9 Development of Conscious Control and Imagination

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Although students of the topic of consciousness can debate its proper definition, most theories tend to take as their starting point what is best characterized as the *end* point of consciousness, that is, the adult (human) state. This appears to be the case whether consciousness is viewed primarily in terms of neural architecture (a biological approach) or first-person experience (a phenomenological approach). Even an evolutionary or comparative approach, which considers changes in consciousness on a grand timescale, takes for granted that the human endowment of consciousness is fully fledged and distinguishes "it" from the consciousness of our predecessors or other species. Those who subscribe to these approaches do not necessarily view consciousness as a fundamentally *developmental* achievement in ontogeny. As noted by Zelazo, Gao, and Todd (2007), differences between younger and older individuals are often assumed to reflect differences in the contents of children's consciousness, not in the nature of consciousness itself. My aims in this chapter are twofold, and at first blush contradictory. The first is to argue that conscious process develops dramatically in infancy and early childhood and is exercised via increases in reflection (a sense of volition) and top-down control of action, thought, and emotion (executive function, EF). However, the second claim is that development in the case of consciousness is not strictly an upward-bound process in achieving an objective sense of self (i.e., the more choice and control, the better), but rather can be characterized as a balance between objectivity and personal, tacit

knowledge. Creative discovery in science and art provide examples of this balance in adults, and imaginative play does so in children. I will conclude with thoughts on the implications of this research and the potential value of taking a domain-specific approach to the study of consciousness and free will.

CONSCIOUS CONTROL

Control and Choice

Free action has many shades of meaning stemming from different traditions (e.g., biological, psychological, theological, sociological). The scientific version, in which the unit of measurement is taken to be the individual agent, suggests that free action is indexed by the ability to resist external forces and to make selections between them. On this view, free will has two key requirements: control and choice.

A distinction between having a "will" and "free will" can be seen in the development of *volition*, defined by William James (1890) as "attention with effort." J. Mark Baldwin (1892) described volition as the "conscious phenomenon of will," an act of exercising the will as a conscious choice, which is distinct from the intended actions it causes (e.g., the intention to reach for a desired object, as distinct from the reaching itself). According to Baldwin, infants progress from simple imitation, which is relatively unreflective and effortless, to persistent imitation, which is deliberate and effortful. Consciousness moves from a state of monoideism to polyideism as awareness that one is intending to repeat an action and doing so selectively from a variety of possible actions begins to take hold. As will be described next, both control over the stimuli one attends to and the awareness that one can decide how to respond to those stimuli increase dramatically in the first several years of life.

In the adult social psychology literature, it has been hotly debated whether this sense of free will is an "illusion." Wegner (2002) cited ample evidence that people's first-hand experience of free will is unreliable, as in the celebrated experiments by Libet (1985) showing that the brain initiates action about a second *before* subjects reportedly decide to act. Similarly, referring to this kind of evidence, Metzinger (2006) wrote that the experience of one's own agency is "thin" and "evasive." But instead of concluding that there is no such thing as free will, or that it is necessarily all or nothing, it might be fruitful to think of a sense of agency as a *gradient* in effortful control (see also Baumeister, Chapter 3, this volume; Vohs, Chapter 5, this volume).

Levels of Consciousness

The prevailing developmental account consistent with this view is Zelazo's levels of consciousness theory (LOC; e.g., Zelazo, 2004; Zelazo et al., 2007). According to the LOC model, consciousness is structured hierarchically, beginning with "minimal consciousness" in the first year of life, in which an infant is motivated to approach pleasure and avoid pain. At this level, behavior is highly stimulus bound, tied to ongoing stimulation (without explicit recall), unreflective, and makes no reference to an explicit sense of self. At progressively higher levels of consciousness, more deliberate action occurs in response to a more carefully considered construal of the same situation, brought about by several degrees of reprocessing the situation (recursion). This is thought to occur via thalamocortical circuits involving regions of prefrontal cortex, which themselves are organized hierarchically in development (Bunge & Zelazo, 2006). Increases in reflection allow for the formulation and maintenance in working memory of more complex systems of rules or inferences, which permit the more flexible selection of certain rules for acting when multiple conflicting rules are possible. This, in turn, forms the basis for conscious control, that is, acting on the basis of explicit rule systems (in potentially silent self-directed speech) at higher and higher levels of complexity.

