SSLA, **30**, 147–167. Printed in the United States of America.
doi: 10.1017/S0272263108080297

MIMESIS AND SECOND LANGUAGE ACQUISITION

A Sociocultural Perspective

Steven G. McCafferty
University of Nevada, Las Vegas

Donald (2001) argued that mimesis is fundamental to communication and culture. The basic level of mimetic action is mime—as found, for example, in the imaginative, expressive play of children, who typically imitate aspects of the world around them, including the actions of their parents, and pretend to be those they will become. Mimesis has a prominent position in the lives of children in relation to language acquisition as well; for example, Nelson (1996) found that mimetic portrayals of events, such as in play, largely precede language and are key to its development. According to Donald, mimesis is also central to tribal identity (culture), in how emotions are expressed and understood. This article argues that mimesis plays two prominent roles in acquiring another language. The first relates to how people materialize aspects of their second language discourse through gesture as a means of making meaning for themselves as well as for interlocutors. This perspective is grounded in the Vygotskian branch of Soviet psychology, particularly the work of Gal'perin (1989). The so-called tribal aspect of mimesis (identity) in the form of gesture is also taken up in relation to SLA, again from a sociocultural perspective. Overall, it is argued that our material being impacts the way we live and learn and that sound theories of SLA will need to take this into account.

People are used to interacting in face-to-face situations through nonverbal forms of communication such as facial expressions, gaze, gestures, and proxemics. We also recognize that extrapersonal forms of expression such as dress,

Address correspondence to: Steven G. McCafferty, University of Nevada, Las Vegas, 4505 Maryland Parkway, Las Vegas, NV 89154-3005; e-mail: mccaffes@unlv.nevada.edu.

© 2008 Cambridge University Press 0272-2631/08 $15.00

https://doi.org/10.1017/S0272263108080297 Published online by Cambridge University Press

makeup, hairstyle, scent, and jewelry play a part in how we communicate with others. Indeed, some linguists have called for language to be studied in a way that does not isolate it from the entirety of the communicative contexts in which it is used, including aspects of the local environment (Harris, 1998, 2003).

Another central aspect of communication that is often overlooked is mimesis. The word is primarily associated with the terms "representation" and "imitation" (Maran, 2003, p. 191). In the earliest Greek texts that included mimesis, such as Aeschylus's tragedy, *Edonians*, musical instruments are described as sounding like roaring bulls (Halliwell, 2002, cited in Maran). Mimesis also became an important philosophical concept in Western antiquity, with both Plato and Aristotle pondering the role of mimeticity in metaphysics, nature, and human affairs, each defining the concept somewhat differently—a practice that has been true for subsequent philosophers as well. However, as Maran pointed out (paraphrasing Gebauer & Wulf, 1995), "the roots of mimesis lie in the oral tradition and as such it is the essence of mimesis . . . to include body-related motions, rhythms, gestures and sounds" (p. 194). This communicative, performative consideration of mimesis will be examined in this article. It is relevant to note that much of the current interest in this perspective on mimesis has arisen from the study of the evolution of language. Although many scholars have taken up this intellectual pursuit (e.g., Armstrong, Stokoe, & Wilcox, 1995; Call & Tomasello, 2007; Corballis & Lea, 1999; Goldin-Meadow & McNeill, 1999; Liberman, 1991; Palmer, 2006), Donald (1991, 2001) has perhaps generated the most interest in mimesis by postulating that it played a pivotal role in the evolution of language and the development of consciousness.

Donald (2001) described mimesis as "an analogue style of communication that employs the whole body as an expressive device. It manifests itself in pantomime, imitation, gesturing, sharing attention, ritualized behaviors, and many games" (p. 240). Donald also noted that mimetic styles can vary widely from one cultural group to another, and, in a further connection to culture, he contended that mimesis "is still the primary public dimension that defines our personal identity, and in it, style and tradition matter, to the degree that these things establish who we are, who our friends are, and where we stand in society" (p. 265). The purpose of this article is to explore the interface between mimesis and gesture and how this interface might pertain to the process of learning a second language (L2) as examined primarily from the perspective of sociocultural theory (SCT) and, in particular, the Vygotskian tradition.

Approaches to the study of SLA have not generally included the broader contexts of communication. However, there are obvious reasons to believe that a more comprehensive approach might prove to be useful to the study of L2 learners, particularly those exposed to naturalistic contexts (in which the L2 is used for everyday interactions), because making meaning is clearly not limited to verbal mediation alone—especially, perhaps, in L2 as opposed to foreign language contexts. For example, Neu (1990) found that a learner who behaved nonverbally more like speakers of the target languaculture (to

https://doi.org/10.1017/S0272263108080297 Published online by Cambridge University Press

use Agar's, 1994, term) was perceived to be more proficient in the L2 than another learner who did not display the same level of skill in this domain despite being judged more linguistically proficient in the L2. Thus, there is reason to believe that differences in how people express emotions mimetically from one culture to another could play a crucial part in the acquisition scheme because a L2 speaker, for instance, might be unable to "read" the nonverbal pragmatics of an interlocutor, leading to a misunderstanding of illocutionary force.

Just how important culturally based mimetic features can be to the overall process of communication is exemplified by Asperger's syndrome. Those who have this neurological condition are essentially unable to read the nonverbal displays of others; of particular note is the lack of understanding of the emotional states of others in face-to-face encounters, which has led Asperger's to be viewed as a mild form of autism. In fact, there have been efforts to provide people with this condition with a way of interpreting the culturally specific mimetic displays of interlocutors in real time through video and computer technology so that they can comprehend the intentions of others and respond appropriately (e.g., Cassell, 1998; el Kaliouby & Robinson, 2005; Tartaro & Cassell, 2006).

