminine-stereotyped attributes (e.g., nurturance) in highly male-dominated societies (see Hofstede, 2000). Although cross-gender-typed behavior can sometimes enhance a girl's status, it typically diminishes a boy's status (see Feinman, 1981). Accordingly, cross-gender-typed behavior tends to be more common among girls than boys (Leaper, 2013).

Fifth, *peer attachment security* may affect the strength of children's gender identities (Tobin et al., 2010). Based on one meta-analysis (Gorrese & Ruggieri, 2012), girls tended to demonstrate significantly stronger ($d = .51$) and more trusting ($d = .36$) attachments to peers. Research suggests insecure children are more vulnerable to peer influence (see Buck, Kretsch, & Harden, 2013). Therefore, if insecure peer attachments are more likely for boys, it may follow that boys are more susceptible to conformity pressures in same-gender peer groups. More research is needed to explore this possibility.

Finally, *gender centrality* reflects the importance of gender as an identity. Children vary in how central they view gender to their identity. For some children, other social identities may be more important. As emphasized in intersectional approaches (Cole, 2009), individuals think about themselves (and others) in relation to multiple social identities. For example, one study found gender was less central to the identities of some ethnic-minority children

818 Gender and Social-Cognitive Development

than to White ethnic-majority children (K. L. Turner & Brown, 2007).

According to the gender self-socialization model (Tobin et al., 2010), there is a reciprocal influence between centrality and typicality during gender development. When the salience of an important group identity is activated, children may focus on ways that they are similar to the group (Bennett & Sani, 2008). Conversely, the centrality of children's gender group identity may be strengthened when they perceive similar values (e.g., activity interests, ideological beliefs, stylistic preferences, future goals) between themselves and same-gender peers (Locke, Craig, Baik, & Gohil, 2012).

Intergroup Processes in Gender Stereotyping, Attitudes, and Prejudice

When applied to gender, intergroup processes may contribute to the development of sexist attitudes and discrimination (see Bigler & Liben, 2006; Harris, 1995; Leaper, 2000b). According to P. Glick and Fiske's (1996) ambivalent sexism model, gender-based prejudice is inherently ambivalent due to (a) asymmetries in status and power between men and women and (b) male–female interdependence in family and heterosexual relationships. In the model, sexism includes both hostile and benevolent types. Hostile sexism refers to negative attitudes toward individuals who violate traditional gender stereotypes, and it helps to maintain the status quo in gender relations. In contrast, benevolent sexism includes protective paternalism (i.e., belief that men must protect women) and complementary gender differentiation (i.e., belief that women and men are different and complement one another). Although these facets of benevolent sexism are attractive to many women and men, they reify traditional gender roles and status imbalances.

Because girls and boys affiliate primarily with same-gender peers during childhood, P. Glick and Hilt (2000) posited that benevolent sexist attitudes do not emerge until adolescence. They characterized childhood as primarily a period of hostile sexism without benevolent sexism. In studies of school-age children, evidence for out-group hostility (e.g., attributing negative traits to the other gender) and in-group favoritism (e.g., attributing positive traits to one's own gender) has been observed, although the latter tends to be stronger than the former (Powlisha, Serbin, Doyle, & White, 1994; Robnett & Susskind, 2011; Zosuls et al., 2011). Out-group hostility may increase in contexts where girls and boys compete over resources (see V. A. Green & Rechis, 2006).

As cross-gender contacts and heterosexual interest increase for most youth during adolescence, both hostile and benevolent sexism may occur (see Leaper & Robnett, 2011). Hostile sexism is increasingly expressed among adolescents through sexual harassment. This includes sexually disparaging comments, unwanted sexual interest, unwanted touching, and sexual coercion. Surveys of adolescents in the United States and other countries indicate that sexual harassment increases with age for many girls and boys (see Leaper & Robnett, 2011). Repeated experience with sexual harassment is associated with socio-emotional and academic difficulties; furthermore, stronger impacts tend to occur for girls more than boys and for sexual-minority more than heterosexual youth (see American Association of University Women [AAUW], 2011; Leaper & Robnett, 2011).

Increases in benevolent sexism during adolescence are reflected in traditional dating scripts whereby the boy takes the initiative and treats the girl in a protective manner (e.g., paying for dates). Studies with heterosexual adolescents in Spain (Montañés, de Lemus, Moya, Bohner, & Megías, 2013) and undergraduates in the United States (Robnett & Leaper, 2013b) found many youth were attracted to these traditional roles. However, in both studies, the participants' personal endorsement of benevolent sexism moderated the likelihood of these preferences.

Self-Regulation of Gender Stereotyping and Sexist Attitudes

Many children may disavow gender stereotypes and endorse gender-egalitarian attitudes (e.g., Galambos, Petersen, Richards, & Gitelson, 1985). However, several studies with adults (see Greenwald et al., 2002) and a few studies with children (e.g., Cvencek, Greenwald, & Meltzoff, 2011) indicate that many individuals who explicitly endorse egalitarian attitudes demonstrate evidence of automatic gender biases. Automatic gender biases may occur in persons who consciously endorse egalitarian attitudes due to repeated exposures to gender-stereotyped images throughout life. However, as children develop executive functions, it becomes possible to control these conditioned associations and other automatic gender biases (Blair, 2002). For example, individuals can make conscious efforts to focus on attributes other than gender when encountering persons.

In addition, children's attributional style may moderate their gender stereotyping and prejudice. Research suggests that individuals with incremental ability beliefs (i.e., abilities are malleable) are more flexible in shifting their focus

to a common group identity when making intergroup judgments. For example, this might include a child who has a positive view of a girl's computer programming ability because she belongs to the computer club. Conversely, individuals with entity attributional beliefs (i.e., abilities are fixed) are more rigid in their stereotyping and prejudice (Dweck, 2002; Hong et al., 2004). For example, a child with this attributional style might view a girl as inherently bad at computer programming regardless of her membership in the computer club.

Social Influences on Gender Stereotyping and Prejudice

Two kinds of social influence on children's gender stereotyping and prejudice are reviewed next. First, I describe how environmental cues in the interactive context often increase the salience of gender and the corresponding likelihood that gender stereotypes will be primed. Second, I review socialization influences that inform and shape children's developing gender beliefs and behavioral practices.

Environmental Gender Cues

Priming is one of the automatic cognitive processes that can influence the encoding and interpretation of information. Once gender is primed, it becomes more likely that observers will subsequently use gender to categorize and stereotype others (Bigler & Liben, 2006). As articulated in developmental intergroup theory (Bigler & Liben, 2006), some contextual features that increase the psychological salience of gender (or other social identities) include perceptual discriminability, labeling, and functional use. In addition, the degree of novelty or uncertainty in a situation is an influential factor (Deaux & Major, 1987).

First, perceptual discriminability increases the salience of a social category. This commonly occurs through physical appearance. For example, girls and boys are differentially marked through hairstyles, colors, and clothing. Another way that gender can stand out is when either females or males are a distinct minority in a mixed-gender group (e.g., three girls out of 25 students in an advanced physics class).

Second, the verbal labeling of gender is a pervasive means of highlighting gender. For example, when languages such as English or Spanish use gendered pronouns (*he*, *she*), people's gender is regularly marked in speech (Leaper & Bigler, 2004). Also, adults commonly label children's gender when alternatives are possible. For example,

teachers welcome their class with greetings such as "Good morning, boys and girls" (Bigler & Liben, 2006). Hilliard and Liben (2010) documented in an experimental study how preschool teachers' use of gender labels led to an increase over 2 weeks in children's gender stereotyping, gender-typed play, and gender segregation.

Third, gender can be made salient through its functional use to organize roles and activities. Functional use can be explicit as when bathrooms, classrooms, and playgroups are deliberately segregated by gender (e.g., Bigler, 1995). Also, it can be implicit as when certain roles tend to be filled more by one gender than another despite the absence of any formal prohibition for one gender to participate (e.g., most nurses are women). The division of labor by gender in society shapes the role expectations of children and adults (W. Wood & Eagly, 2012).

Finally, the degree of novelty or uncertainty in a situation can affect the salience of gender. When a person meets a stranger, it is more likely that gender-stereotyped expectations will be activated (Deaux & Major, 1987). A person's gender is usually obvious from appearance or name, and it becomes an easy social category to guide the perceiver's expectations. In contrast, when interacting with a familiar peer, perceivers can summon multiple things they know about the person (traits, interests, etc.) to guide expectations and behavior. This premise is also consistent with prejudice research based on intergroup contact theory (Pettigrew & Tropp, 2011).

Socialization Influences

During early childhood, parents and other family members are primary sources for learning gender stereotypes and attitudes. As they get older, children also look toward peers, teachers, and media sources to formulate their beliefs and values about gender (e.g., Davis, 2007). The importance of peers was reviewed earlier in the section on gender segregation and social identities. In the following, possible family and media influences on gender stereotyping and prejudice are reviewed. (The potential influence of teachers on gender-stereotyped beliefs about academic achievement is addressed in a later section.)

Parents. Parents with traditional views may overtly endorse gender-stereotyped beliefs and attitudes (e.g., "Girls shouldn't play sports," "Boys don't cry"). Studies suggest that parents commonly reinforce gender stereotypes in at least three subtle ways. First, this occurs through the use of generic or essentialist language about gender (Gelman et al., 2004; Rhodes, Leslie, & Tworek, 2012).

820 Gender and Social-Cognitive Development

Generic language about gender occurs when individuals make generalized statements about a gender group regarding a trait, activity, or role (e.g., “Boys play football,” “Girls are affectionate”). Generic language about gender is common in parents’ speech—even for many parents with egalitarian attitudes (Gelman et al., 2004; Friedman, Leaper, & Bigler, 2007). Using these generic statements may possibly instill essentialist beliefs in young children, whereby particular attributes become viewed as inherent to a particular gender (see Gelman et al., 2004). Second, some parents indirectly contribute to children’s gender stereotyping by not challenging children when they express gender stereotypes. Indeed, most parents did not challenge gender stereotypes in their speech to children (e.g., Gelman et al., 2004; Friedman et al., 2007). However, among mothers who did contest gender stereotypes with their young children, it was mostly likely for those with gender-egalitarian attitudes (Friedman et al., 2007). Finally, parents may reinforce gender-stereotyped beliefs when they encourage different activities and achievements in sons and daughters. For example, parents commonly purchase different toys for girls and boys (see Leaper, 2013). Also, some parents’ expectations about their children’s achievement in certain academic subjects are shaped by gender stereotypes (reviewed later). When parents or other family members treat boys and girls differently, they send messages about the kinds of objects and activities that society associates with a person’s gender.

Assessing parent-child concordance in gender attitudes has been a common strategy for inferring parents’ influence on their children’s gender beliefs. Although correlations cannot prove causation, they can serve as preliminary means to assess whether such an effect might occur. Two meta-analyses have tested for this association. First, Tenenbaum and Leaper (2002) considered the correlation between parents’ and children’s gender cognitions (self-concepts, stereotypes, attitudes). The association was significantly stronger for mother-child pairs ($r = .19$) than for father-child pairs ($r = .13$), which the authors suggested might reflect the greater amount of time that most children spend with their mothers. In another meta-analysis, Degner and Dalege (2013) looked specifically at parent-child similarities in intergroup attitudes (i.e., group-related evaluations, beliefs, relations, and behaviors). Gender was one of the intergroup categories investigated, and there was a significant average parent-child attitude match ($r = .21$). In both sets of meta-analyses the authors noted that the sampled studies included a variety of types of measures,

ages, and samples; however, there were too few available studies to consider possible interactions among several potential moderators. One reason for the small magnitude of parent-child concordance in gender attitudes in both meta-analyses might be that parents’ gender attitudes often do not match their own actions (Leaper & Bigler, 2004).

Siblings. Older siblings may also influence children’s gender-typed beliefs and preferences. Farkas and Leaper’s (2014) meta-analysis considered studies testing for possible associations between older siblings’ gender and children’s gender typing (self-concepts, attitudes, and play preferences). First, the older sibling’s gender was unrelated to children’s scores on traditionally feminine characteristics. However, girls and boys were more likely to score higher on traditionally masculine characteristics if they had an older brother than an older sister ($d = .31$ for girls; $d = .21$ for boys). These associations may have been significant only for masculine-stereotyped characteristics because of the higher status accorded masculine-than feminine-stereotyped qualities. Moderator analyses indicated age was negatively correlated with effect sizes for both girls ($r = -.87$) and boys ($r = -.70$). The authors suggested that older siblings might have less impact on children as they get older and spend more time with peers. Due to the limited number of pertinent studies, however, Farkas and Leaper advised caution when drawing inferences from their meta-analysis.

Media. The mass media is another powerful source for transmitting gender stereotypes in industrialized cultures. Repeated exposure to stereotypical media images may reinforce people’s implicit stereotypes and attitudes even when individuals might consciously disavow the stereotypes (e.g., Gurari, Hetts, & Strube, 2006). Content analyses have highlighted the pervasiveness of gender stereotypes in media targeting children. These include child-oriented television programs, television advertising, movies, books, magazines, music, and videogames (see Blakemore et al., 2009). Several themes tend to recur across content analyses of different media (e.g., see Signorielli, 2012). First, male characters are proportionally overrepresented in most media. Second, characters tend to be portrayed in gender-stereotypical ways (e.g., traits, activities, occupations). Third, male characters are likely to be portrayed in highly aggressive or powerful roles, whereas females are often portrayed as helpless victims or supportive caregivers. Fourth, female characters are frequently presented in hyper-sexualized ways. Finally, although gender

stereotypes are common in the media, there have been increases over time in counter-stereotypical images in some media—especially for female characters.