Evidence from our lab details the normative progression in children's performance on executive function measures and is largely consistent with a levels-of-consciousness account (e.g., Carlson, 2005). For example, we found that from age 2 to 5 years, children progress from understanding a conventional pair of rules in categorization (e.g., "mommy animals go in the Mommy bucket; baby animals go in the Baby bucket") to a pair of incompatible rules ("now *babies* go in the Mommy bucket and *mommies* go in the Baby bucket") to two pairs of incompatible rules in succession (e.g., sorting the same stimuli first according to color and then according to shape) to two pairs of incompatible rules concurrently (e.g., some trials go by the color game, others by the shape game), requiring even greater cognitive flexibility and control (Dimensional Change Card Sort, see Zelazo, 2006).

This circumscribed series of tasks illustrates, more broadly, the gradual development of agency, or a sense of self as "I," who can deliberate among possible courses of action and, with the chosen goal in mind, control my own thoughts and actions in light of the goal, as opposed to allowing the exigencies of the situation to control the self (Russell, 1996; see also Baldwin, 1892). In time, the self becomes the "executive" in charge of selecting a goal, holding it in mind, planning how to achieve it, executing the plan, evaluating whether the goal was met, and, if not,

selecting another alternative (Zelazo, Carter, Reznick, & Frye, 1997). Although these executive function skills take a long time to mature (and indeed, there are large individual differences even in adults), numerous investigators have recently been drawn to the preschool period as a marker of some of the most dramatic improvements (for a review, see Zelazo, Carlson, & Kesek, 2008), and put more strongly, the ontogeny of consciousness itself.

Further evidence for levels of consciousness comes from experiments in which we generated a higher degree of self-control by helping children have more "psychological distance" from a salient stimulus and hence reflect more on the rule system (Carlson, Davis, & Leach, 2005). In this "Less is More" task, children are presented with a larger versus smaller array of candies and told that "whichever tray you point to, those treats will be given away [e.g., go to a naughty monkey puppet] and you'll get the *other* treats in your cup." Three-year-olds have difficulty learning a reverse reward contingency, that is, that they should point to *less* in order to receive more. They tend to be stimulus bound (pointing to the larger amount, the one they want for themselves) and unreflective, whereas 4-year-olds do quite well and infer that they should point to the *un*desired tray, usually within the first few trials. However, when we substituted meaningful symbols for the candies, 3-year-olds readily learned the contingency and were able to exert control over their selections, choosing a symbol for the smaller amount (e.g., a mouse) over a symbol for the larger amount (e.g., an elephant), thus receiving more treats (Carlson et al., 2005). Furthermore, those 3-year-olds who were given the symbolic version of the task were able to transfer their higher-order understanding and maintained good performance even when real treats were introduced later (Beck & Carlson, 2008). This generalization from the symbolic to the real illustrates the great power of symbolic thought in promoting conscious control, even in the presence of a strong temptation (a power not evident in chimpanzees in an analogous task; Boysen, Berntson, & Cacioppo, 1996).

To further illustrate this point, we observed children's spontaneous strategies for self-control (Carlson & Beck, 2009). Using the classic delay-of-gratification paradigm by Mischel and colleagues (Mischel, Shoda, & Rodriguez, 1989), we presented a larger reward and a smaller reward (e.g., 10 vs. 2 Goldfish crackers) to 3- and 4-year-old participants ($N = 171$) and explained that they could have the larger reward if they waited for the experimenter to return; otherwise, they could ring a bell on the table to bring back the experimenter, but in that case, they would only receive the smaller reward. Children were tested individually and waited up to 5 min. We recorded their spontaneous strategies and developed a taxonomy that included physical/ nonsymbolic strategies (obstructing the

line of sight to the treats and/or bell; physically restraining oneself; looking in the one-way mirror behind which the parent was located) as well as verbal/symbolic strategies (reminding oneself of the rules; talking/singing; and pretending). In line with the development of executive function skills more generally, older children were significantly more likely than younger children to employ strategies to delay gratification. Interestingly, however, the pattern changed with age, wherein physical strategies declined while symbolic strategies, which we argue invoke higher-order thought processes to govern behavior in a top-down fashion, became significantly more common.