Despite the difficulties in communication caused by a lack of comprehension of culturally specific nonverbal mimetic displays, accounts of first contact by European explorers with people from cultures previously unknown to them suggest that simple forms of mimesis can be critical to creating shared cross-cultural understandings. Vandenabeele (2002) examined the historical records of two of the Cook expeditions from England, first to New Zealand in 1773 and then to Vancouver Island in 1778. Nonverbal interaction accounted for most of what little communication transpired during first contacts. Indeed, the author believed that nonverbal communication is a "crucial and necessary part in communicative interactions between people from different cultures" (Vandenabeele, p. 86). However, from his point of view, this can be accomplished without appealing to the notion that there is a universality of concepts among cultures, an essentialism; rather, he attested the notion first set forth by Wittgenstein (1969) that people share certain "form(s) of life" (Vandenabeele, p. 86). This suggests that mimetic representation is an underlying aspect of the human experience. For example, although one cultural group might regard trees as harboring spirits and another cultural group might see them as products for consumption, the members of each group need to bend back branches in relatively the same way in order to move through the forest—a process that could be communicated through pantomime and be understood by both groups.

Although the emphasis in this article will be on L2 learners exposed to naturalistic contexts, it is important to keep in mind that mimesis is linked to the whole of a languaculture and therefore must be viewed as a foundation for foreign language learning as well. Before turning to the L2 analysis, let us consider treatments of mimesis as connected to first language (L1) acquisi-

https://doi.org/10.1017/S0272263108080297 Published online by Cambridge University Press

tion, imitation, and gesture as well as how the study of mimesis is illuminated through a SCT perspective.

MIMESIS

L1 Acquisition

According to Nelson (1996), mimesis is the principal form of communication for children between the ages of 2 and 4 years old. In the early stages of development, language is considered by Nelson to be largely an "accessory" to activity (p. 92). Caselli (2002) likewise found that, between the ages of 12 and 16 months, the participant in her case study used words primarily to designate people and objects but used gestures to represent "events or actions" (p. 66).

Mimetic behaviors eventually organize into a series or sequence of actions that comprise an event structure. Nelson (1996) found that in early development, children act out imaginative episodes (play) through mimetic actions with the objects they find in their daily lives. They do not attribute importance to the objects themselves but instead focus on their part in the event structure, not generalizing the use or function of an object beyond its role in the specific event. Parents are the ones who tend to institute such patterns through their own actions, and by the end of the first year, children know how to match their actions with those of close conspecifics. Nelson provided the example of eating lunch, which is seen as a series of interlaced social actions. Such events are, of course, manifested in and representative of the culture in which they occur, instantiating particular social values, routines, roles, and so forth. This approach to mimesis complements Bruner's (1983) and other scholars' thinking that interactive communicative routines are fundamental to language acquisition (e.g., Caselli, 2002).

Overall, Nelson (1996) depicted the unfolding of mimesis, language, and other forms of representation as a complex process:

> Symbolic individual and social play, imitation, and nonverbal communication, as well as event routines, all emerge and become elaborated during the latter part of the first year and the end of the second . . . thus rather than sequential development . . . in ontogeny the process is characterized by overlapping dynamic development of interrelated representational systems. (p. 117)

Additionally, Zlatev (2006) postulated that mimetic routines might play a vital role in the acquisition of language by providing prelinguistic concepts and by serving as the first form of conscious representation formed by the child, an argument also put forth by Donald (2001). Furthermore, mimesis is thought to enhance memory: Ryalls and Gul (2000) found that mimetic events (putting a teddy bear to bed, cleaning the table, and making spaghetti) correlated with increased memory for infants (aged 14–18 months) when imitating both a peer

https://doi.org/10.1017/S0272263108080297 Published online by Cambridge University Press

(a 3-year-old boy) and an adult (a college student), both immediately and after 1 week.

Imitation

Imitation is an underlying property of mimesis, given that mimesis is a mode of representation that derives its essential character from that which it depicts. Additionally, in relation to communication, mimesis initially develops from enacting the use and function of objects as a part of event structures. However, imitation is more pervasive, affecting development as a whole. Vygotsky (1978) tied imitation to development through a theoretical construct, the zone of proximal development (ZPD), arguing that a child can only imitate that which falls within his or her ZPD; that is, if the object of imitation is too much in advance of a child, cognitively, that child cannot imitate but can only mimic the action or activity without true understanding. Indeed, Vygotsky believed that imitation constitutes the most powerful learning tool available to young children. More recently, Tomasello (2003) echoed this belief, deeming imitation a dominant aspect of L1 acquisition.

It is likely that imitation also leads to the development of intersubjectivity and joint attention. In fact, there may be a primary level of intersubjectivity that other mammals and primates share as well (Zlatev, 2002). In relation to humans, Zlatev, Persson, and Gardenfors (2005) argued that "joint attention rests on mimesis in so far as it involves the imitation of purposeful action" (p. 3). In a similar vein, Nelson (1996) contended that "mimetic activities—play, imitation—provide the impetus for the development of self-other consciousness and thus for making what is implicit to self explicit" (p. 117). Furthermore, Zlatev (2006) stated that mimetic schemata help lead children to the understanding that others have internal models—a prerequisite for communicative intentions. It is interesting to note, however, that Tomasello (1999 and elsewhere), although presenting a strong case for the centrality of joint attention in ontogenesis, accorded mimesis no role in this process despite his emphasis on imitation—a detail for which Donald (1998) took him to task. Imitation is also connected with the acquisition of culture. For example, for a young boy learning to use a hammer, the specifics of where the hammer is held on the length of the handle, how it is swung, and one's body position when hammering are all elements that are imitated as a part of the intersubjectivity between father and son in the passing on of culture (mimesis is also connected to the learning of cultural skills by Donald, 2001). Of course, how we convey and understand emotions through facial expressions and other nonverbal features is also an aspect of mimesis, one that solidifies our membership within families, subcultures, and cultures.

