

Imitation, Mirror Neurons, & Mimetic Desire:
Convergent Support for the Work of Rene Girard

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Introduction

The purpose of this paper is to advance the interdisciplinary dialogue commenced at first by Jean-Michel Oughourlian (1982), and later in more detail by Eugene Webb (1993), concerning the convergence between empirical research on imitation and Rene Girard's theory of psychological mimesis. Psychological mimesis is the tendency of human beings to imitate the gestures, behaviors, and intentions 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. The scope of Girard's work is immense 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, "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, p. 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. To this point Webb concluded:

Thus there is good reason to think not only that the latter 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 (p. 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 with the support of the empirical sciences. This absence is made more remarkable when one considers the dramatic rebirth in imitation research since the publication of Webb's book.

Within the last decade empirical investigations on human imitation have undergone a dramatic resurgence of interest, the results of which provide unprecedented support and clarification of the foundational role of psychological mimesis. Convergent evidence across the modern disciplines of developmental psychology and cognitive neuroscience demonstrate that imitation based on mirrored neural activity and reciprocal interpersonal behavior are what guide and scaffold human development. Not only does imitation function powerfully in the mother-infant dyad to bring about experience-dependent neurocognitive development, but it continues to thrive in adulthood as perhaps the most organizing characteristic of human relations, significantly effecting mental representation, empathy, language, and intersubjective experience. More specifically, new discoveries from neuroscience continue to suggest the essential role of mimetic reciprocity in contributing to a wide-scale cerebral re-organization of the brain, allowing for the co-evolution of more complex social and representational abilities from 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 which copies the actions of others, as in children's games, or it is relegated to a narrow role in child development. Both of these conceptions dim in the light of recent empirical evidence. What is more, there are too few imitation researchers who are attempting to understand the importance of imitation for psychosocial development and functioning, in spite of the obvious links between their findings and the existing theories of social dynamics, as well as for the emergence of human culture 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. Similar to Girard's (1987) critique of the social sciences, imitation researchers argue that, "these earliest imitations offer the greatest challenge to psychological theory" (Trevarthen, Kokkinaki, and Fiamenghi, 1999, p. 128).

While focusing primarily on dyadic relationships in infancy, empirical researchers have only begun to look at the persistent role of imitation in adulthood and group dynamics. The questions that have occupied cognitive neuroscientists as well as developmental psychologists have mainly addressed the 'functional architecture' of imitation as well as its role in the development of language, theory of mind, intentionality, and memory. Furthermore, there still remains a suspicious absence among imitation theories concerning the role that reciprocal mimesis has in generating acts of social rivalry, conflict and ultimately violence; this is, therefore, the challenge *par*

excellence, not only for imitation researchers, but the social sciences at large. It seems obvious that mimetic theory with its central focus on universal mimesis has the most potential for making a profound contribution toward this goal. Yet there are many gaps in mimetic theory, which 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 human brain and in the interpersonal matrix where it is found. It is in this light that imitation research has much to offer mimetic theory. Girardian scholars must substantiate the principle claims of mimetic theory in ways which corroborate findings across the disciplines relevant to it. If this can be accomplished, and I believe wholeheartedly that it can, then the social sciences may begin to better appreciate and understand the incredible nature of human life and culture.

The purpose of this discussion then, will be to illuminate and integrate some of the most pertinent findings concerning imitation and the central role it plays in human development, cognition, and intersubjective experience. By no means will this analysis be exhaustive. I intend to demonstrate the valuable contribution that developmental psychology and neuroscience provide for 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 Girard from a more anthropological perspective. Since there have been no substantial studies concerning the critical question of human imitation, which have synthesized recent findings with Girard's theories, 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 theory and imitation research

demand that we take seriously our imitative nature as not only a positive phenomenon 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 & Background

Through his literary research, Girard (1965; 1972) discovered certain repetitive patterns of social relations, which proved reliable and consistent throughout different periods of history. He began to see a consistent underlying mechanism at work in human relationships, which 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, non-conscious 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 behaviour 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 behaviour, if they indeed exist (p. 7).

Since the initial publication of these remarks in 1978, the sciences have accomplished a great deal, albeit unknowingly, to investigate 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 plays a central role in human development and psychosocial functioning at a depth that earlier philosophers and empiricists never comprehended. The following quote, taken from the introductory remarks of a recent interdisciplinary conference on imitation, demonstrates the emerging significance of this area of investigation to the social sciences.

Imitation...is often thought of as a low-level, relatively childish or even mindless phenomenon. This may be a serious mistake. It is beginning to look, in light of recent work in the cognitive sciences, as if imitation is a rare, perhaps even uniquely human ability, which may be fundamental to what is distinctive about human learning, intelligence, rationality, and culture. If so, this will have important consequences for our understanding of ourselves both individually and socially. In particular, social learning by imitation is not merely a mechanism by means of which children acquire culture, but may also have pervasive influence throughout adulthood, in ways that we are only just beginning to understand (Hurley & Chater, 2002).

