Imitation, Mirror Neurons, and Mimetic Desire: Convergence between the Mimetic Theory of René Girard and Empirical Research on Imitation

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Introduction

Until recently, the pervasive and primordial role of imitation in human life was either largely ignored or misunderstood by empirical researchers. This is no longer the case. It is now clear that investigations on human imitation are among the most profound and revolutionary areas of research contributing to the future of a more unified and coherent understanding of the cognitive and social sciences. This ever-growing body of research has profound implications for a better understanding of the development and structure of human psychosocial functioning as well as cultural evolution, yet current applications lack insight into two essential aspects of human imitation: (1) its elemental role in generating uniquely human forms of relational competition, rivalry, and violence; and (2) the historical and anthropological role of religious/cultural beliefs and practices in transforming the effects of human imitation into viable and sustainable communities. Rene Girard's *Mimetic Theory* offers empirical researchers an already elaborated explanatory model that illuminates the way in which imitation is foundational to these universal human phenomena. Yet astonishingly, there have been no substantial studies concerning the critical question of human imitation that have applied and synthesized recent empirical research with the mimetic theory of human motivation and religious and cultural evolution.

The initiation of such a detailed and comparative analysis is essential to understanding not only the historical relationship between culture and religion (and ultimately the evolution of the human species) but perhaps more importantly the pressing and complex relationship between violence, religion, and contemporary society. The mimetic theory of religion helps bring to light the mechanisms of social mimesis that produce the self-other distortions characteristic of behaviors ranging from primitive sacrificial rituals to the abhorred

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atrocities of recent history; yet it also fundamentally elucidates the creative and historical role of the religious and cultural insights and practices based on human mimetic dynamics that continue to be indispensable in fostering alternative, nonviolent forms of progress and social cooperation in our contemporary world.

The purpose of this article, then, is to advance the interdisciplinary dialogue first embarked on by Jean-Michel Oughourlian (1982), and continued in more detail by Eugene Webb (1993), concerning the convergence between empirical research on imitation and René Girard's theory of psychological mimesis. Psychological mimesis[1] is the tendency of human beings to imitate the gestures, behaviors, intentions, and desires of other persons; it is the very cornerstone upon which the entire work of Girard is constructed. From this foundation, Girard has made a number of bold claims about human nature and the resulting origin and structure of human culture and religion. Girard's work is immense in scope and has far reaching implications across such diverse disciplines as anthropology, primitive religion, psychology, literary analysis, theology, and philosophy. Any theory attempting to cover this much ground will undoubtedly draw an enormous amount of criticism, and Girard's work has been no exception. Regardless of this, "Girard's hypotheses about the pragmatics of imitative interaction, and more specifically, about the influence of imitation on motivation, represent a unique and significant contribution that merits a careful examination" (Livingston 1992, xvi).

The ability of mimetic theory to effectively address the various disciplines it claims to interpret will depend significantly upon its capacity to clarify and validate the primordial role of mimesis in psychosocial development and functioning. Webb (1993) has emphasized that while Girard's work has many broader anthropological and historical implications, the most essential aspect of his theory is that of psychological mimesis. On this point Webb concluded:

> Thus there is good reason to think not only that [psychological mimesis] deserves a careful hearing but also that it should prove widely useful for psychologists in providing an explanatory framework for the sorts of systematic relationship that many are currently investigating. (213)

While Paisley Livingston (1992) has attempted a systematic presentation of Girard's ideas on mimesis, to my knowledge the "careful hearing" that Webb called for has not taken place through an engagement with the empirical sciences. This is remarkable when one considers the enormous output of imitation research since the publication of Webb's book.

Within the last several decades, empirical investigations on human imitation have produced a dramatic surge of interest and research, the results of which provide unprecedented support for and clarification of the foundational

role of psychological mimesis. Convergent evidence across the modern disciplines of developmental psychology and cognitive neuroscience demonstrates that imitation based on mirrored neural activity and reciprocal interpersonal behavior is what guides and scaffolds human development from the beginning of life, significantly effecting the emergence and functioning of mental representation, communication and language, empathy, self-other differentiation, and a theory of mind. Imitation not only functions powerfully in the mother-infant dyad to bring about experience-dependent neurocognitive development, but it is thought to thrive in adulthood as one of the most organizing characteristics of human social relations. Furthermore, researchers from neuroscience and evolutionary psychology argue for the essential role of mimetic reciprocity in contributing to a wide-scale cerebral reorganization of the brain, allowing for the evolution of more complex social, cultural, and representational abilities from earlier primates to humans.

However, despite much recent work attesting to its essential role in human life and development, imitation still remains largely misunderstood by many as a secondary, rather than a fundamental, building block of human behavior. Imitation is commonly considered to be either one of two things: a kind of simple mimicry that (1) copies the actions of others, as in children's games, or (2) is relegated to a narrow role in child development, although both of these conceptions dim in the light of recent empirical evidence. What is more, there are too few researchers who are attempting to understand the importance of imitation for psychosocial development and functioning or addressing the obvious links between imitation research and existing theories of social dynamics and the emergence of human culture, religion, and language. Mimetic scholars and imitation researchers agree, therefore, that the social sciences have failed to recognize the primal role that imitation plays in animating and sustaining the human psyche from the beginnings of life, from both a developmental and an evolutionary perspective. Continued explorations on human imitation promise to facilitate one of the most innovative breakthroughs in the attempt to achieve consilience across a wide range of disciplines concerning the core mechanisms and cultural forces of human life.

It seems obvious that mimetic theory, with its central focus on universal mimesis, has the greatest potential for making a profound contribution toward this goal. However, there are many gaps in mimetic theory that have yet to be explained in such a way as to garner sufficient scientific support for its claims. For example, the most obvious gap is the question of *how* the mechanisms of imitation actually function in the brain and coordinate within the human interpersonal matrix. This absence of empirical data has allowed many critics to reject outright the broader cultural and religious implications of mimetic theory. It is in this light that imitation research has much to offer mimetic scholars.

On the other hand, mimetic scholars have already elaborated on the persistent role of imitation in adulthood and group dynamics in ways that empirical researchers are only just beginning to explore. Furthermore, there still remains a suspicious absence, among imitation theories, of considerations of the role that reciprocal mimesis has in generating acts of social rivalry, conflict, and ultimately violence; this is the challenge *par excellence,* not only for imitation researchers but for the social sciences at large.

In order to facilitate this collaborative effort between mimetic scholars and the empirical sciences, I will first present some of the most pertinent empirical findings concerning psychological mimesis and the central role it plays in human development, cognition, and intersubjective experience. I will then demonstrate the convergence between imitation researchers and mimetic scholars by comparing conclusions drawn from the two groups concerning the significance of human imitation. Current shortcomings as well as important areas of research that deserve further exploration will also be discussed.

This analysis will by no means be exhaustive. I intend to demonstrate the valuable contribution that developmental psychology and neuroscience provide to Girard's work by clarifying many aspects of imitation that are not accounted for by mimetic theory, and in complementary fashion, how imitation research may benefit from the implications of human imitative phenomena already outlined by mimetic scholars from a more anthropological perspective. Since there have been no substantial studies concerning the critical question of human imitation that have applied or synthesized recent empirical findings with mimetic theory, it is my hope that this brief and schematic discussion will serve as a catalyst for more detailed and comparative analyses between these diverse bodies of work. Together, mimetic scholars and imitation researchers demand that we take seriously our imitative nature, not only as a positive interpersonal mechanism necessary for human development and rich intersubjective experience, but also as the primary condition from which rivalry and violence emerge in human relations and society at large.

IMITATION IN DEVELOPMENTAL PSYCHOLOGY AND NEUROSCIENCE

Introduction and Background

The present need for interdisciplinary collaboration concerning the primordial role of imitation in human life comes from the remarkable fact that many scholars and researchers have recently arrived at similar conclusions in complete isolation from one another. These insights are represented in this discussion by the work of mimetic scholars and empirical researchers from the cognitive and social sciences.

Through his literary, historical, and anthropological research, Girard (1965, 1977) discovered certain repetitive patterns of social relations that proved reliable and consistent throughout history. He began to see a consistent underlying mechanism at work in human relationships, a mechanism that had not been adequately understood before his time. What he concluded was that humans operated socially according to mimetic principles, which were never really understood directly by the participants but were nonetheless grasped or intuited at some deeper, nonconscious level. He subsequently developed his theory and elaborated it, placing universal mimesis at the center of human culture and interpersonal life. At the beginning of his book *Things Hidden since the Foundation of the World*, Girard (1987) made this additional observation and recommendation:

> In the science of man and culture today there is a unilateral swerve away from anything that could be called mimicry, imitation, or mimesis. And yet there is nothing, or next to nothing, in human behavior that is not learned, and all learning is based on imitation. If human beings suddenly ceased imitating, all forms of culture would vanish. Neurologists remind us frequently that the human brain is an enormous imitating machine. To develop a science of man it is necessary to compare human imitation with animal mimicry, and to specify the properly human modalities of mimetic behavior, if they indeed exist. (7)

Since the initial publication of these remarks in French in 1978, the empirical sciences have accomplished a great deal, albeit unknowingly, in investigating Girard's inclinations. Our understanding of imitation is among those aspects of human behavior that have been significantly enhanced, if not dramatically revolutionized, in light of recent empirical work. In fact, there is now evidence suggesting that imitation is a pervasive mechanism at the core of human development and psychosocial functioning in a way that earlier philosophers and empiricists never alluded to. In order to address the far-reaching implications of this revolutionary work, imitation researchers from a wide range of disciplines gathered in Royaumount Abbey, France, in May of 2002 for a conference entitled "Perspectives on Imitation: From Neuroscience to Social Science." The following quotation, taken from the introductory remarks to this meeting, demonstrates the emerging significance of this area of investigation to the social sciences.

