Imitation and the dialectic of representation

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Abstract

In this paper, we take up Kessen’s challenge to develop a philosophically and historically informed developmental theory by describing a theory of the understanding and use of representations that draws heavily on the hermeneutics of Paul Ricoeur and the genetic epistemology of James Mark Baldwin. This theory, which construes representation to be intrinsically mimetic, characterizes the development of representational understanding as internalization (cf. Vygotsky, 1978), and emphasizes the importance of self-reflection and psychological distancing for the decontextualization of representations from the circumstances in which they were created. Self-reflection is described in terms of a process model of recursive consciousness, the Levels of Consciousness Model (Zelazo, 1999, 2000; Zelazo & Zelazo, 1998).

1. Introduction

It has long been assumed that children’s understanding and use of external representations, such as drawings and speech, potentially provide insight into the development of internal representations, although there is considerable disagreement about why this is so. On one view, often associated with Vygotsky (1934/1962), the growth of internal representation depends causally on the use of external representations. In particular, developmental correspondences between internal and external representa-
tions are due to internalization, a process whereby the formal structure inherent in a cultural practice, such as language use, is first acquired in overt behavior and then reflected in one’s private thinking. On another view, often attributed to Piaget (1964/1967), the direction of causality is reversed, such that children’s understanding and use of external representations depends on the development of internal representation. In this paper, we take up Kessen’s (1984, 1991) challenge to develop a philosophically and historically informed developmental theory, and we describe a theory of representational understanding and use that integrates the apparently opposing views of Vygotsky and Piaget. This theory, which draws heavily on the hermeneutics of Paul Ricoeur and the genetic epistemology of James Mark Baldwin, construes both internal and external representation to be intrinsically mimetic and emphasizes the importance of self-reflection and psychological distancing for the decontextualization of representations from the circumstances in which they were created. Self-reflection is described in terms of a process model of recursive consciousness, the Levels of Consciousness Model (Zelazo, 1999, 2000; Zelazo & Zelazo, 1998).

We begin by considering philosophical problems posed by the traditional copy theory of representation and then describe Ricoeur’s (1981/1991) alternative account, which involves a characterization of the mimetic process that arguably underlies representation. We note striking parallels between this account and the earlier developmental theory of James Mark Baldwin (e.g., 1892, 1894, 1894/1968, 1897), according to which the roots of internal representation (particularly of self and other) can be seen in imitation in infancy. Accordingly, in a subsequent section, we discuss Baldwin’s theory in terms of Ricoeur’s hermeneutics, and then use this discussion to motivate our own theoretical formulations regarding representation and the development of self-reflection.

2. Mimesis and representation

“Mimesis is an action about action.”


According to the traditional copy theory of representation, which is a generalization of Aristotle’s remarks on tragedy (mainly in Poetics, c. 300 b.c./1927), representation, or mimesis, imitates the structure of reality. This feature of representation is perhaps most clearly seen in the case of visual representation. Visual representations vary in verisimilitude, with some representations being realistic likenesses of reality and others being relatively abstract. In any event, however, there is a reproduction of some aspect of reality and the reality-representation relation is important in any consideration of the nature or quality of the representation.
The importance of this relation may have appeared self-evident in the case of visual representation, as painters in Europe and North America perfected a long tradition of representational painting that began in earnest in the early Renaissance (emerging perhaps with Giotto, c. 1266–1337). However, this importance was directly challenged at the beginning of the 20th century by artists such as Malevich (1878–1935), Picasso (1881–1973), and Duchamp (1887–1968; see Jansen & Jansen, 1995). By painting, for example, a black square on a white background (Black Square, 1913), Malevich questioned the necessity, and perhaps the possibility, of evaluating representations in terms of their relation to (real) referents. In what sense is Black Square an imitation? To what does it refer? What, if anything, is imitated? Similar questions were also raised by Picasso’s collages (e.g., Still Life with Chair Caning, 1912, which incorporated “real-world” elements, including an oilcloth and a rope frame, into the artwork itself) and Duchamp’s ready-mades (e.g., Bicycle Wheel, 1913, which consisted of a bicycle wheel mounted on a stool). Bicycle Wheel was not a representation of a wheel, in the traditional sense; rather, it was a wheel.

If the traditional copy theory fails to respond readily to questions regarding the nature of the representation-reality relation, it is downright stumped by questions concerning the status of reality itself. The copy theory seems to presuppose the a priori existence of an un-represented, but nonetheless known, reality. This assumption is clearly problematic—even in those cases where the explicit aim of representation is the reproduction of reality. As Gombrich (1960, p. 14) and Goodman (1968, p. 7) note, there is no “innocent eye” (because of the inescapable subjectivity of experience), and consequently, the copy theory seems “stopped at the start by an inability to specify what is to be copied” (Goodman, 1968, p. 9).

Notice, however, that because these post-positivist considerations apply to cases in which the explicit aim of representation is imitation, they may reveal the inadequacy of the traditional theory, but they should not be taken to indicate that imitation is not involved in representation. Most likely, as Ricoeur (1981/1991) suggests, the limitations of the traditional copy theory consist in an overly simple characterization of the mimetic process. According to Ricoeur, the simple notion of re-presenting an already present reality is an artifactual formulation that follows from an ill-advised abstraction of two moments from a continuous coordination. Instead, Ricoeur recommends that mimesis be understood as a dialectic process, which he traces through three moments or phases. Following Aristotle, he focuses on literary representation and discusses mimesis mainly as a narrative imitation of action: the creation of a story.