Given its essential and ubiquitous presence in human life, it is remarkable that empirical researchers have only just begun to give imitation the attention it deserves. Several authors have commented on the influences that have contributed to the modern misunderstandings of imitation as well as its neglect among empirical researchers.¹ Plato was among the first to formally contemplate the universal phenomenon of imitative behavior, yet he was never able to fully explain its centrality to human life. Prior to empirical research, most theorists followed Plato in reducing imitative behavior to a special “faculty” of lesser significance (i.e. social learning), rather than a pervasive process vital to both the development and sustenance of human thought and culture (Girard, 1987; Nadel & Butterworth, 1999). Systems of philosophy following Plato retained this 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

¹ For further exploration of these influences see Oughourlian, 1982; Girard, 1987; Nadel & Butterworth, 1999; Meltzoff, 2002.

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 to say that the social sciences and medical models inherited from Europe have all been so influenced by this philosophical model that only in the past 40 years have we begun to make incremental shifts in our conceptual paradigms which allow 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 evidence can be seen in Freud by the absence of any reference to imitation in his theory of early infancy. Imitation researchers concur; “It is clear that there is no place in Freud’s theory of early infancy for imitative self-other reciprocity (primary intersubjectivity)” (Trevarthen, Kokkinaki, & Fiamenghi, 1999, p. 155). Similarly, Piaget (1969) 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 throughout 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. 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 phenomena

Such false assumptions have had the enduring effect of steering researchers away from imitation as a rich and viable area of investigation by assuming that they already understood the phenomena completely, or by leaving the impression that imitation was valuable only later in life, and then only for limited functions.

Nadel & Butterworth (1999) provide a historical survey of empirical research and note that it was not until the 1970's that "imitation" appeared as a keyword in psychology reference bases. While not completely neglected, imitative phenomena was instead subsumed under other topics such as observational learning, symbolic play, instrumental learning, acquisition of new responses based on social experience, or a particular form of cognitive development suggested by Piaget. By 1970 as few as 10 studies had looked at imitative ability at different developmental ages, and by 1978 this amount 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", which made developmental studies somewhat obsolete, as well as the discovery that imitation preceded representation and symbolic functions, which will be discussed shortly.

Imitation research has flourished over the last few decades, resulting in a resurgence of research across a wide range of disciplines, including developmental psychology, cognitive science, experimental psychology, neuroscience, linguistics, primate psychology, cultural evolution, evolutionary biology, and artificial intelligence. The literature on this topic, however, is not without debate and disagreements concerning definitions, types, human vs. primate imitation, and the nature of the imitative mechanisms. Despite these differences in opinion, which are inevitably 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. Human imitative phenomena promises to be one the most significant and illuminating areas of research contributing to the future of a more unified and coherent understanding of the social sciences. Because the body of imitation research is voluminous, what follows is a brief survey of several major findings that I hope will illustrate their value in illuminating the primordial significance of psychological mimesis. They will be addressed in the following order:

- 1) Immediate imitation in infancy,
- 2) Mirror neurons, and
- 3) The role of imitation in representation, language, and a Theory of Mind.

Immediate Imitation in Infancy

The seminal work of Andrew Meltzoff & Keith Moore (1977; 1983; 1989) has played a key role in changing the depth and scope of imitation research. 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 from birth.² What they found at first was that 2-3 week old infants could immediately match body parts between themselves and adults, including the ability to imitate facial expressions and various hand gestures. Remarkably, the infants did not confuse either body part or action. For example, 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

² The classical Piagetian view of child development did not credit infants with many of the cognitive abilities we now know them to possess; the most significant of which is the precocious ability to imitate. Meltzoff notes that:

In the classic view, young infants were initially devoid of the ability to imitate, and they developed through stages. A landmark development occurred at about 8-12 months of age when they first became able to imitate facial gestures, such as lip and tongue movements. Before this

that they 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 & Decety, 2003). In order to confirm that such behaviors were not the result of prior associative experience or reinforcement training, they repeated their study with newborns averaging 32 hours old, the youngest being only 42 minutes old (Meltzoff & 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.

These findings came as a shock to developmental theorists. While emphasizing the valuable role of imitation for infant learning, the predominant Piagetian model of the time stressed that infants gradually progressed from non-imitation to imitation. Infants learned to imitate later in development through acts of representation, such as symbolically associating their own actions seen in a mirror or through tactile exploration of their own movements, to the actions of others. Self-imitation led to hetero-imitation. According to Piaget (1969), imitation was an intrapersonal phenomenon first and only later, with the infant's increasing memory and representational skills, did it become interpersonal. Thus, prior to the discoveries by Meltzoff and Moore (1977), "the existence of immediate imitation in development was hardly suspected and its role was ignored (Nadel & Butterworth, 1999, p. 1)."