Most children are avid consumers of mass media and use these images to guide their developing beliefs about gender-normative roles and behavior. Oppliger (2007) conducted a meta-analytic review of studies testing for the effects of the media on gender stereotyping. With children, significant average effect sizes were small but meaningful in both experimental ($r = .24$) and nonexperimental ($r = .21$) studies. The media can also be used to counteract gender stereotypes (Mares & Woodard, 2005). For example, learning about feminism and the women's movement in the media was positively related to endorsing gender-egalitarian attitudes and recognizing sexism in a sample of adolescent girls in the United States (Leaper & Brown, 2008).

Cultural and Social-Structural Influences

Cultures vary in the prevalence that individuals endorse gender stereotypes and sexist attitudes. Cross-national comparisons indicate that gender-egalitarian and nonsexist attitudes among adults are more common in societies with greater gender equality between women and men in rights, opportunities, roles, and power (e.g., Brandt, 2011). The pervasiveness of gender stereotyping among children also appears related to the degree of gender equality in society (see Best & Thomas, 2004, for a review).

GENDER-TYPED PLAY

When children are not attending school, most of their waking day is spent in play and other leisure activities (McHale, Kim, Whiteman, & Crouter, 2004). These different play experiences are powerful contexts that can shape the beliefs and behaviors of girls and boys. Developmental patterns in children's gender-typed play and possible influences on play preferences are surveyed next.

Developmental Patterns in Children's Gender-Typed Play

As reviewed here, one of the largest average gender differences in behavior is seen in children's play preferences. After summarizing these patterns, I consider the possible consequences of gender-typed play on children's thinking and abilities.

Average Gender Differences

Some evidence suggests visual interest in gender-typed toys (e.g., dolls versus trucks) may emerge before the first birthday (see Alexander & Wilcox, 2012). Otherwise, behavioral preferences for gender-typed toys are usually seen by around 18 months of age (e.g., Serbin, Poulin-Dubois, Colburne, Sen, & Eichstedt, 2001). In addition, gender-typed themes in fantasy play emerge around 3 years of age. The degree that children prefer gender-typed activities generally tends to remain stable throughout childhood (Golombok, Rust, Zervoulis, Golding, & Hines, 2012). On average, girls are more likely than boys to favor dolls, cooking sets, and dress-up materials. Girls' fantasy play commonly focuses on domestic situations (e.g., playing house). In contrast, boys are more apt to prefer construction toys, cars and trucks, action figures, and sports equipment (Maccoby, 1998). Also, boys' fantasy play is more likely to entail action-adventure plots with a pursuit-and-conquest theme (e.g., playing war or superheroes). A related difference is that boys are more likely than girls to engage in rough-and-tumble play (Maccoby, 1998). In later childhood and adolescence, boys are especially likely to spend time playing videogames that simulate violence or sports (Cherney & London, 2006). Preferences for gender-typed toys and play constitute one of the largest average gender differences in behavior. For example, Cherney and London (2006) found that gender accounted for 64% of the variance ($d = 2.7$) in toy preferences of children between 5 and 13 years. Furthermore, gender-typed toy and play preferences are seen across different cultures—including gender-egalitarian societies such as Sweden (Nelson, 2005).

Despite the large average gender differences in play preferences, there is some variability among children in how strongly they prefer gender-typed toys and play activities. On average, studies in multiple countries find there is more flexibility in the play choices of girls than boys (e.g., Cherney & London, 2006; Turner & Gervai, 1995; Yu & Winter, 2011). For example, many girls who play with dolls also participate in sports. In contrast, very few boys show an interest in both types of play. This average gender difference in flexibility tends to increase from early into middle childhood (Cherney & London, 2006).

The greater rigidity among boys in play preferences appears partly related to the stronger socialization pressures placed on boys than girls to adhere to traditional gender roles (reviewed later). In addition, some individual

822 Gender and Social-Cognitive Development

factors may contribute to greater average rigidity in play preferences. DeLoache, Simcock, and Macari (2007) documented how approximately one quarter of children between 1 and 6 years demonstrated extremely intense interests (i.e., strong interest reliably seen across time and settings). They observed that the phenomenon was much more common among boys than girls ($N=61$, $d=.98$). Some of the extremely intense interests seen almost exclusively among boys included vehicles, machines, dinosaurs, and balls. In contrast, dress-up was the only area in which intense interest was seen primarily among girls (also see Halim et al., 2014).

Another manifestation of within-gender variability in children's gender-typed play preferences occurs when some children strongly prefer cross-gender-typed over gender-typed play activities. For example, this might include boys who like doll play but not sports; or it might include girls who show the opposite pattern. These individual differences tend to remain stable from the preschool years into early adolescence (Golombok et al., 2012). Also, based on parent reports, more boys than girls demonstrate cross-gender-typed preferences (Zucker, Bradley, & Sanikhani, 1997). It is not clear the extent to which these estimates might partly reflect greater tolerance among parents about cross-gender-typed behavior in daughters than sons.

Possible Consequences of Gender-Typed Play

Play activities are important contexts for the development of gender because they provide opportunities for practicing particular behaviors. Deliberate and repeated practice appears to be prerequisite for developing expertise in a domain (Ericsson & Ward, 2007). Thus, recurring play activities may shape children's developing expectations, preferences, and abilities (Bussey & Bandura, 1999; Leaper, 2000b).

Masculine- and feminine-stereotyped play activities tend to differentially emphasize self-assertive and affiliative behavior (e.g., Leaper, 2000a; Lindsey & Mize, 2001). During masculine-stereotyped play activities, children are more likely to enact self-assertive behaviors (e.g., object mastery, competition, and aggression). In contrast, during feminine-stereotyped play activities, children are more apt to exercise collaborative behaviors that are simultaneously affiliative and assertive (e.g., nurturance and mutual collaboration).

Gender-typed play activities also tend to practice different cognitive and physical skills. Many of the play activities common among girls, such as playing house,

provide opportunities to exercise language and conversation skills (O'Brien & Nagle, 1987). Also, dress-up play emphasizes concerns with physical appearance (Blakemore & Centers, 2005). In contrast, many of the play activities common among boys, such as construction toys and sports, utilize spatial ability (Serbin, Zelkowitz, Doyle, Gold, & Wheaton, 1990) and motor skills (Lindsey & Mize, 2001).

In sum, to the extent that girls and boys systematically participate in different activities, they practice skills that may contribute to later average gender differences in socio-emotional, academic, and physical competencies. Participation in *both* feminine- and masculine-stereotyped play activities, however, may optimally benefit children's development by fostering a broader repertoire of skills (see DiDonato et al., 2012; Leaper, 1994).

Possible Influences on Gender-Typed Play Preferences

The scientific research points to several factors that influence the development of gender-typed play preferences. Individual influences include gender-related variations in temperament and the internalization of gender-stereotyped attitudes. Social influences include encouragement and pressures from parents and peers as well as gender-stereotyped images in the media.

Temperament

Research suggests that hormonal or genetic factors might partly contribute to variations in girls' and boys' play preferences (see Hines, Chapter 20, this *Handbook*, Volume 3). Differences in biologically based temperamental dispositions may partly mediate these links. Moderate average gender differences in temperament are seen in activity level, sensation seeking, and self-control (Else-Quest et al., 2006). Higher levels of activity and sensation seeking tend to occur among boys than girls. In contrast, greater self-control is more common among girls than boys. Based on these average differences, many girls and boys may find certain play activities more attractive than others. Also, as described earlier, early temperamental differences may contribute to children's initial preference for same-gender peers who have compatible behavioral styles. Once children spend more time with same-gender peers, they tend to develop stronger preferences for gender-typed play (Martin & Fabes, 2001).

Another average dispositional difference appearing early in development is the relative interest in people versus things. Some studies of infants have found girls were more likely than boys to show interest in people or

dolls (which have human features) than objects (e.g., balls, vehicles, mechanical objects); in contrast, boys were more likely than girls to show interest in objects (see Alexander & Wilcox, 2012). Also, on average, boys may be more interested in the movement of physical objects beginning in infancy (e.g., Benenson, Tennyson, & Wrangham, 2011). Thus, average gender difference in person–thing orientation may partly underlie children’s gender-typed play preferences (e.g., girls preferring dolls and boys preferring vehicles and moving objects); however, more research needs to test these possible differences (Eliot, 2009).

Gender Stereotypes and Attitudes

Some of young children’s early gender-typed play preferences may emerge prior to acquiring a concept of gender (Bussey & Bandura, 1999). In these instances, preferences may be based partly on temperamental dispositions or on familiarity with parents’ toy selections. However, once children form a gender concept, studies show gender schemas influence toy and play activity preferences increasingly with age (e.g., Zosuls et al., 2009). For example, experimental studies have demonstrated that preschool-age children tend to favor unfamiliar toys labeled for their own gender and to avoid toys labeled exclusively for the other gender (e.g., Martin, Eisenbud, & Rose, 1995).

Parents

In a meta-analysis of studies of parents’ gender typing across multiple socialization areas in the United States and Canada, Lytton and Romney (1991) found that encouraging gender-typed activities was the manner whereby mothers ($d = .34$) and fathers ($d = .49$) most reliably treated daughters and sons differently. Studies suggest that some parents in Western cultures are becoming more flexible in their attitudes regarding young children’s play (E. Wood, Desmarais, & Gugula, 2002); however, this remains more likely with daughters than sons. Most Western parents generally remain rigid in the gender typing of boys (Kane, 2006; E. Wood et al., 2002). However, compared to heterosexual parents (and perhaps especially heterosexual fathers), gay or lesbian parents may be more flexible about boys’ play (Goldberg, Kashy, & Smith, 2012).

The available research does not indicate a strong association between parental reinforcement and children’s toy and play preferences during early childhood (e.g., O’Brien & Huston, 1985; P. J. Turner & Gervai, 1995). As children get older and become more flexible in their understandings of gender stereotypes, parents might

have more influence on the degrees to which children rigidly pursue only gender-typed interests. Some parents may be able to broaden their children’s interests through encouraging traditionally cross-gender-typed activities, such as girl’s participation in sports (e.g., Simpkins, Fredricks, & Eccles, 2012). However, there is surprisingly little research addressing the possible causal relationship between parental encouragement and gender-typed play beyond the toddler and preschool years.

Peers

As explained earlier, the peer group becomes a powerful context for shaping gender conformity in play and peer choices. At least two processes might account for these effects. First, peers function as role models who inform children what it means to be a girl or a boy. Children are more likely to play with a toy (including cross-gender-typed toys) after observing same-gender (versus cross-gender) peer models with the toy (see Bussey & Bandura, 1999). Children are also more likely to be influenced by their friends to become more similar in activities (Martin et al., 2013). Second, peer groups typically enforce conformity regarding gender-typed play. They commonly disapprove of cross-gender-typed play activities (e.g., Carter & McCloskey, 1983). Consistent with these patterns, researchers have found the amount of time that children spent with same-gender peers predicted later degrees of gender-typed play during early childhood (Fagot, 1981; Martin & Fabes, 2001). Also, children’s engagement in gender-typed play and avoidance of cross-gender-typed play are related to peer popularity (e.g., Carter & McCloskey, 1983); however, this association appears stronger among boys than girls (e.g., Moller, Hymel, & Rubin, 1992).

Although they usually spend little time playing exclusively with cross-gender peers in public settings, younger children sometimes engage in mixed-gender group play. A study of preschool-age children found approximately one fourth of peer interactions involved mixed-gender groups (Fabes, Martin, & Hanish, 2003). In mixed-gender settings, a somewhat greater range of activity choices was made. Thus, encouraging cross-gender cooperative play may increase greater flexibility by leading girls and boys to practice a broader spectrum of activities (see Leaper, 1994). However, because boys are generally more rigid than girls in their gender typing, the activities during mixed-gender peer play may lean more toward those that are masculine-stereotyped (e.g., see Goble, Martin, Hanish, & Fabes, 2012).

824 Gender and Social-Cognitive Development

Media

Television advertisements for children's toys model and reinforce gender-typed play patterns (Signorielli, 2012). The gender of the child actors in TV commercials underscores the message that certain toys are either "for boys" or "for girls." Boys in the ads are shown enjoying action-oriented and aggressive behaviors. In contrast, girls are depicted as nurturing dolls as well as showing interest in fashion and beauty. There is also clear evidence that TV advertisements can be effective in shaping girls' and boys' toy preferences (e.g., Robinson, Saphir, Kraemer, Varady, & Haydel, 2001).

GENDER COMPARISONS OF PERFORMANCE AND ACHIEVEMENT

In the following section, I review evidence for gender similarities and differences in children's competencies in academic, physical, socio-emotional, and other domains. According to Gardner's (2006) theory of multiple intelligences, there are eight sets of abilities in which a person might attain competence: linguistic, spatial, logical-mathematical, naturalistic, bodily-kinesthetic, musical, intrapersonal, and interpersonal. In the present chapter, each area is characterized as a different performance and achievement domain rather than a type of intelligence. Regardless of how the multiple-intelligences debate is ultimately resolved, Gardner's domains appear to reflect meaningful ways that people differentially express their talents. In most of these domains, gender-related variations in performance or achievement have been indicated.