> Imitation is often thought of as a low-level, cognitively undemanding, even childish form of behavior, but recent work across a variety of sciences argues that imitation is a rare ability that is fundamentally linked to characteristically

> human forms of intelligence, in particular to language, culture, and the ability to understand other minds. This burgeoning body of work has important implications for our understanding of ourselves, both individually and socially. Imitation is not just an important factor in human development, it also has a pervasive influence throughout adulthood in ways we are just beginning to understand. (Hurley and Chater 2005, 1)

Given the essential and ubiquitous presence of imitation in human life, it is remarkable that the empirical sciences have only just begun to give imitation the attention it deserves. This neglect can be accounted for, at least partially, by Plato's narrow, yet highly influential, conceptualizations of human imitation, which have persisted and contributed to modern misunderstandings in the social sciences. While Plato was among the first to formally contemplate the universal phenomenon of imitative behavior, he was never able to fully explain its centrality to human life. Prior to empirical research, most theorists followed Plato by reducing imitative behavior to a special "faculty" of lesser significance (i.e., social learning), rather than seeing it as a pervasive process vital to both the development and the sustenance of human thought and culture (Girard 1987; Nadel and Butterworth 1999b).

Systems of philosophy following Plato also retained his limited view of imitation, which contributed significantly to the modern notion of the autonomous self. This core belief falsely emphasized the importance of individual strivings and development over the role and function of social influences in the construction of the self. As a result, our modern sense of imitation was reduced to a simple caricature of a more dynamic and interpersonal mechanism. It is difficult to overestimate the effects of this tradition on the history of Western civilization and the sciences. Suffice it to say that the social sciences and medical models inherited from Europe have all been so profoundly influenced by this philosophical model that only in the past 40 years have we begun to make incremental shifts in our conceptual paradigms, allowing for more diverse perspectives.

The inheritance of many Platonic and Enlightenment assumptions about an autonomous self led both Freud and Piaget to exclude the possibility of dyadic mimetic experiences during the first year of life. This can be seen in Freud in the absence of any reference to imitation in his theory of early infancy. Imitation researchers point out that "It is clear that there is no place in Freud's theory of early infancy for imitative self-other reciprocity (primary intersubjectivity)" (Trevarthen, Kokkinaki, and Fiamenghi 1999, 155). Similarly, Piaget (1962, 1963) argued that self-other imitation was a developmental milestone achieved around the first year of life. As a result of these influences, many false

beliefs about imitation persisted in the social sciences through most of the last century, up to and including the present. The following assumptions are derivatives of these perspectives:

1. Humans gradually *learned* to imitate over the first several years of life
2. Imitation required at least an elementary level of representation
3. Newborn infants had no intrinsic link between the seen actions of others and the felt actions of the self
4. Imitation, once achieved, was a rote and mindless phenomenon

These limited assumptions have had the enduring effect of steering researchers away from imitation as a rich and viable area of investigation because they have assumed that they already understand the phenomenon completely.

Nadel and Butterworth (1999b) provide a historical survey of empirical research and note that it was not until the 1970s that "imitation" appeared as a "keyword in reference bases such as Psychological Abstracts" (1). While not completely neglected, the imitative phenomenon was instead subsumed under other topics, such as observational learning, symbolic play, instrumental learning, the acquisition of new responses based on social experience, or a particular form of cognitive development suggested by Piaget. By 1970 as few as ten studies had looked at imitative ability at different developmental ages, but by 1978 this number had increased to 76 studies. Nadel and Butterworth attribute the increased interest in imitation research to the decline of "the long-lasting imperialism of learning theories" (1), which made developmental studies somewhat obsolete, as well as recent discoveries demonstrating that imitation preceded representation and symbolic functions (1).

Interest in imitation has flourished over the last few decades, resulting in a renaissance of research across a wide range of disciplines, including developmental psychology, cognitive neuroscience, neurophysiology, linguistics, primate psychology, evolutionary psychology, and artificial intelligence. The literature on this topic, however, is not without debate and disagreements concerning definitions, types, human vs. nonhuman primate imitation, and the nature of imitative mechanisms. Despite these differences in opinion, which are inevitable in the process of theoretical evolution, it is clear that imitation is a driving force in development and plays a vital role across all major domains of human life. Because this body of research is voluminous, what follows is a brief survey of several major findings, related primarily to human imitation,

which I hope will illustrate their value in illuminating the primordial significance of psychological mimesis that mimetic scholars have long emphasized. These findings will be addressed in the following order:

1. Immediate imitation in infancy
2. Mirror neurons
3. The generative role of imitation in representation, self-other differentiation, language, intentionality, and a Theory of Mind

Immediate Imitation in Infancy

The key role that developmental psychology has played in changing the depth and scope of imitation research, as well as our understanding of cognitive and emotional development, is perhaps best exemplified by the seminal work of Andrew Meltzoff and Keith Moore (1977, 1983, 1989). In the process of testing Piaget's developmental stages of infant preverbal learning, Meltzoff and Moore (1977) unwittingly discovered that newborn infants were able to learn via imitation immediately upon birth. What they found at first was that two- to three-week-old infants could instantly match body parts between themselves and adults, being able, for example, to imitate facial expressions and various hand gestures. Remarkably, the infants did not confuse either body part or action. When viewing a protrusion of the tongue by the experimenter, the infant's tongue, and not the lips, would first become activated, while other body parts such as the hands or limbs would become silent, demonstrating that the infant could accurately and immediately match the correct body part. The infant would then actively engage in moving that body part until it matched the specific action of the adult. In essence, the infant would isolate the *what,* and then proceed with the *how* (Meltzoff and Decety 2003). In order to confirm that such behaviors were not the result of prior associative experience or reinforcement training, the researchers repeated their study with newborns on average 32 hours old, the youngest being only 42 minutes old (Meltzoff and Moore 1983, 1989). The results were the same, demonstrating that newborns possessed an innate ability to imitate in a way that could not be explained by conditioning or the triggering of innate responses. Furthermore, imitation appeared to be not just a mindless phenomenon but an active and willful effort to match one's experience with that of another.

Over the years, the unexpected findings on neonatal imitation have had a profound effect, altering theories of cognitive and emotional development as well as our understanding of the place of imitation in human life (Meltzoff 2002). Prior to the infant observation studies by Meltzoff and Moore (1977), "the existence of immediate imitation in development was hardly suspected

and its role was ignored" (Nadel and Butterworth 1999b). For example, while emphasizing the valuable role of imitation for infant learning, the influential work of Piaget (1962, 1963) stressed that infants gradually progressed from nonimitation to imitation. For Piaget, infants learned how to imitate others later in development through acts of representation. For instance, it was thought that infants first symbolically associated their own actions seen in a mirror with concurrent tactile information on the same movements. The associations formed through self-imitation were then used to explore the matching of action and perception in the imitation of others. Imitation was thus seen as an intrapersonal phenomenon first; only later, with the infant's increasing memory and representational skills, did it become interpersonal. In contrast, the research on neo-natal imitation by Meltzoff and Moore had the effect of eventually debunking what was thought to be an obvious disconnect in infancy between action and perception, self and other.[2] Imitation is now seen as a powerful interpersonal mechanism facilitating infant learning and affective experience with caretakers from the very beginning of life. The question was no longer *if* infants could imitate immediately, but, rather, *how?*

Meltzoff and Moore (1994, 1997, 1999) propose an influential model in order to account for the unity of shared self-other experience that they observed. They argue that infant imitation is based on a process of "active intermodal mapping" or AIM.

> The crux of the AIM hypothesis is that imitation, even early imitation, is a matching-to-target process. The goal or behavioral target is specified visually. Infants' self-produced movements provide proprioceptive feedback that can be compared with the visually-specified target. AIM proposes that such comparison is possible because the perception and production of human movements are registered within a common supramodal representational system. Thus, although infants cannot see their own faces, their faces are not unperceived by them. They can monitor their lip and tongue movements through proprioception and compare this felt activity to what they see. Metaphorically, we can say that perception and production speak the same language; there is no need for "associating" the two through prolonged learning, because they are intimately bound at birth. (Meltzoff and Moore 1999, 254)

While it became increasingly obvious that infants were imitating and thus unifying these cognitive and perceptual modalities, is was not clear at the time how this actually worked; that is, what the underlying mechanisms were that made such unification possible, although the research certainly suggested shared neural representations. Only years later would the AIM hypothesis be

substantially validated from the separate discipline and methodological domain of neuroscience.