A variety of studies conducted by Meltzoff and numerous others have been replicated and validated cross-culturally, essentially debunking what was thought to be an

age it was said that they could watch the facial gestures of adults, but they had no way of connecting or associating the seen acts of another with the invisible acts of their own (p.254).

obvious disconnect in infancy between action and perception, self and other.³ Imitation was now seen as a powerful interpersonal mechanism facilitating infant learning from the very beginning of life. The question was no longer *if* infants could imitate immediately, but *how*? Attempts at elucidating the mechanisms and conditions underlying such reciprocal behaviors are, for the most part, the story of imitation research over the last several decades.

Meltzoff & Moore (1994; 1997) have developed 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. According to this model infants are born with a very primitive and foundational ‘body scheme’ that allows them to “unify the seen acts of others with their own felt acts in a common framework”.

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, 1999, p. 254).

Based on earlier findings (Meltzoff & Moore, 1977) of immediate imitation in human neonates, Meltzoff & Moore (1994) later developed the above model, which implied an innate matching process between action and perception, between ones own body scheme with that of another. While it became increasingly obvious that infants were imitating and thus unifying these cognitive modalities, it was not clear at the time how this actually worked; that is, what the underlying mechanisms were that made such

³ For a comprehensive review of infant imitation research see [Imitation in Infancy](#) (Nadel & Butterworth,

unification possible, although it certainly suggested shared neural representations. It would only be a few years later that the AIM hypothesis would be substantially validated from the separate discipline and methodological domain of neuroscience.

Mirror Neurons

The 1990's were known as the decade of the brain, and the impression that neuroscience continues to make on biology, psychology, medicine, and culture at large is enormous and undeniable. One of the most amazing 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)

The significance of the recent discovery of mirror neurons is inestimable for cognitive neuroscience and psychology, and imitation research in particular. Not only do mirror neurons provide overwhelming support for models proposed by developmental psychologists concerning imitation, but they also take our understanding of mimetic reciprocity to a whole new level of research and underlying mechanisms, that of cerebral organization and neural integration.

Mirror neurons are brain cells that are activated both when an individual is performing a particular motor movement and when observing the same movement by another person. The Italian research team led by Giacomo Rizzolati (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 the 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. This “mirror system” seemed to represent an immediate reciprocal link between participant and observer, a finding that is invaluable to imitation research. Rizzolatti et al. (2001) explain why:

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 (p. 663).

The fortuitous nature of this discovery is that the Italian researchers were not necessarily investigating imitation per se, but rather the neural underpinnings of action understanding, a very common yet complex cognitive capability (Fogassi & Gallese, 2002). Over fifteen years ago Rizzolatti, et al. (1988) had discovered an area of the premotor cortex which contained individual neurons that responded only when the monkey was performing complex goal-directed actions, such as grasping, manipulating, holding, or tearing of objects. This was an interesting finding because at the time it was thought that neurons in the premotor cortex responded only to more elementary movements that were later coalesced into complex actions. While this finding was a remarkable one in its own right, further investigations of these neurons led to an even more bewildering discovery; that the same neurons were responding to purely perceptual information of the same action! Mirror neurons are 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 evasive methodologies have demonstrated the same mirroring process of brain activation in humans (Iacoboni,

Woods, Brass, Bekkering, Mazziotta, & Rizzolatti, 1999; Rizzolatti, Fogassi, & Gallese, 2001).

Follow-up investigations with monkeys have revealed that mirror neurons not only share core common characteristics, but are also differentiated according to the action that evokes their response and the congruence between the action performed and the action perceived (Fogassi & Gallese, 2002). Mirror neurons demonstrate that visual and motor information can be matched at the single neuron level with actions that are “virtually indistinguishable”, but not just any action will excite them. 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.

Apart from their similarities, mirror neurons differ with respect to the 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. In addition, mirror neurons not only demonstrate 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 & 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 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 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 (p.19).

From the above explanation, we can see that the functional significance of mirror neurons pertain to many facets of social interaction which 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 their evolution across species. For example, contemporary theorists propose that differences between humans and non-human primates are due more to cortical ‘re-wiring’ rather than brain size or the acquisition of unique brain structures (Roth, 2002). Thus, the development of mirror neurons, which code and unify both perception and action, may have contributed significantly to a wide-scale cerebral re-organization, allowing for the co-evolution of more complex social and representational skills (Rizzolati & Arbib, 1998; Gruber, 2002).⁴

The dual coding capabilities of individual neurons provide convergent validation for the AIM hypothesis of infant imitation forwarded by Meltzoff & 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, is innate and initiated at a very primitive level of human experience. From the very beginnings of life, infants are immediately immersed in a rich social matrix of self-other reciprocity. However, human imitation is vastly more important than the *in vivo* resonance of affective states and visual-motor information. For example, we know that monkeys do not imitate, even though they do have the same basic mirror neuron machinery that affords them the capacity to interpret complex actions (Meltzoff & Deceity, 2003). 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 complex representation, language, and the development of a theory of mind.

Deferred Imitation & 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 model. In addition to immediate imitation, Meltzoff and Moore (1977; 1992; 1994) have also demonstrated that deferred imitation (the delayed re-presenting of past events) takes place much earlier than what Piaget had suggested.

In classical theory, there is a difference between a 'sensorimotor' and a 'representational' stage of development (e.g. Piaget, 1952, 1962). 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 & Moore, 1999, p. 13).

