

CHAPTER 2

The Development of Self-Knowledge

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To “know thyself,” the ancient Greeks maintained, is fundamental for virtue. The person with self-knowledge is equipped to make decisions serving the self’s true interests and can sidestep the temptations that deflect one from flourishing and achieving wisdom. Contemporary Western thought continues to enshrine self-knowledge, as it is seen as essential for ethical and meaningful life (e.g., Williams, 1995). Choices concerning careers and relationships, common knowledge suggests, are best made in awareness of the self’s talents, qualities, and aspirations. The centrality of self-knowledge is the foundation for popular measures of values, interests, and personality; adolescents and young adults take career-related inventories in order to choose appropriate jobs in light of their real interests; managers seek insight into their personality types in order to choose the techniques that will be most effective in managing employees, and so on.

Self-knowledge might well serve these ends and many more; to prize it, however, does not ensure that its meaning is well understood. One reason this is so is that both “self” and “knowledge” are immensely more complicated than ordinarily realized. Before embarking on an account of how self-knowledge develops—the central goal of this chapter—it is necessary to identify the complexities inherent in the constructs of knowledge and self.

Knowledge and the Nature of the Self

Knowledge

Three conditions are prerequisite to the judgment that a person has knowledge (Scheffler, 1983; Steup, 2008). First, the proposition embodying the knowledge must be *true*. The complexities of determining the truth value of a proposition are increased when the self is the object of knowledge, a point discussed at greater length in the

next section. It suffices for the discussion here to note that *self-knowledge*—the true beliefs one has about one’s self—is only a subset of the ideas and beliefs an individual has about the self, and given the difficulty of ascertaining the truth value of propositions, it seems likely that self-knowledge is difficult to assess. Second, knowledge must be *justified* (Scheffler, 1983; Steup, 2008). This means that for a proposition to constitute knowledge, it must be validated using processes known to track truth. Finally, knowledge requires *belief* in a proposition (Scheffler, 1983; Steup, 2008). To know requires an attitude of commitment to and investment in a truthful, justified proposition. Most often, propositions about the self arouse self-concern from which commitment and investment can be inferred.

Self

Components

Self-knowledge is difficult to acquire because *the self* refers not to a single object but to a loose collection of experiences, memories, propositions, and theories. Conceptual distinctions about the self made by William James more than 100 years ago remain insightful today. For James, the self results from consciousness. In his terms, “a man’s self is the sum total of all that he can call his” (James, 1890/1998, p. 291). Three implications flow from this claim. The first of these is that in order for there to be a self, some faculty for reflection must exist; there must be a capacity for self-consciousness. Second, the notion of “all that he can call his” suggests that the individual is the final arbiter on what is to be considered part of the self. Third, the notion of “all that he can call his” suggests proprietary interests in elements included within the self, what can be referred to as *self-identification*. Reflecting upon the self is frequently accompanied by self-awareness, what James called a “unique kind of interest” (1890/1998, p. 289) and emotional involvement in specific elements associated with the self with which we identify.

Two components relate to the self. First, there are *personal memories*, memories that an individual considers to define the self and that are linked to particular times and locations. While Freud acknowledged that some younger children were capable of reporting a sequence of personal memories, he claimed that “in many cases [it is] only after the tenth year . . . that our lives can be reproduced in memory as a connected chain of events” (cited in Ross, 1991, p. 224). Second, people form representations and generalizations about the self, such as the self’s appearance (e.g., “I am tall”), capabilities (e.g., “I’m a good dancer”), relationships (e.g., “I’m a good friend”) and other psychological characteristics (e.g. “I’m smart and perceptive”). While infants do not have such representations of self, Neisser (1991) argues that they at least have “implicit self” representation growing through interactions with others and with their physical environment. By *implicit self*, Neisser is referring to infants’ perceptual awareness of self.

However, autobiographical memories and representations by themselves would constitute only a collection of self-characteristics without the sense of integration provided by a *theory* or *narrative of self*. Theories of self provide persons with a framework within which personal memories and representations can be evaluated, weighted for importance to the self, and aligned with other characteristics of self.

Which Components Allow for Knowledge?