Mirror Neurons

In addition to developmental psychology, neuroscience and neurophysiology are among the disciplines contributing to a more profound understanding of the role of human reciprocal interactions for cognitive and psychosocial development and functioning. The impression that neuroscience continues to make on biology, psychology, medicine, and culture at large is enormous and undeniable. One of the most revolutionary findings from neuroscience in the last decade, however, has not been widely publicized:

> The discovery of mirror neurons . . . is the single most important unreported story of the decade. I predict that mirror neurons will do for psychology what DNA did for biology: They will provide a unifying framework and help explain a host of mental abilities that have hitherto remained mysterious and inaccessible to experiments. (Ramachandran 2000)

Mirror neurons are brain cells that are activated regardless of whether the individual is performing a particular motor movement or observing the same movement being made by another person. The Italian research team led by Giacomo Rizzolati (Rizzolati et al. 1996) first reported on mirror neurons from their research in area F5 of the premotor cortex of macaque monkeys. They found that individual neurons that were activated while a monkey was *performing* a particular goal-directed motor sequence, such as grasping an object with its hand, would equally become activated when the monkey simply *observed* the experimenter performing the same action. Mirror neurons therefore act as both motor and sensory neurons. Their dual function suggests a direct resonance, or common coding between observation and execution, of participant and observer. The activation of these neurons is automatic and independent of the individual performing or observing the action, creating an immediate and shared experience. Similar studies using less intrusive methodologies have demonstrated the same mirroring process of brain activation in humans (Iacoboni et al. 1999; Rizzolatti, Fogassi, and Gallese 2001).

The discovery of mirror neurons is revolutionary because they contribute not only to a better understanding of the underlying mechanisms of imitation but more generally to the neurophysiological basis of social cognition. In addition to providing clues supporting models proposed by developmental psychologists concerning imitation, mirror neurons take our understanding of mimetic reciprocity to a whole new level of research and underlying mechanisms, that of cerebral organization and neural integration. This “mirror sys-

tem" seems to represent an elemental and immediate reciprocal link between participant and observer. A study by Rizzolatti and others (2001) explains why the finding of mirror neurons is so invaluable to resolving many unanswered questions about social cognition:

> The novelty of these finding is the fact that, for the first time, a neural mechanism that allows a direct matching between the visual description of an action and its execution has been identified. Such a matching system constitutes a parsimonious solution to the problem of translating the results of the visual analysis of an observed action . . . into an account that the individual is able to understand. (663)

Follow-up investigations with monkeys detail "types" of mirror neurons identified by their suggested functionality and response orientation, demonstrating the complexity of the mirror system underlying social cognition. Fogassi and Gallese (2002) point out that the properties of mirror neurons reveal that visual and motor information can be matched at the single neuron level with actions that are "virtually indistinguishable," but that not just any action will excite them. For example, they all respond most effectively to hand-object or mouth-object interactions. That is, they do not discharge when the observed or executing hand mimics the particular action without the target object. The actions classified thus far are grasping, manipulating, holding, and tearing of objects. Grasping actions are by far the most common.

In addition to sharing these core common characteristics, mirror neurons differ with respect to the type and manner of action to which they will respond. For example, more than half respond to only one action, while the remaining ones respond to two or more actions. Additionally, mirror neurons demonstrate not only selectivity for the action (grasping vs. manipulating) but also the way in which the action is accomplished (whole hand grasping vs. a precision grip with two fingers). Mirror neurons are further divided into categories of "strictly congruent" and "broadly congruent" neurons. "Strictly congruent" neurons are those neurons in which observed and executed action coincide (precision grip only by both participant and observer). "Broadly congruent" neurons are those in which the action is similar but not identical (whole hand grasping or precision grip by experimenter or observer). Fogassi and Gallese (2002) discuss the functional significance of these similarities and differences:

> The congruence found between the visual and motor responses of mirror neurons suggests that every time an action is observed, there is an activation of the motor circuits of the observer coding a similar action. According to this interpretation, strictly congruent mirror neurons are probably crucial for a

> detailed analysis of the observed action. In contrast, broadly congruent neurons appear to generalize across different ways of achieving the same goal, thus probably enabling a more abstract type of action coding. Moreover, these neurons could be very important for other two [*sic*] functions: (a) to appropriately react within a social environment, where normally understanding the actions made by conspecifics is crucial for survival; (b) to communicate, responding with gestures to other individual gestures. In both cases what is crucial for any individual belonging to a social group is to understand and discriminate the different types of action made by another conspecific in order to react appropriately. When a monkey observes another monkey throwing an object away, the former can react by grasping the same object. When a monkey of higher hierarchical rank performs a threatening gesture when facing another monkey of lower rank, this latter will not respond with the same gesture but, for example, with a gesture of submission. All these different types of social behaviors could benefit of [*sic*] a mechanism such as that instantiated by broadly congruent mirror neurons. In fact, these neurons "recognize" one or more observed actions, and produce an output that can be ethologically related to them. (19)

From the above explanation, we can see that the functional significance of mirror neurons pertains to many facets of social interaction that are quite complex and virtually inseparable, including imitation, action representation, and communication. Theoretical speculations stemming from the discovery of mirror neurons address their significance in helping to explain not only the underlying mechanisms of such skills but also their evolution across species. For example, contemporary theorists propose that differences between humans and nonhuman primates are due more to cortical "rewiring" rather than to brain size or the acquisition of unique brain structures (Roth 2002). Thus, the development of mirror neurons and the evolution of a more complex "mirror system" and imitative brain may have contributed significantly to a wide-scale cerebral reorganization, allowing for the coevolution of more complex social and representational skills (Rizzolati and Arbib 1998; Gruber 2002).[3]

In addition to their evolutionary significance, the dual coding capabilities of these individual neurons provide convergent validation for developmental theories of imitation such as the AIM hypothesis put forward by Meltzoff and Moore (1994, 1997). Mirror neurons support this hypothesis by demonstrating how the capacity to imitate by the matching of equivalent body parts, as well as action and perception, can be initiated automatically at a very elemental level of human experience. In this way, human infants are thought to be immersed in a rich social matrix of self-other reciprocity and intersubjective experience from the very beginnings of life.

However, while mirror neurons provide valuable information about the neural correlates of social reciprocity, the phenomena of human imitation is

vastly more complex than the *in vivo* resonance of affective states and visual-motor information. For example, contemporary research from evolutionary and comparative psychology has shown that imitation in nonhuman primates is not nearly as complex or efficient as human imitation (Tomasello 1999; Byrne 2002; Whiten 2002), even though monkeys have the basic mirror neuron machinery that affords them the capacity to interpret complex social actions. The human mind demonstrates a greater development of imitative phenomena throughout the lifespan, both quantitatively and qualitatively. Such phenomena are demonstrated by our capacity for more complex representation, the evolution of symbolic systems and language, and the development of a theory of mind.

Deferred Imitation and Representation

Imitation plays a key role in learning and the representation of events and mental states that extend over time and in the absence of the initial or external model. In addition to immediate imitation, Meltzoff and Moore (1977, 1992, 1994) have also demonstrated that deferred imitation (the delayed re-presenting of past novel events) takes place much earlier than Piaget had suggested.

> In classical theory, there is a difference between a "sensorimotor" and a "representational" stage of development (e.g., Piaget 1962, 1963). Young infants were said to live in a rich here-and-now perceptual world and their relation to the past was highly constrained. They could retain their motor habits (circular reactions) but could not recall actions or events that had been seen but not practiced. In classical developmental theory, the shift beyond sensorimotor functioning occurred at 18 months of age (Meltzoff and Moore 1999b, 13).

In contrast, Meltzoff and Moore (1977) have found that infants can represent and imitate adult facial gestures after short or prolonged periods of time. For example, in their initial studies the experimenter made a particular facial gesture while the infants had pacifiers in their mouths. The pacifiers induced the sucking reflex and thus prevented the infants from immediately imitating the adult behavior. When the pacifier was removed, the experimenter assumed a neutral face. What Meltzoff and Moore found was that the infants would then imitate the previously displayed facial gesture for several minutes while looking at the now neutral face of the adult. In another study, infants as young as six weeks old would imitate facial gestures while looking at the neutral face of the adult after delays as long as 24 hours (Meltzoff and Moore 1994).

In an additional series of "observation-only" design studies developed by Meltzoff (1985, 1988a, 1988b), infants were exposed briefly to novel, and

often bizarre, acts by the experimenter and were not allowed to imitate them until a period of time had passed. In one study (Meltzoff, 1988a), the experimenter demonstrated a novel behavior to infants by leaning forward and pressing his head against an unfamiliar panel on a table that would then light up. When exposed to the panel one week later, infants would use their foreheads in a similar way to press the panel and turn on the light. This delayed imitation demonstrated that the infants had stored the novel use of the forehead by the adult and not simply the fact that the panel lit up if pressed; otherwise the infants might have simply used their hands to achieve this same goal. Furthermore, infants who had no prior experience with the panel or the adult behavior did not spontaneously produce the novel act. Experiments such as these have shown that infants as young as six weeks old can store a model of a novel act or gesture through a single brief exposure and imitate it from memory after delays as long as 24 hours. At twelve months of age, children can successfully imitate after delays up to four weeks, and by two years of age, the delay can be as much as four months or longer (Meltzoff and Decety 2003).