In contrast, Meltzoff & Moore (1977) found that infants could represent and imitate adult facial gestures after short or prolonged periods of time. For example, the experimenter made a particular facial gesture while the infant had a pacifier in their mouth. The

⁴ For a more complete review of mirror neurons and their functional and evolutionary significance see Stamenov & Gallese, 2002.

pacifier induced the sucking reflex and thus prevented the infant from imitating immediately the adult behavior. When the pacifier was removed the experimenter assumed a neutral face. 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 6 weeks old would imitate facial gestures while looking at the neutral face of the adult after delays as long as 24 hours (Meltzoff & Moore, 1994).

In an additional series of “observation-only” design studies developed by Meltzoff (1985; 1988c; 1988d), 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 the experimenter would lean forward and press his head against an unfamiliar panel that would then light up. When exposed to the panel one week later, infants demonstrated that they 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 may have used their hands to achieve this 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 6 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 infants can successfully imitate after delays up to 4 weeks, and by two years of age the delay can be as much as four months or longer (Meltzoff & Decety, 2003).

We now know that at a very early age infants can store a representation of adult behavior and actively compare their own behavior to that of an internal model (Meltzoff & Moore, 1992; 1994). Observation and execution of novel acts can be broken apart in

time. The ability to defer over longer periods of time is made possible by the infant's increasing development of working and long-term memories. Imitation is therefore a powerful learning tool because it "avoids time-consuming trial-and-error learning" (Wohlschlager & Bekkering, 2002). 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, & Tomasello, 1998).⁵

Self-Other Differentiation

One of most important lessons learned by infant imitation is the awareness and identity of oneself as both similar and different from other people. Imitation plays an essential role in facilitating the development of self-other differentiation. We know that infants not only imitate, but they 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 versus adults who are simply responding to them in time. Meltzoff & Moore (1999) argue that the responsiveness directed toward the imitating adult is due not simply to "temporal contingency", but rather accurate "structural congruence" with the imitated behavior. The significance for infants is not just that their action produces another action, but the experience of the other as doing "the same as me".

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' behaviour, 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 behaviour in a generative fashion (p. 24).

⁵ For a more extensive analysis of preverbal representation and deferred imitation see Meltzoff, (1990b) and Meltzoff & Moore (1994; 1997; 1998)

Through imitation infants learn that of all the objects in their environment only people can match and participate in the same experiences as them. The cognitive and affective qualities of these shared experiences propel the infant to generate and seek out more of these experiences. In the presence of participating and reciprocating others, infants learn to explore and expand their domain of being. Meltzoff & 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 & 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, 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 & Decety, 2003, p. 495).

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 & Decety, 2003). The attunement and responsiveness that psychologists associate with healthy parenting is based on an active state of imitative reciprocity. These 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 them and different. “Imitation is both a measure of self-other understanding and a prime engine in its development (Meltzoff, 2002).”

An important question that pertains to the mimetic reciprocity mentioned above, is how the brain keeps 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 & Sommerville (2003) provide a review of this research and demonstrate that similar and distinct brain regions are involved in the differentiation between self and other both when imitating or 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 (p. 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 & Decety, 2001; Decety, 2002; Decety & Chaminade, 2003).

Communication & 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, Guerini, Peze, & Rivet, 1999; Nadel, 2002; Trevarthen, Kokkinaki, & Fiamenghi, 1999; Wohlschlager & Bekkering, 2002). The social contingency inherent in the immediate imitation of others and the recognition of being imitated in return, allows older infants to communicate intentions, negotiate turn taking and role switching, share in pretend play, and collaborate in shared projects (Nadel, 2002). Reciprocal imitation is also thought to play an important role in early communication by serving as a foundation for language and a precursor to more symbolic processes (Nadel, Guerini, Peze, & Rivet, 1999; Nadel, 2002; Trevarthen, Kokkinaki, & Fiamenghi, 1999; Wohlschlager & Bekkering, 2002; Rizzolati & 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 difficulties involved in studying the processes have only recently been available.⁶

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 & Arbib, 1998; Billard & Arbib, 2001). For example, Rizzolati & 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 & 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 (p. 190-191).

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

⁶ 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 which produced this imitation.

understanding the genesis of how we understand the goals and intentions of others, and how these findings change our understanding of human development.⁷

Meltzoff (1995) designed a series of experiments that use imitation as a way of understanding the 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 attempt to grasp and pull the other end off with the opposite hand. Rather than completing the act, the experimenter's 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 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 & Decety, 2003, p. 496).

The 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 similar manner as the human actor. He found that infants who viewed

⁷ 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 researches between intentions and desires. As one example, Malle & 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 (Malle, Moses, & Baldwin, 2001, p. 4).

the uncompleted act by the mechanical device were not 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 not only helps the infant differentiate between themselves and others, but also between human and non-human 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 their 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”, 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, p. 32).