With the following modifications, Gardner's (2006) domains are used as an organizing framework to review the research comparing boys' and girls' performances and achievement. First, the evidence is noted for any average gender differences in measures of general intelligence and overall academic achievement. Second, the logical-mathematical domain is differentiated into (a) mathematics and (b) physical sciences and technology. The latter fields are generally considered math intensive; however, somewhat different gender-related achievement patterns are indicated for them and mathematics. Third, achievement in life sciences (e.g., biology) is considered separately; this domain overlaps with what Gardner describes as naturalistic abilities. Fourth, because many studies consider overall science achievement, findings from this work are summarized. A final adaptation is to review musical and artistic abilities together. In Gardner's scheme, musical abilities are distinct from other artistic abilities. Visual arts involve

spatial skills whereas dramatic arts call upon interpersonal and intrapersonal abilities. However, there has been little research examining gender and musical or artistic abilities; and many of the available reports combined musical and other artistic forms of achievement.

In summary, evidence is reviewed below for gender-related variations in the following domains: (a) general intelligence, (b) overall academic achievement, (c) language skills and achievement, (d) spatial skills, (e) mathematics, (f) general science, (g) physical sciences and technology, (h) life sciences, (i) musical and artistic abilities, (j) physical abilities and athletic achievement (related to Gardner's bodily-kinesthetic domain), (k) interpersonal skills, and (l) intrapersonal competencies.

General Intelligence

There is no mean gender difference on measures of general intelligence. More variability in intelligence test scores, however, occurs among males than females. Proportionally more males than females score at the very high and very low ends of the distribution beginning in early or middle childhood (Halpern, 2012).

Overall Academic Achievement

In many industrialized countries in which girls and boys have comparable access to education, there has been a pattern in recent decades of girls doing better than boys in overall academic achievement beginning in elementary school (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2010; Voyer & Voyer, 2014). The gender gap in achievement tends to widen after the transition to secondary school. Compared to boys, girls tend to have higher grade point averages from elementary school to high school ($d = .37$; Voyer & Voyer, 2014). However, in much of the nonindustrialized world, educational opportunities are more limited for girls than boys (UNESCO, 2010).

The gender gap favoring girls in overall academic achievement in industrialized countries extends into college. On average, women tend to attain higher grades in college than do men ($d = .21$; Voyer & Voyer, 2014). In the United States, approximately 57% of bachelor's degrees have been awarded to women in recent years (National Center for Education Statistics [NCES], 2013). In addition, a similar gender gap in bachelor's degrees is seen in most Organisation for Economic Co-operation and Development (OECD) countries (OECD, 2013). The gender differences in high school and college education within the United States are wider for African Americans

and Latinos/Latinas than for White European Americans or Asian Americans (NCES, 2013).

Verbal Skills and Achievement

Overall, average gender differences have been observed in reading and writing test scores and grades in the United States and other OECD countries (OECD, 2013; Voyer & Voyer, 2014). The corresponding effect sizes tend to be small but meaningful. National reading tests in the United States have consistently indicated a gender gap favoring girls since 1971 (NCES, 2013). During this period, the gap has narrowed considerably for 9-year-olds but not for 13- or 17-year-olds. In addition, a study of reading achievement in 15-year-olds from 27 European Union countries found gender accounted for approximately 3% of the variance (approximate $d = .35$), whereas socioeconomic status explained nearly 15% of the variance (Eurydice Network, 2010). Finally, there is evidence that more women than men may continue to achieve in language-related domains in college. Among the 2010 bachelor's degrees awarded in the United States, 69% went to women in literature, linguistics, and foreign languages.

Spatial Skills

When comparing boys' and girls' spatial skills, meta-analyses generally point to a male advantage. According to one review (Voyer, Voyer, & Bryden, 1995), average gender differences depended on the age level and the type of spatial skill being evaluated. On tests of *mental rotation* (mentally rotating two- or three-dimensional figures), the average effect sizes were small to medium with statistically significant differences during childhood (under 13 years: $d = .33$), adolescence (13 to 18 years: $d = .45$), and adulthood (over 18 years: $d = .66$). On tests of *spatial perception* (determining spatial relations when there is a distracting frame of reference), the effect sizes were small but nonsignificant during childhood ($d = .33$) and small with statistically significant differences during adolescence ($d = .43$) and adulthood ($d = .48$). On tests of *spatial visualization* (solving complex spatial problems in sequence), there were no significant differences in childhood ($d = .02$) or adolescence ($d = .18$); however, a significant gender difference appeared in adulthood ($d = .23$). In sum, the differences in all types of spatial ability increased with age. Also, the largest average gender difference in spatial ability occurs in mental rotation. Evidence suggests average gender differences in mental rotation may possibly appear as young as 3 months of age (e.g., Quinn & Liben, 2008).

Gender Comparisons of Performance and Achievement 825

Spatial skills are related to other ability domains reviewed in later sections. Some types of spatial ability may be used in particular high-level mathematical abilities (Laski et al., 2013). Also, both spatial reasoning and mathematical skills are important in many STEM (science, technology, engineering, and mathematics)-related domains (Liben, 2006; Wai, Lubinski, & Benbow, 2009).

Mathematical Skills and Achievement

In terms of average math grades in American high schools, girls tend to achieve slightly better than boys (NCES, 2013; Voyer & Voyer, 2014). A different pattern, however, is indicated for performance on standardized mathematics tests. Meta-analyses reveal no appreciable average gender difference in math achievement on standardized tests until adolescence. In one of these reviews, Lindberg, Hyde, Petersen, and Linn (2010) summarized findings from 242 studies and 441 samples across the world. During elementary and middle school, there were essentially no differences ($d = .06$ and $d = .00$, respectively). A small effect size occurred in high school ($d = .23$, boys higher) and college ($d = .18$, men higher) samples. In their meta-analysis, Lindberg et al. (2010) did not find that nationality was a significant moderator when eight diverse regions in the world were compared. However, ethnic-majority status within the United States was a significant moderator. Across all age levels, effect sizes were significantly larger in samples comprised mostly of White European Americans ($d = .13$) than those from ethnic-minority backgrounds ($d = -.05$), although the effect sizes for both groups were negligible.

There is more variability among males than females in math performance (see Halpern, 2012). For example, proportionally more boys than girls continue to be represented among those attaining the highest and lowest scores in mathematical reasoning on standardized tests (SAT, ACT) taken during high school in the United States (Wai, Cacchio, Putallaz, & Makel, 2010). The gender gap at the highest levels has declined somewhat over the last 30 years, but males continue to have a sizeable advantage (e.g., 3.8:1 male-to-female ratio [approximate $d = 1.11$] for the top 0.01% scores during 2006 to 2010).

The closing of the gender gap in math achievement is seen in higher education. Among the bachelor's degrees in mathematics recently awarded in the United States, approximately 43% went to women (NCES, 2013). Cross-national comparisons (UNESCO, 2012) similarly indicate that women are well represented in mathematics bachelor's degrees across North America and Western

826 Gender and Social-Cognitive Development

Europe (48% women), Latin America and the Caribbean (53% women), and East Asia and the Pacific (62% women). But proportionally fewer women are attaining doctorates in mathematics in most countries. Among the 2010 doctorates in mathematics awarded in the United States, 30% went to women. Thus, although the historical trend is toward increasing gender equality in mathematics achievement, gender imbalances favoring men persist at advanced levels of education and in many math-related occupations such as engineering (reviewed later).

Overall Science Achievement

Much attention is now paid to the underrepresentation of girls and women in STEM fields (see Hill, Corbett, & St. Rose, 2010). Patterns related to overall science achievement are summarized in this section. However, as explained in subsequent sections, there are varying degrees of gender similarity and difference depending on the particular STEM field.

In terms of overall high school science grades, girls have higher grade point averages than do boys ($d = .16$; Voyer & Voyer, 2014). On assessments of general science aptitude, however, significantly higher averages were seen for boys than girls on NAEP (National Assessment of Educational Progress) general science tests at grades 4, 8, and 12 (NCES, 2013). An analysis of 15-year-old students' performances on science tests in 27 European Union countries similarly indicated a higher average for boys than girls (Eurydice Network, 2010). Finally, proportionally more boys than girls were represented among the extreme top scores on the ACT standardized assessment of science reasoning in the United States (Wai et al., 2010). Between 2006 and 2010, the male-to-female ratio among those in the top 0.01% was approximately 2.8:1 (approximate $d = .84$).

Physical Sciences and Technology Achievement

On average, boys tend to score higher than girls in physical science tests during childhood and adolescence. On the 1991 International Assessment of Educational Progress (Beller & Gafni, 1996), there were small average differences in physical science performance across countries with boys having higher averages at 9 years ($d = .28$) and 13 years ($d = .42$). On the 1995 Trends in International Mathematics and Science Study (TIMSS) high school physics test (TIMSS International Study Center,

2000), boys scored higher on average than did girls (effect sizes not reported). This average difference occurred in the United States as well as highly gender-egalitarian countries such as Sweden and Norway. A comparison of American boys' and girls' scores on the Advanced Placement (AP) Physics exam in 1996 pointed to a small average difference ($d = .42$) with boys scoring higher (Stumpf & Stanley, 1998). The same report also indicated a small average difference ($d = .33$) in AP Computer Science exam scores favoring boys. More recent estimates indicate that boys continue to attain higher average scores on AP Physics and Computer Science exams (Hill et al., 2010).

The gender gap in physical sciences and technology achievement extends into college in the United States. Among the bachelor's degrees recently awarded in particular majors, the percent going to women were 49% in chemistry, 20% in physics, 18% in engineering, and 16% in computer and information sciences. However, there is variability across the world in the relative percentages of degrees in physical sciences and technology going to women and men. For bachelor's degrees in all of the physical sciences, women accounted for 43% across North America and Western Europe, 51% in Latin America and the Caribbean, 58% in East Asia and the Pacific, and 61% in Arab states (UNESCO, 2012). For bachelor's degrees in computing, women accounted for 21% across North American and Western Europe, 31% in Latin America and the Caribbean, 29% in East Asia and the Pacific, and 33% in Arab states (UNESCO, 2012).

Over the decades, the gender gap in the physical sciences and technology fields has closed somewhat in the United States (National Science Foundation [NSF], 2013). For example, comparing the percent of bachelor's degrees in the United States awarded to women in 1970 versus 2001 reveals appreciable increases in engineering (1% versus 20%), computer science (13% versus 28%), and physical sciences (14% versus 41%).

Life Sciences Achievement

As previously noted, higher average science grades are generally seen for girls than boys in American high schools. On standardized tests, however, boys have scored significantly higher than girls on AP Biology test performances. An analysis from tests taken in 1996 indicated a small effect size ($d = .24$, boys higher; Stumpf & Stanley, 1998). More recent figures also indicate a higher average in the United States for boys than girls (Hill et al., 2010). Nonetheless, more women than men have been pursuing



degrees in biology and other life sciences. In the United States, 58% of 2010 bachelor's degrees in biological and biomedical sciences went to women. Among the doctorates in these fields, 53% went to women. Also, 48% of medical school degrees in the United States went to women. American women's achievement in the life sciences and medicine has dramatically increased over the decades. By comparison, in 1970, 14% of doctorates in biological sciences, and 8% of medical degrees went to women in the United States (NSF, 2013).

Musical and Artistic Achievement

When considering artistic abilities, one can differentiate between musical, visual-artistic, and dramatic arts. Each type involves different ability profiles (Gardner, 2006). On the NAEP tests of American eighth graders, girls scored higher on average than did boys in separate assessments of music and the visual arts (NCES, 2013). Another investigation of elementary and middle school children in the United States (Pfeiffer, Petscher, & Kumtepe, 2008) found no average gender difference on a measure of overall artistic talent (combining visual, musical, dance, and dramatic arts). Among the bachelor's degrees in the visual arts awarded in the United States in 2010 (NCES, 2013), slightly more went to women (compared to the base rate of 57% of all bachelor's degrees going to women). These included 65% in painting, 67% in photography, 64% in sculpture, and 53% in music. One notable exception was only 35% of film degrees were awarded to women.

Physical Performance and Athletic Achievement

As reviewed in this section, some of the largest average gender differences in behavior are found in motor performance. There are also average gender differences in athletic achievement, although these differences have dramatically narrowed in the past 40 years in many countries.

Motor Performance

Some of the largest average gender differences in behavior are found in motor performance. Thomas and French's (1985) meta-analysis reported large average gender differences in strength, speed, and balance. First, boys demonstrate greater levels of strength than do girls. For example, on measures of throwing distance, the magnitude of the difference is already quite large during childhood (approximate $d=1.5$ at 6 years) and becomes even larger in later adolescence (approximate $d=3.0$ at

Gender Comparisons of Performance and Achievement 827

16 years). Second, boys also indicate faster average running speed than do girls. For example, on short-distance running, the difference was small in childhood (approximate $d=.3$ at 6 years) and very large in later adolescence (approximate $d=2.0$ at 16 years). Finally, boys on average do better than girls on measures of balance at older ages. Although there is no difference in childhood (approximate $d=0$ at 6 years), a large difference in balance occurs in adolescence (approximate $d=1.0$ at 16 years). Most of the average gender differences in motor performance are related to corresponding average physical differences between males and females in size and muscle mass (Thomas & French, 1985).