This ability to defer over longer periods of time is made possible by the infant's increasing development of working and long-term memories, afforded largely by the highly evolved executive functioning of the human frontal lobes. One important function of the frontal lobes of the brain (where mirror neurons have been located) is their inhibitory role on motor action. This area of the brain allows the function of inhibition that permits actions to be delayed. According to Solms and Turnbull (2002), this delay created by the frontal lobes is in the service of thinking: "Thinking may be regarded as *imaginary* acting, whereby the outcome of a *potential* action is *evaluated*" (281, italics in the original). The authors describe how this process works: "This is achieved by running the envisaged action programs while motor output is precluded (inhibited). Acting without acting is thinking (imaginary acting). Inhibition is therefore the prerequisite *and* the medium of thought."

Together, immediate and deferred imitations are considered powerful and advantageous learning tools for humans because they avoid "time-consuming trial-and-error learning" (Wohlschlager and Bekkering 2002). At a very early age, human infants can store a representation of adult behavior after a single exposure and actively compare their own behavior to that of this new internal model, even in the absence of the model over long periods of time (Meltzoff and Moore 1992, 1994). As a result, deferred imitation allows the child to adapt to novel situations and produce increasingly complex behaviors, including the appropriate use of language and cultural skills (Carpenter, Akhtar, and Tomasello 1998).[4]

Self-Other Differentiation

The reciprocity of imitating and being imitated is an essential part of parent-child interactions, which promote the process of emotional attachments and the development of self-other differentiation (Meltzoff and Decety 2003). The attunement and responsiveness that psychologists associate with healthy parenting is based on an active state of imitative reciprocity. Parent-child interactions must be imitative in nature to produce the interpersonal connectedness and rich affective experience necessary for stimulating further development, not only psychologically but also biologically via experience-dependent neural growth. From the close imitative matrix between parent and child, a scaffolding process takes place, in which the mind of the child is mirrored and drawn forward through development by the mind of the adult. Through the early imitation of facial expressions to later, more advanced, reciprocal imitative games, the child is learning that other people are both similar to him and different. "Imitation is both a measure of self-other understanding and a prime engine in its development" (Meltzoff 2002).

In this light, imitation is advantageous for more than just acquiring novel behaviors and cultural skills, but it also facilitates self-other recognition and differentiation, which are the foundation for human relational motivations and attachments. For example, infants not only imitate but also recognize when others are imitating them. Imitating and being imitated have both cognitive and affective significance. Meltzoff (1990a) has demonstrated that young infants will smile and direct more visual attention to adults who are imitating them, while concentrating less on adults who simply respond. Meltzoff and Moore (1999b) argue that the responsiveness directed toward the imitating adult is due not just to "temporal contingency" but to rather accurate "structural congruence" with the imitated behavior. The significance for infants is not just that their action produces another action, but that it invites a mirrored response from another person. This is an important point, because it suggests that human interactions are most meaningful when they are imitative in nature, carrying a much deeper affective response:

> We do not dispute that timing and contingencies are important, but think that the uniqueness of such interaction lies in the equivalence of the *form* of the participants' behavior, the fact that the experienced self and the seen other are performing identical acts. Physical objects may come under temporal control. Only people, indeed only people who are paying attention to you and acting intentionally, can systematically match the form of your behavior in a generative fashion. (Meltzoff and Moore 1999b, 24)

The cognitive and affectively charged qualities of these shared experiences propel the infant to generate and seek out even more of these interactions. In the presence of participating and reciprocating others, infants learn to explore and expand their domain of being. Meltzoff and Decety (2003) report that older infants will engage in more complex imitative games and systematically vary their acts to see if the adult is still following them, such as speeding up the behavior or stopping abruptly. Younger infants in the first months of life are attentive to being imitated and will generate more of the action if they are being imitated, but they do not engage in "testing behaviors" as do older infants (Meltzoff and Brooks 2001). According to Meltzoff and Moore (1999) older infants may recognize that the adult actions are not a direct consequence of their own behavior, as younger infants may assume, but that the adult is acting as a separate intentional person.

> By 14 months, infants undoubtedly know that adults are not under their total control, and part of the joy of this exchange is the realization that although the infant does not actually control the other, nonetheless the other is choosing to do just what I do. (Meltzoff and Decety 2003, 495)

An important question that emerges from the study of imitation and self-other differentiation is the following: how does the brain keep track of who is imitating whom? A third party may not be able to make this distinction based on physical appearances alone. Research from neuroscience provides evidence for the neural basis of reciprocal imitation and the brain's ability to differentiate between actions of the self and others. Decety and Sommerville (2003) provide a review of this research and explain how similar and distinct brain regions are involved in the differentiation between self and other, both when imitating and when being imitated:

> Consistent with research and theoretical claims from developmental and social psychology, representations of aspects of the self both overlap with representations of other and are distinct from such representations. Common and distinct representations of self and other extend along many dimensions of self and other processing: from action recognition to mental state understanding. Indeed, such shared representations, including beliefs, unify the cognitive and motivational processes that constitute the contents of culture. These findings shed light on the nature of the self as both special and social, unique and shared. (532)

Thus, when two individuals are involved in reciprocal imitation, they share similar representations of the action as well as code-specific information

relevant to their own point of view. Additional studies demonstrate that similar brain regions correspond when one is simply imagining the same actions from either perspective, providing further information for the neural substrates of empathic resonance (Ruby and Decety 2001; Decety 2002; Decety and Chaminade 2003).

Communication and Language

Along with facilitating the development of self-other differentiation, imitative exchanges used by preverbal children are thought to be a primary form of communication (Nadel et al. 1999; Nadel 2002; Trevarthen, Kokkinaki, and Fiamenghi 1999; Wohlschlager and Bekkering 2002). The social contingency inherent in the immediate imitation of others, plus the recognition of being imitated in return, allows older infants and older children to communicate intentions, negotiate turn taking and role switching, share in pretend play, and collaborate in shared projects (Nadel 2002).

Furthermore, reciprocal imitation is thought to play an important role in the acquisition of language by serving as an early form of communication and a precursor to more symbolic processes (Nadel et al. 1999; Nadel 2002; Trevarthen, Kokkinaki, and Fiamenghi 1999; Wohlschlager and Bekkering 2002; Rizzolati and Arbib 1998). The role of imitation in language acquisition has been one of the most important and consistent variables in theories of human development for close to a century, though the scientific and technological methods for studying the relationship between the two has only recently been available.[5]

In addition to the development of speech in infancy, researchers have described the role of imitation in the evolution of communication and language across species (Rizzolati and Arbib 1998; Billard and Arbib 2001). For example, Rizzolati and Arbib (1998) argue that human speech developed from, and is an extension of, the increasingly complex ability to match and understand hand and facial gestures with communicative intent. Most researchers agree that area F5 of the monkey's premotor cortex (where mirror neurons are located and function to facilitate action understanding of hand and mouth movements) corresponds to Broca's area in the premotor cortex of humans, which is the center for speech production. Based on this evidence, Rizzolati and Arbib (1998) propose the following argument:

> There is obviously an enormous gap between recognizing actions and sending messages with communicative intent. We offer now a hypothesis on how this gap might have been bridged. Whether an individual is about to perform an action or observes another individual performing an action, premotor

> areas are activated. Normally, a series of mechanisms prevents the observer from emitting a motor behavior that mimics the observed one, and the "actor" from initiating the action prematurely. . . . Sometimes, however, for example when the observed action is of particular interest, the premotor system will allow a brief prefix of the movement to be exhibited. This prefix will be recognized by the other individual. This fact will affect both the actor and the observer. The actor will recognize an intention in the observer, and the observer will notice that its involuntary response affects the behavior of the actor. The development of the capacity of the observer to control his or her mirror system is crucial in order to emit (voluntarily) a signal. When this occurs, a primitive dialogue between observer and actor is established. This dialogue forms the core of language. . . . This new use of the mirror system, at both individual and species levels, marks the beginning of intentional communication. (190–91)

Rizzolati and Arbib further speculate that the evolution of symbolic language in humans beyond the more primitive communication in nonhuman primates is most likely due in large part to a greater capacity for representation through "the evolution of the mirror system in its globality" (192).

The Role of Goals and Intentions in Imitation

Imitation involves more than just the visual and more tangible realities of shared actions and gestures. In tandem with these physical markers are internal mental states such as desires, beliefs, intentions, and goals, which help predict and explain human actions. These internal states are what provide purpose and meaning to our actions in the world and in our social relationships. Imitation researchers have recently become interested in understanding the genesis of how we understand the goals and intentions of others, and how these findings change our understanding of human development.[6]

Meltzoff (1995) designed a series of experiments that use imitation as a way of understanding infants' ability to read below surface behaviors to underlying goals and intentions as well as their capacity to act on the goals inferred. In the first experiment, 18-month-old infants were shown an unsuccessful act involving a failed effort by the experimenter to pull off the end of a toy dumbbell. The experimenter would hold one end of the dumbbell with one hand and, using the opposite hand, attempt to grasp and pull off the other end. Rather than completing the act, the experimenter would "accidentally" under- or overshoot the target. Thus, the infant never saw the goal of the intended action. Using a variety of control groups, Meltzoff found that infants understood the intended goal of the adult and were more likely to complete this inferred goal rather than repeat the failed gesture of the experimenter. "Evidently, young toddlers can understand our goals even if we fail to fulfill

them. They choose to imitate what we meant to do, rather than what we mistakenly do" (Meltzoff and Decety 2003, 496).