For Ricoeur (1981/1991), mimesis depends first on the presence of actions—significant behavior—to be represented. Actions are significant, or meaningful, because they refer to something beyond themselves—they are about something (inter alia, they are about their goals). Given the availability
of actions to be represented, the first moment of mimesis (mimesis<sub>1</sub>) prefigures these actions, providing a partial, and perhaps implicit, understanding of their significance. Indeed, Ricoeur suggests that actions serve as interpretants (in Peirce’s, 1932, terminology) — they offer rules for their own reading or interpretation (at least to those who are literate in the language of action). This point is important because it underscores the subjectivity, or interpretative nature, of the mimetic process even in this first phase, where mimesis is anchored to external events.

The second phase of mimesis (mimesis<sub>2</sub>) corresponds to the active configuration of the actions that are prefiguratively understood in mimesis<sub>1</sub>. Ricoeur (1981/1991) refers to this process of configuration as emplotment — the arrangement of events into a coherent story in order to “augment their readability” (p. 141). In other words, the outputs of mimesis<sub>1</sub> (i.e., partially or implicitly understood actions) are reprocessed in the context of a variety of constraints (e.g., narrative constraints) particular to that phase of mimesis and interpreted. The resulting interpretation, or story, is then “actualized” (p. 151), by reading, in the third and final phase of mimesis. That is, through reading, the actions that were prefigured in the first phase (resulting in partial understanding) and configured in the second phase (resulting in an interpreted story) now become transfigured — understood differently in light of the story. Ricoeur borrows the term iconic augmentation from Dagnognet (1973) to emphasize that mimesis is productive, rather than reproductive. Instead of re-presenting a present reality, mimesis transforms that reality. So, for example, a novelist might notice the way in which someone plays absent-mindedly with a wedding ring, and then incorporate this gesture into a sequence of events centering on the subject of commitment. Doing so would no doubt render the ring play in a new light. This transformation of reality through mimesis blurs the distinctions between internal vs. external and representation vs. reality, and it further underscores the subjectivity of the entire mimetic process. As Goodman (1968, p. 33) puts it, “Nature is a product of art and discourse.”

Ricoeur’s (1981/1991) account of mimesis provides an alternative to the traditional copy theory of representation that nonetheless preserves the insight that representation captures the structure of something. Although Ricoeur was concerned with external representation, aspects of his account apply to internal representation, too. Indeed, there are striking parallels between this account and the earlier developmental theory of James Mark Baldwin, according to which the roots of internal representation (particularly of self and other) can be seen in imitation in infancy. Generalizing from Ricoeur and Baldwin, we suggest that all representations (external and internal) are intrinsically imitative, although at every phase, they are also interpretative. Thus, internal representations, like external representations, are mimetic in Ricoeur’s sense: they accommodate the structure of something and transfigure one’s subjective experience of reality as part of an ongoing, circular process.
2.1. Baldwin’s theory of mental development

“My sense of myself grows by imitation of you, and my sense of yourself grows in terms of my sense of myself.”

Baldwin (1894, p. 42)

Baldwin’s theory of mental development was formulated in a cultural context marked by the artistic experiments of Malevich, Picasso, and Duchamp, mentioned earlier, and like these artists, Baldwin’s work prompts a reconceptualization of the concept of representation itself. Baldwin grounds his account of representation in an account of imitation, which Baldwin (1894) defines functionally as a reaction that “normally repeats its own stimulus” (p. 48). For Baldwin, babies are imitative from birth, although the character of their imitation develops considerably over the course of infancy. Initially, imitation is automatically elicited (“suggested”) by the infant’s experience of his or her own behavior or by the perception of stimuli in the environment, such as facial expressions. The former case corresponds to what Baldwin calls a circular reaction—the self-imitative repetition of a pleasurable response. The latter case, instinctive mimicry, includes “those reactions which reproduce subconscious, vaguely present stimulations: for example, the acquisition of facial expression, the contagion of emotion...” (Baldwin, 1894, p. 48). In both cases, there is responding that reinstates (to some degree) the circumstances that triggered it (which he refers to as the copy), but there are also opportunities for learning. First, because instinctive mimicry is fairly indiscriminate, the infant imitates painful as well as pleasurable responses, and only the latter will be selected for repetition. Second, efforts at repetition are subject to accidental variation, which allows fortuitous, useful variations to be retained in a manner that Baldwin considered an application of Darwin’s notion of natural selection (Baldwin, 1892; cf. Cahan, this issue; see also Siegler, 1994).

Imitation at this level can be understood in terms of Fig. 1, taken from Baldwin’s 1894 book. A gesture, call it the target action, is seen and represented in the visual system, \( v \). This information triggers an imitative attempt through a pathway running to the motor system and then to the muscles moved. The infant’s reaction is then seen and that also initiates an imitative attempt. However, because the new information, represented in \( v’ \), flows through the same pathway, the same reaction is repeated in a fairly stereotypical fashion.