Knowing Me and Knowing You

In a related line of research, we have shown that individual differences in self-control are positively correlated with the ability to recognize and interpret other people's inner mental states, that is, theory of mind (e.g., Carlson & Moses, 2001). Several studies have found robust correlations between executive function and theory-of-mind task performance in preschoolers (e.g., $r = .66$ in Carlson & Moses, 2001), and in most cases these links have held up over age and IQ or verbal ability and have been upheld cross-culturally (e.g., Sabbagh, Xu, Carlson, Moses, & Lee, 2006). Despite this body of research, the nature of the relation between EF and theory of mind has been a matter of controversy. On the emergence view, this evidence suggests that children must be able to suppress their own potent representations of events before they can reflect accurately on the mental states of others (Moses, 2001). In contrast, others have argued that children must have a representational understanding of mental states before they will be able to monitor and control their behavior (Perner & Lang, 2000). A third theory, cognitive complexity and control-revised (Zelazo, Müller, Frye, & Marcovitch, 2003), is that executive function and theory of mind are both developmental by-products of the domain-general ability to reason about and selectively attend to hierarchically embedded rules, that is, as a result of increasing levels of consciousness regarding both the self and others.

Longitudinal studies thus far have favored the conclusion that individual differences in executive function significantly predict subsequent variance in theory of mind (independent of child general cognitive ability and socioeconomic factors) significantly better than the reverse developmental ordering (e.g., Carlson, Mandell, & Williams, 2004; Hughes & Ensor, 2007; Pellicano, 2007). In other words, although the correlations alone cannot rule out the idea that these skills are both by-products of a general reflection ability, when examined longitudinally,

increases in self-control governed subsequent theory of mind rather than the reverse or a fully bidirectional relation. Further research is needed to fully understand the coordination of these skills in development. Nonetheless, it seems clear that some modicum of control over one's own thoughts and actions would be needed in order to reflect upon another's perspective, most crucially when that perspective differs from one's own. From a theoretical standpoint, at least, being able to interpret the underlying mental states of others in this nonegocentric way would be a powerful social reasoning tool (see Pizarro & Helzer, Chapter 7, this volume).

IMAGINATION

Is Higher-Order Thought the Highest Form of Thought?

We might naturally draw the conclusion from such evidence that the more, the better when it comes to conscious control of thought and action. The development of executive function marks a major shift from children being relatively unreflective, stimulus-bound creatures to being more reflective, thoughtful individuals who can pursue goals in the face of distraction, solve means–ends problems planfully, and engage in social interactions with some consideration of the other's perspective, hence reducing the potential for interpersonal conflict. It makes for a tidy story, so why not stop here? Why not train children (and anyone else at an apparent disadvantage on self-awareness) in mindful reflection on their own thought processes and behavioral tendencies, hence accelerating all of these developmental benefits? Indeed, some executive function training interventions have been successful with preschool children and generalized to other school-readiness skills (e.g., Diamond, Barnett, Thomas, & Munro, 2007).

There is an apparent disconnect here, however, which brings me to my second main point. A long tradition in cognitive psychology has revealed that as behaviors come under greater conscious control, with enough practice or, one might say, development, the effort required to carry out the same action decreases; the act becomes more automatic, and so *less* consciously experienced. The example of driving a car is often cited to describe procedural, implicit knowledge in adults that takes place with minimal consciousness, so much so that the driver can carry on a conversation while operating the vehicle (e.g., Zelazo et al., 2007). However, this implicitness pertains not only to what might be regarded as sensorimotor behaviors that get us where we need to go but otherwise are not particularly special or creative (e.g., to walk and chew gum at the same

time), but also to a much broader spectrum of thought and behavior. With increasing skill and expertise at thinking about a certain domain (e.g., theoretical physics) or at a certain artistic or athletic talent (e.g., playing a Suzuki violin, writing a novel, or shooting free throws in basketball), thoughts and actions become more automatic, less consciously effortful. Indeed, experts in both thinking (e.g., physicists, philosophers) and doing (e.g., musicians, athletes) have great difficulty accessing *how* they know what they know, or do what they do, and often claim that overthinking such things can lead to more errors, not fewer.