A second experiment was designed to test whether or not infants would attribute intentions or infer goal states from inanimate objects. To test this, Meltzoff (1995) designed a mechanical device with arms and pincers that replicated the actions with the toy dumbbell in a manner similar to that of the human actor. He found that infants who viewed the uncompleted act by the mechanical device were no more likely to infer and complete the target goal than infants who were simply exposed to the toy without a demonstration. Apparently, infants do not attribute goals and intentions to inanimate objects, which do not provide the precise information afforded by human actions. Thus, imitation helps infants to differentiate not only between themselves and others but also between human and nonhuman agents.

In another study, Meltzoff (1996) glued the ends of the dumbbell together to see if the infant would be satisfied with copying the surface behavior of the adult. Because the infant could not pull the object apart, his hands would slip off, thus replicating the precise behavior of the adult. He found that infants who were given the trick toy were not satisfied with copying the surface act but instead "repeatedly grabbed the toy, yanked on it in different ways, and appealed to their mothers and the adult" (Meltzoff 2002, 32), demonstrating that they were attempting to fulfill and thus imitate the perceived intention of the adult.

> This work reinforces the idea that the toddlers are beginning to focus on the adult's goals, not simply their surface actions. It provides developmental roots for the importance of goals in organizing imitation in older children and adults. (Meltzoff 2002, 32)

Several researchers have advanced this point even further, proposing that imitation is essentially the replication of the goals and intentions of others rather than the copying of movements or actions (Trevarthen, Kokkinaki, and Fiamenghi 1999; Wohlschlager and Bekkering 2002). For example, Wohlschlager and Bekkering (2002) argue that "children probably primarily imitate the goal of the model's action while paying less attention to—or not caring about—the course of the movement" (102).

> The goal directed theory of imitation does not only explain the recent data of imitation research, but also gives imitation a more fundamental nature. Direct mapping, on the other hand, has a rather automatic taste. The goal-directed theory of imitation allows imitators to learn from models even if the differences in motor skills or in body proportions are so huge that the imitator is physically unable to make the same movement as the model. Whatever movement the imitator uses, the purpose of learning by imitation can be

> regarded as being fulfilled as soon as he reaches the same goal as the model. (Wohlschlager and Bekkering 2002, 104)

The increased human ability to imitate, therefore, may have a generative relationship to our ability to recognize and infer the mental states, such as the desires and intentions, of others, rather than just to our ability to infer the meanings of actions. As was already discussed, mirror neurons provide monkeys with the ability to understand complex social actions, yet they do not imitate like humans. Goals, intentions, and motives seem to organize the coordination of perception and action inherent in imitation at a much deeper level than surface behaviors.

The Development of a Theory of Mind

In addition to language, one of the most distinctive features of the human social mind is its ability to represent and mentalize (i.e., think about and infer) the mental states of others in complex ways that indicate a knowledge of other minds that exist separately from one's own. A Theory of Mind (ToM) refers to a "particular research domain whose goal is to provide an explanation of the ability . . . to explain and predict the actions, both of oneself, and other intelligent agents" (Carruthers and Smith 1996, 1). The acquisition of a ToM is crucial for becoming a participatory agent intending one's own actions and interpreting the actions of others within the social world.[7]

The more recent interest concerning ToM emerged from the field of primatology in an article by Premack and Woodruff (1978). They questioned whether chimpanzees had a theory of mind, and their resulting research on this question pressured psychologists in particular to study how it is that one person can know what is in another's mind. Prior to the discovery of mirror neurons and the recent neurocognitive findings of imitation research, and even since, there have been several diverse theories that have attempted to account for the *fact* of ToM as well as the various processes involved in acquiring such a capacity (Carruthers and Smith 1996). While ToM research continues to be a vast area of investigation, cognitive neuroscience imitation researchers have pointed out that there exists an explanatory gap between the *in vivo* resonance afforded by mirror neurons and the later development of ToM (Meltzoff and Decety 2003). Many developmental theorists still explain the acquisition of ToM in terms of the emergence of representational skills in a way similar to that in which Piaget explained imitation as a function of representation.

> Recent speculations about how a "Theory of Mind" develops in children constitute a real advance by recognizing that what goes on in minds is naturally of interest to humans. But, these models have not, we believe, much clarified

> the problems of how sympathetic awareness begins. They merely rephrase the verbal representational hypothesis in mentalistic or cognitive science (machine intelligence) language. The Theory of Mind debate is leading to clarification of important steps in the development of human intersubjectivity after language has been mastered. However, the basic ability to imitate remains to be understood. It is independent of both linguistic and rational representations, and it is not a symbolic formulation of machine "thinking." Mimesis generates symbols, not the other way around. Imitation is part of the needed explanation. (Trevarthen, Kokkinaki, and Fiamenghi 1999, 140)

Meltzoff and Decety (2003, 497) propose a "linking argument" demonstrating how complex representational skills and ToM develop from the building blocks of preverbal representations of visual-motor imitation laid down in the first two years of life. Their three-step argument is as follows:

1. *Innate equipment.* Newborns can recognize equivalences between perceived and executed acts. This is that starting state, as documented by newborn imitation (Meltzoff and Moore 1997).
2. *Constructing first-person experience.* Through everyday experience infants map the relation between their own bodily acts and their mental experiences. For example, there is an intimate relation between "striving to achieve a goal" and the concomitant facial expression and effortful bodily acts. Infants experience their own unfulfilled desires and their own concomitant facial/postural/vocal reactions. They experience their own inner feelings and outward facial expressions and construct a detailed bidirectional map linking mental experiences and behavior.
3. *Inferences about the experiences of others.* When infants see others acting "like me," they project that others have the same mental experience that is mapped to those behavioral states as in the self.

According to this argument, infants would not need the adult theory of mind "innately specified," nor would its developmental path be guaranteed. Instead, the innate mechanisms of imitation allow the infant to develop an understanding of others based on experience.

> The crux of the developmental theory offered here is that imitation sets children on a trajectory for learning about the other's mind. The "like-me-ness" of others, first manifest in imitation, is a foundation for more mature forms of social cognition that depend on the felt equivalence between self and other. The Golden Rule, "Treat thy neighbor as thy self" at first occurs in action, through imitation. Without an imitative mind, we might not develop

> this moral mind. Imitation is the bud, and empathy and moral sentiments are the ripened fruit—born from years of interaction with other people already recognized to be "like me." To the human infant, another person is not an alien, but a kindred spirit—not an "It" but an embryonic "Thou." (Meltzoff 2002, 36)

SUMMARY

The combined efforts of developmental psychology, neurophysiology, and cognitive neuroscience have produced a dramatic array of data elucidating the role and mechanisms of imitation. This brief survey is admittedly selective and schematic; however, the implications are revolutionary in regard to the social sciences. The above research demonstrates the profound significance of reciprocal imitative phenomena at both neural and behavior levels. Imitation is no longer seen as a mindless act expressing simple mimicry, but rather a fundamental and inherently positive mechanism stimulating the individual mind to develop through its relationship with another mind. The congruence of such reciprocity of minds, along with the ability to delay imitation, is understood as the basis for the emergence of more diverse and complex behaviors and representations, including human language and the development of a theory of mind.

CONVERGENCE BETWEEN MIMETIC THEORY AND IMITATION RESEARCH

Introduction

Imitation research provides an abundance of unprecedented support for and clarification of the foundational role of psychological mimesis in human life; however, this body of work has not yet been utilized—and made substantially more groundbreaking—by addressing the many obvious links with the mimetic theory of culture and religion. Several decades before empirical research prompted a resurgence of interest in imitation and its significance to human development and psychosocial functioning, Girard (1965, 1977) had already articulated a theory of imitation, which explained the imitative phenomenon and its broader anthropological implications with surprising power and economy. What makes Girard's insights so remarkable is that he not only discovered and developed the primordial role of psychological mimesis (i.e., *mimetic desire, acquisitive mimesis,* and the *scapegoat mechanism*) during a time when the concept of imitation was quite out of fashion, but he did so through investigations in literature, cultural anthropology, history, and an ultimate return to religious texts for further evidence of mimetic phenomena.[8] Early on, mimetic theory recognized human imitation as what was essentially human and the founding force that propelled proto-human beings to establish culture

and primitive religions. The parallels between insights from mimetic scholars and the very recent conclusions of empirical researchers concerning imitation (in both the development and the evolution of the species) are extraordinary and deserve a more detailed and comparative review.