Several researchers have pushed this point even further, proposing that imitation is essentially the copying of goals and intentions of others rather than the copying of movements or actions (Trevorthen, Kokkinaki, & Fiamenghi, 1999; Wohlschlager & Bekkering, 2002). For example, Wohlschlager & 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” (p. 102). Furthermore, they suggest that direct-mapping theories, such as Meltzoff & Moore’s (1994;1997) AIM model, account for a large part of imitative learning, especially in younger infants, but do not accommodate other findings such as the matching of goals and intentions.

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 (p. 104).

The human ability to imitate, therefore, may come from our unique ability to recognize and infer the mental states of others, such as desires and intentions, rather than the ability to understand 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 knowledge of other minds that exist separate 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 & Smith, 1996, p.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.⁸

⁸ 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 & Woolley, 1990). Later, around the age of 3 or 4, children begin to develop the ability to think about what others are thinking, also known as first-order beliefs (Wimmer & Perner, 1983). Children continue to build upon their ToM capacity and between the ages of 6 and 7 they are able to engage in second-order beliefs (i.e. I think that he knows that she wants) (Perner & Wimmer, 1985).

The more recent interest concerning ToM emerged from the field of primatology in a paper given by Premack and Woodruff (1978). They questioned whether chimpanzees had a theory of mind, and their resulting research in this question pressured psychologists in particular to study how it is that one person could know what was in another's mind. Prior to the discovery of mirror neurons and the recent neurocognitive findings of imitation research, there were (and continue to be) several diverse theories, which attempted to account for the *fact* of ToM, as well as the various processes involved in acquiring such a capacity (Carruthers & 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 & Decety, 2003). Many developmental theorists still explain the acquisition of ToM in terms of the emergence of representational skills in a similar way that 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, & Fiamenghi, 1999; Wohlschlager & Bekkering, 2002).

Meltzoff & Decety (2003) 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 & 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 behaviour.
- (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 behavioural 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, p.36).

Summary

The combined efforts of both developmental psychology and 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 regards to the social sciences. The above research demonstrates the profound significance of reciprocal imitative phenomena at both the neural and behavior levels. Imitation is no longer seen as a mindless act explaining 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 & Imitation Research

Introduction

Several decades before empirical research prompted a resurgence of interest in imitation and its significance to human development and psychosocial functioning, Rene Girard (1965; 1972) had already articulated a theory of imitation, which explained imitative phenomena 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. *acquisitive mimesis*, *mimetic desire* and the *scapegoat mechanism*) during a time when imitation was quite out of fashion, but he did so through investigations in literature, cultural anthropology, history, and ultimately returning to religious texts for further evidence of mimetic phenomena. The parallels between Girard's insights and the only recent conclusions made by empirical researchers concerning imitation (in both the development and evolution of the species) are extraordinary and deserve a more detailed and comparative

review. Such an undertaking will require a more extensive analysis than what is possible in this discussion. What follows is merely a springboard for thinking about the value of furthering this exploration.

Since the emergence of modern imitation research, little dialogue has taken place not only between imitation researchers and mimetic scholars, but between imitation researchers themselves, though the latter has changed substantially in recent years. For example, while infant imitation has been an active and growing area of investigation since the late 1970's, it was not until 1999 that the first compilation of evidence from a variety of researchers was published in book form (Nadel & Butterworth, 1999). That same year, one of the first conferences took place, which created an interdisciplinary dialogue between developmental psychology and neuroscience researchers (Meltzoff & Prinz, 2002). Two years later the dialogue expanded from developmental psychology and cognitive neuroscience to the social sciences more broadly, including the philosophical and social importance of imitation, at a conference in Royaumont Abbey, France in May of 2002 entitled "Perspectives on Imitation" (Hurley & Charter, 2004).

Even less, if any, dialogue has taken place between mimetic scholars and imitation researchers. While Oughourlian (1982) and Webb (1993) both made reference to several studies, the majority of convergence and potential influence between the two domains has yet to be recognized and fully developed. The importance of such an analysis was made explicit by Webb 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 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 later 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. (p. 225)

It is too soon to tell exactly how successfully interindividual 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.... (p. 217-219).

Based on this comparison, we can see an immediate parallel between the findings of imitation research and mimetic theory. Empirical research provided by disciplines such as developmental psychology and neuroscience is in a position to help establish Girard's theory of psychological mimesis and its broader implications in a similar way that 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. Thus, it is imperative that his foundational claims be readdressed in light of new evidence from contemporary empirical research. Girardian scholars are in a position to substantiate principal claims of mimetic theory in ways which 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."

Universal Mimesis and the Generative Function of Imitation

Imitation researchers and mimetic scholars overlap most significantly in their view of imitation as a vital and positive force in both human development and evolution.

While mimetic theory also addresses the conflictual aspects of mimesis in relation to human desire, Girard has stated 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, and everything” (Williams, 1996, p. 64). In like fashion, we have already seen empirical researchers speak of imitation as the primary source of one’s access and attachment to the mind and being of the other, and that these mimetic connections foster the opening of intersubjective experience to deeper and more penetrating levels of relationality and social cognition.