Eventually, imitation becomes less automatic and more deliberate. In fact, Baldwin suggests that the very origin of volition can be seen in changes in imitation that occur at the end of the first year of life. At this time, according to Baldwin, the maturation of a coordinating center makes possible the conscious comparison of (i.e., deliberation between) a target action to be imitated and a response in the infant’s behavioral repertoire (see Fig. 1).
Now, instead of simple imitation, the infant exhibits persistent or try-try-again imitation because, as Baldwin (1892) puts it, there is a "stimulus to repeated effort [that] arises from a lack of co-ordination or identity in the different stimulations which reach the centre of co-ordination simultaneously" (p. 287). When one of these stimuli is selected for repetition (transforming a state of poly-ideism to one of mono-ideism), the infant feels the sense of effort that is a hallmark of will. In Fig. 1, one can see how the infant can now select the target action, represented in $v$, instead of his or her own initial attempt, in $v'$. 

2.1.1. The dialectic of personal growth

For Baldwin, imitation, whether simple or persistent, is the primary way in which human beings learn about the world, including most particularly, the personal world of self and other (by personal, Baldwin refers both to oneself and to persons). Baldwin describes the development of this understanding as a dialectic process of identification through imitation. The dialectic starts with the presence of action that is (at least partially) outside of one’s behavioral repertoire, and hence, viewed in terms of its outward or projective aspects. By imitating this behavior, one comes to comprehend the subjective side of it; for
example, one comes to appreciate the affect that accompanies it, or the effort involved. Once this happens, one tends automatically to *eject* this subjectivity back into the original behavior. So, for example, when a father pricks himself with a pin, his daughter may observe this behavior but without any appreciation of its painful consequence. When she imitates the behavior, however, she will feel the pain, and then immediately infer that her father felt it too. Subsequently, and consequently, she will view the behavior of pin pricking in a different fashion; her understanding of the behavior will have been transformed from projective to subjective to ejective. In effect, the child will have brought the behavior into the scope of her self- and social-understanding, expanding the range of human behavior with which she can identify. Baldwin (1897) captures the ever-crescent character of identification when he writes, “It is not I, but I am to become it” (p. 36), a formulation that anticipated Freud’s (1933/1940) famous dictum, “Where It was, there I shall be (Wo Es war, soll Ich werden)” (p. 86)—what is now seen from the outside will later be understood from the inside.

In general, according to Baldwin, children learn in this way, by appropriating new behaviors from suitable person-projects (e.g., parents) and subsequently practicing these behaviors on *ejects* (e.g., younger siblings). This process allows children (and adults, for that matter) to modify their *ego* (their sense of self) and *alter* (their sense of other), which Baldwin sees as (ideal) ends of a continuum, called the *socius*, that inevitably develop together through the dialectic of personal growth. To illustrate that the dialectic operates at every age and in a broad range of situations, Baldwin (1897) recalls being amazed by a friend’s proficient typing. After Baldwin himself learned to type, he incorporated a first-person appreciation of this behavior into his own socius, adding to his own behavioral repertoire, but also transfiguring his friend’s prestidigitation into a more mundane skill.

It should, perhaps, be emphasized that the socius is essentially, fundamentally, subjective. This is an important point to consider when evaluating claims about the supposed social origins of a self-concept (e.g., Müller & Runions, this volume; Zeedyk, 2001). According to Baldwin, person-projects are defined from one’s own point of view and so, later, is the alter. Thus, Baldwin (1897) reminds us that when the child imitates his or her father, it is a representation of the father, the “father-thought” (p. 23), and not the father himself, that is being imitated. This inescapable subjectivity follows from the fact that experience—including one’s own experience of the copy to be imitated—is always phenomenal, never *noumenal* (to use the Kantian, 1781/1927, term). For Baldwin, the development of self-consciousness was understood to be the way in which phenomenal experience, and indeed history itself, unfolds in time—a point made more explicitly by William James (1904).

Another point worth emphasizing is that actions to be imitated are prefigured in Baldwin’s account just as they are in Ricoeur’s. To see this, consider the
question, “What does one imitate, and why?” Although Baldwin (1897, p. 17) writes that the child “imitates everything, being a veritable copying machine,” the statement is manifestly hyperbolic. Some behavior is already understood by the child and corresponds to the accomplishments that he or she practices on ejects. What does get imitated is behavior that is moderately discrepant from what the child already understands; from what the child has already incorporated into his or her socius. Baldwin does not develop this suggestion, but he does make it (albeit somewhat obliquely; see Baldwin, 1897, p. 101). Early in development, then, what gets imitated are new elements that are not entirely novel but instead bear some relation to what the child already knows (cf. Kagan, 2002). It is within the range of these dimly understood, pre-figured behaviors that imitation is indiscriminate.

2.1.2. Development of conceptual understanding

In addition to appropriating partly new behaviors through imitation, children also learn about themselves and others by reflecting on the moments in the dialectic of personal growth and abstracting these moments from the continuous circular process. Initially, infants exist in a state of *adualism*, which Baldwin envisions as a kind of prelapserian innocence. Although they are conscious in some minimal sense, infants are unaware of any distinctions that might be implicit in the structure of experience (e.g., inner vs. outer, subject vs. object, ego vs. alter; Baldwin, 1906). During the course of development, however, children proceed through a series of “progressive differentiations between the knower and the known” (Cahan, 1984, p. 131) that culminates, ironically, in transcending these dualisms and recognizing their origin in the dialectic.

Although the dialectic of imitation operates throughout the life span, there are cognitive developmental changes that affect the kinds of abstractions one might make from the dialectic. Thus, for example, the growth of the coordinating center at the end of the first year makes possible persistent imitation with effort, which Baldwin (1894, p. 42) claims is “the first volition, and the first germinating nucleus of self-hood over against object-hood. Situations before accepted simply, are now set forward, aimed at, wrought; and in the fact of aiming, working, the fact of agency, is the sense of subject.” The acquisition of additional distinctions is similarly subject to developmental constraints, resulting in a fairly reliable developmental sequence that continues well into adulthood (Baldwin, 1906; see Cahan, this issue, and Ferrari, this issue, for details regarding these developments).