While Oughourlian (1982) and Webb (1993) both made reference to several imitation studies in support of mimetic theory, the majority of the convergence between the two domains and the potential influence on each have yet to be recognized and fully developed. The importance of such an analysis was made explicit by Webb (217–19) in his discussion on the potential longevity of mimetic theory in comparison to traditional Freudian theory:

> It has often been remarked that Freudianism has an ambiguous status as a science because it does not connect significantly with the results of any other branch of scientific inquiry. Daniel N. Robinson stated the problem clearly in his *Systems of Modern Psychology*:
>
> "There is no psychoanalytic *theory*: there are formulations of personality based upon psychoanalytic hypothesis. The *theory* continues to evolve. But it does not evolve in the way that, for example, evolutionary theory did. In the latter case, advances in genetics and molecular biology made it possible to fill gaps unavoidably present in Darwin's original formulations. The accomplishments of science made it possible to replace Lamarckian with Mendelian modes of hereditary transmission. . . . One test of the scientific status of a theory . . . is the extent to which it is accessible to the enriching and modifying effects of discoveries in science at large. Evolutionary theory passes this test; Freudian theory fails it" (225).
>
> It is too soon to tell exactly how successfully interdividual psychology will pass the same test, but it seems a good sign, at least, that experimentalists working in complete independence of its concepts have been turning up exactly the sort of findings that the hypothesis of universal subjective mimesis would be expected to predict. Such results certainly suggest that Girard, Oughourlian, and their colleagues are on solid ground in claiming that mimesis is fundamental to human psychology both within the individual and in social relations, and that it contributes to all psychological processes on every level of development. A great deal more development will clearly be needed. (217–19)

Based on this comparison, we can see an immediate parallel between the findings of imitation research presented here and mimetic theory. Empirical research provided by disciplines such as developmental psychology, neurophysiology, and cognitive neuroscience is in a position to help establish Girard's theory of psychological mimesis and its broader implications in a way similar to that in which Darwinian theory achieved its substantive structure

and continued influence. Much of the criticism aimed at Girard's work has centered upon the absence of empirical data to support his broad conclusions about the role of imitation in human life and in his theory of human culture (Livingston 1992). This absence has allowed many critics to reject outright the broader implications of mimetic theory on this basis alone. It is therefore imperative that Girard's foundational claims be readdressed in light of new evidence from contemporary empirical research. Girardian scholars are in a favorable position to substantiate the principal claims of mimetic theory in ways that corroborate findings across the disciplines relevant to it, as well as making their conclusions "accessible to the enriching and modifying effects of discoveries in science at large." Such an undertaking will require a more extensive analysis than is possible in the present discussion. Therefore, what follows will constitute a springboard for thinking about the value of imitation as the central modality in furthering explorations in human development, interpersonal relations, and the formation of culture and religion.

Mimetic Desire and the Generative Function of Imitation

Imitation researchers and mimetic scholars overlap most significantly in their view of imitation as a creative and positive dynamic essential to human motivation and cognitive and psychosocial development and functioning. In a fashion similar to Girard's (1965) primary thesis of human *mimetic desire,* imitation researchers now agree that "We [human beings] use imitations interactively to motivate one another reciprocally from the start," and that "these earliest imitations offer the greatest challenge to psychological theory" (Trevarthen, Kokkinaki, and Fiamenghi 1999, 128). While mimetic theory also addresses the conflictual aspects of mimesis in relation to human desire (see below), Girard has emphasized that "mimetic desire, even when bad, is intrinsically good, in the sense that far from being merely imitative in a small sense, it's the opening out of oneself. . . . Extreme openness. It is everything. It can be murderous, it is rivalrous, but it is also the basis of heroism, and devotion to others" (Williams 1996, 64). Likewise, it has been explained here how empirical researchers speak of imitation as the primary source of one's access and attachment to the mind and being of the other, and pointed out that reciprocal imitative exchanges foster the opening of intersubjective experience to deeper and more penetrating levels of relationality and social cognition.

However, despite these advancements in recognizing the central role of imitation in human life, empirical researchers have only begun to elaborate on the role of psychological mimesis for mutually influencing and reciprocating feedback loops between participants and over longer periods of time. Because cognitive neuroscientists and developmental psychologists have mainly addressed the "functional architecture" of imitation and its role in the development of

cognitive and social abilities, their work has mainly involved dyadic, short-lived, and often unidirectional imitative interactions between conspecifics (Meltzoff and Prinz 2002). Yet, apart from facilitating learning and cognitive development in infancy, imitation researchers are beginning to recognize that imitative interactions are essential in producing the "shared rhythms of behavior" that serve as a primary motivation for social interaction in and of itself and throughout the lifespan (Kinsbourne 2005).

If it is true, then, that a new psychology of human motivation is emerging and is in the process of constructing itself on the basis of imitation (as imitation researchers seem to be encouraging), then it would make sense for mimetic scholars to be in dialogue with such progress. Perhaps one of the most relevant domains of overlap that deserves further exploration and application is that of psychotherapeutic theory and practice, which has its origins in psychoanalysis. Imitation research from developmental psychology and neuroscience may provide a bridge or common denominator for collaboration between mimetic theory and the field of psychotherapy and clinical psychology. I return again to Webb (1993) who has already made such a proposal:

> The American experimental research into this subject [of imitation] has so far taken place mainly within the framework of developmental psychology and neurology, but it should be only a matter of time before psychiatrists and psychotherapists become interested in the implications of such studies for understanding the psychology of adults. When they do, they should find the French Girardian contributions pertinent. In fact, although the two sides seem to be completely unaware of each other, there are already some indications of virtual convergence, most notably in Daniel Stern's studies of the psychology of interpersonal relations. (217)

Indeed, many branches of psychoanalytic thought have progressed significantly from the autonomous and dual drive theories of Freudian psychology to more relational perspectives that emphasize the social matrix in the development of the self (Mitchell 1988). However, while developmental psychologists have made use of imitation research in revising core theoretical assumptions, psychoanalysis has not. Because imitation research needs a framework in which it can be applied and made substantially more meaningful, I propose that the theory and practice of psychotherapy is at least one appropriate domain of application. Imitation research offers extensive information that may help redefine, or at least clarify, the underlying nature and mechanisms of psychotherapeutic concepts such as empathy, transference, projection, introjection, and identification, which attempt to account for the interpersonal transfer and registration of mental content between patient and therapist. Trevarthen, Kokkinaki, and Fiamenghi (1999) argue that imitation

research will be essential in better accounting for such interpersonal exchanges:

> Our task is to explain how this could be, how behaviors and their motives can be translated intersubjectively. Our psychology offers little help. It gives us no clear explanation for fundamental motives, or for their intersubjective transfer. The emotional forces of human semiosis, correspondingly, remain obscure. The facts are that motives in individuals do affect the awareness and intentions motivated in other individuals. The understanding (and misunderstandings) of talk, and of all symbolic and representational forms of language, are carried upon intuitive interpersonal regulations, and upon mimetic representations that cross intersubjective space easily. They are woven into narratives of sympathetic intentionality charged with emotion. (128–29)

From this example we can see that empirical researchers are now in agreement with Girard (1987) and Oughourlian (1982) concerning the shortcomings of psychoanalytic theory and the importance of imitation in revitalizing this field of work.

It should also be noted that many important aspects of psychoanalytic theory may be integrated with imitation research to better understand aspects of human mimesis that have been neglected by mimetic scholars. For example, how does deferred imitation actually function in the mind of the adult? On what basis does the adult imitate old affect-laden schemas (be they good or bad), which are represented in memory in the presence of new imitative models? The implications of these dynamics for interventions in human relations easily go beyond the consulting room to the infinitely more complex dilemmas inherent in attempts at conflict resolution in social groups and society at large. For example, how is it that, in the face of hostile or malignant models, one is able to act in a more benign manner, rather than succumbing to group contagion? It seems logical that this can only be done if one has a way to draw from a previously internalized model whose desires are not externally available. These questions deserve further exploration from many diverse perspectives.

From Mirror Neurons to the Mimetic Theory of Cultural Evolution

Along with the fields of social and clinical psychology, imitation research has much to offer to current explorations in cultural evolution. By combining the efforts of both mimetic scholars and imitation researchers, investigations on imitation allow for important connections to be made from the neural basis of

social interaction to the structure and evolution of culture and religion. Empirical research from cognitive neuroscience and evolutionary psychology enhances mimetic theory by illuminating many unaccounted-for aspects of human mimesis that are used by mimetic scholars to explain its broader cultural and historical ramifications.

For example, there are too many gaps and limitations in mimetic theory to sufficiently explain the mechanisms that allow for such widespread generative effects to take place in dyadic and group interactions as well as their evolution from nonhuman primates to humans. The really interesting questions no longer pertain to *whether* we imitate, or at what age we begin imitating, but *how?* What are the mechanisms of mimesis and how do they develop? What are the differences between human and nonhuman primate imitation and representation? And how do these differences figure into the evolution of the species? Developmental psychology, evolutionary psychology, and neuroscience are among those disciplines pioneering a clearer understanding of our imitative origins, which need to be accounted for by mimetic theory.