Not all the components of self genuinely allow for knowledge. For example, an individual may provide different narratives of the self at different times and in different locations, and it may be difficult to judge one of the narratives to be true and the others to be false (see also Adler, Chapter 20, this volume). Similarly, it is difficult to assign truth value to boundaries of self-identification. A child who identifies fiercely with a doll and consequently judges injury to the doll to be an injury to self is including within the self an object that ordinary adults would not see as part of the self; nonetheless, it is difficult to judge that the child is mistaken in seeing the doll as an extension of self. This is because we ordinarily grant authority to the individual to determine which experiences elicit the “unique kind of interest” noted by James that defines the boundaries of self (for a philosophical discussion of the issue of first-person authority, see Davidson, 1984).

Self-knowledge is largely possible in the domains of personal memories and representations (see also Kelley & Jacoby, Chapter 18, this volume). We generally believe that children can be correct or mistaken, at least to an important degree, in their memories for important events and in their generalizations about themselves. In a later section, we sketch developmental trends in each of these components.

Three Traditional Developmental Perspectives on Self-Knowledge

Most grand theories of development have attended, to one degree or another, to the origins of self-knowledge. Neopsychoanalytic theories posit that powerful emotions and needs dominate psychological functioning and provide the landscape within which self-knowledge is obtained. Ausubel (1949) proposed that infants believe themselves to be powerful (*infantile omnipotence*) because their needs—for nutrition, for example—are satisfied shortly after these needs are experienced. It is, of course, parents who satisfy these needs; however, in infancy, parents are viewed as extensions of self, subject to volitional control. As infants age, however, they recognize that parents are separate individuals who choose to minister to their infants’ needs. This insight brings with it, Ausubel argues, self-devaluation as infants realize that they are dependent on others rather than omnipotent. Infants accommodate to this realization by identifying, at least loosely, with their competent parents.

One stream of cognitive developmental theory has followed Baldwin in imagining that imitation is the motor for early self-knowledge development. Baldwin (1906) argued that the self evolved largely as a result of social imitation. Baldwin noted that human infants are born without most of the skills necessary for survival and must acquire these skills by imitating appropriate models. As Baldwin described it:

All were born helpless; all have been educated. Each has been taught; each is to become a teacher. Each learns new things by doing what he sees others do; and each improves on what the other does only by doing what he has already learned. (pp. 79–80)

Through imitation, the infant and child’s self emerges and is influenced in predictable ways. First, the process of imitation results in structural commonalities between representations of self and other. Second, imitation reveals to the individual the prominence of volition in the experience of self.

The first stage in the sequence was called by Baldwin the *projective stage*. Baldwin (1906) argued that from birth infants are equipped to distinguish between persons and other objects in the world, and are particularly interested in the former. As infants focus their attention on others, they recognize that these others perform interesting actions, and they seek to emulate these behaviors. These nascent efforts to imitate result in the recognition that self and other differ: While the self's actions may resemble visually the actions of another, only the self's actions are accompanied by the experience of volition. This recognition demarcates the onset of the *subjective stage* in self development. Eventually, the child recognizes that if the self and other perform similar actions, then self and other probably have similar experiences accompanying those actions. That is, the sense of volition that accompanies the self's actions is probably experienced by others when they act; more generally the other's conscious experience is probably much like the self's: "Other people's bodies, says the child to himself, have experiences *in them* such as mine has. They are also me's" (p. 14). This discovery is the defining feature of Baldwin's ejective stage, and allows the child to empathize with others (because the child now understands that others experience emotional states similar to the self's).

A final mechanism of self-knowledge is *social attunement*, where knowledge of the self is acquired through inferring what others believe of the self. This mechanism has its roots in symbolic interactionism, particularly in the work of George H. Mead (1934). Mead argued that communication facilitates self-reflection: "The importance of what we term 'communication' lies in the fact that it provides a form of behavior in which the organism or the individual may become an object to himself" (p. 138). Mead suggested that early in the development of self-consciousness, the child mentally assumes specific perspectives—that of the mother, that of the father, that of the peer, and so on—from each of which the self is viewed differently; consequently, the child discerns little unity in the self and experiences the self differently across roles. This leads to role-specific behavior:

The child is one thing at one time and another at another, and what he is at one moment does not determine what he is at another. That is both the charm of childhood as well as its inadequacy. You cannot count on the child; you cannot assume all the things he does are going to determine what he will do at any moment. He is not organized into a whole. (p. 159)

With extensive social experience in groups and in networks of relationships, the child develops the ability to infer commonalities among the various perspectives he or she imaginatively assumes, and acquires a fully developed self:

Full development of the individual's self is constituted not only by an organization of these particular individual attitudes, but also by an organization of the social attitudes of the generalized other or the social group as a whole to which he belongs. (p. 158)

It is only in this last stage of self-development that the individual acquires sufficient self-coherency to be able to act consistently across contexts.