Athletic Achievement

During the past 50 years, the gender gap in sports participation has dramatically narrowed in much of the world. For example, women's representation at the Olympic Games has steadily increased from 11% in 1960 to 44% in 2012 (International Olympic Committee, 2013). A similar pattern has occurred within the United States. During the 1971–1972 school year, 93% of high school athletes were male. During the 2011–2012 year, 58% were male (National Federation of State High School Associations [NFSHSA], 2013). This reflected approximately half of all male students and two fifths of all female students participating in a high school sport. (Data comparing girls' and boys' high school sport participation in other parts of the world could not be located.)

Gender similarities and differences are seen among the sports that are most popular for American youth (NFSHSA, 2013). Sports that were among the most popular for both genders in the United States included outdoor track and field (ranked first for girls, second for boys), basketball (ranked second for girls, third for boys), baseball/softball (ranked fourth for both boys and girls), and soccer (ranked fifth for both girls and boys). The most notable differences were the almost exclusively male sports of American football (99.9% male, by far the most popular for boys) and wrestling (98% male, ranked sixth for boys). In contrast, a popular sport for girls that was rarely pursued by boys included competitive spirit squads (98% female, ranked tenth).

Interpersonal Competencies

Interpersonal competence is based on a combination of skills that include socio-emotional understanding, communication, and self-regulation (Beauchamp & Anderson,

828 Gender and Social-Cognitive Development

2010). Socio-emotional understanding includes emotion decoding and empathy, perspective taking, social problem solving, and moral reasoning. Relevant communicative skills include being able to initiate positive social interactions, and to cooperate with others. Interpersonal skills are all related to the development of satisfaction and intimacy in close relationships. Conversely, poor social skills can lead to aggressive behavior. Gender-related variations in these aspects of social competence are reviewed next. (Average gender differences in self-regulation and its relevance to social competence and other domains are addressed in the later section on explanations for average gender differences.)

Emotion Decoding and Empathy

Emotion decoding and empathy are two interrelated processes. The former refers to the ability to accurately recognize other people's emotions, whereas the latter is the vicarious sharing of another person's feelings. According to two meta-analyses, there are modest average gender differences favoring girls in emotion understanding and empathy during childhood and adolescence. McClure (2000) reported a statistically significant but negligible to small gender difference ($d = .18$) among children and adolescents in the decoding of emotion from facial expressions. In addition, Eisenberg and Fabes (1998) noted a small average difference ($d = .34$) between girls and boys in empathy. A more recent study that sampled youth from across several regions in the United States (Romer, Ravitch, Tom, Merrell, & Wesley, 2011) similarly found girls were rated significantly higher than boys on empathy (teachers: $d = .23$; parents: $d = .40$).

Perspective Taking and Social Problem Solving

Perspective taking (including theory of mind) is the ability to understand other people's viewpoints and mental states. As children develop perspective taking from infancy into adolescence, they can increasingly recognize that it is sometimes possible to coordinate one's views and needs with those of others (Selman, 1980). Good perspective taking is one step toward effective social problem solving. Higher levels of social problem solving emphasize prosocial or collaborative strategies (e.g., proposals for compromise, requests for clarification, seeking help from others), whereas lower levels emphasize aggression or withdrawal (e.g., Selman, Beardslee, Schultz, Krupa, & Podorefsky, 1986).

Although there are no pertinent meta-analyses, a few researchers in different industrialized countries have

observed small average gender differences in perspective taking and social problem solving. When significant differences have been found, they point to greater perspective taking (or better performance on theory-of-mind tasks) among girls than boys from early childhood into adolescence (e.g., Devine & Hughes, 2013; R. L. Smith & Rose, 2011; Walker, 2005). Also, among studies finding significant average gender differences in assessments of interpersonal problem solving, girls typically score higher than boys from early childhood into adolescence (e.g., D. C. Miller & Byrnes, 2001; Selman et al., 1986; Walker, Irving, & Berthelsen, 2002). Given the limited number of relevant studies, these trends must be viewed cautiously.

Moral Reasoning

Seeking to complement Kohlberg's (1981) theory of moral reasoning, Gilligan (1982) distinguished between moral judgments emphasizing a justice orientation (e.g., fairness, individual rights) and a care orientation (e.g., empathy, compassion). Moreover, she posited that a care orientation was more likely among girls and women, whereas a justice orientation was more common among boys and men. Jaffee and Hyde (2000) performed a meta-analysis testing for average gender differences in measures of justice and care moral orientations with child and adult samples. Across all ages, small effect sizes pointed to modest differences in the care orientation ($d = -.28$, females higher) and the justice orientation ($d = .19$, males higher). As Jaffee and Hyde note, however, the two moral orientations are not mutually exclusive and their meta-analysis could not address if and when any average gender differences might occur in the relative uses of the two orientations. Furthermore, it is unclear whether any variations in the two moral orientations account for average gender differences in prosocial behavior.

Communication Skills

Communication skills are related to other facets of social competence including self-control, emotion understanding, and perspective-taking ability (e.g., Monopoli & Kingston, 2012). It is noteworthy that a faster average rate of language development (Gleason & Ely, 2002) and greater average talkativeness (Leaper & Smith, 2004) are indicated for girls than boys. As reviewed next, there are also average gender differences in children's uses of particular communicative strategies to initiate social interactions, to negotiate cooperatively with others, to express personal feelings and thoughts, and to show social support.

Gender Comparisons of Performance and Achievement 829

Successful entry into an ongoing peer group interaction requires social competence. Prosocial strategies leading to positive group responses usually involve finding a relevant way to join the ongoing conversation and activity. Strategies that are usually unsuccessful include disruptive behaviors (e.g., irrelevant comments, trying to change activity, aggression) or passive observation. Boys were more likely than girls to use disruptive strategies in studies of children from preschool to elementary school age conducted in Western countries (e.g., Black & Hazen, 1990; Borja-Alvarez, Zabatany, & Pepper, 1991). The higher average rate of disruptive strategies among boys is consistent with research generally finding higher rates of aggressive behavior among boys than girls (reviewed later).

To develop harmonious relationships, children learn to cooperate with others and to negotiate conflict when it occurs. Examples of collaborative speech include proposals for joint activity and building on another person's ideas. Collaborative speech can be contrasted with controlling and obliging speech. Controlling (or directive) speech is primarily self-assertive, whereas obliging (or submissive) speech is primarily affiliative or other-oriented (Leaper, 1991; Leaper, Tenenbaum, & Shaffer, 1999; Leman, Ahmed, & Ozarow, 2005). Collaborative communication increases with age, and it is common in the interactions of both girls and boys. However, studies find average gender differences in proportions of collaborative speech occur in some populations and activity settings. Leaper and Smith's (2004) meta-analysis of observational studies of peer interactions indicated girls used two forms of collaborative speech—responsiveness ($d = .45$) and verbal acknowledgements ($d = .22$)—significantly more frequently than did boys.

In contrast to the higher average rates of collaborative speech among girls than boys, higher average amounts of self-emphasizing or controlling speech forms appear among boys. Leaper and Smith's (2004) meta-analysis of observational studies reported a significantly greater average for boys than girls in directive speech during peer interactions ($d = .25$). Also, Archer's (2004) meta-analysis of self-report studies indicated higher rates of verbal aggression for boys than girls ($d = .36$).

Gender-related variations in negotiation and conflict-resolution strategies parallel the pattern seen regarding cooperation and competition. When studies find significant average gender differences in negotiation or conflict resolution, the pattern is usually for higher rates of prosocial strategies among girls than boys. Conversely, the pattern

is often to find higher rates of self-emphasizing strategies among boys than girls. These average gender differences have been observed in studies of children and adolescents from different industrialized countries with effect sizes ranging from small to large (e.g., Butovskaya, Timentschik, & Burkova, 2007; Laca, Alzate, Sanchez, Verdugo, & Guzmán, 2006; P. M. Miller, Danaher, & Forbes, 1986; Thayer, Updegraff, & Delgado, 2008; Yeates, Schultz, & Selman, 1991). The gender-typed emphasis among many girls toward interpersonal harmony and communion may lead them to minimize conflict and to use prosocial strategies aimed at reconciliation when conflict occurs. In contrast, the gender-typed emphasis among many boys on overt competition and power assertion may lead to greater use of coercive strategies (e.g., P. M. Miller et al., 1986). However, it is important to underscore that individual and contextual factors can moderate these gender-typed patterns (see Leaper, 2014).

Two additional behaviors associated with communicative competence are self-disclosure and the provision of emotional support. Self-disclosure of personal feelings and thoughts fosters intimacy in relationships with friends, romantic partners, and family. Several studies have observed higher average amounts of self-disclosure for girls than boys. Although they did not perform a meta-analysis, Rose and Rudolph (2006) summarized the results from several studies and listed the effect sizes. Most of them indicated that self-disclosure with friends was more likely for girls than boys during childhood (median $d = .47$) and adolescence (median $d = .81$).

Some studies suggest that there may be more variability in friendship intimacy among boys than girls. Camarena, Sarigiani, and Petersen (1990) identified two pathways toward friendship intimacy among boys. For one group of boys, shared disclosures predicted emotional closeness with friends. For another group of boys, shared activities predicted friendship closeness. For girls, only shared disclosures significantly predicted friendship closeness. Other studies have reported similar findings in adolescence (McNelles & Connolly, 1999) and early adulthood (Radmacher & Azmitia, 2006).

With the advent of electronic social media, many youth can easily communicate with one another when they are apart. As with other forms of communication, electronic media can be used to pursue intimacy goals or aggressive goals (see later section on aggression). With regard to potentially positive outcomes, online communication tends to stimulate self-disclosure and to enhance relationship quality (see Valkenburg & Peter, 2009). The

830 Gender and Social-Cognitive Development

benefits of online communication with friends may be especially helpful for adolescent boys who are reluctant to disclose with one another in face-to-face interactions (Valkenburg, Sumter, & Peter, 2011). There is mixed evidence regarding whether online disclosures have spillover to face-to-face interactions (cf. Valkenburg et al., 2011; J. Wang, Jackson, & Zhang, 2011).

Providing support to others is the last reviewed component of communicative competence. People's responses to others' distress can range from highly negative to highly supportive (Burlleson, 1982; Leaper, Carson, Baker, Holliday, & Myers, 1995). Unsupportive responses include critical statements that negate or ignore the other person's feelings (e.g., "Don't be a baby"). Supportive responses include simple acknowledgements of the others' experience (e.g., "That sounds upsetting") as well as more elaborate statements that validate the other's feelings (e.g., "That wasn't nice for your friends to ignore you"). Research suggests that the number, sensitivity, and complexity of supportive responses increase over the course of childhood and adolescence (Burlleson, 1982). When significant gender differences have been found, the usual pattern is for higher rates among girls than boys in providing supportive responses (e.g., Brendgen, Markiewicz, Doyle, & Bukowski, 2001; Burlleson, 1982; Leaper & Smith, 2004). In addition to giving support, studies conducted in different industrialized countries have found girls were more likely than boys to seek support from others (e.g., Eschenbeck, Kohlmann, & Lohaus, 2007; G. C. Glick & Rose, 2011; Siu & Watkins, 1997).

Aggression

High rates of aggressive behavior usually reflect poor interpersonal skills (Underwood, 2011). When examining aggression, reviewers distinguish between direct and indirect aggression. Direct aggression refers to hostile acts (e.g., physical assault, threats, insults) overtly aimed at another person. In contrast, indirect aggression (i.e., relational or social aggression) involves hostile acts that typically occur covertly behind the target's back (e.g., social exclusion, negative gossip). Verbal and physical forms of aggression are also seen in sexual harassment and sexual violence (see Leaper & Robnett, 2011). Furthermore, verbal aggression is commonly expressed through girls' and boys' uses of online media (e.g., Ittel, Azmitia, Pfetsch, & Müller, 2014; Sinclair, Bauman, Poteat, Koenig, & Russell, 2012).

In their meta-analysis, Card, Stucky, Sawalani, and Little (2008) noted a higher average incidence of direct aggression among boys than girls ($d = .37$ for observational

studies; $d = .34$ for teacher ratings). The researchers also indicated significantly higher average rates of indirect aggression (e.g., social exclusion, negative gossip) among girls than boys, but the effect size was negligible ($d = -.06$). Another relevant study (Lansford et al., 2012) examined children (ages 7 to 10 years) from nine diverse nations in self-reported aggression. Across all countries, the average for self-reported physical aggression was significantly higher for boys than girls ($d = .22$). There was no significant gender difference in indirect aggression across nations.

Contrary to earlier proposals, there is not strong evidence for meaningful average gender differences in indirect aggression. However, because they are less likely to engage in physical aggression, girls are most likely to use indirect aggression when they do express hostility toward others (Leaper, 2013; Underwood, 2011). Furthermore, there may be average differences in the ways that girls and boys express indirect aggression (e.g., Coyne, Archer, & Eslea, 2006).

Intrapersonal Competencies

Intrapersonal competence is based on developing positive and accurate self-concepts (Gardner, 2006). A distinction is made between global self-concepts (e.g., esteem) and domain-specific self-evaluations (i.e., self-perceived competencies). As reviewed next, average gender differences are associated with many aspects of intrapersonal functioning; however, the effect sizes in most areas are small in magnitude.

Global Self-Worth (Self-Esteem)

Meta-analyses testing for gender differences in self-esteem have pointed to significant but modest differences favoring males. In one meta-analysis (Kling, Hyde, Showers, & Buswell, 1999), there was a small difference with males higher than females ($d = .21$). When age was considered as a moderator, larger differences occurred during late adolescence ($d = .33$) than either younger or older age levels. A similar pattern was observed in a second meta-analysis (Gentile et al., 2009) testing for gender differences in self-satisfaction. The researchers found a small and significant difference in high school samples ($d = .36$, boys higher) and no significant difference in college samples ($d = .05$). Thus, adolescence may be an especially challenging period for many girls' esteem.