But then, doesn't it follow that if such acts are carried out subconsciously or without volition in the Jamesian (1890) sense of "attention with effort," then what was once the province of the highest level of consciousness is now the lowest level? A full return to minimal consciousness in the LOC model does not quite capture this sort of downward progression in conscious control. A distinction would need to be made between stimulus-bound and unenlightened action (as in the preverbal infant) and unattended yet enlightened action (as occurs in domains of expertise). Even more disturbing to an exclusively upward-bound view of consciousness is that if we cannot grasp our own most highly accomplished skills and hold them up for scrutiny in an objective, reliable sense, but only in some deeply personal, idiosyncratic, inarticulate sense, this would seem to violate the Western ideal of scientific detachment: True knowledge is deemed impersonal, universally established, objective.

To the contrary, the chemist-philosopher Michael Polanyi (1958) sought to establish an alternative ideal of knowledge, termed "personal knowledge," to reflect a fusion of the personal and the objective. He regards knowing, from a Gestalt principle, as an active comprehension of the things known, an action that requires skill. "Skilful knowing and doing is performed by subordinating a set of particulars, as clues or tools, to the shaping of a skilful achievement, whether practical or theoretical. We may then be said to become 'subsidiarily aware' of these particulars within our 'focal awareness' of the coherent entity that we achieve" (p. vii). In this sense, all knowing involves the personal participation of the knower; "...into every act of knowing there enters a passionate contribution of the person knowing what is being known, and ...this coefficient is no mere imperfection but a vital component of his knowledge" (p. viii). Polanyi referred to our influential yet inarticulate ways of knowing as the "tacit component."

How might this apply to human development? It follows from Polanyi's (1958) thesis that there might be gradients of self-awareness of one's mental effort (control) and the fact that one is selecting some items of knowledge for focal attention while setting aside or postponing others (choice), even though it is asserted by Polanyi to be always a fusion

of the subjective and the objective, never devoid of one or the other. However, unlike the canonical way of thinking about a gradient in a strictly linear form, with ever-increasing degrees of awareness and conscious access corresponding to an ever-widening knowledge base (which itself is perfectly correlated with age and experience), this process might be illustrated as a series of curvilinear functions in which conscious awareness first rises, then falls, as a function of knowledge or understanding within particular domains of ability, even though the highest level attainable generally increases with age and metacognition. This view takes consciousness to be dissociable according to different domains of experience rather than all of a piece. Karmiloff-Smith (1995), building upon Piaget (1974/1977), proposed a similar idea in her theory of representational redescription, in which domain-specific knowledge structures proceed through a hierarchy of redescription: Level I (implicit and procedural) to Level E_1 (explicit awareness of the structure of procedures) to Level E_2 (consciousness, with greater degrees of "explicitation" of knowledge and integration within and across domains). However, for Karmiloff-Smith, as in the LOC model, the assumed developmental progression (the "internal drive") is toward ever-higher degrees of explicit, verbalizable knowledge. Hence, although representational redescription provides a means for domain-specific increases in consciousness, it does not capture the paradox described here that *less* thinking can sometimes be *more* advanced.