Three points of agreement can be noted in these accounts. The first is that in the first two accounts, agency, or the experience of volition, plays a central role in the emergence of self-knowledge. Infants learn that they cannot control others, Ausubel

(1949) notes, and Baldwin (1906) suggests that infants identify experiences of volition that arise with actions of the self but do not intrude into consciousness when visually identical actions are performed by the self. Second, both Ausubel and Baldwin focus their accounts on the developmental acquisition of knowledge of the self's boundaries, which suggests each believed that distinguishing self from nonself is an achievement dependent upon considerable experience with an interpersonal world. Finally, all three points view early self-knowledge as emerging in interactions with others. The argument that self-knowledge emerges in a social context has become a fundamental tenet of many theories of self and remains influential today (e.g., Fogel, 1993, 1995; Lewis, 1999; Neisser, 1991; Stern, 1985).

Contemporary Directions on the Development of Self-Knowledge

One notable trend of the last 20 years is that research on the self has focused on perceptual and cognitive mechanisms that may give rise to self-knowledge. As we reviewed, traditional approaches—the neopsychoanalytic, cognitive-developmental, symbolic interactionist paradigms—noted in the previous section have emphasized the gradual construction of self-boundaries through social interaction, yet have not been specific about the underlying mechanisms. However, with methodological and technological advances, modern-day researchers highlight the critical roles that specific perceptual, cognitive, and biological brain-based mechanisms play in self-knowledge development, and how these dynamically interact with objects and people in our world. We briefly review some of this research below.

Imitation

Infant imitation is an important area of inquiry as it relates to the development of self-knowledge. Imitation requires an active mapping between the self and other. Specifically, infants are beginning to detect the similarities between their actions and those of others. Through reciprocal imitation infants are also focusing their attention on and learning from others. Meltzoff and Williamson (2010) argue that imitation is foundational to the development of later social-cognitive milestones such as the mastery of theory of mind, where children use their own self-experiences in order to understand those of others.

The discovery of *mirror neurons* has drawn renewed attention to imitation as a means of obtaining information about the self. Mirror neurons are found in humans in great density at the posterior edge of the frontal lobes and the anterior portion of the parietal lobes (Iacoboni & Dapretto, 2006), and have the unique property of being activated nearly equally by an action performed by the self and the same action performed by another. For example, the hand reaching for an object might cause a mirror neuron to fire; watching another reach for the object causes the same discharge in the same neuron. Mirror neurons consequently contribute to the causal understanding of how imitation of shared experiences occur, although they alone are not sufficient. Nevertheless, the research on mirror neurons has led to further brain imaging studies that have revealed shared neural circuitry for the observation and execution of acts in later adulthood (Iacoboni, 2005).

Perceptual Mechanisms

Rochat and Hespos (1997) focused on identifying the perceptual origins of self-knowledge. They reported that newborns are able to discriminate between double-touch (i.e., where they touched themselves) and single-touch stimulation (i.e., an external object touched them) to the cheek. At 3 months, infants are able to discriminate between unfamiliar and familiar (i.e., how they typically view their legs given the proprioceptive calibration of the head to body) views of their leg motions through online video feeds looking longer at the former over the latter (Rochat & Morgan, 1995). Hence, these results provide evidence that infants have an early perceptual sense of their own physical bodies that may be the precursor to an explicit conceptual sense of self.

Ehrsson, Spence, and Passingham (2004) demonstrated one illusion concerning the self's boundaries that is an example of the trend toward brain-based perceptual capacities in the study of self. Adult participants were seated at a table on which a prosthetic hand was visible; their own hands were occluded from view. With participants viewing the prosthetic hand, identical locations on the prosthetic hand and on their hidden hands were stimulated, creating the illusion that the prosthetic hand belonged to the self. This illusion illuminates the powerful roles of perception in defining the boundaries of self. In a later study (Ehrsson, Holmes, & Passingham, 2005), the illusion was found to be associated with activity in areas of the brain known to be important for integrating information from different senses.