Furthermore, there is evidence that we are biologically predisposed to imitate. In the early 1990s, mirror neurons were discovered in the brains of monkeys. These neurons were found to fire not only when a given animal engaged

https://doi.org/10.1017/S0272263108080297 Published online by Cambridge University Press

in a meaningful activity (e.g., peeling a banana) but also when it watched the same movements of another animal or person (Di Pelegrino, Fadiga, Fogassi, Gallese, & Rizzolatti, 1992). Rizzolatti and Gallese (1997) documented the same function for mirror neurons in humans. With this and other studies has come a widening sense of the possible importance of gesture as part of our biological, psychological, linguistic, and cultural makeup (Rizzolatti & Arbib, 1998). Additionally, there has been speculation that mirror neurons provide a possible neural basis for imitation, observational learning, and motor imagery (Jeannerod, 1997) as well as for empathy and our ability to read the minds of others. As expressed by Gallese and Goldman (1998), "according to 'simulation theory', other people's mental states are represented by adopting their perspective: by tracking or matching their states with resonant states of one's own" (p. 493).

Mirror neurons are found in Brodmann's area 45 of the brain, which by no coincidence is directly adjacent to Broca's area (Brodmann's area 44). On this basis, researchers have suggested a possible direct evolutionary connection between the two areas—specifically, that gesture likely preceded the advent of speech. Moreover, Givon (2002) speculated that speech was initially very much like gesture: largely iconic and lacking sophisticated syntax. Givon noted that "the oral-articulary motor control and arm-hand-finger control for writing and gestural sign is fairly well established as being in various locations in the primary motor cortex in the left-frontal lobe near Broca's area" (p. 143). Givon also argued that "the early human lexicon must have been equally concrete (in relation to gesture), confining itself to, primarily, sensory-motor spatial-visual objects, states and actions" and that "early child vocabulary is equally concrete" (p. 147, parentheses added).

Gesture and Speech

Goldin-Meadow and McNeill (1999) have argued that the manual modality could have just as easily been the primary modality for language in terms of meeting basic linguistic requirements, as is, of course, exemplified by the existence of sign language. Even in the case of homesign (systems of gestures created by the deaf children of hearing parents), mimesis is not the dominant aspect of communication. Instead, children use "segmented gestures combined into a rule-governed string" that affords a "sentence-like structure" (Goldin-Meadow & McNeill, p. 158). At the word level, each gesture has two components: (a) a hand shape and (b) a motion, which also grants a sense of structure. Although unable to fully meet the linguistic requirements of communicative interactions, gesture, in comparison with speech, is clearly the superior modality for conveying mimetic features, as speech has a rather limited mimetic capacity. This is demonstrated by the comparatively few onomatopoetic and other mimetic expressions that are found across languages, although languages may vary in both frequency and variety of mimetic forms; for example, Japanese has both a greater variety and a higher frequency of

https://doi.org/10.1017/S0272263108080297 Published online by Cambridge University Press

verbal forms than are found in English. As an indication of the importance of mimesis as a part of communication and of gesture as a modality for mimesis, Goldin-Meadow and McNeill pointed out that the use of spontaneous gestures (gesticulations) has been found to accompany and illustrate representations in speech in every culture studied.

Goldin-Meadow and McNeill (1999) also wrote that "mimetic coding fills in where (linguistic) categorization reaches its limit" (p. 164, parentheses added). In other words, there are crosslinguistic differences in the structures of languages such that what gets linguistically encoded may vary. For example, the authors cite the difference between English and Spanish with regard to motion events. The use of manner in speech is a marked phenomenon in Spanish. If a speaker wishes to include manner in Spanish, it is more common to do so through gesture than through speech. English, on the other hand, signals manner primarily through speech. Gesture in English is typically utilized to provide shades of meaning that complement speech: to move focus to motion rather than manner or to "trim" manner when it is peripheral to the speaker's communicative intent.

It is also important to note that whereas spoken language has generally been tied to speakers' thoughts, gesture has largely been considered limited to expressing feelings and emotions. However, McNeill (1992) modified Vygotsky's conception of the intertwining of thinking and speaking to include gesturing as a part of both the genesis and expression of thought, a theoretical construct he deemed the growth point hypothesis. Additionally, McNeill maintained that the gestures that accompany speech are global and synthetic, capturing the whole of what is being represented.

With regard to the different domains or types of gestures that occur spontaneously with speech, it is obvious, first of all, that iconic gestures are representations of the objects or activity they convey and, thus, are clearly mimetic. For example, with the statement "It's down in the basement," a speaker might point downward with the index finger while simultaneously moving the forearm and hand downward. Gestures of the abstract (following McNeill's, 1992, classification system) are iconic representations as well (e.g., use of the thumb to point back over the shoulder with the question "You mean yesterday?"). This is also a deictic gesture, as in the previous example, although in this case the referent is temporal (abstract) and the gesture articulates what would otherwise be the hidden conceptual metaphor behind the speech/gesture formation THE PAST IS BEHIND US. Also, beats (often the sharp up-and-down movement of a hand) are representative of emphasis and thus mimetic in the sense that emphasis is concretized as a downward movement of the hand, chin, or foot. This same feature (concretization of the abstract) is achieved for the other gestures in McNeill's scheme as well. Indeed, Goldin-Meadow and McNeill (1999) concluded that spontaneous gestures are at once both "analogic and mimetic" (p. 163).