Besides age level, ethnic background appears to be another important moderator (Kling et al., 1999). Significant average gender differences in self-esteem were

indicated for White European Americans samples but not for African Americans. Effect sizes for other ethnic groups were not tested.

Internalizing Disorders

This chapter does not attempt to provide a comprehensive review of gender-related variations in psychological maladjustment and disorder. Internalizing disorders (depression and anxiety) are worth noting, however, given they are common in the general population and affect girls' and boys' abilities to maintain positive self-concepts. As summarized in one meta-analysis (Twenge & Nolen-Hoeksema, 2002), higher average rates of depression occur among girls than boys. However, this pattern is not seen until adolescence. Based on the age levels used in the meta-analysis, there was no difference in childhood (8 to 12 years), a significant but negligible difference in early adolescence (13 years: $d = .08$), and more meaningful differences in middle adolescence (14 to 15 years: $d = .22$; 16 years: $d = .20$). The widening of the gender difference reflected an underlying increase in the incidence of depression among girls with age. By adulthood, estimates are that twice as many women than men are depressed (Hyde, Mezulis, & Abramson, 2008).

The findings regarding average gender differences in anxiety during childhood are mixed. One meta-analysis (Feingold, 1994) reported a significantly higher incidence of anxiety among girls than boys during childhood ($d = -.24$) and among adolescents and adults ($d = -.31$). However, a more recent meta-analysis did not find a significant gender difference in children's general experiences of anxiety (Chaplin & Aldao, 2013). The two meta-analyses used somewhat different criteria for including studies, which may partly account for the different findings. Also, average gender differences in anxiety may be specific to particular domains. For example, some studies have found higher average anxiety among girls than boys regarding mathematics (Else-Quest, Hyde, & Linn, 2010) and science (Britner, 2008).

Body Image: Satisfaction With Biological Sex

Satisfaction with one's body is another facet of having a positive self-concept. At the most fundamental level, body satisfaction includes being content with one's biological sex (Egan & Perry, 2001). The current *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, 2013) includes the diagnostic category of gender dysphoric disorder to classify individuals who experience distress with their biological sex or gender identity. (This category replaced the former diagnosis of

Gender Comparisons of Performance and Achievement 831

gender identity disorder.) The incidence of gender dysphoria during childhood is unknown, although it is generally considered rare. Appreciably more parents have referred boys than girls to clinicians with concerns about their child's gender identity (Cohen-Kettenis, Owen, Kaijser, Bradley, & Zucker, 2003). A comparison of referral rates to clinics in Canada and the Netherlands indicated the male-to-female ratios were 5.8:1 (approximate $d = 1.52$) and 2.9:1 (approximate $d = .87$), respectively. Thus, there were more referrals of boys than girls, although the ratio was appreciably lower in the Netherlands than in Canada.

Among children and adolescents who are unhappy with their gender assignment, some include those with intersex conditions. These are persons who are born with ambiguous genitals or possibly characteristics of both sexes (see Hines, Chapter 20, this *Handbook*, Volume 3). In the past, children born with intersex conditions were commonly subjected to surgery and gender reassignment soon after birth; however, there has been a movement toward acceptance of intersex individuals (M. Diamond, 2011).

Based on one estimate, approximately two thirds of children who were labeled with gender identity disorder later demonstrated gay or lesbian sexual orientations (Zucker & Bradley, 1995). A smaller number of persons dissatisfied with their biological sex have sought sexual reassignment surgery later as adults (Zucker & Bradley, 1995). An increasing number of gender-nonconforming persons embrace alternative gender identities known as transgender (Bockting, 2014). Alternative gender identities have appeared in a variety of cultures (Wilson, 1996).

Body Image: Satisfaction With Appearance

Most children and adolescents are content with their biological sex. However, many of them are not be satisfied with their bodies and appearance. In Western society, children are exposed to narrow standards of physical attractiveness. For example, contemporary beauty ideals emphasize thinness for females and muscularity for males. Research shows that felt pressure to attain cultural body ideals can have negative consequences on body self-images. The most frequently studied facets of body image have been body dissatisfaction, self-objectification, internalization of the ideal body, and body-change strategies (Grabe, Ward, & Hyde, 2008).

Although many girls and boys experience body image problems, they are generally more pervasive among girls than boys. Meta-analyses indicate higher satisfaction with physical appearance and more positive body image among males than females. Gentile et al. (2009) found a small average gender difference ($d = .35$) in self-evaluations of

832 Gender and Social-Cognitive Development

physical appearance. When effect sizes were computed separately by age level, significant gender differences favoring higher body image in males were indicated during elementary school ($d = .30$), junior high school ($d = .41$), high school ($d = .30$), and college ($d = .25$). Whereas body image problems are more prevalent among girls than boys, an increasing number of boys are experiencing concerns about their muscularity (e.g., Ricciardelli, McCabe, Lillis, & Thomas, 2006).

Body image can have serious consequences on people's health. Body dissatisfaction is related to higher risk for eating disorders and other adjustment difficulties (Grabe & Hyde, 2009). According to one estimate, approximately 3.8% of females and 1.5% of males develop an eating disorder at some point (Merikangas et al., 2010). Furthermore, dissatisfaction with muscularity in boys may lead to steroid use and negative physical outcomes (Cohane & Pope, 2001).

Ethnic background appears to moderate the associations between gender and body image during childhood and adulthood. In their meta-analysis, Grabe and Hyde (2006) compared Asian American, African American, Latina, and European American (White) girls and women in the United States on measures of body image. On average, African American females expressed significantly more positive body images than did either European American females ($d = .29$) or Latina females ($d = .18$). Other group comparisons proved to be negligible in magnitude.

Domain-Specific Self-Evaluations

According to Harter's (2012) research and theory on self-concepts, individuals' self-worth or esteem increases when they positively evaluate their competencies in domains that are important to them. In a similar manner, research based on expectancy-value theory (Eccles & Wigfield, 2002) finds that children are most motivated to achieve in domains (a) in which they feel competent and (b) that they value. Thus, self-evaluations can have important consequences for children's overall adjustment and achievement in particular domains (addressed later in chapter). As reviewed next, research studies based on samples collected in industrialized cultures point to average gender differences in self-evaluated abilities in different domains.

One general pattern that tends to occur is that boys tend to estimate their abilities in most (but not all) domains higher than females do. This has been found even when controlling for independent measures of abilities or achievement (e.g., Steinmayr & Spinath, 2009). Given the

average gender difference in many of these self-estimates could not be explained by actual competence differences, some researchers propose the pattern reflects an underlying average gender difference in "hubris versus humility" (see Furnham, 2001). That is, more males than females may tend to overestimate their abilities (hubris), and more females than males may tend to underestimate their abilities (humility). Some psychologists have interpreted the slight advantage of males over females in self-esteem along similar lines (see Baumeister, Smart, & Boden, 1996).

Based on available meta-analyses, significantly higher self-evaluations of ability have been found for boys than girls in several domains (Gentile et al., 2009; Syzmanowicz & Furnham, 2011). In samples including children and adolescents, this was seen in self-estimates of overall intelligence ($d = .27$), spatial ability ($d = .21$), mathematical ability ($d = .32$), and athletic ability ($d = .41$). Among these four domains in which boys tended to have higher self-estimates, average gender differences in performance or achievement have been indicated in spatial ability, and mathematics (high school only) and athletics (higher participation among boys), as reviewed earlier.

The evidence for average gender differences in science-related self-concepts depends on the type of scientific domain being assessed. Overall, science self-concepts were assessed in a cross-national analysis of Program for International Student Assessment (PISA) data of 15-year-olds from 50 OECD and partner countries (Sikora & Pokropek, 2012). Higher average self-estimates of science ability occurred among boys than girls ("advanced industrialized" countries: $d = .30$; "developing and transforming" countries: $d = .11$). With regard to self-concepts in the physical sciences, only a few studies have compared girls and boys. Higher average self-perceived physics competence was found among boys than girls in two studies (Kessels, 2005; Lerdpornkulrat, Koul, & Sujivorakul, 2012), but no difference was indicated in a third (Britner, 2008). Given the small number of studies (and different country locations), it remains unclear how generalizable these trends might be. Finally, when self-concepts in the life sciences (e.g., biology) have been assessed, girls and boys tend to be similar according to a 20-year-old meta-analysis (Weinburgh, 1995) as well as a more recent study of American high school students (Britner, 2008).

Verbal and musical-artistic abilities are domains in which more positive self-concepts tend to be observed among girls than boys. First, higher averages in self-estimated verbal skills (e.g., reading and writing) were indicated for girls than boys ($d = .23$) in a meta-analysis

Possible Explanations for Gender-Related Variations in Performance and Achievement 833

based on samples of elementary and secondary school students (Wilgenbusch & Merrell, 1999) and also in more recent studies (e.g., Marsh & Ayotte, 2003; Watt, 2004). In addition, based on limited available research, more positive self-evaluations in musical competence (e.g., Kessels, 2005; Neto, Ruiz & Furnham, 2008) and overall artistic abilities (Lapan, Adams, Turner, & Hinkelman, 2000; Whitehead, 1996) were observed in girls than boys. As previously described, higher averages are seen among girls than boys in assessments of reading, writing, music, and the visual arts.

Turning to gender comparisons of self-estimated abilities in socio-emotional domains, the research is mixed. In one meta-analysis (Wilgenbusch & Merrell, 1999), boys had significantly more positive self-concepts of social competence than did girls ($d = .18$). However, in another meta-analysis considering somewhat different measures (Gentile et al., 2009), higher average self-evaluations occurred for girls than boys for behavioral conduct ($d = -.17$) and moral-ethical competence ($d = -.38$). As summarized earlier, girls are more likely than boys to score higher on assessments of social competence.

Other studies have compared girls' and boys' self-concepts regarding agentic (i.e., self-assertive, instrumental) traits and communal (i.e., affiliative, expressive) traits (e.g., Bassen & Lamb, 2006; Thomson & Zand, 2005). On average, girls scored higher than boys on self-ratings of communal traits. Although many studies did not find significant gender differences in self-ratings of agentic traits, when significant mean differences were found it was usually boys who scored higher. Finally, girls tend to be more likely than boys to view themselves as high in both communal and agentic traits.

Summary

Whereas average gender differences in performance and achievement are indicated in several domains, the magnitude of difference is small for most of them. One domain associated with a large average gender difference is motor performance (i.e., boys scoring higher than girls in strength and speed). There are also large average gender differences favoring boys in the extreme scores (top 0.1%) on tests of general intelligence, mathematics, and science reasoning. Domains in which boys tend to score higher than girls with small effect sizes include spatial ability, mathematics (high school standardized tests), general science (high school standardized tests), physical sciences, computer science, physical aggression, global self-esteem, and body

satisfaction. Also, boys tend to participate in high school athletics at higher rates than do girls (no available effect size). Domains in which girls tend to score higher than boys with small effect sizes include overall academic achievement, verbal skills, interpersonal competence, and depression. Average gender differences also have been observed in self-evaluations of particular abilities and personality traits.

Given the small magnitude of gender difference in most domains, one must conclude that there is a great deal of similarity or overlap in the assessed abilities of girls and boys (Hyde, 2005). Moreover, there is also a large degree of variability within each gender in these domains. Some of the possible reasons for average gender differences and within-gender variability in different domains are reviewed next.

POSSIBLE EXPLANATIONS FOR GENDER-RELATED VARIATIONS IN PERFORMANCE AND ACHIEVEMENT

Earlier in the chapter, I described some of the major contemporary theoretical explanations for gender development. Many of these theories either (a) overlap in their constructs and explanations or (b) complement one another in their relative attention to different processes. What follows next is a synthesis of factors that different theories have highlighted. It is beyond the scope of the present chapter to provide a comprehensive review of possible explanations for each of the domains associated with gender differences. Instead, examples are provided to illustrate how each type of influence might affect gender-related variations in an academic or a socio-emotional domain. I acknowledge at the outset that these factors are interrelated and influence gender development in a dynamic manner.

Individual Influences

Genetic and Hormonal Influences

Neuroscience researchers have tested for possible ways that gender-related variations in certain abilities and achievement might be related to genetic and hormonal factors. The reader is directed to Hines' comprehensive summary of this work in this *Handbook* (Chapter 20, Volume 3).

Executive Functions

Executive functions are related to developing competence in many academic and socio-emotional domains

834 Gender and Social-Cognitive Development

(e.g., Duckworth & Seligman, 2006; Monopoli & Kingston, 2012). When individuals are aroused by negative emotions or high-intensity positive emotions, controlled cognitive processes and performance typically suffer (Valiente, Swanson, & Eisenberg, 2012). In these situations, “bottom-up” or automatic cognitive processing may dominate. This may interfere with children’s capacity to effectively negotiate in social situations or to focus in achievement settings. For example, average gender differences in aggression (e.g., Hay, 2007) and overall academic achievement (e.g., Duckworth & Seligman, 2006) may be partly mediated by executive function skills such as self-regulation and cognitive flexibility.