3. Synthesis: Representation and its development

The parallels between Baldwin’s theory of mental development and Ricoeur’s account of representation are particularly striking when one considers
that Baldwin was writing nearly 90 years before Ricoeur and ostensibly for a different purpose, although both were struggling with the same problem of overcoming a kind of copy theory of representation. Ricoeur’s solution was to recommend that representation be understood as a dialectic of mimesis; Baldwin’s theory, based on developmental data, suggests that a similar dialectic has its roots in infant imitation.

The conceptualization of representation as a kind of productive or generative imitation provides a rich alternative to the traditional copy theory, and might be summarized as follows. In all cases of representation (external and internal), an agent captures some aspect of the perceived structure of something (a “copy”), interprets this aspect in light of various constraints (epistemic, artistic, etc.), and consequently changes one’s construal of whatever was imitated (changes one’s copy). As shown in Fig. 2, a prefiguration (prefiguration\(_n\)) is the basis of a configuration (configuration\(_n\)), which then leads to a transfiguration (transfiguration\(_n\)) of the initial prefiguration. The transfiguration can then re-enter the circle as a new prefiguration (prefiguration\(_{n+1}\)), as can the configuration itself when it becomes an object of consideration. This basic process will be familiar to anyone who has ever written descriptively about something—say, about someone else’s theory (to use a reflexive example). First, one’s writing is obviously constrained by (what one perceives to be) the structure of the theory—that is, by the prefigured theory. Second, there are discursive (and other) constraints introduced by the writing process (i.e., in the process of configuration). Third, the entire exercise, including an appreciation of the resulting description, transfigures one’s understanding of the theory described. The transfigured theory can then serve as the basis for another iteration of the mimetic process. Moreover, just as text can serve as a model of speech (Olson, 1994), the description of the theory itself (the configuration) can serve as a relatively concrete model of one’s thinking about the theory. This model provides feedback that can scaffold the representational process and facilitate critical self-reflection (cf. the process illustrated in Fig. 1).

Fig. 2. A schematic depiction of representation as a circular process. Prefiguration\(_n\) provides the raw material for configuration\(_n\), which then effects a transfiguration\(_n\) when it is “read.” Transfiguration\(_n\) can serve recursively as prefiguration\(_{n+1}\), as can configuration\(_n\). (Reproduced from “Minds in the (re-)Making: Imitation and the dialectic of representation” by Zelazo (2000), in J.W. Astington (Ed.), Minds in the making: Essays in honour of David R. Olson, p. 155). Oxford: Blackwell Publishers.
Although the above-mentioned example may feel familiar to the reader, it is important to recognize that this same process is inherent in every instance of representation, including those that operate implicitly outside of focal attention. Indeed, consideration of different kinds of representation is instructive. For one thing, it helps clarify the relation between internal and external representations, which, in turn, permits one to chart the course of internalization. To see this, consider the case of behavioral imitation. This is a form of external or public representation insofar as it is the imitator’s overt, publicly observable behavior that most conspicuously captures (some aspect of) the structure of the action that is imitated; the imitator’s overt behavior is a kind of configuration. However, to the extent that the imitation is genuine imitation (and not, say, the elicitation of a fixed action pattern; Jacobson & Kagan, 1979), it is also undoubtedly mediated by internal or private representation, as Meltzoff and Moore (1998) have argued. That is, no matter how reflexive (in the full sense of the term) the imitation may be, the translation from the perception of another person’s behavior to one’s own imitative expression requires some form of intermediate (perceptual-cognitive) representation that preserves (some aspect of) the structure of the observed behavior at some level of abstraction. This is as true of yawning as it is of, say, one’s concerted efforts to improve one’s pronunciation of French. We may identify moments in the imitative process that deserve to be called internal or external, but every instance of behavioral imitation involves both. More generally, all instances of external representation also involve internal representation for their generation.

One thing to notice about behavioral imitation is that one’s own imitative behavior, being a relatively concrete expression of one’s internal representation, scaffolds the whole process of representation by providing an interim model of one’s thinking. The presence of this model serves as a kind of feedback that allows one to reflect on one’s representations and (potentially) modify them. Gradually, one may come to rely less on this feedback, much in the same way that we learn to do long division without the aid of paper and pencil (see Valsiner & van der Veer, 2000, for further explanation of this point).

Perhaps the most important thing to notice about behavioral imitation, though, is that the presence of the model’s behavior provides a relatively rich set of constraints on the representation that is achieved and expressed. Indeed, we might say that the model’s behavior serves as a fairly explicit suggestion or prop for the imitator’s representational effort. Serving as a prop is one of the key characteristics of external representations (Walton, 1990). A painting, for example, invites one to imagine a certain configuration of events. In the case of a “realistic” painting, the suggestion is often fairly explicit, and our conceptual image will be relatively constrained. In other cases (e.g., impressionist painting), the suggestion may be more subtle (see Gombrich, 1963, p. 10). (Incidentally, so-called non-representational paintings...
often provide explicit props, it is just that the suggested conceptual image may be primarily formal, as in Malevich’s *Black Square*.