One of the first mimetic scholars to incorporate imitation research was Oughourlian (1982), who referenced the original work of Meltzoff and Moore (1977) in his development of an interdividual psychology—a psychological system founded solely upon universal mimesis. In addition to using this research to support his conclusions on the innateness of imitation, Oughourlian (1982) provided the following critique of the model used by Meltzoff and Moore to explain such phenomena:

> Is imitation the result of a matching process due to the intervention of a system of abstract representations, as Meltzoff and Moore seem to think? Certainly not, and I have already indicated my agreement with Piaget on this point. In fact, the American Psychologists, having disproved Piaget's observations experimentally, have wished to take up a theoretical position that simply reverses his. The only way to reconcile the indisputable observations of the Seattle psychologists and the sound conceptual intuitions of Piaget is to adopt the theory of universal mimesis. (9)

However, while not as abstract as Meltzoff and Moore may have initially implied, the solution to the problem of neonatal imitation is indeed the result of an innate and universal matching process (Meltzoff and Moore 1997), albeit one that is supported by mechanisms at a level in the brain that no one had thought possible. Furthermore, simply stating that there exists a universal mimetic capacity at birth does not answer the question that Meltzoff and Moore were attempting to answer, which is, how do we account for or make sense of this early form of mimesis? On this point, Oughourlian asked

the following questions, which at the time were unanswerable due to the limitations of cognitive neuroscience: "How does that mimetic force operate or get brought into operation? What sorts of neurological or neurophysiological systems are indispensable to its operation? These questions pertain to neurophysiology and perhaps also to biochemistry" (Oughourlian 1982, 9). The available research described here helps to clarify, and in many respects answer, these questions to a high degree of specificity.

This is most evident in the work on mirror neurons, which provide the most conclusive empirical support for explaining the underlying mechanisms of human imitation. Research on mirror neurons has only recently emerged, as technological advances have allowed researchers to study more detailed activity and functions of the live brain. Mirror neurons seem to represent a primary or elemental form of reciprocal social experience and are understood as the neural basis for learning by imitation (Billard and Arbib 2001). Further explorations of the properties and functionality of mirror neurons promise to alter outdated conceptions of the nature of primate representation and mimesis as well as their role in the evolution of human representation. Girard (1987) has commented on the significance of mimesis in evolution and the emergence of the "distinctively human phenomena" of mimetic desire:

> For there to be desire according to our definition, the effects of mimesis must interfere, not directly with animal instincts and appetites, but in a terrain that has already been fundamentally modified by the process of hominization: in other words, the mimetic effects and a wholesale re-processing of symbols must develop in unison. All the elements of what we call normal psychology, and everything that constitutes us as human beings on the level that we call "psychic," must result from the infinitely slow, but ultimately monumental work achieved by the disorganization and increasingly complex reorganization of mimetic functions. Our hypothesis makes it logical to imagine that the rigorous symmetry between the mimetic partners . . . must bring about two things among man's ancestors, little by little: the ability to look at the other person, the mimetic *double,* as an *alter ego* and the matching capacity to establish a *double* inside oneself, through processes like reflection and consciousness. (Girard 1987, 283–84)

Research on mirror neurons details the complex and intricate functioning of the socially interactive brain, allowing researchers to ask questions that promise to enrich our understanding of the process that Girard has described above, in support of his own mimetic theory of cultural evolution. In fact, the overlap between conclusions arrived at by Girard and empirical researchers concerning the implications of imitation for the evolution of the species is

remarkable. For example, in a fashion similar to Girard's above explication, Stamenov and Gallese (2002) predict that

> The peculiar (first-to-third-person) "intersubjective character" of the performance of mirror neurons and their surprising complementarity to the functioning of the strategic (intentional, conscious) communicative face-to-face (first-to-second) interaction may help shed light from a different perspective on the functional architecture of the conscious vs. unconscious mental processes and the relationship between behavioral and communicative action in monkeys and humans. And they may help to re-arrange, at least to a certain degree, some aspects of the big puzzle of the emergence of language faculty, the relation of the latter to other specifically human capacities like social intelligence and tool use. (2)

Understandably, imitation research has created quite a clamor in the scientific community with its promise of offering important insights into many unanswered questions related to the origins of human life and social dynamics. This is why it is so important that the empirical sciences be able to interface with the models of imitative dynamics already outlined by mimetic theory. Such cross-fertilization between disciplines would allow imitation research to broaden its scope to include the competitive nature of human mimesis as well as to appreciate the profound consequence that such mimetic interactions have for a fuller and more cohesive understanding of the diverse and complex systems of religion and culture.

Acquisitive Mimesis and the Role of Imitation in Conflict

It has just been demonstrated that mimesis *is* universal; however, not all mimesis is pacifying and cooperative. For mimetic scholars, the positive imitative phenomena essential to human development and interpersonal relationships are simultaneously the basis for social competition, rivalry, and ultimately violence. In 1979 Girard critiqued the corpus of work on imitation in the following manner:

> If you survey the literature on imitation, you will quickly discover that acquisition [the goal of obtaining an object] and appropriation [the goal of obtaining an object exclusively for oneself] are never included among the modes of behavior that are likely to be imitated. If acquisition and appropriation were included, imitation as a social phenomenon would turn out to be more problematic than it appears, and above all conflictual. (9)

Indeed, a contemporary survey will reveal the same result: that this conflictual problematic of human imitation has not been addressed by the empirical sciences. If a connection is made between imitation and violence, it is typically done so in relation to "copycat" behaviors either through social modeling or violence portrayed in films and the media (Eldridge 2005; Huesmann 2005). While this phenomenon is important and deserves to be addressed, the connection it makes between imitation and violence overlooks the way in which our imitative nature facilitates initial acts of violence in the first place, before there is any violence to imitate.

Girard (1987) regards Plato's work on imitation as highly influential yet ultimately insufficient for understanding this consequential aspect of the human imitative phenomenon. While Plato was very concerned about humanity's profound imitative ability, he limited imitation to acts of "*representation*—types of behaviors, manners, individual or collective habit, as well as words, phrases, and ways of speaking" (8). Girard critiques Plato's account of imitation and its resulting influence on Western thought:

> What is missing in Plato's account of imitation is any reference to kinds of behavior involved in appropriation. Now it is obvious that appropriation figures formidably in the behavior of human beings, as it does in that of all living beings, and that such behavior can be copied. There is no reason to exclude appropriation from imitation; Plato nonetheless does just this, and the omission passes unnoticed because all his successors, beginning with Aristotle, have followed his lead. It was Plato who determined once and for all the cultural meaning of imitation, but this meaning is truncated, torn from the essential dimension of acquisitive behavior, which is also the dimension of conflict. (8)

While the dimension of conflict as such has yet to be addressed by imitation researchers, over the last decade the scope of what can be imitated has gone beyond Plato's limitations to include those *nonrepresentational* states of intentions and goals of which the desires to acquire and appropriate are types. For example, evidence has already been presented demonstrating the link between imitation and intentions. Not only is imitation understood to be the means by which children acquire access to the mind of another, including another's desire, goal, or intention, but imitation itself is thought to be goal directed or intention oriented. Meltzoff's (1995, 1996) work demonstrates that infants can infer and imitate invisible goals and intentions based on human acts and gestures, and that the convergence of gaze between adults and infants "indicate[s] that infants understand the object directedness of an adult act even when the adult has only a distal relationship with the object" (Meltzoff and Brooks 2001, 187).

Furthermore, we have seen that individual neurons demonstrate a primary response orientation toward goal- or object-directed actions, and not simply types of behavior. The finding that most mirror neurons respond to object-directed *grasping* behaviors becomes all the more poignant in light of our discussion on acquisitive mimesis. What more is grasping than a gesture of acquisition or appropriation? While not explicitly stated, many of the ingredients of acquisitive mimesis have thus been detailed by empirical research. Even if researchers do not yet recognize the escalation of rivalry inherent in the generative reciprocity of such acts, their findings nonetheless provide valuable information and support for Girard's ideas about the mechanisms that underlie acquisitive mimesis.

The challenge put forward by mimetic scholars is, therefore, as follows: now that we know more clearly *how* it is we imitate, it is time to look at exactly *what* we are imitating and how this makes mimetic behavior even more enlivening, and potentially destructive. Of course, what empirical researchers have yet to address is the fact that the goal-directed gestures of acquisition and appropriation are imitated and subjected to the same generative effects as all the other gestures involved in more cooperative acts of imitative reciprocity. So at this stage in the development of cognitive neuroscience and developmental psychology, imitation researchers speak only of models and never rivals. It is no surprise, however, that when two toddlers reciprocate the goal or intention to acquire and appropriate the same object, such as a toy, they converge upon one another in a manner that foreshadows the plethora of adult rivalry, conflict, and envy to come.[9]

It is crucial that the seemingly paradoxical or dual nature of human relationships be understood as based on the single property of imitative reciprocity. This "bipolarity" of human mimesis is important, because a mimetic understanding of human motivation can help eliminate many gaps in theories that attempt to account for the pervasive nature of human rivalry and violence with dual or opposing instincts or with autonomous biological traits such as aggression. In contrast, mimetic theory makes it clear that

> We are competitive rather than aggressive. In addition to the appetites we share with animals, we have a more problematic yearning that lacks any instinctual object: desire. We literally do not know what to desire and, in order to find out, we watch the people we admire: we imitate their desire. Both models and imitators of the same desire inevitably desire the same object and become rivals. Their rival desires literally feed on one another: the imitator becomes the model of his model, and the model the imitator of his imitator. Unlike animal rivalries, these imitative or mimetic rivalries can become so intense and contagious that not only do they lead to murder but they spread, mimetically, to entire communities. (Girard 2004, 8)

The incorporation of acquisitive mimesis, and thus mimetic rivalry, by imitation researchers would not only dramatically enlarge the scope of imitation research but fundamentally revolutionize our understanding of human motivation and the origins of violence in society. Further integration between mimetic theory and imitation research should help expand and detail a mimetic understanding of the transformation of human desire from simple competitive efforts to acquire objects or resources (i.e,. food, mates, power) to the emergence and escalation of *mimetic rivalry* void of objects (rivalry for rivalry's sake), giving rise ultimately to *mimetic violence* and frantic, destructive, and deceptive attempts to triumph over and differentiate between oneself and one's rival. Such an analysis is clearly possible, given current research and understandings of both the dynamic relationship between imitation and self-other differentiation and of the breakdown in inhibitory functions, and thus differentiation, during affectively intense interactions. Such explorations should naturally lead us even further, to an understanding of the consequences of these mimetic effects in social relations and the resulting loss of differentiation experienced in group contagion.