Imagining the Impossible

To put the problem another way, if a drive toward higher-order, more reflective thought is the only engine in the development of consciousness, or the only metric by which we judge development to be complete, then why is it so often those individuals who are prone to being *least* mindful of their own thought processes who make the really big discoveries? For one, having a larger internal database makes for a richer network of associations from which to draw on (e.g., Tulving, 1985). But one might still think that the more conscious these associations are, the better for discovery of new ones. Polanyi (1958), however, offered several counterexamples of this principle, in which the scientist's personal participation in his knowledge (at a subconscious level), in both its discovery and validation, is an indispensable part of science itself. The observer is never fully removed from the observed (see also Baldwin, 1892). This is true in the "exact sciences" such as physics, astronomy, and chemistry (e.g., in the reading and calibrating of instruments) and becomes even more evident in the biological and social sciences, in which assertions are

probability statements (degrees of confidence that a given outcome was not due to chance). The scientist is a "believer" in *something* even if it cannot be fully articulated, and not the epitome of pure, detached reason we might wish for.

This might be an erroneous wish, after all. Polanyi (1958) provided the example of Einstein's discovery of the theory of relativity occurring through a combination of high intellect and objective (impersonal) knowledge along with a personal, tacit knowing at a less conscious level. Einstein describes that he was vaguely aware of the problem at the age of 16, left it, only to return to it with a more explicit formulation 10 years later. For Polanyi this is an example not of subjectivity, but of the self establishing contact with a "hidden reality." On this view, intuition and faith play a role in scientific discovery—and this aspect of Polanyi's thought might be accused of being teleological—but my point is that discovery occurs against a backdrop of knowledge that is both objective and personal, both conscious and inarticulate. Imagining the "impossible," then, is infinitely elastic, but relative only to what one takes to be possible, and that is grounded in knowledge. Originality and innovation develop out of habit, or as Louis Pasteur noted, "Chance favors the prepared mind." Moreover, imagination would not get off the ground without some deeply personal commitment to the subject matter, what Polanyi calls "in-dwelling," or living *through* the knowledge, not simply carrying it around and operating on it like a computer.

This balance is exemplified not only in scientific discovery, but also in creative arts. Several accounts point to the relatively unconscious aspects of creativity. The antirationalist view takes many forms, including that of Immanuel Kant, who wrote in the *Critique of Judgment* that, "genius cannot describe or indicate scientifically how it brings about its products, but it gives the rule just as nature does. Hence the author of a product for which he is indebted to his genius does not know himself how he has come by his Ideas; and he has not the power to devise the like at pleasure or in accordance with a plan, and to communicate it to others in precepts that will enable them to produce similar products" (1790/1952, p. 188). Kant speculated that this process is guided by a "guardian spirit." Much later, Carl Jung affirmed the mystery of creativity: "Any reaction to stimulus may be causally explained; the creative act, which is the absolute antithesis of mere reaction will forever elude human understanding" (1933, p. 177). He posited that the archetypal themes of the "Collective Unconscious" of the human race are transformed in some way by the artist (and appreciated by the consumer who identifies with those themes). Indeed, it is common for accomplished fiction writers to report that they experience their characters as if they exist apart from themselves; the characters dictate the story, are often uncooperative, and say shocking or

funny things that take the author by surprise. Taylor, Hodges, and Kohanyi (2003) documented this phenomenon, which they termed the "illusion of independent agency," in interviews with 50 writers, most of whom had experienced it at some point. Note that the illusion of independent agency (I think I am not in control of my own action) is the opposite of the "illusion of conscious will" that Wegner and others refer to (I think I am in control of my own action).