Average gender differences in executive functions are seen in self-regulation (attention focus, effortful control), impulse control (inhibitory control, low-intensity pleasure), and cognitive flexibility (shifting mental set depending on task demands, perspective taking). Based on one meta-analysis (Else-Quest et al., 2006), significantly higher averages were indicated for girls than boys on two indices of self-regulation (attention focus: $d = .16$; effortful control: $d = 1.01$), two aspects of impulse control (inhibitory control: $d = .41$; low intensity pleasure: $d = .29$), and a measure of cognitive flexibility (attention shifting: $d = .31$). As described earlier in the chapter, a few studies have found higher levels of perspective taking (or theory of mind) in girls than boys. Some other meta-analyses suggest that average gender differences in some of these executive functions may lessen as youth approach adulthood (Cross, Copping, & Campbell, 2011; Feingold, 1994).

Executive function skills may also predict outcomes in some domains differently for girls and boys. For example, there is evidence that self-regulation may be more strongly related to math achievement in girls than boys (e.g., Li-Grining, Votruba-Drzal, Maldonado-Carreño, & Haas, 2010). In contrast, self-regulation may benefit reading achievement more in boys than girls (e.g., Li-Grining et al., 2010). As reviewed later, mathematics and reading are two ability domains in which stereotypes sometimes favor males and females, respectively. Self-regulation skill may help girls and boys attenuate anxiety that is possibly associated with self-relevant negative stereotypes in these domains (e.g., Li-Grining et al., 2010).

Personality

Some personality characteristics may partly account for gender-related variations in competence and performance in various domains. To illustrate, the possible influences

of person–thing orientation and attachment security are considered.

First, average gender differences in person versus thing interest may emerge during infancy (Alexander & Wilcox, 2012). This trend continues into childhood, as illustrated in a study (Graziano, Habashi, Evangelou, & Ngambeki, 2012) examining children’s interests (at Grades 3 and 6) in activities with either a person orientation (e.g., meet someone new) or a thing orientation (e.g., fixing something). The researchers found large average gender differences in person orientation (girls higher) and thing orientation (boys higher). A similar difference is seen in adults’ occupational interests as documented in a meta-analysis (Su, Rounds, & Armstrong, 2009). On average, women preferred jobs that focused on working with people whereas men preferred jobs that focused on working with things ($d = .94$). The researchers suggested this difference might partly account for average gender differences in some STEM fields. Among those STEM fields where women are most represented (biological and health sciences), the potential to help other people is more apparent than in those fields where they are less represented (physical sciences and technology). Pertinent to this interpretation, interest in seventh-grade physics classes was significantly increased for girls (and unaffected for boys) when the curriculum included units focusing on the human applications of physics principles (Häussler & Hoffmann, 2002).

Attachment security is another facet of personality that may contribute to some average gender differences in competence and achievement. Gender differences in attachment styles are generally not seen until middle childhood. During this period, girls and boys demonstrate similar average rates of secure attachment to parents; but there may be average differences in the relative rates of avoidant-insecure versus anxious-insecure styles. Based on samples of children collected in Italy, the United States, Canada, and Israel, the avoidant style was predominant among insecure boys, whereas the anxious-ambivalent style was predominant among insecure girls (see Del Giudice, 2008). Another average gender difference has been found in adolescents’ attachment to peers. In a meta-analysis (Gorrese & Ruggieri, 2012), girls were significantly more attached to peers than were boys ($d = .51$). Attachment security may also have different average correlates to some outcomes for girls and boys. In one study (Huebner & Betts, 2002), adolescents’ attachment bonds to parents were positively associated with academic achievement in girls (but were unrelated to academic achievement in boys). In another report (Årseth, Kroger, Martinussen, & Marcia, 2009),

Possible Explanations for Gender-Related Variations in Performance and Achievement 835

attachment security was more strongly related to intimacy in the close relationships of males than females.

Ability Self-Concepts

As reviewed earlier in the chapter, ability self-concepts are considered an important influence on motivation and performance in several theoretical models. In addition, self-perceived competencies are seen as defining personal identities during adolescence and adulthood (e.g., Sharp, Coatsworth, Darling, Cumsille, & Ranieri, 2007). Consistent with all of these theories, ability self-concepts regarding particular domains tend to predict children's motivation and later achievement in those areas. Moreover, the impact of self-evaluations on later behavior is seen even after controlling for initial performance (e.g., Eccles & Wigfield, 2002; Harter, 2012; Valentine, DuBois, & Cooper, 2004). Accordingly, variations in ability self-concepts appear to account partly for the development of average gender differences in abilities and achievement. For example, it was previously noted that boys tend to have more positive self-evaluations of their abilities in spatial performance, mathematics, science (and perhaps especially physical science), and athletics. These are areas that boys have historically exceeded girls. Although the gender gap in math achievement during childhood has narrowed, average gender differences in math self-concepts may be related to gender differences in motivation to take advanced math courses and possibly to pursue some math-intensive majors in college (e.g., Watt, 2008).

Performance Attributions

Another facet of children's self-concepts is the type of attribution they make to explain their performances. According to Dweck (2002), motivation is greater when children make incremental (i.e., malleable or growth mind-set) rather than entity (i.e., stable or fixed mindset) attributions for their performances. Some studies suggest average gender differences in performance attributions may occur in some contexts. This was indicated in a study using data collected between 1990 and 1993 on elementary school children in seven countries (Stetsenko, Little, Gordeeva, Grasshof, & Oettingen, 2000). In some contexts, school grades were higher for girls than boys, and in other contexts, there was no difference. When girls and boys had similar grades, there were no average gender differences in performance attributions to effort, ability, or external factors. When girls attained higher grades than did boys, there was no difference in attributions to ability, but it was more likely for girls than boys to attribute performance to effort and being able

to obtain the teacher's help. Other studies have similarly observed that effort-based attributions are more common among girls than boys in samples of elementary or high school students from different countries (e.g., Ablard & Mills, 1996; Georgiou, 1999; Mok, Kennedy, & Moore, 2011). The previously reviewed studies compared girls' and boys' attributions about their overall academic performances. Considering the academic subject as a moderator might offer greater clarity (e.g., Chen & Pajares, 2010).

A meta-analysis tested for average gender differences in a particular style of attribution known as self-serving bias (Mezulis, Abramson, Hyde, & Hankin, 2004). This refers to a tendency to make more ability attributions for one's successes than for one's failures. According to Dweck's earlier research, this pattern was more common among boys than girls (see Dweck, 2002, for a summary). However, in the meta-analysis, self-serving biases were equally likely for females and males in child or adolescent samples. A significant difference did occur in adult samples, with self-serving biases higher among men than women. The latter finding was related to females' self-serving attributional biases becoming less likely from childhood into adulthood; in contrast, males' self-serving biases did not significantly differ with age.

Task Values

People's motivation in a particular domain is strongly tied to the value associated with it (Eccles & Wigfield, 2002; Harter, 2012). Task values predict children's subsequent achievement in particular domains—even after controlling for initial performance levels. Furthermore, average gender differences in the values placed on these particular domains help to account for some of the gender-related variations in later abilities and achievement.

Average gender differences in task values have been observed in studies conducted primarily in Western countries with ethnically diverse samples of children from kindergarten to high school. The effect sizes in most studies are in the small-to-medium range. (There are no pertinent meta-analyses.) Girls are more likely than boys to place higher value on overall school success (e.g., Lam et al., 2012; M. Wang, Willett, & Eccles, 2011), reading and writing (Eurydice Network, 2010; Marsh & Ayotte, 2003; Watt, 2004; Wigfield et al., 1997), and music and the arts (e.g., Andre, Whigham, Hendrickson, & Chambers, 1999; E. M. Evans, Schweingruber, & Stevenson, 2002; Kessels, 2005; Lapan et al., 2000; Simpkins et al., 2012). Also, reports suggest girls show equal interest (e.g., Andre et al., 1999) or higher interest (e.g., Sikora & Pokropek,

836 Gender and Social-Cognitive Development

2012) in biological and health sciences compared to boys. As described earlier, these are also domains in which girls tend to achieve better than boys.

In contrast, boys are more likely than girls to value mathematics, physical sciences, computers and technology, and athletics. According to one meta-analysis (Else-Quest et al., 2010), average intrinsic motivation for math was higher for boys than girls ($d = .20$). In addition, a few studies reported higher mean ratings of interest in the physical sciences among boys than girls during high school (Chow, Eccles, & Salmela-Aro, 2012; Kessels, 2005; Riegle-Crumb, Farkas, & Muller, 2006); at the same time, there is evidence that American girls' interest in high school physics has increased over the years (Ivie & Ray, 2005). On average, boys are also more likely than girls to value achievement in computers and technology (Chow et al., 2012; Dickhäuser & Stiensmeier-Pelster, 2003; Sikora & Pokropek, 2012; Whitley, 1997). Finally, studies find greater male than female interest in athletics (E. M. Evans et al., 2002; Jacobs, Lanza, Osgood, Eccles & Wigfield, 2002; Sharp et al., 2007). Moreover, boys are significantly more likely than girls to consider sports as central to their personal identities (Klomsten, Skaalvik, & Espnes, 2004; Sharp et al., 2007).

Social Values

When making choices in life, sometimes individuals are faced with balancing among competing values or interests. This may include weighing the perceived benefits and costs of different tasks (Eccles & Wigfield, 2002). In addition, making choices may involve balancing task values and social values. For example, when choosing a career direction, two options might be equally interesting, but one of them may be seen as more compatible with one's social values and goals (e.g., helping others, seeking financial security). Thus, average gender differences in social values may partly account for some gender-related variations in behavioral outcomes.

Rose and Rudolph (2006) reviewed studies comparing girls' and boys' social goals and values. When significant gender differences were indicated, dominance/control-related goals were more likely among boys while affiliation/prosocial-related goals were more common among girls. Variations in these goals may partly underlie average gender differences in the relative uses of power-assertive and affiliative communication strategies (e.g., P. M. Miller et al., 1986; Strough & Berg, 2000). Dominance and control values can facilitate the development of instrumental skills, gaining a sense of personal agency, and succeeding

in competitive contexts. Extreme concerns with dominance, however, can limit boys' capacity for intimate relationships and undermine psychological health, as highlighted in the gender-role strain model (see Levant, 2005). In contrast, prosocial and cooperative values can motivate the development of perspective taking, negotiation skills, and supportive communication; in turn, these behaviors foster intimate friendships and romantic relationships. However, excessive discussion of personal problems between friends, known as co-rumination, may increase some girls' risk for depression (Rose, Carlson, & Waller, 2007).

Gender-typed social values also may differentially affect how well girls and boys adapt to the school classroom. Prosocial and cooperative values are positively related to academic adjustment and therefore may partly explain why girls tend to do better in school (e.g., Ojanen, Smith-Schrandt, & Gesten, 2013). In contrast, many boys value toughness and dominance as personal and group goals (Rose & Rudolph, 2006). Valuing toughness and dominance may lead some boys to engage behaviors that interfere with their learning and academic success (e.g., Legewie & DiPrete, 2012; Santos, Galligan, Pahlke, & Fabes, 2013).

Social goals and values also appear to influence girls' and boys' occupational aspirations. In general, studies find more women than men consider altruistic values and work-family balance when evaluating their academic and career trajectories (Ceci, Williams, & Barnett, 2009). As explained earlier, women are also much more likely than men to be interested in occupations that involve working with people (Su et al., 2009). Furthermore, there is some evidence that girls and women may be more likely than boys and men to develop competencies in both math and verbal skills (Ceci et al., 2009; M. Wang, Eccles, & Kenny, 2013). When individuals have a broader repertoire of abilities, they may be more likely to consider multiple factors when evaluating which ability domain they might pursue. It has been suggested that some women who might otherwise excel in certain STEM fields may choose other options because they see the alternatives as more compatible with their helping goals, they desire to balance time with family and work, or they prefer to avoid perceived gender bias (Ceci et al., 2009).

Finally, girls' and boys' participation in sports is affected by social goals and values. Besides the intrinsic enjoyment that individuals gain from their participation in athletic activities, sports are social contexts in which children can gain a sense of belongingness with teammates

Possible Explanations for Gender-Related Variations in Performance and Achievement 837

and possibly enhance their social status among their classmates (e.g., Patrick et al., 1999). Yet, despite the historical advances in girls' athletic participation, female athleticism continues to clash with some adolescent girls' notions of femininity and heterosexuality (Cockburn & Clarke, 2002). There are also personal costs that can go with boys' sports involvement. The male sports culture has traditionally emphasized norms stressing aggression, dominance, emotional control, sexism, and homophobia (e.g., Osborne & Wagner, 2007); these values can sometimes undermine desires for friendship intimacy (Zarbatany, McDougall, & Hymel, 2000).

Stereotypes and Attitudes

As explained earlier, gender stereotypes and attitudes can guide what children notice and how they interpret events. I also addressed how gender stereotypes can influence children's play choices and behavioral norms in same-gender peer groups. In addition, gender stereotypes can affect achievement outcomes via their impact on children's values and expectations for success (Plante, de la Sablonnière, Aronson, & Théorêt, 2013). Gender-stereotyped beliefs may be applied in conscious, deliberate ways; but they often guide information processing in unconscious, automatic ways. Next, I review some of the ways that children's gender stereotypes and attitudes may influence achievement.