The presence of acquisitive mimesis in human and nonhuman primates may be an appropriate topic for beginning a dialogue between mimetic scholars and imitation researchers interested in evolutionary theory. In fact, Girard (1987) has gone so far as to say that that the nature of acquisitive mimesis in causing conflict is essential in understanding the ramifications of mimesis elaborated by mimetic theory in its entirety:

> That cause, we repeat, is rivalry provoked by an object, the acquisitive mimesis which must always be our point of departure. We will see now that not only the prohibition but also ritual and ultimately the whole structure of religion can be traced back to the mechanism of acquisitive mimesis. A complete theory of human culture will be elaborated, beginning with this single principle. (18)

From the process of reciprocal acquisitive mimesis, Girard's anthropological theory proposes to show how culture has emerged from this essentially bi-personal experience. Girard asserts that all social structures and institutions have developed from a progression that is fueled by mimetic desire, which, in the transitional stages from primates to humans, had spontaneously transformed itself into a contagious group phenomenon that found its only resolution in the murder of a communal victim. The "war of all against all" (described by Hobbes) was transformed into the sacrificial act of all against one. This *scapegoat mechanism* is a social resolution to human desire (in contrast to the instinctual dominance patterns seen in nonhuman primates) and can account

for all the uniquely human social and religious structures that have evolved from the need to limit mimetic potential in order to achieve some degree of social cohesion and order.

While the scope of this anthropological process is outside the purview of the empirical sciences, it is important to point out that there are at least some hints that imitation researchers are beginning to think about and appreciate the relationship between violence and mimesis and its broader and potentially destructive ramifications in society. In his discussion of imitation as "entrainment" or "adopting shared rhythms of behavior," the neuroscientist Marcel Kinsbourne (2005) argues that social imitation is "more innately compelling than reasoned argument in inducing two, or many, to adopt the same point of view" (172). Along this line of thought, he makes an essential connection between the effects of mimesis on group behavior and its relationship to religious/cultural rituals and practices.

> I suspect this is so in every religion: there are hymns, chants, responsive praying, all variants of entrainment, which is so persuasive. The worshiper feels elevated, inspired, influenced not only by the prayer's content, but also by the togetherness in praying. Consider marching songs, marching bands, drums, tom-toms, and ritualistic gestures made in unison. The faith healer works his routine on the crowd. The crowd is responsive. The emotional temperature goes up and up, and then the crowd is persuaded of the faith healer's powers, and logic has nothing to do with it. And on the dark side, there is the goose step, the Heil Hitler cheer and salute, all serving to persuade people to do things that individually they would not dream of doing. It is as though entraining with the crowd suspends personal responsibility. Such is the potent effect of imitation on the behavior of the species. (170–71)

Summary

While mimetic scholars have long stressed the primordial role of psychological mimesis in human motivation and social relations, it is only recently that empirical research has been able to account for and support such reciprocity of experience, even at a level as basic as that of individual neurons. Taken together, imitation research, still in its infancy, alongside mimetic theory, provides a complementary set of theories, which inevitably lead to greater clarity and explanatory depth on human mimesis, which is not found in Girard's work alone or in the work of those who have advanced his ideas. In addition, the developing fields of developmental psychology and cognitive neuroscience are influenced by and dependent upon disciplines such as anthropology,

philosophy, literary analysis, and theology, all of which approach similar or unique questions from differing sources and points of view. Without these other disciplines, neuroscience would not be able to ask the questions that it does, or apply its findings in a meaningful, preexisting framework of knowledge. For example, the broader implications relevant to mimetic theory did not originate within the empirical sciences but from literary, anthropological, and historical investigations. At the same time, Girard's entire corpus of work rests on the primacy of human imitative behavior, the significance of which must be measured against the unfolding and revolutionary research in the fields of developmental psychology and cognitive neuroscience.

CONCLUSION

It is clear, then, that a new environment exists, in which mimetic theory can be further elaborated and developed. This new environment is a multidisciplinary field of study that promises to fill in many of the gaps that exist in mimetic theory as well as making it available to more domains of research. The work of René Girard makes an enormous contribution to a fuller understanding of the imitative/mimetic phenomenon and its social and anthropological implications. For the most part, empirical research focuses on imitation at the individual or dyadic level of behavior, emphasizing short-lived imitative acts, with the goal of understanding how imitation is accomplished at the psychological and neuropsychological levels. Most of this literature has focused on imitation in infancy or in nonhuman primates, with little attention given to its continued and pervasive influence in human adult life.

Additionally, the most obvious neglect in imitation theory is the role of mimesis in generating conflict between a subject and its model, and the subsequent effects of contagion in group relations and the evolution of culture and religion. While the discoveries of developmental psychology and neuroscience are profound in their own right and have been used to advance many interventions in medicine and psychology, scientists are ultimately ill equipped in their attempts to appreciate the broader anthropological implications of imitation that mimetic scholars address.

When imitation research is viewed through the lens of mimetic theory, one sees not only the building blocks of relatedness, mindfulness, and meaningfulness but also the mechanisms of distortion, disillusionment, and violence. If a reciprocating feedback loop between mimetic scholars and imitation researchers can be established—and I believe wholeheartedly that it is inevitable—the social sciences may begin to better appreciate and understand the incredible nature of human life, culture, and religion, an appreciation that is essential in transforming human culture and relationships through infinitely more imaginative and nonviolent ways of relating.

Notes

1. I will use the terms mimesis/mimetic and imitation/imitative somewhat interchangeably, though I do realize that there is a great deal of distinction that can be made between them, both for mimetic scholars and imitation researchers. For example, Girard (1987) tends to preserve the term imitation for those acts that are more consciously copied, while mimesis would indicate a type of reciprocity that is below phenomenological awareness. Imitation researchers might make different distinctions between the terms. To give one example, Donald (2005) provides the following definitions:

   > *Mimicry* is the deliberate reduplication in action of a perceived event without careful attention to, or knowledge of, its purpose. . . . *Imitation* is a more flexible, abstract reduplication of an event with closer attention to its purpose. . . . *Mimesis* is the reduplication of an event for communicative purposes. Mimesis requires that the audience be taken into account. (286)

2. For a comprehensive review of infant imitation research, see Nadel and Butterworth's (1999a) *Imitation in Infancy.*

3. For a more complete review of mirror neurons and their functional and evolutionary significance, see Stamenov and Gallese (2002).

4. For a more extensive analysis of preverbal representation and deferred imitation, see Meltzoff (1990b); Meltzoff and Moore (1994, 1997, 1998).

5. See Guillaume (1926), *Imitation in Children.* Paul Guillaume recognized the universality of imitation in children, in the acquisition of language as well as the apprehension of another's mind and one's person, and set out to study the psychological mechanisms that produced this imitation.

6. In order to provide an adequate comparison between mimetic theory and imitation research, we would need to orient ourselves to various distinctions made by empirical researchers between intentions and desires. To give one example, Malle and Knobe (2001) propose that intention and desire can be distinguished by three features:

   > First, intentions are directed at the intender's own action whereas desires can be directed at anything. Second, intentions are based on some amount of reasoning whereas desires are typically the input to such reasoning. Third, intentions come with a characteristic commitment to perform the intended action whereas desires do not. (as summarized in Malle, Moses, and Baldwin 2001, 4)

7. The development of ToM is thought to emerge around 18 months of age in the form of protodeclarative pointing (Baron-Cohen 1989). At this stage, the child is aware that he or she is sharing the view or attention of a particular object with another person. From 18 to 24 months, children become increasingly involved in pretend play (Leslie 1987) and the understanding of others' desires or intentions (Wellman and Woolley 1990). Later, around the age of three or four years, children begin to develop the ability to think about what others are thinking, also known as first-order beliefs (Wimmer and Perner 1983). Children continue to build upon their ToM capacity and, between the ages of six and seven, are able to engage in second-order beliefs (i.e., I think that he knows that she wants) (Perner and Wimmer 1985).

8. Over the last 45 years, René Girard and subsequent mimetic scholars have made significant strides in elaborating on the role of human mimesis through applications in anthropology (Anspach 2001; Gans 1981), theology (Hamerton-Kelly 1992; Schwager 1987; Williams 1991; Alison 1998), economics (Dumouchel and Dupuy 1979), literary analysis (McKenna 1992), psychology (Oughourlian 1982), and philosophy (Gardner 1998), to name just a few.
9. See Gil Bailie's (1995) examples of mimetic rivalry in childhood and adult relations (116–20).

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