Reports from creative individuals who swear by intuition and unconscious inspiration can be contrasted with others who claim that creative works are just that— work! Edgar Allen Poe, for example, described his writing of "The Raven" as a painstaking, conscious process: "No one point in its composition is referable either to accident or intuition. . .the work proceeded, step by step, to its completion with the precision and rigid consequence of a mathematical problem" (1846, p. 163). He added that it is "autorial vanity" that prevents others from allowing the public to take a peep behind the scenes at the writing process and all that gets discarded, as they would prefer it to be understood that they compose by "ecstatic intuition." But even to this, one might argue that Poe's self-critical judgment of what would satisfy his goal and be just the right word in just the right place is itself testament to the unspoken power of personal knowledge. Therefore, it is likely that *both* higher and lower levels of consciousness and control play a role in creative acts. It is possible that expertise in the domain contributes to implicitness, in which multiple associations are made, many uneventfully integrated with existing knowledge structures, making it seem, at least in retrospect, that the inspiration came suddenly or from an external source. The creative process is conscious and most likely to assume center stage in focal attention when the artist is somehow dissatisfied with the expression. Consistent with lower levels of consciousness, individuals with low "latent inhibition" (i.e., less able to inhibit interference from extraneous stimuli) appear to be more creative. Carson, Peterson, and Higgins (2003) reported that *eminent creative achievers* were seven times more likely to have low rather than high latent inhibition scores. But the fact that creativity requires some effortful control is not disputed here, and indeed, adults who were "depleted" by a task requiring self-control were subsequently less creative than others who had not had their self-control tapped on a prior task (Baumeister, Schmeichel, DeWall, & Vohs, 2007).

Conscious Process in Children's Pretend Play

Returning to a developmental perspective, multiple levels of consciousness are also evident in children's pretend play. In symbolic thought, a

symbol (e.g., a word, picture, number, visual image, or even an idea) is knowingly substituted for a direct experience of a stimulus, which allows behavior to be controlled in light of the symbol rather than the stimulus itself (i.e., psychological or symbolic distancing). Carlson and Zelazo (2008) adapted the LOC model (Zelazo, 2004) to account for developmental changes in symbolic thought that correspond to levels of consciousness and increases in working memory (Figure 1). In the first several years of life, symbolic thought progresses from being mediated and intentional (in the Brentano sense) but unreflective (Level 1), to thinking about representations in the absence of stimuli (Level 2), to treating symbols *as* symbols (Level 3; full-blown pretend play emerges), and finally to reflection on the quality of the symbol-referent relation (Level 4). With each level comes a greater degree of reflection on the symbol-referent relation and, hence, greater top-down control over behavior.

A paradox quickly becomes evident when we think about these cognitive requirements for pretend play: It is not the imagination running wild,

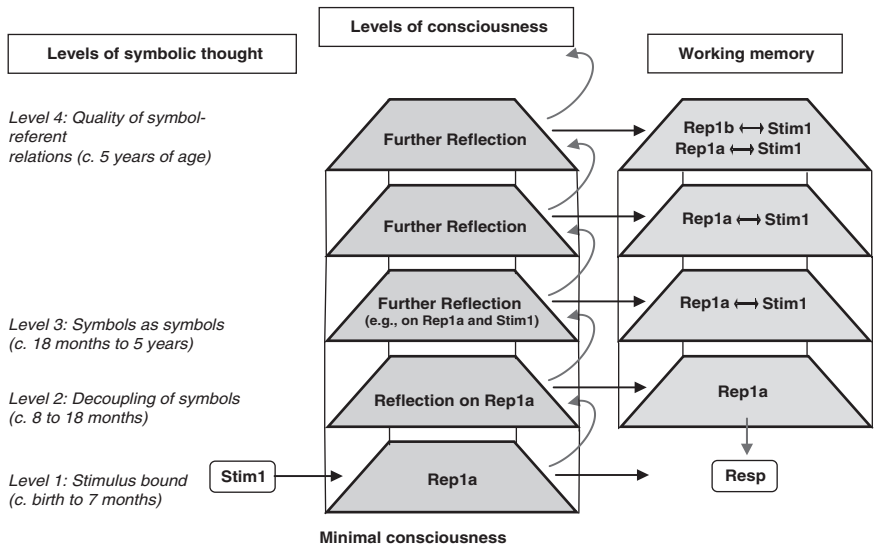

Figure 9.1. Consequences of reflection for symbolic thought. Development of the capacity to reflect on the contents of one's own consciousness, resulting in higher, more reflective levels of consciousness, allows for more aspects of symbols and symbol-referent relations to be considered and maintained in working memory. Reflection is interposed between perception of a stimulus (Stim1) and responding (Resp). The contents of minimal consciousness at one moment, together with new information about a stimulus, are fed back into minimal consciousness. Figure illustrates the different contents of working memory made possible by different degrees of reflection. Rep1a and Rep1b are alternate symbolic representations of the stimulus. Reprinted from Carlson and Zelazo (2008).