It has already been established that imitation research validates and substantiates many claims made by Girard and Oughourlian concerning the foundational significance of universal mimesis as the cornerstone of cognitive and emotional life (Oughourlian, 1982; Webb, 1993). The research presented here increases such validation exponentially by providing necessary explanations of the fundamental neural mechanisms on which mimesis operates.

In addition to validating universal mimesis, imitation research in fact extends Girard’s mimetic theory in many important ways. In this respect, there are many gaps and limitations in mimetic theory to explain and account for the origins and mechanisms that allow for the positive mimetic effects to take place. The really interesting questions no longer pertain to *if* we imitate or at what age we begin imitating, but *how*? What are the mechanisms of mimesis? What are the differences between human and non-human primate mimesis and representation? And how do these differences figure into the evolution of the species? Empirical researchers from disciplines such as developmental

psychology and neuroscience are among those pioneering a clearer understanding of our imitative origins that need to be accounted for by mimetic scholars.

Oughourlian (1982) referenced the original work of Meltzoff & Moore (1977) in his development of an interindividual psychology—a psychological system founded solely upon universal mimesis. In addition to supporting their conclusions on the innateness of imitation, Oughourlian (1982) provided the following critique of the model used 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 (p. 9).

While not as abstract as Meltzoff and Moore may have initially implied, the solution to the problem of infant imitation indeed seems to be the result of an innate and universal matching process (Meltzoff & Moore, 1997), albeit one that is supported by mechanisms at a level in the brain that no one thought possible at the time. 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? To this point, Oughourlian asked the following questions that at the time were unanswerable: “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, p. 9). The available research described here helps to clarify, and in many respects answer, these questions to a great degree of specificity.

This is most evident in the work on mirror neurons. Mirror neurons seem to represent a primary and primitive form of reciprocal social experience, and are understood as the neural basis for learning by imitation (Billard & 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, p. 283-284).

The findings on mirror neurons detail 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 describe here in support of his own theory.

For example, Stamenov & 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...” (p. 2).

This evidence also leads us to think about the nature of internal imitation as well. How does deferred imitation actually function in the internal world or mind of the adult? On what basis does the adult imitate old affect-laden schemas, which are represented in

memory in the presence of new imitative models? These questions deserve further exploration.

Thus, while mimetic scholars have long stressed the primordial role of psychological mimesis, it is only recently that we have been able to account for and support such reciprocity of experience, even at a level as basic as individual neurons. Taken together, imitation research, still in its infancy, along side mimetic theory provide a complimentary set of theories, which provides greater clarity and explanatory depth not found in Girard's work alone or those who have advanced his ideas.

Acquisitive Mimesis and the Role of Imitation in Conflict

As I have just demonstrated, mimesis *is* universal, however, not all mimesis is pacifying and cooperative. For Girard, the positive mimetic phenomenon essential to human development and interpersonal relationships is simultaneously the basis for 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 (p. 9).

Indeed, a contemporary survey will reveal the same results. If such a connection is made between imitation and violence by empirical researchers, it is typically done so in relation to “copycat” behaviors either through social modeling or violence portrayed in films and the media (Eldridge, 2002). While this phenomenon is important and deserves to be addressed, the connection it makes between imitation and violence overlooks how our

imitative nature facilitates initial acts of violence in the first place, before there is any violence to imitate.⁹

Girard (1987) regards Plato's work on imitation as highly influential yet ultimately insufficient for understanding this consequential aspect of human imitative phenomena. While Plato is very concerned about humanity's profound imitative ability, he limits imitation to acts of "*representation*—types of behaviors, manners, individual or collective habit, as well as words phrases, and ways of speaking" (p. 8). Girard critiques Plato's address 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 (p. 8).

Thus, the challenge forwarded by mimetic scholars is; 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 acknowledge is that the goal directed gestures of acquisition and appropriation are imitated and subjected to the same generative effects as all other gestures involved in imitative reciprocity. So at this stage in the development of cognitive neuroscience, imitation researchers only speak 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 See Appendix A for a brief summary of Girard's theories on mimesis and violence

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 surpassed Plato's limitations to include those *non-representational* states of intentions and goals, of which acquisition and appropriation are a type. Interestingly, the study of intentions has recently become a hot topic in its own right and has developed parallel to, and in many respects separate from, imitation research, though the two have converged recently and most notably by the efforts of Andrew Meltzoff (see Meltzoff & Brooks, 2001; Meltzoff & Decety, 2003). This new trend in understanding intentions and intentionality is largely the result of Theory of Mind investigations that seek to understand how infants acquire knowledge about the mental states of "Other Minds" and to what extent non-human primates can do the same.

The nature of intention and the means whereby we recognize one another's intentions has become a central issue not only in philosophy but also in psychological theory and research—and not just in psychology "in general," but in enriching our understanding of how the growing child comes to know his or her social world and, indeed, how *Homo sapiens* managed to take the crucial step of developing human culture (Malle, Moses, & Baldwin, 2001, p. xii).