This does not mean that nonspontaneous gestures or *emblems* (gestures that function as a lexical item in and of themselves) are not mimetic. For exam-

https://doi.org/10.1017/S0272263108080297 Published online by Cambridge University Press

ple, a famous although erroneous "thumbs down" gesture has been attributed to the Roman emperors for signaling life or death for a particular gladiator (the actual gesture is recorded as a plunging or stabbing downward motion of the hand, as if holding a sword by its hilt). There are other, less transparent forms of emblems as well, like the Western gesture meaning "I don't know" (arms apart and bent at the elbow, palms up, fingers splayed). Nothing directly ties this gesture to actions in the world in concrete form, as in the thumbs-down example; instead, it substitutes for the verbal representation. Moreover, this gesture can be articulated to convey a number of different shades of meaning. For instance, it can engender a sense of being flippant ("How should I know?"), humorous, or serious, depending on how it is articulated (although it is difficult to imagine this gesture without facial expressions and other accompanying nonverbal features such as posture and gaze). This kind of mimetic display is tied directly to tribal or cultural forms of identity: How it is deployed has everything to do with the particulars of culture and the contexts of use.

Gesture and Cognitive Development

Goldin-Meadow, along with her students and colleagues, has documented many instances in which mimetic representations in the form of gesture can be linked to cognitive development (see Goldin-Meadow, 2003, for an overview of studies in this arena). Goldin-Meadow, Alibali, and Church (1993) found that children solving math problems used the virtual space in front of them to carry out different mathematical operations; they performed these operations virtually, like moving one virtual object from the left side of the body to the right for subtraction (they did not speak during their calculations). Kita (2000), building on this work, formulated his information packaging hypothesis, which claims that gesture can act as a spatio-motoric mode of thought, independent of speech.

The relation of gesture to cognitive development was further illustrated by Roth (2003), who studied the science talk of German secondary students engaged in school laboratory assignments. Roth found that, initially, in the presence of the actual materials and instruments used in the investigations, students' descriptions and explanations included deictic gestures to indicate specific objects and iconic gestures to illustrate the physical manipulation of objects, a practice that dropped off once the students became familiar with the process. Additionally, Roth (2002) argued that language development in the emergence of new discourse forms (German secondary students conceptualizing and reporting on laboratory experiments) is an evolutionary process. He found a genetic shift from representation on the external plane of activity—from "things and movements in the world" to "symbolic gestures" and, finally, to "spoken and written texts" (Roth, 2002, p. 551). In a similar vein, Evans and Rubin (1979) found that kindergarten children used gesture instead of speech when explaining game rules, although older children relied

https://doi.org/10.1017/S0272263108080297 Published online by Cambridge University Press

on speech instead. Also, in the case of adults, Schwartz and Black (1996) found that participants in their study, when given problems to solve based on the movement of gears, first relied on gesture to materialize the rotation of the gears, but by the end of the problem set, they were no longer dependent on creating motor or visual images to help them solve the problems. On reviewing the developmental research on gesture, Roth and Lawless (2002) noted that both experimental and naturalistic studies supported the view that "during transitional periods gestures express complex meaning that individuals do not (cannot) yet express in words" (p. 336). They went on to say that "gestures enact kinesthetic schemata that are correlated with verbal expressions" (p. 333) and that "the students not only enacted sensorimotor schemata for descriptive purposes but for finding explanations for phenomena as well" (p. 349).

DEVELOPMENT, SCT, AND MIMESIS

Enculturation begins in the womb, with the fetus subject to the cultural habitus of the mother and her interactions in the environment. Once born, the infant is immediately immersed in the physical and cultural environment and the world of those who inhabit it, continually subject to the cultural practices that help shape experience (i.e., not just sleeping, but sleeping alone, in a crib, with the parents, with a nurse maid, with other siblings, in the same room as others, or in a separate room). Moreover, the child growing into the adult is engaged in the process of becoming a self-regulated member of society, which from a Vygotskian perspective centers on the process of learning-leading-development (which is not an individual but a collective social process). At an early age, this might entail a child putting on her mother's shoes and pretending to be her mother, performing this small aspect of her future role (all that she is proximally capable of at the time with regard to the ZPD). Play, and especially pretense, is considered by Vygotsky to be the leading source of learning-leading-development. Some children, it would seem, almost literally grow into their parents' shoes—copiously imitating values, beliefs, and tastes (again, literally as well as figuratively) as well as physical and mental dispositions. Other children, however, take on very different sociocultural forms of being than those of their parents, consciously resisting the modes of becoming they grow up with. Indeed, a crucial feature of imitation from Vygotsky's perspective is that it does not only imply transmission, but it also transforms consciousness, which can be a creative, unpredictable process.

In the beginning of this section, I used Bordieu's (1977) concept of habitus to exemplify how the fetus in the womb experiences life through the mother. For Bordieu, this concept entails the inculcation of members of a social group with a particular set of conditioned structures. Resistance to cultural norms does take place, however, and indeed it transforms whole cultures, in some instances through revolution. As Kulick and Schieffelin (2004) pointed out, the

https://doi.org/10.1017/S0272263108080297 Published online by Cambridge University Press

term *enculturation* leaves no room for agency, as it deals exclusively with reproduction. Although there is reason to believe that habitus does not simply align with reproduction per se, the explanation that it is formed through the processes of inculcation and that it has to do with beliefs nonetheless signals that it is possible over determination, as noted by Kulick and Schieffelin and others (e.g., King, 2000). Indeed, it is hard to imagine culture without individual as well as collective agency.