This characterization of external representations in terms of the degree to which they provide explicit suggestions regarding what is to be represented, and of behavioral imitation as representation that is constrained by a relatively explicit suggestion, suggests a metric by which we might measure the course of internalization. Consider the case of pretend play, which typically develops during the second year of life. In pretend play, one treats something (a pretense object) as something else (a real object). Over the course of the second year, children become more likely to perform pretend actions (e.g., talking on the telephone) with pretense objects (e.g., a spoon) that bear little physical resemblance to the real objects, and they also become more likely to perform pretend actions without objects altogether (e.g., Ungerer, Zelazo, Kearsley, & O’Leary, 1981). Moreover, there are proportional (complementary) age differences in children’s ability to resist responding on the basis of the actions suggested by the real objects (Elder & Pederson, 1978; Pederson, Rook-Green, & Elder, 1981). Thus, in this context, one sees increasing independence from the literal context, and an increasing reliance on imagination (see Overton & Jackson, 1973; O’Rielly, 1995, for work with preschoolers). As Vygotsky (1978, p. 103) puts it: “It is remarkable that the child starts with an imaginary situation that initially is so very close to the real one. A reproduction of the real situation takes place.” He describes the child at this point in terms of a ratio where object properties dominate meaning (a relation he depicts as “object/meaning”). Initially, we might say that representation is relatively stimulus-bound, or context-dependent, and, correlatively, that representational structure is determined primarily by something external. Eventually, however, children become capable of creating representations on the basis of more subtle suggestions, and we might say that their representations are less dependent on external context and more internally determined. Thus, in pretend play, the locus of control shifts from external to internal during the course of the second year.

Conceptualized in this way, it becomes clear that internalization is not an explanatory mechanism, but an explanandum. In the course of internalization, structure in the environment is transferred into a representing organism. An explanation of this pervasive developmental process can perhaps be sought in an account of representation as productive imitation.

3.1. Conceptual understanding of representation

In addition to being a by-product of mimetic representation, the internalization (and consequent decontextualization) of representations will undoubtedly also be affected by children’s growing conceptual understanding of representation. Gombrich (1963, p. 9), for example, describes the cultural insight that representations might correspond to a particular visual experi-
ence, rather than to reality, and he suggests that this had dramatic consequences for the history of painting (permitting Giotto, for example, to depict a person as seen from behind). More recently, several other authors (e.g., DeLoache, Pierrouatsakos, & Trosseth, 1996; Liben, 1999) have described similar insights from an ontogenetic perspective, and they uniformly agree that the consequences for behavior are profound. (See Ferrari, this issue, for more on concordances between cultural change and ontogenetic development.)

Like the decontextualization seen in children’s use of objects, the development of children’s conceptual understanding of representation can be considered in the context of pretend play. Olson and Campbell (1993, pp. 16–17) articulate one position on this issue: “Pretend play is one of the first clear indications of the understanding of symbols.” They then go on to suggest that pretense objects (e.g., a bench used as a horse) are “not true symbols in that they do not yet represent any particular thing” (our emphasis). A similar point has been made by DeLoache and Burns (1993, p. 108), who suggest that toddlers generally fail to appreciate the “representational specificity” of symbols that they employ when pretending. We would suggest, however, that the limitations on children’s conceptual understanding of pretense objects as symbols are more severe—even though their pretend play is certainly representational, as described above.

The severity of this conceptual limitation is suggested by DeLoache et al.’s (1996, p. 30) remark that babies “see through” pictures (e.g., photographs or drawings) to their referents. Indeed, as Vygotsky (1978, p. 108) notes, it is the reality behind representation that matters to infants and young children: “What is most important is the utilization of the plaything and the possibility of executing a representational gesture with it... A pile of clothes or a piece of wood become a baby in a game because the same gestures that depict holding a baby in one’s hands can apply to them” (our emphasis). Similarly, Gombrich (1963, p. 4), who generally addresses the question of the history of representation, rather than its ontogeny, suggests, “The baby sucks its thumb as if it were the breast... But here too ‘representation’ does not depend on formal similarities, beyond the minimal requirements of function.” This analysis, which suggests that pretend play initially corresponds to substitution rather than explicit symbolization (cf. DeLoache & Burns, 1994, p. 109), fits well with the gradual decontextualization that can be seen in this context. Although pretend play always involves representation, and (initially at least) involves the use of external representation, it does not strictly require an understanding of external representation.

One aspect of children’s conceptual understanding of external representation that has been widely studied is the insight that these representations have a dual character (e.g., DeLoache et al., 1996). J.J. Gibson (1979, p. 282) pointed to the duality of pictures when he wrote, “A picture is both a surface in its own right and a display of information about something
else.” A mature understanding of pictures requires the reconciliation of two fundamental requirements: identifying the representation with its referent, while, at the same time, recognizing the distinction between referent and representation. DeLoache and colleagues have traced the development of children’s conceptual understanding of pictures, including their dual character (DeLoache & Burns, 1994; DeLoache et al., 1996). Even infants can recognize objects in pictures and discriminate depicted objects from actual objects (e.g., DeLoache, Strauss, & Maynard, 1979). At 2 years, however, they have difficulty using pictures to guide their search for a hidden toy in a simple object-retrieval task (DeLoache & Burns, 1994). Presumably, children at this age have learned that a “picture of X” may be represented as both a “picture of” and “X.” However, they may infer from the fact that a picture of X is not the same as X that pictures are irrelevant to existing reality (DeLoache et al., 1996).