I have already presented evidence demonstrating the link between imitation and intentions. Imitation is not only the means by which children acquire access to the mind of another, including their goals and intentions, 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 that the convergence of gaze between adults and infants, "indicate that infants understand the object directedness of an adult act even when the adult has only a distal relationship with the object" (Meltzoff & Brooks, 2001, p.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 is all the more poignant in light of our discussion on acquisitive mimesis. What more is grasping than a gesture of acquisition? Thus, while not explicitly stated, many of the ingredients of acquisitive mimesis have 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 of acquisitive mimesis. Further explorations on the nature and presence of acquisitive mimesis in human and non-human primates may be an appropriate topic commencing dialogue between mimetic scholars and imitation researchers. Indeed, Girard (1987) stressed that the nature of acquisitive mimesis in causing conflict is essential in understanding the ramification of mimesis elaborated by mimetic theory.

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 (p. 18).

Discussion & Implications

Over the last several decades, the growing disciplines of developmental psychology and neuroscience have continually required psychologists, anthropologists, linguists, and philosophers alike to rethink, and often do away with, certain assumptions about human nature that were founded without such knowledge, as well as helping them to understand why they came to such false conclusions in the first place (Churchland, 2000; Lakoff & Johnson, 1999). Yet, while neuroscience and other modern modes of investigation have disclosed many valuable secrets inaccessible to other methodologies, they do not claim to insubstantiate the findings of other theories, nor do they insist on any sort of methodological hierarchy determining what can or cannot be said about reality.

Rather, convergent evidence concerning the structure and function of the brain, for example, is considered an integral reference point holding other disciplines accountable to a clearer understanding of their own claims and assumptions as well as helping them recognize certain blind spots from which their own methodologies elude them. In a reciprocal manner, developing fields like neuroscience are influenced by 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 into a meaningful and 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.

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

The American experimental research into this subject 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 (p. 217).

Indeed, many branches of psychoanalytic thought have progressed significantly from the nomadic and autonomous drive theories of Freudian psychology to more relational perspective that emphasize the social matrix in the development of the self (Mitchell, 1988). However, while developmental psychologists have made use of imitation research in reconstructing their theories beyond that of Piaget, to my knowledge, psychoanalysis has not. In my opinion, both Freud and Piaget would have welcomed the new information and conclusions that we now have concerning the foundational role of psychological mimesis in human development. The evolution of their theories would have likely taken a different course had they possessed the insights we now have on imitation. For example, when Freud (1920) first introduced the idea of the death instinct, he did so in part for reasons that were entirely speculative and, as he himself stated, were provisional. He admitted that though his assumptions of the death instinct served to explain the overwhelming evidence of human destructiveness throughout history, it also helped to explain other essential aspects of his larger psychoanalytic theory, which had been revised at the same time. Nevertheless, as was his practice, he repeatedly stated that as a scientist, he must remain open to new clinical findings, and new clinical data may one day indicate otherwise. That data is now available, yet psychoanalysis has yet to really appreciate and integrate the significance of psychological mimesis. If imitation research needs a framework into which it can be applied and made substantially more meaningful, then the theory and practice of psychotherapy seems to be at least one appropriate domain of application.

Conclusion

It is interesting to note that the *process* of Girard's discoveries are comparable to the work of developmental psychologists and neuroscientists (i.e. Meltzoff & Moore and Rizzolati) who, in a similar manner as Girard, unintentionally stumbled upon the profound depth and significance of imitation while actively pursuing other aims. Now, over the last several decades, various theorists with various methodologies and subject matters have converged upon the same phenomena and have concluded unanimously with the Aristotelian decree that the human ability to imitate is what makes us unique. However, unlike the classic philosophers and enlightenment theorists, the concept of imitation that we now speak of is that which operates outside our conscious awareness, though it does not go unperceived; it is preverbal, meaning that it operates during a time in psychosocial development in which the verbal capacity to communicate with others is crude and non-symbolic, though it does not go un-communicated; and finally, it is an imitation that is ultimately guided not by the acquisition of gestures or modes of behavior but by the intentions and desires of the other. Together, the disciplines represented by mimetic scholars and those of the empirical sciences demonstrate the significance of mimetic phenomena as a fact to be reckoned with by the social sciences.

It is clear then that a new environment exists in which mimetic theory needs to be developed and explored. This new environment may allow for many of the gaps that exist in mimetic theory to be clarified as well as making it available to more recent domains of research. The work of Girard provides an enormous contribution to a fuller understanding of imitative/mimetic phenomena and its social and anthropological implications. For the most part, imitation 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 (Meltzoff & Prinz, 2002). Most of this literature has focused on imitation in infancy or non-human primates with little attention given to its continued and pervasive influence in human adult life. In addition, 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. 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, they are ultimately ill-prepared in their attempts at appreciating the broader anthropological implications of imitation that Girardian scholars address. When imitation research is viewed through the lens of mimetic theory, one sees not only the building blocks of connectedness, mindfulness, and meaningfulness but also the mechanisms of distortion, disillusionment, and violence.