The importance of sensory integration for the sense of self is evident in another illusion involving visual afterimages, the dim photograph-like images perceptible for seconds after brief exposures to very bright lights. If participants are looking at their hands when exposed to very bright light, the afterimages they see include their hands. However, if they move their hands after exposure to the flash of light, the representations of their hands in the afterimages disappears (Carlson, Alvarez, Wu, & Verstraten, 2010). This phenomenon demonstrates that there are connections between visual images and motor experiences of self. Particularly interesting is the finding that if an individual is holding an object with a hand, and the hand and object move following exposure to a bright light, the resulting afterimage evidences deterioration of the sensation of the hand and object. However, if the object is not held but is near the hand, and then is moved mechanically following exposure to the light, the afterimage shows no deterioration specific to the object. This suggests a held object that moves in concert with the hand is incorporated into the representation of self (Carlson et al., 2010). Like the research described earlier, the findings from research on afterimages suggest that the boundaries of self can be extended to include inanimate objects as a result of perceptual cues.

One way of interpreting this set of findings is to suggest that powerful sensory cues, or environmental affordances allow for distinctions between self and nonself at very early ages. Bremner, Holmes, and Spence (2008) argue that infants have very good knowledge of space relations within short distances of the self, with this understanding of spatial relations constructed upon the self's actions and body schema. This early understanding, based on the self's orientation to its immediate environment, is complemented by a more slowly developing understanding of spatial relations that exist outside the immediate, peripersonal space of the child.

Statistical Sensitivity

Research on social cognition in young children suggests that infants and preschoolers are able to make inferences about others based on statistical inferences. Kushnir, Xu, and Wellman (2010) asked toddlers (20 months of age, on average) to observe adults pulling toys out of clear plastic boxes. In one box, the target toy (either a frog or duck) was present in the box in the ratio of 31:7 (majority condition), and in the other box the target toy was in the minority (7:31). Toddlers observed the adult withdraw the same toy from the same box on five successive trials. Next, the experimenter asked the toddler to select a toy of his or her choosing and deliver it to the experimenter. Infants who observed the experimenter choose the target toy from the box in which the target toy was in the minority were more likely to choose that toy to deliver to the experimenter than were toddlers who watched the experimenter choose the target toy from the box in which the target toy was in the majority. The inference is that this occurs because toddlers can easily infer a preference for the target toy with the experimenter's repeated withdrawal of that toy, and that it is unlikely to reflect a random selection (the experimenter is unlikely to be withdrawing the target toy on five successive draws from a box in which there are many other types of toys, unless the experimenter is *selecting* the target toy; random selection could be occurring, however, when the experimenter selects the target toy on five successive draws when the target toy is in the majority). This study reveals that older infants are able to make inferences about others based on statistical information concerning the likelihood of different information. The findings do not pertain directly to self-knowledge; however, it seems possible that if older infants can make use of statistical information to make judgments about others, they can do so to make judgments about themselves.

Awareness of Capacities

Studies by Kagan (1981) and Richman and colleagues (1983) suggest that toddlers develop knowledge of their capabilities at about the same time that mark-directed behavior is first exhibited, such as being able to touch a rouge mark on their nose when gazing upon the self in a mirror. Researchers modeled both simple and complex actions to infants of a variety of ages, and found that a common response in infants 18–22 months of age was to imitate the simple actions but to exhibit distress and refuse to imitate after observing the complex actions. Kagan and Richman and colleagues inferred from this pattern that infants at this age were aware of their own capabilities, recognized the implicit demand to imitate the actions of the experimenter, and did so if they were able, but they reacted negatively to invitations to imitate actions that they knew exceeded their capabilities. In other words, toddlers have knowledge of the self's abilities.