On the other side of this dialectic, however, Ratner (2006) provided an analysis of culture that exposed underlying cultural macrofactors that influence behavior in ways that are so pervasive that they are typically imperceptible at the conscious level. For example, Ratner described the Kaluli, a tribe in New Guinea, as feeling no personal responsibility (blame) for misfortunes that might befall them, charging "fate and external events" instead (p. 175). As a result, the Kaluli are said not to turn inward in psychological self-examination or to experience the consequences of such an examination, such as "guilt, low self-esteem, and self-doubt about overcoming adversity" (Ratner, p. 175). At first glance, it might appear that mimesis of the cultural variety (i.e., those forms having to do with social identity) would belong to this pervasive, unconscious level of culture and mind as well. However, this is not necessarily so, as there are individuals and groups within a culture who resist such forces. In the case of gesture, this was demonstrated historically by the European nobility, who, in an attempt to disassociate themselves from the general public, stopped engaging is this ostensibly vulgar behavior when speaking or interacting in public.

From a SCT perspective, it is necessary to depolarize reproduction and transformation and recognize that dualistic accounts are untenable, as both processes are clearly at work and often at the same time.[1] Furthermore, the fruitful study of reproduction and transformation in operation is facilitated by SCT. Because both are a part of lived experience, they can be examined ontogenetically and microgenetically (in development over short periods of time). Researchers can thus focus on whether change, and particularly conceptual change from a Vygotskian viewpoint, occurs.

Another aspect of development within the Vygotskian school of thought concerns the interrelationship between supposed external and internal planes of activity. Marx (1967, 1973) chose to focus on the use of physical tools in transforming the world on the material plane (depicted by the hammer and sickle on the Soviet flag), whereas Vygotsky, at the start of his short career, concentrated on the psychological tools that members of a culture employ to mediate mind and considered these psychological tools as analogous to the physical tools employed to mediate human activity on the material plane. However, because of this approach, some in his day and afterward accused Vygotsky of establishing a dualistic account of human psychology and activity, creating an idealized separate internal plane. In the Soviet Union of the 1930s, such an interpretation was likely to have been a politically motivated attack rather than a reflection of Vygotsky's true beliefs (see Zinchenko, 1994).

https://doi.org/10.1017/S0272263108080297 Published online by Cambridge University Press

In any case, one of Vygotsky's students, Gal'perin (1989), explicitly drew the external and internal planes of activity together, maintaining that the two coexist in a nondualistic manner, but emphasizing that both derive from the material world.

Gal'perin's (1989) view of psychology and activity holds that neither communication (words) nor material activity (sensuous interaction with objects in the world) alone can account for the process of *internalization* (psychological movement from the material to the internal plane, also called *interiorization* by the Soviets) and posits a "stepwise formation for mental actions" (Arievitch & van der Veer, 1995, p. 118). In this internalization process, meaningful, external, and object-related (material) actions are transformed, abbreviated, and, finally, formed on the mental plane (as words), thus creating a continuum that moves toward increasing levels of abstraction. For Gal'perin, mental actions (i.e., actions not carried out in physical terms) are the key components of psychic functioning; moreover, "mental actions can only be carried out on the basis of images" (Arievitch & van der Veer, p. 118).

A final aspect of SCT and mimesis to be considered in this article is play. Play is central to Vygotsky's ideas on learning-leading-development in relation to the ZPD. As in the example of the child putting on her mother's shoes, children are able to engage in the process of becoming through play, particularly pretend play. Newman and Holzman (1993) brought attention to the role of performance in play, arguing that on an everyday basis we act out our predetermined societal roles, such as being parents, but that when a child pretends to be her mother, she is in fact performing; that is, she is "self-consciously creating new roles" for herself (pp. 102–103). Mimesis, as indicated earlier, is a strong element in both pretend play and performing.

SCT, MIMESIS, AND SLA

Frawley and Lantolf (1985) formulated a concept they termed *continuous access*: the idea that, cognitively, we do not simply pass to a next stage of development never to return (à la Piaget, 1952) but, instead, we continue to go back to earlier ways of knowing and doing in our efforts to come to grips with cognitively demanding problems of one sort or another. Considering this idea in relation to Gal'perin's (1989) view that we remain conceptually grounded by experience at the material level, it is reasonable to think that people might employ gesture as a means to materialize aspects of a problem they find troubling, to help them get a grip (even if virtual) on either the whole or parts of a difficulty, as found to be the case in the studies cited previously for the developmental use of gesture. Indeed, one of the researchers, Roth (2002), took an explicitly SCT perspective with regard to materiality (a point of view that he and I arrived at independently), although he drew on the psychological theory of Leont'ev (1978) and not Gal'perin. However, I submit that it is Gal'perin's scheme of stepwise formulation that bridges the material and the ideal planes.

https://doi.org/10.1017/S0272263108080297 Published online by Cambridge University Press

In Gal'perin's taxonomy, gesture falls into the category of perceptual action, as it does not in fact transform anything materially. Its representational character as a form of mimesis nonetheless clearly connects it with the material world in the case of iconic forms of gesture. The use of iconic gestures for self-regulation harks back developmentally to event representation in the L1, so its use as a form of continuous access is plausible.

The SLA process, needless to say, presents many challenges to those who undertake learning a new language. At the intrapersonal level, gesture has been recognized to have a private function much like that found for the use of private speech as a part of language learning. For example, McCafferty (2006) contended that the L2 participant in his study, an adult speaker of English as a second language (ESL), was using gesture to materialize English syllabification in naturalistic contexts through beats of the hand on each syllable of a word in up to five-word utterances, despite being engaged in a conversation at the same time. McCafferty argued that this function for gesture might be traceable to an earlier developmental mode of gesture use, as McNeill (1992) found this same metalinguistic function of beats for children. McNeill also found that later in ontogenesis, beats take on a metapragmatic function and no longer operate metalinguistically except in the case of repairs.