Appendix A

Mimetic Desire, Mimetic Rivalry, & Mimetic Violence

If left to itself, the mimetic process between two persons goes through three identifiable stages: mimetic desire, mimetic rivalry, and mimetic violence. *Mimetic desire* is the response of one person's interest in another person's desire. Girard (1965) states that we come to desire what another desires; that is, we learn what to desire from a model, though we often do not recognize the function of the model in the experience (affect) of desire. Instead, what the imitator experiences is a linear process in which he or she is suddenly motivated or curious about an object. The essential misrecognition in this process is that it is the object of the imitator's desire that has somehow become valuable to the imitator. The reality is that the model's desire or interest in the object has effectively created value in the object by means of his simple attention and interest in it. So mimetic desire consists of an awakened desire in an object (a thing, a trait in a person, etc.) which has come to fruition by means of a model who is already desiring the object.

The second stage in the mimetic process is the transition from awakened mimetic desire to *mimetic rivalry*. What occurs in the interpersonal matrix between imitator and the model being imitated (once the mimetic process is engaged) is a set of dynamic interactions, which are driven by the intensity of reciprocal mimetic capacities found in the human brain. Once the desire is awakened in the imitator, he soon believes that the object of interest that is in the possession of the other person now becomes more valuable and thus more interesting. As a result, the imitator's interest increases. After this happens in the mind of the imitator, he reflects outwardly (in some degree or another that is communicated) some derivative of this interest, which then has a profound effect upon

the imitated model. The interest of the model in the object he possesses, whether it remained high or was decreasing when the imitator came on the scene, now becomes influenced greatly by the effect of the imitator's desire. The model's desire now increases substantially due to the fact that the imitator's desire for the object now becomes a model for his own imitativeness. Thus, there is a fundamental reciprocal dynamic that emerges quickly between the two participants, which begins to erupt if left without social structures to restrain it or outside limitations of some sort.

As the desire of one influences the desire of the other, this process sets up an increasingly intense interest in the object and subsequent rivalry, since one becomes the model for the other while at the same time responding to the other's interest as a model as well. Both become more alike as models, rather than the original situation in which they started out as more differentiated (i.e. one had the object and one did not). Something then develops from this reciprocity; the models now become *model/obstacles*. Previously, one was the model whose interest in the object became the model for the other to imitate. However, the effects of imitation of the first imitator towards the model increased the desire of the original model for the object in question. His response naturally would be to protect or to remove the object from the view of the imitator, thus granting the object even more perceived value to the original imitator. Now the imitator's interest is excited even more and he must gesture towards the model or attempt to obtain the object himself. Yet his move and focus, as said before, has become a model to the model's desire. Thus each becomes both a model for the other's desire and an obstacle towards obtaining it.

Girard (1978, 1987) calls this stage mimetic rivalry because what quickly becomes the focus is the rivalry itself and not the object anymore. As the rivalry

heightens and the accusations or attempts toward obtaining/defending the object increase (behaviors), the affect-awareness system of perception and the primitive fight-or-flight responses in the body increase dramatically. The focus is now on the other-as-obstacle and as the mimesis or reciprocity increases, participants begin to undifferentiate in particular aspects of their movements, utterances, and sense of identities. They become what Girard calls “the monstrous doubles”, referring to the ultimate convergence of exact reciprocity: each becomes an exact model of the other. This begins by movements and utterances (accusations), which are immediately imitated by the other and provoke the process into more extreme forms of the mimetic entanglement. This fascination/abhorrence vortex of emotional intensity is the most powerful experience of all human experiences. As the crisis of undifferentiation continues, it propels the now combatants into the third stage in the mimetic process.

The most imitative behavior in the human species is violence. *Mimetic violence* is the last movement in the deepening vortex of mimetic rivalry. At last the doubles that have come to the apex of their emotional expressions of interest, mimesis, and rivalry, now are so undifferentiated and lost in the abyss of emotions that one strikes out with a blow, which is not defended or mirrored and death ensues. The most intense emotions possible are now immediately over and the victor is left with the most powerful sense of differentiation: that between life and death. No more convincing and powerful relief is possible than that of one living (victor) and one dead (victim). In the immediate aftermath of the struggle, the object that has long been forgotten, for the sake of the intense rivalry and its spiraling process, is slowly retrieved and possessed. Though its value has been forgotten in the mimetic entanglements, now the victor leaves with a sense of

righteousness and relief, which then becomes translated unknowingly back to the object. The experience is awe-inspiring and the object may begin to take on meanings, which have nothing to do with its utility.

This short outline of Girard's theory shows its enormous indebtedness to human mimesis. He argues for its centrality in all aspects of human life as well as for its universality across cultures and throughout history. From this simple process, Girard has developed an anthropological theory that explains how all culture has emerged from this essentially bi-personal experience. He claims that all social structures and institutions have developed from a process that is fueled by mimetic desire but which had spontaneously transformed into a contagious group phenomenon that account for its derivatives—namely the social and religious structures which have evolved from cultures which have needed to limit the mimetic potentials in order to achieve some degree of social cohesion and order.

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