where anything goes, but rather, it is regulated and constrained. Vygotsky (1933) described this key aspect of play as rule-governed in his description of two sisters playing at "sisters," where the play version is highly scripted and follows inviolable expectations that barely resemble the way real sisters behave toward one another. The idea is that there are unwritten rules to pretense, and it is a serious misdemeanor to step outside the play frame by allowing real stimuli to overtake oneself (e.g., really biting into a mud "pie"). It follows from this that pretend play should be *positively* correlated with performance on executive function measures such as the Dimensional Change Card Sort in preschoolers. Indeed, they are robustly related even after controlling for individual differences in age, sex, verbal intelligence, and working memory performance (Carlson, Davis-Unger, & White, 2009). Furthermore, as presented earlier, making the task more symbolic leads to systematic improvements in 3-year-olds' self-control in the Less Is More task (Carlson et al., 2005), suggesting a mutual bootstrapping of pretense and executive function in development.

On the other hand, it is important to point out that pretend play is not goal-directed behavior, at least not in the same way as executive function tasks in which there is an explicit goal (e.g., "sort according to color [not shape]"). Play is intrinsically motivated (it cannot be commanded), pleasurable (as contrasted with "work"), nonliteral (reality is distorted), and actively engaged (not passively reflected upon) (Rubin, Fein, & Vandenburg, 1983). Hence, while pretend play is lawful behavior, it is also improvisational. Plans are not laid out ahead of time but unfold, as the successive nonliteral behaviors of one player are contingent upon the nonliteral behaviors of a partner (who, by the way, might be real or imagined). Players thus engage not necessarily in shared *goals*, but in shared *imagination*. I would argue that this process includes tacit knowledge, an implicit understanding made possible by personal investment in the skill of playing. A jazz metaphor is particularly apt (e.g., Sawyer, 1997). Accomplished jazz musicians such as Miles Davis have described the creative tension that occurs when a player introduces a change in the riff and the others are impelled to discover a new theme or a recombination of old themes and play off of it. In this way, the music is eternally generative (almost never the same thing twice), drawing on tacit knowledge based in experience. Similarly, as children progress through levels of consciousness and symbolic thought, they are also becoming "expert players," less consciously aware of their symbolic routines but readily able to access them. The play is constrained but is sustained and amplified by the introduction of uncertainty, as when a partner takes it in a slightly new, creative direction, and the other responds in kind as if to say, "Oh, I think I know where you're going with this." I suspect that the episode usually ends with an interloper from outside the play frame (e.g., mother calling one to dinner;

recess is over) or when one of the partners tires of the effort to keep it up (overthinking play turns it into work), and not with a great sense of achievement as when a goal has been met or a problem solved.

Other evidence suggesting that lower levels of consciousness can occur in pretense is that children exhibit the illusion of independent agency in their descriptions of interactions with imaginary friends, in ways that are nearly identical to creative writers' descriptions of being guided by their characters (rather than the other way around). Taylor, Carlson, and Shawber (2007) reported that among preschoolers with imaginary companions (which occurs in approximately 33%–50% of children), one-third of the imagined characters were described as being outside of the child's control. Some were regarded more like enemies than friends, and were uncooperative and unpredictable. For example, one child described her pretend friend as bothering her when she tries to read, to the extent that she sometimes has to shut and lock her door to keep the friend out. It is important to keep in mind that this was a nonclinical, typically developing sample, and that descriptions of uncontrollability were fairly common. As well, children age 3–4 years are not generally confused about the distinction between fantasy and reality; they "know," when pressed, that their imaginary companions are only pretend and will even begin to worry about the *interviewer's* grasp on reality after a lengthy list of questions about the friend (Taylor, 1999). Preschoolers who engage in more frequent role play (including having imaginary companions and impersonating others) are also more dissociative (at a subclinical level), which might be indicative of a more componential sense of self (Carlson, Tahiroglu, & Taylor, 2008). Consistent with this interpretation, Taylor and Carlson (1997) found that high-fantasy children performed significantly better than low-fantasy children on theory-of-mind tasks, in which they need to understand the subjectivity of mental states, and this was independent of intelligence.