McCafferty (2006) assumed that the origins in development for the use of beats by the ESL learner in his study had derived from (a) continuous access or (b) imitation while interacting with the native speaker in the study (the only other participant). This particular native speaker gestured in a manner similar to foreigner talk, which at times also included the beating out of syllables with the hand. However, the more general category of mimesis is perhaps a good enough explanation in and of itself; that is, the act of materializing through gesture is a basic cognitive function that human beings rely on not only to solve specific problems but also as an underlying principle of representation, stemming from ontogenesis and possibly as an aspect of the evolution of language.[2] With this in mind, it is also important to remember that motor representation through mimesis has been linked to increased memory, which further signifies the possible advantages of this modality as a mental tool.

The process of materialization is claimed to have played a major role in another gesture study of a L2 learner as well (McCafferty, 2008)—for both private and communicative purposes in this case. A naturalistically exposed adult L2 speaker of English, who had been living in North America for many years, was found to use a series of three repeating gestures that—because of a lack of linguistic proficiency—proved to bear the lion's share of her efforts at making meaning. Basically, she described the abstract process of creating an ideal marriage with three gestures that each represented a stage in the process. The first stage was the coming together of the two partners in the marriage, for which the participant designated the husband with her right hand and the wife with her left. Then, with elbows pulled out to her sides, she incrementally moved both hands toward each other and upward at the same time in

https://doi.org/10.1017/S0272263108080297 Published online by Cambridge University Press

coordinated movements, resembling the stacking of bricks. This second gesture signified the two partners' efforts to work together (the second stage), and its defining feature was the fingertips of the two hands touching or almost touching and forming an A shape at the apex of the gesture. The third and final stage represented the outcome of the process—the couple reaching their goals—and was represented imagistically by her right hand moving upward and a bit out in front of her at the same time, palm open and outward as if grasping an object (the goal).

Due to difficulties with the verbal channel, the meaning of the discourse was primarily rendered mimetically. The relative positioning of the three gestures was critical to the overall representation. The gesture for the first stage was always positioned in the center of the body and at the lowest point of the three gestures. The second gesture was positioned immediately above the first, and the final gesture was positioned directly above the other two. This arrangement in space provided a rudimentary mimetic syntax to the unfolding of the explanation. The chronological ordering of the events in creating an ideal marriage was materialized virtually as a stage-by-stage process—a visual instantiation of the conceptual metaphor IDEAL MARRIAGE IS A MANUFACTURED PRODUCT. On top of this, and also providing a sense of grammatical coherency (missing in the verbal channel), was a second layer of metaphor signified by the relative placement of the three gestures: IDEAL MARRIAGE IS BUILT FROM THE GROUND UP. The three gestures taken together also created another layer of metaphor, UP IS GOOD, and a fourth layer of metaphor, THE FUTURE IS AHEAD OF US, was configured into the discourse by the participant producing the goal gesture a bit further out in front of her than the other two gestures.

Kendon (1972) identified the repeated use of a gesture in the same location as providing coherency to discourse, terming the function of such a gesture a *catchment*. This concept clearly applies to the analysis of this L2 speaker's gestures because the participant produced the same trio of gestures multiple times and always in the same relative positions, despite the fact that they were produced out of sequence at times. Additionally, in another study (McCafferty, 2004), a L2 participant was found to use deictic gestures—pointing back to different locations in space he had previously established as representing three different countries (anaphoric reference)—in a process that added mimetic cohesion and grammatical structure to the discourse through the use of catchments (similar findings are reported in Gullberg, 1998, 2003).

In relation to McNeill's (1992, 2005) growth point hypothesis, the findings of McCafferty's (2008) study on metaphor and gesture suggest that SLA can produce circumstances in which speech and gesture are no longer tied together in the way that this theoretical formulation intends. Gesticulation in the condition of SLA can apparently overshadow instead of complement the linguistic component, provided there is difficulty with verbal proficiency. From a SCT standpoint, what would appear to be a lopsided configuration is explainable if the interface between speech and gesture is viewed as a flexible—as opposed to rigid—functional system.

https://doi.org/10.1017/S0272263108080297 Published online by Cambridge University Press

To illustrate the concept of a flexible functional system, I draw on the work of Luria (1979), who, in his capacity as a neurologist, was commissioned to organize a hospital for brain-injured soldiers during World War II. In some instances, patients could no longer produce aspiration—a condition that adversely affected their speech production—but, interestingly, they continued to be able to create a puff of air when it served so-called instinctive functions. Under Luria's general supervision, an intervention was devised through which an affected patient would hold a lit match, instinctively blowing out the flame when it reached his fingers. This process was repeated many times, with patients being told to concentrate on the different physical movements required in the forming and releasing of the puff of air. The intervention also included a therapist working with a patient to help him understand how to form the lips and even to hold his lips together while pushing on his chest so that he would gain conscious control over his body in order to reproduce the needed sound.

This understanding of mind and body as a functional system is an approach to neurology that has become much celebrated in the present day, owing to the work of Ramachandran (Ramachandran & Blakeslee, 1998), who, among other things, used mirrors to help patients trick their minds into believing that a phantom limb was in fact still there by making the remaining arm or leg appear to be the missing one. This technique allowed the patients to eventually rid themselves of the sometimes excruciating pain they suffered from the phantom.

Given these illustrations of the plasticity of the mind-body functional system, it should not be especially difficult to entertain the possibility that a learner exposed to a L2 naturalistically might develop exceptional mimetic ability in the manual modality as a result, at least in part, of a lack of verbal codevelopment. Moreover, following Vygotsky's (1978) thinking on development, it is also possible that gesture could play a transformative role under these conditions, psycholinguistically reorganizing the functional relationship of thinking, speaking, and gesturing, with gesture taking a much larger part in the genesis and production of language than would be found for a monolingual speaker. This hypothesis finds possible support in the general finding to date that L2 speakers tend to produce more gesture in their L2 than their L1 (e.g., Gullberg, 1998; Hadar, Dar, & Teitelman, 2001; Jungheim, 1995; Kita, 1993; Nobe, 1993; Zhao, 2006).