Memory Maturation

One of the central achievements of the study of early cognitive development has been the demonstration that many skills long thought to emerge in middle childhood are in fact present even at young ages. Research on memory has illuminated that young infants are capable of not only recognition memory—a capacity long known to exist

in infants—but also semantic and episodic memory (Hayne, 2004), the latter two forms of memory referring to the retention of explicit facts and events. However, while even young infants have these different memory capacities, early memory is characterized by high rates of forgetting, lack of detail, and an extremely limited accessibility to recall, with all these limitations diminishing dramatically over early childhood (Hayne, 2004). With the dynamic development of many interrelated cognitive systems, including language, memory, self and other forms of mental representations, and differing forms of narrative experiences, personal memories are believed to take shape in the fourth year of life (Nelson & Fivush, 2004). Moreover, personal memories, of the type important for self-knowledge, may draw upon neural circuits dependent upon a level of maturation in the frontal lobes not reached until approximately 4 years of age (Levine, 2004). Contemporary research, then, suggests that very early personal memories are likely to be short-lived and inaccessible, with major improvements occurring in the third and fourth years of life.

A Common Neural Basis to the Self

Recently, Spreng, Mar, and Kim (2009) have argued that an early developing neural system is responsible for different types of behaviors involving the self and the understanding of others' minds. This claim is important in several respects. First of all, it suggests a set of specific neural circuits, based in the medial prefrontal, medial temporal, and medial and lateral parietal regions of the brain, that generate phenomena of interest to scientists interested in self- and social cognition. Second, the idea that there is a single *self-projection* system of the brain responsible for self- and social cognition suggests that phenomena traditionally considered to be independent of each other—for example, the ability to attribute beliefs and thoughts to others (the focus of research for developmental and comparative researchers studying theory of mind), early autobiographical memories, the navigation of the self through space, and so on—are in fact united by their common neural and psychological processes. The idea that a single set of neural circuits regulates disparate kinds of actions and judgments is deeply provocative; while further work is necessary to explore the value of this idea for understanding self-knowledge development, it is in our view promising and suggests that researchers interested in the development should consider the possibility that self-knowledge incorporates inferences about the minds of others and the location of the self in physical space.

Social Attunement

While it is certainly true that inferring the perspectives of others toward the self can lead to self-knowledge, as Mead (1934) pointed out, it need not always do so (see also Srivastava, Chapter 7, this volume). As Vazire (2010) has pointed out, the perspectives of others—even once integrated in the form Mead suggests constitutes the apex of development—do not necessarily lead to self-knowledge. There are facets of the self with which others may not be concerned or they may lack relevant information. For example, Vazire has demonstrated that adults typically have more accurate insights into their own emotion tones than into the moods of others. Little is known about the developmental course of children's sensitivity to the value of the perspectives of others

for gaining self-knowledge, though it seems likely that this development occurs over the course of childhood and adolescence.

Developmental Sequencing of Knowledge Acquisition Processes

This brief overview of mechanisms of self-knowledge reflects our hypothesized developmental ordering. We propose that mechanisms for deriving information about the self from imitation and perception are probably present at birth and are operational in the first year of life. Perhaps because the phenomena corresponding to these mechanisms are recently discovered, very little is known about how these mechanisms relate specifically to the emergence of a sense of self and its later development. In our view, these mechanisms offer rich opportunities for exploring the early development of self-knowledge.

The ability to draw upon statistical generalizations, successes and failures, personal memories, and the perspectives of others may not be present at birth, and may develop more slowly, perhaps well into adolescence. Little is known about either the trajectories of development in these mechanisms or their interactions with each other. One can imagine statistical information about the self and personal memories may yield different representations of self, and the reconciliation of these different kinds of information may assume a different form in adolescence than in childhood. There have been attempts to find common neurological bases for these cognitive capacities that are promising avenues of exploration in our understanding of self-knowledge development.

Finally, the contemporary research reviewed in this section suggests that self-knowledge is unlikely to be the result of a single insight derived from one social process, as postulated by Ausubel, Baldwin, and Mead; instead, we and others suggest that notions of self arise from a range of social, perceptual, cognitive, and biological processes dynamically interacting. Because these processes follow independent developmental trajectories, and correspond to different facets of self, it is unlikely that they yield a tightly integrated set of propositions concerning the self.

Development in Self-Knowledge

The sequencing of mechanisms of self-knowledge development is in correspondence with some of the most important findings on the development of self-knowledge. Space limitations preclude a thorough review of this literature; in this section, we limit our discussion to the diversity of findings and their relations to the mechanisms of self-knowledge. As noted earlier, only representations of self and personal memories are well characterized in terms of knowledge, and our review is limited to these facets of the self.