In contrast to 2-year-olds, 2.5-year-olds are able to use pictures and videotapes to guide their search for a hidden toy (DeLoache, 1987; DeLoache & Burns, 1994; Troseth & DeLoache, 1998), although they still have difficulty appreciating the dual function of a 3-dimensional scale model (see DeLoache et al., 1996, for a review), and they show considerable confusion in other tasks that require an understanding of the representational function of pictures and videotapes (e.g., Flavell, Flavell, & Green, 1983; Flavell, Flavell, Green, & Korf, 1990; Zaitchik, 1990; Zelazo, Sommerville, & Nichols, 1999). For example, Flavell et al. (1990, Exp. 2) showed 3-year-olds a photograph or a videotape that depicted a glass filled with liquid. Children were asked whether the liquid would spill out when the photograph or television were turned upside down, and a substantial percentage of the children said that it would (25% for the photograph and 33.3% for the video). Flavell et al. (1990) suggested that children who fail this task do so because they consider only the referent when answering the question; essentially, they find it difficult to think of one thing in two different ways at the same time. Zelazo et al. (1999, Exp. 3) provided some support for the suggestion that children’s difficulty understanding and using representations may be due in part to a difficulty handling conflicting information. Using a variant of a procedure used by Troseth and DeLoache (1998), this experiment confirmed that 3-year-olds can use delayed-video (and delayed-verbal) representations to guide their search for a hidden object in the absence of a conflicting expectation about the object’s location, but it also showed that 3-year-olds have difficulty doing so in the presence of a conflicting expectation. In the conflict condition, 3- and 4-year-olds helped an experimenter hide an object at one location in a room. Then, they were informed that the experimenter was going to move the object to a different location and they either watched this movement on video or were told the object’s new location verbally. In the no-conflict trials, children were simply presented with the verbal or video information. Results showed that 3-year-olds were
more likely to err in the conflict condition than in the no-conflict condition, and in most cases when they erred, children searched where the object was hidden initially. Conflicting expectations may be especially difficult for children to ignore when they are based on direct experience.

More recent research has explored another way in which children come to take a dual perspective on external representations. Lourenco and Zelazo (2000) examined 3- and 5-year-olds’ ability to respond to pictures on the basis of their formal properties (i.e., form) as well as on the basis of their content. This ability was assessed using a match-to-sample task (see Fig. 3) in which children were shown a sample picture (e.g., a blurry bird) and test pictures that matched the sample according to content (e.g., a non-blurry bird), form (e.g., blurry gloves), and neither (e.g., a non-grainy violin). Children were asked to find a test picture that “goes together” with the sample, and then to find another test picture that “goes together” with the sample.

Fig. 3. A black and white version of a trial from the match-to-sample task used by Lourenco and Zelazo (2000).
To perform successfully, children needed to select one test picture that matched the sample picture according to content (while mismatching according to form) and also select another test picture that matched the sample according to form (while mismatching according to content). Content matches were based on familiar categories (e.g., animals, vehicles, clothing, and furniture) and form matches were based on six features: blur, grain, color, line thickness, presence vs. absence of border, and degree of realism (drawings vs. photographs).

Three-year-olds performed worse than 5-year-olds in this study: Whereas most 5-year-olds were successful at matching pictures according to both content and form, 3-year-olds often failed to match according to form. These findings provide support for the notion that younger children “see through” pictures, experiencing particular difficulty with the dual requirement of representing pictures with respect to both their content and formal properties. That is, 3-year-olds seem particularly captured by content, and have difficulty attending to form in the presence of conflicting content information.

Gardner (1970) also suggests that young children have difficulty responding to the stylistic features of paintings because they are unable to decenter from the dominant feature or subject matter; older children and adolescents, however, are capable of decentering from subject matter, and, consequently, can appreciate the formal properties as well as the subject matter of a representation. Subsequent work (Steinberg & DeLoache, 1986), however, has found that children as young as 3 years of age are indeed capable of responding to stylistic cues in paintings when subject matter cues were unavailable (i.e., content was held constant). In this study, preschoolers (between 3 and 5 years) were presented with slides of paintings in which artistic style was varied both in the presence or absence of conflicting subject matter cues. Children of all ages were capable of making both style and subject matter matches. However, they exhibited a strong preference for subject matter over style when style and subject matter cues conflicted. Moreover, 3-year-olds were only capable of responding to paintings on the basis of style in the absence of conflict.

Similar results have been found in studies of children’s understanding of language, which is another type of external representation. For example, Robinson, Goelman, and Olson (1983) found that even 5-year-olds tended to confuse what was meant with what was said when they heard ambiguous verbal messages. In one of their studies, 5-year-olds were required to distinguish between expressions (i.e., what was said) and intentions (i.e., what was meant). The experimenter and child sat on opposite sides of an opaque screen, and each had their own set of cards, which varied along two dimensions (e.g., large/small and red/blue flowers). They then played a game in which they took turns choosing a card from their set and describing the card in such a way that the other could choose the identical card from his or her set. When the experimenter acted as the speaker, the utterances were inten-
tionally ambiguous on certain trials. For example, the child might be told: “Pick up the red flower,” an expression that described both the ‘big’ red flower and the ‘small’ red flower. Subsequently, the child was asked to make a judgment about what was said. The child heard one of three types of utterance: a disambiguated version of the original utterance (e.g., “Did I say ‘the big red flower’?”), a verbatim repetition of the original utterance (e.g., “Did I say ‘the red flower’?”), or an incorrect version of the original utterance (e.g., “Did I say ‘the blue flower’?”). Robinson et al. found that 5-year-olds were quite good at rejecting the incorrect version of what the experimenter had said (81% of the time) and at accepting the verbatim repetition (76% of the time). However, when it came to judging the disambiguated version of the original utterance, children incorrectly accepted it 60% of the time. Thus, children behaved as if the two utterances were indiscriminable, suggesting perhaps that they did not understand that the utterances expressed different intentions. Kamawar (1999) suggests that children act as if the utterances are indiscriminable “because they do not recognize their different ways of referring” (p. 53). Indeed, emphasizing the similarity to children’s understanding of visual representations, Kamawar proposes that children “see through” linguistic expressions to the intended referent, failing to “see” expressions in and of themselves.