If the hypothesis that materialization through gesture is a part of L2 developmental processes is confirmed, it could lead to a very different model of SLA than anything previously proposed (at least that I am aware of). Most if not all models to date have relied on linguistic or cognitive theories—or both—that have left little or no room for the fact that people live a material existence as embodied beings and that materiality thus becomes a part of our cognitive architecture.

Materialization through mimetic gesture also may have a possible role in lexical acquisition. As pointed out by McCafferty and Ahmed (2000) and McCaf-

https://doi.org/10.1017/S0272263108080297 Published online by Cambridge University Press

ferty (2002), when in naturalistic contexts and interacting with native speakers of the L2, a learner might resort to the use of mimetic gestures because of a lack of familiarity with the L2 lexicon at the level of sense (i.e., psychological associations). In other words, the L2 speaker might know the surface meaning of a word but not feel comfortable with its use in contexts. Materialization through iconic representation can communicate a person's understanding of a word to an interlocutor, adding an element of semantic intentionality. This can, of course, also be a function for the use of iconic gestures in the L1. In relation to the development of the L1 lexicon, Donald (2001) argued that "most words are invented in the theater of mimesis, within the framework provided by the typical scenarios of childhood" (p. 288). Furthermore, Donald also contended that "we learn words by hanging them on a mimetic fabric of action, based on experience" (p. 288). There is certainly reason to believe that this account of lexical acquisition may be reflected in L2 development as well.

It is also important to note that crosslinguistic and cross-cultural differences are likely to impact the extent to which materialization through gesture takes place. For example, if a learner comes from a L1 languaculture background that is much different than the L2 languaculture, the degree of reorientation—if exposure occurs in naturalistic contexts—might affect how much the speaker relies on this type of gesture to gain self-regulation. The assumption is that languaculture dissimilarity leads to a greater need to employ gesture for this purpose. Also, materialization through gesture might be influenced by discursive contexts. For instance, L2 students might feel much more comfortable materializing through gesture in their language classroom than when talking to strangers in the L2, especially if their teacher utilizes gesture for this purpose as a part of regular classroom instruction (Lazaraton, 2004).

Level of proficiency also seems to have a bearing on the use of gesture for materialization. Taranger and Coupier (1984) reported that with gains in proficiency Moroccan learners of L2 French moved from a reliance on representational gestures to more discourse-based gestures. Also, Kida (2005) reported a similar progression, although he cautioned that, like language, changes in the use and function of gesture mirrors complex process at work and not simple linear development. Additionally, in the earlier stages of acquisition, ambiguity of reference is a typical problem for L2 learners. As such, they tend to repeat full referents without the use of pronouns. A similar state of affairs has been determined for the use of gesture. Initially, learners are overly explicit with their gestures; they often repeatedly refer back to the exact spot in gesture space where a referent was previously established, repeating the gesture with the original hand shape instead of indicating the referent in a more abbreviated manner, as perhaps by deictically pointing in the general direction of where the referent had been established, as would be common for L1 speakers (Gullberg, 2003; McCafferty, 2004). However, once pronouns have been introduced with regularity into L2 discourse, reference through gesture is less frequent and more abbreviated (Gullberg, 2008).

https://doi.org/10.1017/S0272263108080297 Published online by Cambridge University Press

On the other side of the coin, mimetic gestures are also produced by interlocutors in an attempt to mediate learners' comprehension. For example, Allen (2000) argued that "physical demonstration is important for learners in lower-level classes" as a means to supplement their limited knowledge of the L2 (p. 169). Other studies have also suggested that teachers engage in a specialized register of gesture meant to materialize salient aspects of the discourse content in a manner akin to foreigner talk and teacherese (Adams, 1998; Barnett, 1983; Henzl, 1979; Lazaraton, 2004; McCafferty, 2002; Zhao, 2007).

MIMESIS AND IDENTITY

Cultural fit (i.e., the match between how a L2 speaker, such as an immigrant, expresses himself or herself mimetically when compared to native speakers of the L2)—is potentially another aspect of mimesis that relates to SLA. For example, the role of accommodation in naturalistic settings can have an impact on communication, as described by von Raffler-Engel (1976). Von Raffler-Engel found that some bilingual anglophone and francophone children gesturally accommodated speakers of their L2 by deploying gestures they had not used when speaking with children from their own L1 background, although this was not the norm for participants in the study. There is also evidence, although also meager, of the production of L2 emblems by learners in naturalistic contexts (McCafferty, 1998). Also, related to McCafferty's (2008) recent study on the production of metaphoric gestures by an immigrant speaker of ESL, McCafferty and Ahmed's (2000) data—the original source of the data reported in McCafferty (2008)—reveals that one monolingual American English participant illustrated his speech about ideas of ideal marriage with gestures similar in form and meaning to the gestures of the L2 learner. In this case, then, there seems to be a plausible connection between mimesis and a shift in identity, with the L2 participant producing gestures that fit a conceptualization of ideal marriage found in the L2 languaculture.

At the other end of the spectrum, I am also aware of a linguist living in the United States who, when discussing gesture with me, was quite adamant about her conscious efforts at resisting changes to aspects of her gesture production that she associated with her L1 languaculture, including specifics, such as the gesture space, as well. She claimed that this was part of her overall resistance to assimilation, also noting that she did not say "we" when talking about the American government or people.