Representations

Physical Representations of Self

We proposed that perceptual and cognitive mechanisms for acquiring information about the body are present early in development. Perhaps not surprisingly, therefore,

some of the most compelling early evidence for self-knowledge concerns physical characteristics of self. While there are clear signs of implicit self-knowledge in early infancy, as we reviewed earlier, evidence of explicit self-representation does not emerge until later. The best evidence for self-knowledge in infancy and early childhood makes use of the mirror self-recognition task. To briefly summarize it (for descriptions, see Amsterdam, 1972; Lewis & Brooks-Gunn, 1979), infants are first placed in front of a mirror and their behavior is observed; this serves as a baseline against which to judge infants' behavior in subsequent trials. Next, the mirror is turned away and the infant's face is surreptitiously marked with rouge on the ear or nose. The infant is once again seated in front of a mirror, and behavior is observed once again. At approximately 18 to 24 months of age, a human infant in this second episode shows *mark-directed behavior* by touching the rouge on its face, which it can only see by inspecting its image in the mirror.

Several facets of mark-directed behavior are relevant. First, the behavior indicates self-reflection because infants focus attention on representations of themselves in the mirror. Second, mark-directed behavior is an indication of identification with the image; the infant knows that the image marred with rouge is of him- or herself, and is sufficiently disturbed by the anomaly in the self's typical appearance to explore it tactually. Finally, mark-directed behavior is a demonstration that infants have constructed representations of their physical appearances, and have some knowledge of what their faces typically look like—and know that their faces typically do not have rouge on them (interestingly, this capability seems to depend little on the amount of exposure to mirrors, as it develops at about the same age even in infants with relatively little exposure of reflective surfaces; Priel & de Schonen, 1986).

Knowledge of the self's physical characteristics continues to develop into the third year of life. Brownell, Zerwas, and Ramani (2007) encouraged children between 17 and 30 months of age to attempt tasks that tapped knowledge of the self's characteristics. For example, children were encouraged to put on hats that were too small for their heads, and to crawl through an opening with two doors, one of which was too small for them to pass through. The number of errors—attempts to perform actions made impossible by the size or location of their bodies and appendages—was recorded. Brownell and colleagues found that the number of errors decreased with age, suggesting that children were developing more accurate representations of their bodies. In a second study, Brownell, Nichols, Svetlova, Zerwas, and Ramani (2010) asked children to place stickers on body locations modeled by an experimenter. Children who could correctly place a sticker on their elbows and 11 other locations, when a similar action was modeled by the experimenter, were judged to have knowledge of the location of various body parts and their locations. As children grew older, their ability to correctly locate the stickers increased.

Mark-directed behavior also occurs at about the same time that toddlers learn to appreciate the effects that their bodies' locations have on other objects. Moore, Mealiea, Garon, and Povinelli (2007) asked toddlers to push small carts with mats attached to the back. Toddlers pushing from directly behind the carts would stand on the mat and would then be unable to move the carts. Older toddlers (21 months of age) were more likely than younger toddlers (15 months of age) to solve the problem and push the cart from the side. Moore and colleagues interpreted this trend to indicate development in knowledge of the self's body in relation to the world.

Representations of Capabilities

As mentioned, studies by Kagan (1981) and his colleagues (Richman et al., 1983) suggest that toddlers have knowledge of the self's abilities. Over the next several years, children's success in reaching a standard continues to develop. Stipek, Recchia, McClintic, and Lewis (1992) studied affective responses to success and failure in children between 2 and 5 years of age. Although the findings weren't entirely consistent for expressions of positive emotion, the authors found that older children expressed more negative emotion than did younger children in response to failures. This suggests that older children were more likely to understand that they had failed on the task, and that the failure reflected poorly on the self's capabilities.

Hart and Matsuba (2007) and Lewis (2007) have highlighted the importance of the self in the development of self-conscious emotions such as pride, guilt, and shame. Lewis was able to demonstrate 3-year-olds' experiences of shame or pride relative to their failure or success at a task, but that these experiences were also dependent on children's attentional focus (i.e., being task-oriented vs. performance/self-oriented). Those children who were task-focused experienced relatively little shame when they failed an easy task, attributing most of their failure to the task and away from the self. In contrast, those children who were performance-focused experienced significantly more shame when they failed the same easy task, attributing their failure more to themselves. These findings further illustrate the link between self and emotional development.