Morton and Trehub (2001) have recently reported a related phenomenon. These authors found that 6-year-olds had difficulty evaluating paralinguistic cues (i.e., how a speaker’s voice sounded) in the presence of conflicting propositional content (i.e., what was said). For example, children had difficulty reporting that a speaker sounds sad when she utters a positive proposition in a sad voice (e.g., “My mommy gave me a treat” in a sad voice). In an initial experiment, 4- and 5-year-olds took longer to process conflicting cues to emotion than they did non-conflicting cues to emotion, and they failed to report that there was anything odd about what was said. They also had a bias to judge the speaker’s emotion on the basis of propositional content. By 7 years of age, most children described the conflict sentences as odd. Subsequent experiments demonstrated that the younger children could respond on the basis of paralinguistic information when it was not in conflict with propositional content. For example, they could judge whether a speaker was happy or sad when she spoke a foreign language.

In another set of experiments, Morton, Trehub, and Zelazo (2001) looked more directly at the cognitive basis of younger children’s difficulty with the conflict task. To do so, these authors used a rule-use paradigm, in which children heard conflicting sentences and were first told to judge on the basis of content, and then told to switch and judge on the basis of prosody. Results indicated that children who noticed the conflict and described it when asked, tended to switch successfully. This finding reveals an interesting link between children’s representation of the problem and their ability to resist interference from a salient aspect of the problem.
3.2. Mechanisms underlying the acquisition of an explicit concept of representation: Use and reflection

Using representations involves both interpreting them and producing them, and as with the distinction between internal and external representations, they invariably occur together, so it is somewhat artificial to consider them separately. By using representations, one comes to understand more aspects of the representing relation. Vygotsky (1934/1962, p. 90) views this as one instance of a more general developmental law: “... [C]onsciousness and control appear only at a late stage in the development of a function, after it has been used and practiced unconsciously and spontaneously.” The basic aspects of this law have been preserved in more recent accounts. For example, Bruner (e.g., 1973, p. 329) notes that the movement from an enactive representation to an iconic one is dependent on “a certain amount of motoric skill and practice.” Similarly, Karmiloff-Smith (1992), building on Piaget (1974/1976), suggests that the use of procedural representations drives their redescription into a more explicit (and conscious) format. DeLoache and her colleagues (e.g., DeLoache, 1991; Marzolf & DeLoache, 1994) have found that experience with a symbol-referent relation that children already understand can facilitate their detection of other similar symbolic relations. Marzolf and DeLoache (1994) suggest that experience with a symbolic relation may result in children’s (implicit) knowledge being re-represented at a higher level, and, consequently, the knowledge of an easier symbolic relation may transfer to a more difficult one.

Both Liben (1999) and DeLoache (e.g., DeLoache et al., 1996) emphasize the transformative effect of using representations. For example, when DeLoache et al. (1996, p. 37) discuss the difference between 2- and 2.5-year-olds’ use of pictures to guide search for a hidden object, they suggest that the older children are able to use pictures because they understand the “intention regarding how pictures are to be used in this situation” (i.e., as maps). Presumably, 2.5-year-olds have inferred that pictures are not always decontextualized (DeLoache & Burns, 1994). Like their adult counterparts, these children have perhaps understood that some pictures represent reality whereas others do not. DeLoache et al. (1996, p. 37) further note that children at this age “have also begun to produce pictures” (their italics). Drawing may provide insight into the artist’s intention to represent a particular referent, which, in turn, may help children to attain a reflective understanding about pictures as representations. Without a first-person appreciation of this intention, it is no wonder that the purpose of pictures is obscure.

Our own research supports the notion that by using representations certain aspects of the representation come to be understood. For example, in the match-to-sample study described above, children were administered two versions of the task, deductive and inductive, with order counterbal-
anced. In the deductive version, children were explicitly told that two pictures matched the sample according to particular content (e.g., “See this picture [sample picture: blurry bird], can you show me the other bird?”) and formal property (e.g., “See this picture [sample picture: blurry bird], can you show the other blurry picture?”). In the inductive version, children were required to identify these dimensions themselves (e.g., “Can you show me a picture that goes together with this picture [sample picture]?” and “Can you show me another picture that goes together with this picture [sample picture]?”). Three-year-olds’ performance on the inductive version improved significantly when they were exposed to the deductive version prior to the inductive version. Although younger preschoolers seem particularly captured by content, the order effect indicates that they are indeed capable of responding on the basis of form. However, to respond to form they may need support from explicit instruction, which then generalizes to their performance on the inductive version.