Explicit Stereotypes and Attitudes. When gender stereotypes about specific subjects are examined, some studies have found that many children and adolescents believed girls are better than boys in language skills (e.g., Heyman & Legare, 2004; Martinot, Bagès, & Desert, 2012; Rowley, Kurtz-Costes, Mistry, & Feagans, 2007) and general artistic abilities (i.e., art, music, and drama) (Chatard, Guimond, & Selimbegovic, 2007; Whitehead, 1996). Conversely, based on a few investigations, some children and adolescents stereotyped science and technology as domains in which boys are better than girls (Rowley et al., 2007) and equated science jobs as being male (Andre et al., 1999). More specifically, girls and boys stereotyped physics and physical science as male (Andre et al., 1999; Kessels, 2005; Whitehead, 1996). Studies similarly indicate that many students considered computer science as a male-stereotypical domain (Mercier, Barron, & O'Connor, 2006; Whitley, 1997).

Given the absence of meaningful gender differences in mathematics achievement during childhood, one might expect the old stereotype that "girls are bad at math" would

be fading. There is some evidence this may be occurring in a few places. Some studies have found children viewed girls and boys as similar in math competence (e.g., Martinot et al., 2012) or expressed an in-group bias that their own gender does better (e.g., Heyman & Legare, 2004). Some children have even been found to stereotype girls as better than boys at math (e.g., Rowley et al., 2007). Nonetheless, other studies have observed many children and adolescents continue to associate math more with males than females (e.g., Cvencek, Meltzoff, et al., 2011; Del Río & Strasser, 2013; Muzzatti & Agnoli, 2007; Steffens, Jelenec, & Noack, 2010).

Athletic achievement is yet another domain subject to gender stereotyping. Despite the dramatic increases in girls' athletic participation over the years, studies conducted within the last decade continue to find that many children associate sports more with boys than girls (e.g., Cockburn & Clarke, 2002; Rowley et al., 2007). Furthermore, many children view certain sports as appropriate for "boys only" (e.g., football, wrestling), some sports as for "girls only" (e.g., cheerleading, ballet), and some sports as for both boys and girls (e.g., soccer, running; Schmalz, Kerstetter, & Anderson, 2008).

Finally, children form gender stereotypes about personal-social attributes (Best & Thomas, 2004; Giles & Heyman, 2005; Liben & Bigler, 2002; Serbin et al., 1993). They associate females with communal and prosocial traits and males with agentic and aggressive traits. These beliefs can guide social information processing and might be related to average gender differences in certain behaviors such as direct aggression (Ostrov & Godleski, 2010).

Implicit Stereotypes and Attitudes. To my knowledge, no researchers have examined whether implicit gender stereotypes and attitudes are related to gender-related variations in social behavior and interpersonal competence. However, there is some work relating implicit cognition to gender-related variations in academic achievement. Researchers observed gender stereotypes about math and science operate at both explicit and implicit levels as young as 5 years of age (Cvencek, Meltzoff, et al., 2011; Del Río & Strasser, 2013; Steffens et al., 2010). Even though some children may not consciously endorse gender stereotypes about math, they may form implicit gender stereotypes that differ from their explicit attitudes. These implicit attitudes may have an impact on self-concept and performance (e.g., Nosek et al., 20009; Steffens & Jelenec, 2011). Nosek and colleagues (2009) examined nation-level variations in gender-science implicit stereotypes and

838 Gender and Social-Cognitive Development

eighth graders' science and mathematics achievement. Across the 34 countries sampled, implicit stereotyping of science as male was strongly related to national gender differences in eighth graders' science performance ($\beta = .56$) and mathematics performance ($\beta = .52$).

Stereotype Threat. The impact of negative gender stereotypes on performance during assessment situations has been documented in research on stereotype threat. When a social identity is threatened, it can lead to heightened arousal that disrupts working memory and can impair controlled cognitive processing (Krendl, Richeson, Kelley, & Heatherton, 2008). As a result, performance can suffer. Conversely, it is sometimes possible to boost a person's performance when a positive stereotype about a self-relevant social identity is made salient (Ambady, Shih, Kim, & Pittinsky, 2001). Furthermore, stereotype threat effects can be subverted if the person uses strategies such as self-affirmation or focusing on an alternative social identity (Shapiro & Williams, 2012).

There is no known research testing whether stereotype threat might be related to gender-related variations in children's interpersonal behavior and competence (but see Koenig & Eagly, 2005, for a pertinent study with an adult sample). Much of the past research on stereotype threat has focused on math performance. A meta-analysis testing for stereotype threat effects on female math performance included both adolescent and adult samples (Picho, Rodriguez, & Finnie, 2013). There was a small overall effect size ($d = .24$) indicating females' math performance significantly declined during stereotype threat conditions. When age was taken into account, effect sizes were slightly stronger for middle school and high school ($d = .30$) than college ($d = .24$). Although the average effect size was meaningful, other reviewers have called into question the degree to which stereotype threat accounts for average gender differences in mathematics achievement (Stoet & Geary, 2012).

Social-Relational Influences

Social relationships are contexts for observing role models, learning values, and practicing behaviors. Examples are reviewed of possible ways that parents, teachers, the media, and peers might contribute to gender-related variations in academic and socio-emotional domains.

Family

Families vary in cultural traditions, socioeconomic status, family structure and size, parental role sharing, parents'

sexual orientation, and the gender composition of any siblings. These factors can moderate if and how parents (and other family members) contribute to the development of gender differences in abilities and achievement (see McHale, Crouter, & Whiteman, 2003). Given this complexity, a comprehensive review of family influences is beyond the scope of the present chapter. Instead, a few examples are presented to suggest possible parental influences on gender-related variations in children's academic achievement and socio-emotional development.

Researchers generally find a positive association between parents' educational involvement (e.g., educational expectations for child, showing interest in school work, assistance with homework) and children's academic achievement. Longitudinal studies indicate that parental educational involvement and encouragement predict children's later academic achievement (see Eccles & Wigfield, 2002). Thus, a pertinent question is whether parents tend to encourage academic achievement differently in sons and daughters. According to Lytton and Romney's (1991) meta-analysis, North American parents did not significantly differ in their encouragement of overall achievement in daughters and sons. However, evidence for differential parental effects has been indicated in studies investigating either (a) indirect effects on overall academic achievement or (b) parental encouragement of specific academic subjects.

Indirect parenting effects on gender differences in overall academic achievement are implicated in a few ways. First, this was suggested in a longitudinal study of low-income Canadian children who were followed from elementary into secondary school (Serbin, Stack, & Kingdon, 2013). A gender gap in achievement favoring girls during secondary school was partly mediated by higher average levels of mothers' emotional support to daughters than sons during elementary school. A second type of indirect effect might occur when the same amount or quality of a particular behavior affects some girls and boys differently. For example, because girls are more likely than boys to be self-controlled, more boys than girls may benefit from parental supervision and involvement in their children's academic achievement (Pomerantz, Moorman, & Litwack, 2007). Third, girls and boys may respond differently on average to the same kind of parental behavior. In one study of elementary school children (Tan & Goldberg, 2009), fathers' involvement was positively related to school adjustment in daughters but not sons. In contrast, mothers' involvement was positively related to school adjustment in sons but not daughters.



Possible Explanations for Gender-Related Variations in Performance and Achievement 839

Further research is needed to explore the possible causal dynamics in these relationships.

Additional evidence for some parents' gender-differentiated encouragement of academic achievement is seen when specific subjects are examined. When parents believe in gender stereotypes about particular subjects (e.g., stereotyping math for boys or reading for girls), their expectations may affect their children's own attitudes toward those subjects. For example, in a 12-year longitudinal study (from seventh grade to 25 years of age), mothers' expectations about their seventh-grade children's math ability predicted daughters' (but not sons') pursuit of careers in physical science or computing (Bleeker & Jacobs, 2004). In similar ways, parents' gender-typed expectations may influence their children's motivation in athletics (e.g., Fredricks & Eccles, 2002).

Observational studies of parent-child interactions during learning settings have pointed to ways that some parents might differentially encourage girls and boys in particular subjects. A few studies have documented how American parents tended to use more science process talk (e.g., hypothesizing, conceptual questions, explanations) with sons than daughters at science museums (Crowley, Callanan, Tenenbaum, & Allen, 2001) and during assigned science-related teaching tasks (Tenenbaum & Leaper, 2003). The potential impact of this differential treatment is also implicated in studies finding parents' science encouragement was related to high school girls' confidence and motivation in science (Leaper, Farkas, & Brown, 2012; Stake, 2006).

Parents' behavior also may be related to gender-related variations in the development of interpersonal competencies. On average, parents tend to encourage self-assertion and tolerate aggression in sons more than daughters; conversely, parents tend to promote closeness and expressiveness in daughters more than sons (see Leaper, 2013). For example, in a meta-analysis, there were significant but small average differences in mothers' speech to daughters and sons (Leaper, Anderson, & Sanders, 1998). On average, mothers were more talkative ($d = .29$), used more supportive speech ($d = .22$), and used more directive speech ($d = .19$) with daughters than sons. In these ways, mothers tended to emphasize affiliation more with daughters and to be less controlling with sons. Many parents tend to encourage closer family ties in daughters than sons, which may include a greater likelihood of emotional disclosure between parents and daughters than parents and sons (e.g., Lichtwarck-Aschoff, Finkenauer, van de Vorst, & Engels, 2012). Close family ties may

be especially strong for daughters with Latin American (Harwood, Leyendecker, Carlson, Asencio, & Miller, 2002), Asian (Chao & Tseng, 2002), or Arab (Dwairy, Achoui, Abouserie, & Farah, 2006) cultural backgrounds.

Finally, parents' gender-typed behavior may contribute to some average gender differences in intrapersonal competencies. This is illustrated in some of the research on gender differences in body image. Parents' negative comments about their children's weight predicted later body dissatisfaction (e.g., Phares, Steinberg, & Thompson, 2004) as well as dieting in adolescent girls (Wertheim, Mee, & Paxton, 1999). Perceived parental appearance-related pressures (e.g., thinness in girls, muscularity in boys) were correlated with eating disorders in girls and boys (Peterson, Paulson, & Williams, 2007). Some studies found that parents' appearance-related comments were more strongly related to body dissatisfaction for girls than for boys (e.g., Phares et al., 2004).

Teachers

Teachers' gender-stereotyped beliefs are a potential source of gender bias in the classroom. In their review of research on teacher expectancy effects, Jussim and Harber (2005) concluded, "Self-fulfilling prophecies in the classroom do exist, but they are generally small, fragile, and fleeting" (p. 151). The effects tend to be stronger when students recognize teachers' differential treatment and they can attribute it to being a member of a stigmatized social identity. Thus, some pertinent questions to consider are whether teachers have gender-stereotyped expectations of their students and whether children recognize these biases if they occur.

A few studies have identified ways that some teachers may hold gender-stereotypical views about children's behavior and academic potential. Examples include expecting higher overall school performance in girls than boys, believing math is easier for boys than girls, and expecting higher rates of misbehavior in boys (e.g., Jones & Myhill, 2004). For some American teachers, these negative biases may be more pronounced toward African American boys (e.g., D. Wood, Kaplan, & McLoyd, 2007).

Also, students sometimes view their teachers as having gender biases about girls' and boys' academic potential and behavioral styles (e.g., Leaper & Brown, 2008; Spencer, Porche, & Tolman, 2003). Some students may end up internalizing the stereotypes that they recognize in their teachers (e.g., Beilock, Gunderson, Ramirez, & Levine, 2010; Keller, 2001). Once teachers begin to form generalized beliefs about girls' and boys' academic abilities, they

840 Gender and Social-Cognitive Development

may inadvertently reinforce gender differences in behavior (Jones & Myhill, 2004).

Media

I highlight two examples of ways that the media can affect boys' and girls' development. First, given the numerous hours that many boys devote each week to violent TV programs and video games (Cherney & London, 2006), researchers have considered whether these experiences have an impact. Paik and Comstock's (1994) meta-analysis identified a statistically significant and moderate association between exposure to television violence and antisocial behavior in experimental studies ($r = .37$). In addition, Ferguson's (2007) meta-analysis revealed that violent videogame play was related to increased aggressive behavior ($r = .15$) and decreased prosocial behavior ($r = -.30$) in experimental studies.

Second, the sexualization of girls and women in the media has been a source of concern (Zurbriggen & Roberts, 2013). These images create unrealistic standards that most girls and women cannot attain. Even female professional athletes—whom one might imagine could be positive role models for girls and young women—are commonly sexualized in the media (e.g., Daniels, 2009). The potential effects of sexualized media images of females were underscored in Grabe et al.'s (2008) meta-analysis; it found that exposure to mass media was related to lower body satisfaction ($d = .28$), higher internalizing symptoms ($d = -.39$), and more disordered eating ($d = .30$) in adolescent and young adult women. Moreover, these effects appear to be cumulative over time (Clay, Vignoles, & Dittmar, 2005).

Peer Groups

Peer groups are potentially powerful contexts for the socialization of children's socio-emotional skills and academic achievement (Maccoby, 1998; Rubin, Bukowski, & Bower, Chapter 5, this *Handbook*, Volume 4; Wentzel, 2009). The influence of peer groups tends to increase as children make the transition into adolescence and they begin to form friendship cliques (Wentzel, 2009). Longitudinal studies suggest that peers can have a causal influence on gender-related behavioral outcomes over time (e.g., Barber, Eccles, & Stone, 2001; Martin & Fabes, 2001; Martin et al., 2013). Affiliating with a same-gender peer group that shares similar interests becomes a context for practicing and repeating behaviors and thereby strengthening preexisting preferences and skills (e.g., Martin &

Fabes, 2001). Also, members of a group who may not initially share some interests or skills with the rest of the group may become assimilated over time.