One of the most frequently studied areas of self-evaluation is academic achievement. In a series of studies, Marsh and his colleagues (e.g., Marsh, Köller, & Baumert, 2001) studied adolescents' judgments regarding their academic abilities in the context of classmates' academic abilities. The general pattern found across countries is that adolescents' judgments of their own academic abilities rest most heavily on their achievements in their classes, as indexed by the grades they receive for their academic work: Adolescents receiving high grades for their academic work judge themselves to be talented academically. However, judgments about the self's abilities also depend in part on the success of classmates. The average achievement level for an adolescent's classmates is *inversely* associated with judgments of the self's abilities. This is the big fish–little pond effect. One's judgments about the self's academic abilities are most positive when one's classmates are weak students, and least favorable when one's peers are high-achieving students. This well-studied effect shows little relationship to age through adolescence (e.g., Marsh, Kong, & Hau, 2000) and is found in a variety of the world's cultures (Seaton, Marsh, & Craven, 2009). The big fish–little pond effect also illustrates the difficulty of obtaining self-knowledge of one's academic ability because it does depend on context and an adolescent's cognitive abilities to understand the self in this context.

Personal Memories

Memories of personally meaningful events are important constituents of the sense of self. To some degree, memories can be characterized as accurate or inaccurate, and consequently can be judged to be truthful or not. Adolescents and adults have few personal memories for their lives prior to the age of 4 or 5. However, infants and

young children do form personal memories that are retained for short periods of time and, with rehearsal, can be retained over longer periods of time (Hartshorn, 2003). In one fascinating study, Wang (2008) asked mothers of 3-year-olds for two relevant events for their children that had occurred in the previous 2 months. Children then were questioned about these events. Wang followed the children longitudinally, using the same procedure at testing times 6 and 19 months subsequent to the initial assessment. At each assessment, children were also asked to identify situations that produced different types of emotions in order to measure their knowledge about emotions. As children aged, their ability to provide accurate details of personal memories increased. Wang found that the ability to provide accurate details in personal memories seems dependent, in part, upon children's knowledge of emotions.

There is evidence as well that, with age, children become better able to distinguish between personal memories of real events and false memories. *False memories* are memories for events not experienced by the individual. Children's false memories have frequently been studied. Oftentimes in this kind of research an experimenter proposes to a child that he or she experienced an event that never occurred, with the goal of determining whether the child will report the never-experienced event as a memory. In various studies, children have been asked to remember events they never actually experienced, such as medical mishaps, separation from parents, and physical pain. Generally, but not always, the evidence indicates that older children are more accurate than younger children in discerning real memories from false ones (Brainerd, Reyna, & Ceci, 2008).

Conclusions

Acquiring knowledge about the self is made difficult by the multiple facets of self, several of which are difficult to align with standards of knowledge. For example, self-identification and theories or narratives of self seem to exist apart from knowledge. Consider self-identification: Because we usually judge that individuals are the final arbiters of what is, and what is not, included in the self, people generally cannot be wrong about some aspects of the self. Theories and narratives of self seem to be impervious to evidence; it would be difficult to judge, for example, that the stories people tell about themselves after psychotherapy are in some important way more "true" than they were before experiencing psychotherapy (see also Adler, Chapter 20, this volume).

Contemporary cognitive and developmental research suggests that self-knowledge—concerning facets of self for which knowledge is possible—likely rests upon a variety of perceptual, cognitive, biological, and social processes that dynamically interact as infants and children actively explore their world. As a consequence, traditional theories that emphasize the developmental acquisition of fundamental insights regarding the self relative to social interactions must be complemented with new findings suggesting the early emergence of knowledge of the body and its properties.

New research on mechanisms that contribute to self-knowledge provides fascinating opportunities to explore how children acquire early self-knowledge, and how

this self-knowledge might develop. The opportunities for synthesizing insights from disciplines traditionally isolated from each other—neuroscience, cognitive psychology, social/personality psychology, developmental psychology—for the study of the development of self-knowledge have never been richer.

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