In children's imaginative play, as in creativity in science and art, we see that descending back down the ladder of consciousness need not be the mark of a brain disorder (e.g., blindsight), or a fundamental breach with reality (e.g., schizophrenia), or a regression to an infantile or automaton state of mind; instead, it might paradoxically indicate a relatively advanced stage in thinking, on the way to having a new take on an old situation, that is, grounded innovation (see Schooler, Chapter 12, this volume).

CONCLUSION

Consciousness develops, most likely in a hierarchical fashion with recursive reprocessing of information at higher levels of reflective awareness.

But what goes up must come down, that is, with increasing automaticity of skill in a given domain, thinking about the known becomes less effortful, more implicit or tacit, hence drawing a distinction between objective and personal knowledge. Nonattended but enlightened information can influence action and discovery, as in science, the arts, and children's play. To understand how, we need to put things back together again. It is possible that back-grounding of the known frees up resources for new associations and creative syntheses to be formed and, eventually, articulated consciously in verbal thought. Bumping up against a new problem or aspect of a situation (e.g., a fact that doesn't fit a theory or belief; disliking something about one's painting in progress; uncertainty in play) can propel one to make existing knowledge again explicit so that it can be consciously examined, alongside a feeling *in* (not necessarily about) the situation, thereby integrating objective and tacit knowledge structures and viewing things from a more enlightened yet deeply personal (attached) perspective.

DISCUSSION WITH STEPHANIE CARLSON

Is "theory of mind" an appropriate term to describe the ability to distinguish one's own mental states from those of others?
Learning to walk requires that children learn about balance and gravity, among other things. However, when a child learns to walk, no one argues that the child has learned a theory of physics. Walking is just a physical skill that children develop, based largely on learned responses. Why not refer to *theory of mind* as an interpersonal skill that one develops, like walking? The reason *theory of mind* is preferable is that interpersonal development in children is not simply the learning of a set of responses one gives to other children. Interpersonal interactions require that one form mental representations of other people's mental representations. The ability to form representations of others' representations is more than just a skill (in the sense that walking is a skill), so the term theory of mind is apt.

There is evidence that children form representations of others' representations, even at a very young age. This is evident in pretend play. When a child engages in pretend play, he or she has to make assumptions about the state of mind of the other player, beginning with the understanding that the other player is pretending.

How immersive is pretend play?
Pretend play can be extremely immersive. For instance, children who pretend to play a game like "Peter and the Wolf" can become genuinely

scared of the wolf. There are many cases of children becoming afraid of monsters that the children invented themselves. Likewise, children who have imaginary friends often imbue their imaginary friends with a sense of independent agency. For example, a child's imaginary friend might refuse to play a game the child wants to play, and the child may become frustrated with the imaginary friend. Clearly, pretend play can be very immersive. However, this does not mean that children are incapable of distinguishing imagination from reality; when children are pressed, they will acknowledge the difference between reality and unreality.

Parents often play with their children by pretending to be serious about something silly. For example, a parent may pretend to be serious about using a banana as a telephone. Why is this common?

Parents may unintentionally (or perhaps intentionally in some cases) be teaching children about theory of mind. This exercise requires that children make sense of a parent's behaviors by understanding that what appears to be serious behavior is actually playful behavior. In other words, children need to understand their parents' mental states for the game to work. There is research illustrating that when parents pretend to do something seriously, they exaggerate the motions so as to give children cues that they are really playing.

Does humor help develop consciousness?

Humor is helpful in developing children's understanding of what is real and what is unreal. Often the things that children find humorous are discrepancies between what is expected and what is experienced. For example, children may laugh when a father puts a bucket on his head. Presumably the discrepancy between what is expected and what actually occurred is the element that children find funny. Children as young as one year experience actions discrepant with expectations as humorous.

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Chapter 9

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