At the very least, using representations provides an opportunity for the discovery of certain of their properties. For example, sophisticated symbol users eventually identify various aspects of the representational process. This understanding develops gradually, and several authors have described its development in detail (e.g., DeLoache et al., 1996; Liben, 1999). As Liben notes, children first come to distinguish the representation from its meaning; then they come to appreciate the relation between them; and so on. These discoveries, however, will be constrained by age-related, domain-general limitations on the complexity of the relations children can formulate.

One approach to understanding these age-related changes in complexity is to attribute them to a functional process of recursion whereby the contents of consciousness are fed back into consciousness so that they can become available to consciousness at a higher level. This suggestion, which is broadly consistent with the dialectic accounts offered by Ricoeur and Baldwin, follows from the Levels of Consciousness Model (LOC Model; e.g., Zelazo, 1999), an information processing model of the role of reflection in the control of thought and action. According to the LOC Model, there are four major age-related increases in the highest level of consciousness that children are able to muster in response to situational demands. These increases, which are brought about by recursion, have important consequences for the quality of subjective experience, the potential for recall, the complexity of knowledge structures, and the possibility of action control. First, recursion adds depth to subjective experience because more details can be integrated into the experience before the contents of consciousness are replaced by new environmental stimulation. Second, each degree of recursion causes information to be processed at a deeper, less superficial level (Craik & Lockhart, 1972), which increases the likelihood of retrieval (Craik & Tulving, 1975). Third, higher levels of consciousness allow for the formulation and use of more complex knowledge structures. The complexity of these
knowledge structures, which is measured in terms of the number of degrees of embedding in the structures (e.g., an “if X then if Y then Z” rule is more complex than an “if Y then Z” rule), determines the scope of one’s cognitive control (e.g., Frye, Zelazo, & Palfai, 1995; Zelazo & Frye, 1997). In general, recursion moves consciousness further away from the exigencies of environmental stimulation in what might be called psychological distance (cf. DeLoache, 1993; Dewey, 1931/1985; Sigel, 1993), and this allows for the formulation of increasingly complex, and more decontextualized discursive reasoning. It is this representational complexity that more directly constrains the development of children’s conceptual understanding of representation (e.g., Frye et al., 1995; Zelazo & Frye, 1997).

Fig. 4 illustrates several aspects of the LOC Model, which is explained more fully elsewhere (e.g., Zelazo, 1999). Briefly, the basic psychological processes that are depicted in the figure include: minimal consciousness (abbreviated as minC), semantic and procedural long term memory (LTM), and working memory (WM). MinC, which is perhaps the most important theoretical primitive in the model, is meant to be the simplest, but still conceptually coherent, kind of consciousness that we can imagine. When an object in the environment (objA) triggers an intentional representation of that object (IobjA) from semantic long term memory (LTM), the IobjA can become the content of minC, by way of which it can trigger an associated action program stored in procedural LTM. When the entire contents of minC are fed back into minC via a recursive loop, a higher level of consciousness is achieved, namely recursive consciousness (recC). The contents of this level of consciousness can be related to a corresponding description (descA) or label, which can then be deposited into working memory where it can serve as a goal (G1) to trigger an action program (stored in procedural LTM). Self-consciousness involves another degree of recursion, and makes possible the use of conditionally specified self-directed speech (i.e.,

![Fig. 4](image-url)
rules). Additional degrees of recursion (not depicted in Fig. 4) yield additional levels of consciousness, and each new level of consciousness affords a new degree of self-regulation by allowing the formulation and use of rules of greater complexity. These rules then allow children to integrate and understand conflicting aspects of stimuli, such as those inherent in external representations.

4. Conclusion

In this paper, we have described a theory of representational use and understanding that draws heavily on the hermeneutics of Paul Ricoeur and the genetic epistemology of James Mark Baldwin. Ricoeur (1981/1991) recommends that representation be understood as a dialectic of mimesis; Baldwin (e.g., 1897) suggests that a similar dialectic has its roots in infant imitation. Following from Ricoeur and Baldwin, we have proposed a model in which all representations (internal and external) are intrinsically imitative, and, at every phase, they are also interpretative. This model, which we believe to be very much in the spirit of Bill Kessen, with his love of history and literature, his deep appreciation of Baldwin, and his willingness to confront the problems of development openly, despite or perhaps on account of their chaotic complexity, emphasizes the importance of self-reflection and psychological distancings for the decontextualization of representations from the circumstances in which they were created. Just as children become less dependent on paralinguistic context to constrain the interpretation of speech (Olson, 1977), and presumably learn to supply the constraints themselves, we can see how the external support for representation may be gradually diminished, with the agent requiring few external constraints in order to achieve the appropriate conceptual image. According to the model, the mechanisms of use and reflection drive this decontextualization and this, in turn, permits a conceptual understanding of various aspects of representation (e.g., DeLoache et al., 1996; Liben, 1999; Lourenco & Zelazo, 2000; Zelazo et al., 1999).

At this point, we might ask how this approach addresses the questions that proved so problematic for the copy theory. As we saw, certain kinds of visual art, for example, challenge the viewer to answer the question, What is represented? In light of our account, we can now say that all art is representational in some sense—just not in the sense supposed by the copy theory. Instead of assuming that art represents a present and objective reality (the “natural world”), we propose that it always, in part, represents something subjective. This may be a particular perception of something or it may be an idea or even a feeling. An external representation is a prop that serves to elicit this subjective state in another person, and as such, it “repeats its own stimulus” (Baldwin, 1894, p. 48).
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