The impact of peer groups on social norms was reviewed in the earlier section on gender segregation. Peer norms can shape children's play and social behaviors. For example, in a study sampling several middle schools in China, variations in peer norms regarding the acceptance of aggression within a classroom predicted the degree of average gender difference in aggressive behavior (Chang, 2004).

Besides determining norms for interpersonal behavior, peer groups and cliques may establish norms about academic achievement. These norms often vary with gender. In a national study of adolescents across different ethnic groups, positive attitudes about academic domains within same-gender peer groups were more common among girls than boys (Lundy & Firebaugh, 2005). However, there is variation within each gender. In another investigation, male and female adolescents who affiliated in a clique valuing academic success were later more likely to fare better in school even after controlling for earlier achievement levels (Barber et al., 2001).

The effects of group norms on academic achievement can be specific to particular academic subjects. For example, American high school students' interest in possible STEM careers was related to perceptions of their friendship group's support of science but was unrelated to their group's support of English (e.g., Robnett & Leaper, 2013a). Although the pattern held for both girls and boys, boys were more likely than girls to report having friendship groups supportive of science. A friendship group's norms regarding achievement in particular subjects may be especially important for students' ability to overcome negative gender stereotypes about girls in math (e.g., Riegle-Crumb et al., 2006) or about boys in reading and writing (Van de Gaer, Pustjens, Van Damme, & De Munter, 2006).

There are also ways that peers can sometimes express hostile comments to dissuade girls or boys from pursuing interests that might be viewed as counter-stereotypical for their gender. First, some boys who show interest in school are teased by being called misogynist or antigay slurs (e.g., Sherriff, 2007). In addition, children are sometimes ridiculed if they show a preference for particular subjects that might be viewed as counterstereotypical for their gender (e.g., math, science, and computers for girls; Leaper & Brown, 2008); in turn, these messages may negatively affect students' self-concepts and interest in those subjects (e.g., Brown & Leaper, 2010).

Possible Explanations for Gender-Related Variations in Performance and Achievement 841

Friendships

Dyadic friendships differ from peer groups in their psychological functions and influences (Bukowski, Buhrmester, & Underwood, 2011). Whereas individuals' social identities are especially salient when interacting in a group, their personal identities are more readily expressed with friends (Harris, 1995; J. C. Turner, 1985). Also, friends are commonly used as sources for intimacy and social support. Having close friends can help to buffer negative experiences that children might experience with other peers, families, or teachers. Thus, average gender differences in friendship intimacy can both reflect and influence differences in multiple domains. As explained in an earlier section, self-disclosure and emotional support are more common in the friendships of girls than boys.

Average gender differences in the provision of emotional support may partly explain many boys' reluctance to disclose vulnerable feelings to same-gender friends; hence, some boys may look to female friends or dating partners to disclose personal feelings and thoughts (Kuttler, La Greca, & Prinstein, 1999; Poulin & Pedersen, 2007). Because of the important function of emotional support in close relationships, average gender differences in friendship intimacy can contribute to dissatisfaction in heterosexual relationships (see Leaper & Anderson, 1997) and gay men's relationships (see Kurdek, 2005) in adolescence and adulthood.

Most dyadic friendships during adolescence are with members of the same gender, although many adolescents have cross-gender friends (McDougall & Hymel, 2007; Poulin & Pedersen, 2007). According to Poulin and Pedersen's (2007) 5-year longitudinal study that followed Canadian children from Grades 6 to 10, a growth in cross-gender friends occurred over time (rising to 25% of friendships at Grade 10). Increases in cross-gender friends were greater for secondary friends than for close friends; that is, same-gender friends remained most adolescents' main source of companionship (Kuttler et al., 1999). However, according to prior reports, many boys were more likely to seek emotional support from female than male friends (Kuttler et al., 1999; Poulin & Pedersen, 2007), which may occur when boys are concerned with maintaining a traditionally masculine image of toughness with male peers (see Leaper & Anderson, 1997; Tolman, Spencer, Harmon, Rosen-Reynoso, & Striepe, 2004). Thus, cross-gender friendships can give boys the opportunity to develop intimacy skills that they might not

practice with same-gender friends (Leaper & Anderson, 1997; Zarbatany et al., 2000). In addition, cross-gender friendships allow boys and girls to learn about the perspectives of the other gender (McDougall & Hymel, 2007), which may benefit them in later heterosexual relationships and work settings (Leaper & Anderson, 1997).

Romantic Relationships

During adolescence, most girls and boys begin to develop cross-sex or same-sex romantic attractions (or both). Romantic relationships are another social context that can influence the development of boys' and girls' academic and socio-emotional skills. First, a few studies have tested for possible associations between adolescents' dating and academic achievement. One finding is that students tend to date partners with similar academic profiles. This was seen in Giordnao, Phelps, Manning, and Longmore's (2008) longitudinal study of American middle and high school students in heterosexual dating relationships. Romantic partners' grades predicted the targeted students' later grades even after controlling for earlier grades. The latter effect was stronger for boys than girls. Future research will need to replicate this finding and seek possible explanations.

Giordnao et al.'s study only examined adolescents who were in dating relationships. Other investigators have compared adolescents' academic achievement in relation to whether or how frequently they were dating. A few studies conducted in different Western countries have found that frequent or steady heterosexual dating was negatively related to academic achievement over time—either only in girls (Brendgen, Vitaro, Doyle, Markiewicz, & Bukowski, 2002; Gustafson, Stattin, & Magnusson, 1992) or in both girls and boys (Quatman, Sampson, Robinson, & Watson, 2001). Thus, high levels of involvement in romantic relationships during adolescence may undermine academic achievement in some girls (and possibly in some boys). In future research, possible mediators need to be explored. Also, another topic to consider is whether same-sex or bisexual dating is related to adolescents' academic achievement.

Dating relationships are also a context in which aggressive behaviors can occur. Studies in the United States suggest that this happens in approximately one fourth of adolescent dating relationships, with the rates varying across different communities (e.g., Hickman, Jaycox, & Aronoff, 2004). Also, rates of dating violence appear similar for heterosexual, lesbian, gay, and bisexual relationships

842 Gender and Social-Cognitive Development

(e.g., Freedner, Freed, Yang, & Austin, 2002). Although both girls and boys may initiate aggressive behavior in dating relationships, it is more likely for boys than girls (e.g., Wolitzky-Taylor et al., 2008). Furthermore, many girls come to expect demeaning behaviors as normal in heterosexual relationships (e.g., Witkowska & Gådin, 2005), and adolescent girls who experience dating abuse may be at risk for low esteem as well as dysfunctional and abusive relationships in adulthood (e.g., P. H. Smith, White, & Holland, 2003).

Intersections of Gender and Race/Ethnicity

The race/ethnicity of children and adolescents can moderate how gender is experienced. First, the cultural traditions associated with a family's ethnic background may emphasize particular gender-related values. For example, in many families with Latin American heritage, traditional values include *marianismo* (self-sacrifice) in girls and *machismo* (toughness) in boys (Baldwin & DeSouza, 2001). These cultural practices may amplify some of the previously reviewed trends during gender socialization.

In addition, children from ethnic-minority groups may encounter prejudice and discrimination in their schools and communities that affect academic and socio-emotional outcomes. These effects may differ for girls and boys. For example, longitudinal studies of Mexican American and African American youth have found perceptions of racial or ethnic discrimination were negatively related to later academic achievement for boys but not for girls (e.g., Benner & Graham, 2011; D. Wood, Kurtz-Costes, & Copping, 2011). Perceptions of racial barriers may lead to devaluing of education as a viable means for success (Benner & Graham, 2011; D. Wood et al., 2011). Conversely, there are other ways in which ethnic and racial prejudice may have more negative impacts on girls than boys. Ethnic-minority girls' double-minority status puts them at risk for experiencing discrimination based on their gender or their ethnicity/race (or both). This double-minority status may especially sensitize ethnic-minority girls to stereotype threats in academic domains (e.g., Gonzales, Blanton, & Williams, 2002).

The intersection of race/ethnicity and sexual orientation may also contribute to variations in gender development. Due to their membership in multiple disadvantaged groups, youth who are both sexual and racial/ethnic minorities may be at greater risk for bullying and victimization (see Poteat & Anderson, 2012). Research suggests that experiencing antigay or racist discrimination has an additive effect on youth's adjustment (e.g., Thoma & Huebner, 2013).

Societal Gender Equality

Gender relations vary across different cultural, institutional, and socioeconomic contexts. An increasing number of studies have considered various nation-level indicators of gender equality (e.g., gender similarities in employment, political office, income, and education) as possible moderators of average gender differences in particular outcomes (see Else-Quest & Grabe, 2012). Studies suggest that the relative degree of gender equality in a country is negatively related to the likelihood and magnitude of some average gender differences in socio-emotional adjustment and academic achievement (see Else-Quest & Grabe, 2012; W. Wood & Eagly, 2012).

Summary

A dynamic interplay of individual and social factors influences gender development. Specific theories address only a few of these influences. Hence, in the preceding review, I presented a synthesis of many of the important factors highlighted across theories. Individual processes relevant to our understanding of gender development include genetic and hormonal factors, executive functions, personality dispositions, ability self-concepts and attributions, task and social values, and gender stereotypes and attitudes. Important social contexts during gender socialization include the family, teachers, the media, peer groups, friendships, and romantic relationships. The importance of considering ethnic and cultural variations in relation to gender was also noted.

CONCLUSIONS AND FUTURE DIRECTIONS

Fifty years ago, most research on gender development was guided by psychoanalytic theory, social learning theory, or cognitive-developmental theory (see Blakemore et al., 2009). In the ensuing decades, these three approaches have faded in importance and several alternative theories have emerged. Only some of them could be reviewed in the present chapter.

The time is ripe to integrate some of the theoretical approaches and, indeed, developmental psychologists are increasingly recognizing the need for synthesis (see Leaper, 2011). There are two main ways to seek greater theoretical integration. One approach is to bridge different models that complement one another. There are several examples where this has been accomplished (Bigler & Liben, 2006; Killen et al., 2013; Ostrov

& Godleski, 2010; Tobin et al., 2010). Two that were described earlier are Bigler and Liben's (2006) developmental intergroup theory and Tobin et al.'s (2010) gender self-socialization model. In both cases, complementary constructs from gender schema theory, intergroup theory, and other approaches were linked to present a fuller picture of processes involved in gender development. A related trend toward increased integration is seen in efforts to develop dynamic systems models of children's gender development (e.g., DiDonato et al., 2012; Fausto-Sterling, Coll, & Lamarre, 2012). We need to understand how biological, cognitive, motivational, and social processes involved in children's gender development are interrelated (Ruble et al., 2006).

The second strategy for attaining greater theoretical synthesis involves minimizing the redundancy across theories that posit similar constructs using different terminologies or slightly different emphases. One example mentioned in the present chapter is the overlap among ability beliefs (in expectancy-value theory), self-efficacy (in social cognitive theory), and self-perceived competencies (in self-perception theory). Finding ways to reconcile differences in terms for similar constructs is a challenge. Individual researchers become wedded to their particular theories regardless of how similar they might be to other theories, and there are often professional incentives to advance "new" models and constructs (see Leaper, 2011; Liben, 1997). Moreover, there is no easy way to arbitrate which terms or constructs the field should choose over others. However, advances in this direction have been made in research review articles (e.g., Underwood, Galen, & Paquette, 2001) and other venues (see Leaper, 2011).

In addition to working toward greater integration among theories, there need to be more systematic replications of the research studies upon which theories are based. Despite the information overload typically encountered when sorting through the research literature on gender development (see Leaper, 2011), more studies are needed that test whether existing findings can be replicated (see Pashler & Wagenmakers, 2012; Schmidt, 2009). Researchers across several scientific disciplines have observed a common phenomenon known as the decline effect (see Lehrer, 2010). This refers to the tendency for significant effects initially seen in studies to disappear in subsequent attempts at replication. Some reviewers have even proposed most published research results in science are false (Ioannidis, 2005).

Failure to replicate a finding appears most likely when (a) fewer studies have been conducted on a topic in a scientific field, (b) the effect size is small, and (c) there is

more variety in research designs and definitions used to test an effect (Ioannidis, 2005). These are also some of the reasons why meta-analyses can be useful for evaluating overall trends in the research on a particular research topic. However, any meta-analysis is constrained by the number and type of studies available on a particular subject. In meta-analyses of gender effects, it is often not possible to conduct potentially important moderator analyses due to the limited number of available studies. Thus, there is a need for more replications to evaluate how well certain patterns hold up when tested over different age levels, populations, methods, activity contexts, cultures, and historical periods (Henrich, Heine, & Norenzayan, 2010). In recognition of this need, the Association for Psychological Science launched an initiative to support replications of important psychological findings (Drew, 2013).

Although replication is an important issue for any science, it seems especially pertinent to the study of gender development. Over the years, many assertions have been made about the presumed differences between the sexes. Some of them have been confirmed across several research studies (as reviewed in the present chapter). However, many claims have not been supported (see Eliot, 2009; Hyde, 2005). Given that assumptions about gender differences can guide policies and practices directed toward girls and boys, it is important that any decisions are based on reliably observed scientific findings. Otherwise, efforts intended to help girls and boys attain success in life may end up perpetuating gender biases.

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844 Gender and Social-Cognitive Development

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852 Gender and Social-Cognitive Development

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References 853

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