The relationship between mimesis, identity, and SLA can also be observed in the L2 classroom. Haught and McCafferty (2008) focused on the use of drama techniques in an adult ESL class in which students volunteered to participate in a drama workshop for additional practice in the language. Early in the instruction, when first reading a short scene, the students asked the instructor (also the co-author of the study) to model the lines. As a former actor, he also represented the characters nonverbally. The students responded by imi-

https://doi.org/10.1017/S0272263108080297 Published online by Cambridge University Press

tating not only the instructor's verbal production but also his nonverbal expressions, including gestures. Moreover, the students imitated each other's gestures when watching themselves on a monitor after being recorded (a form of private rehearsal), although, on all of these occasions, the gestures they imitated were first produced by the instructor. The participants also applied these gestures to other lines during scripted rehearsals. Most of the gestures that were imitated were iconic or metaphoric, although the students also imitated beat gestures when they indicated emphasis. The students eventually incorporated more gestures into their readings as they became more familiar with the scripts, apparently having linked gesture to L2 performance.

These circumstances provided the workshop participants with the opportunity to engage in an activity that was developmentally beyond them, a case of learning-leading-development or, in Newman and Holzman's (1993) terms, performing as L2 speakers. This does not imply that they wanted to become native speakers of the L2 but, instead, that they were provided with the opportunity to "try on" the language and culture and to boost their L2 proficiency as well. Moreover, the class was structured so that the students returned to the scripts again and again in a recursive manner, which afforded them multiple opportunities to practice and discuss cultural, linguistic, and nonverbal features—a process that allowed for a deepening of their understanding of the L2 languaculture.

In another classroom context, DaSilva Iddings and Jang (in press) found that a newcomer from Mexico enrolled in a kindergarten class in the United States was able to acquire appropriate mimetic schemata to indicate solidarity with his classmates, despite being in the silent period. This finding indicates that child L2 learners engage in mimetic behaviors before they are able to use the language, a process that is connected to meaning making in the same fashion as expressed for L1 acquisition. It is also important to point out that the first words of this student when participating in a whole-class activity were associated with an embodied activity in which a chosen student had to point at another student and say "I choose you." From the authors' point of view, the silent period is thus not silent with regard to semiosis (i.e., making meaning through signs), especially with regard to embodied actions exercised within the structure of the classroom.

CONCLUSION

In this article, I have tried to present the case that mimesis—particularly in the form of gesture—is an underappreciated aspect of learners' experiences with L2s and that it might prove to have a fundamental part to play in the SLA process. In particular, I have highlighted two functions for mimesis: The first is its role as a materializer for both the purposes of thinking and communicating (i.e., creating meaning), and the second relates to being and doing in a L2 languaculture (i.e., identity). I sincerely hope that both of these aspects of

https://doi.org/10.1017/S0272263108080297 Published online by Cambridge University Press

SLA will be better understood in light of further research in this area. Any truly comprehensive theory of SLA will need to move beyond the mind-body dualism that currently pervades the field and take into account our material experience in the world as an aspect of living and learning.

NOTES

1. See, for example, DaSilva Iddings and McCafferty (2005), Haught and McCafferty (2008), Lantolf (2006), and McCafferty (2002) for previous work on dialectical unity from a SCT perspective.

2. It is also possible that gesture is a phylogenetic source of human communication; Tomasello and Call (2007) remarked that "ape gestural signals work in ways more similar to human communication than do ape vocal signals, particularly in terms of flexible production and attention to the attentional states of the partner" (p. 222).

REFERENCES

Adams, T. W. (1998). *Gesture in foreigner talk*. Unpublished doctoral dissertation, University of Pennsylvania, Philadelphia.

Agar, M. (1994). *Language shock: Understanding the culture of conversation*. New York: Quill.

Allen, L. (2000). Nonverbal accommodations in foreign language teacher talk. *Applied Language Learning*, *11*, 155–176.

Arievitch, I., & van der Veer, R. (1995). Furthering the internalization debate: Gal'perin's contribution. *Human Development*, *38*, 113–126.

Armstrong, D. F., Stokoe, W. C., & Wilcox, S. E. (1995). *Gesture and the nature of language*. New York: Cambridge University Press.

Barnett, M. A. (1983). *Le langage des gestes* [The language of gestures]. *Canadian Modern Language Review*, *41*, 543–550.

Bordieu, P. (1977). *Outline of a theory of practice*. New York: Cambridge University Press.

Bruner, J. (1983). *Child's talk: Learning to use language*. New York: Norton.

Call, J., & Tomasello, M. (2007). *The gestural communication of apes and monkeys*. Mahwah, NJ: Erlbaum.

Caselli, M. C. (2002). Communicative gestures and first words. In V. Volterrra & C. J. Erting (Eds.), *From gesture to language* (pp. 56–67). Washington, DC: Gallaudet University Press.

Cassell, J. (1998). A framework of gesture generation and interpretation. In R. Cipolla & A. Pentland (Eds.), *Computer vision for human-machine interaction* (pp. 191–216). New York: Cambridge University Press.

Corballis, M. C., & Lea, S. E. G. (1999). Phylogeny from apes to humans. In M. C. Corballis & S. E. G. Lea (Eds.), *The descent of mind: Psychological perspectives on hominid evolution* (pp. 1–15). Oxford: Oxford University Press.

DaSilva Iddings, A. C., & Jang, E. Y. (in press). The mediational role of classroom practices during the silent period: New immigrant children learning the English language in the mainstream classroom. *TESOL Quarterly*.

DaSilva Iddings, A. C., & McCafferty, S. G. (2005). Creating zones of proximal development in a third-grade multilingual classroom. In A. E. Tyler, M. Takada, Y. Kim, & D. Marinova (Eds.), *Language in use: Cognitive and discourse perspectives on language and language learning* (pp. 112–123). Washington, DC: Georgetown University Press.

Di Pelegrino, G., Fadiga, L., Fogassi, L., Gallese, V., & Rizzolatti, G. (1992). Understanding motor events: A neurophysiological study. *Experimental Brain Research*, *91*, 176–180.

Donald, M. (1991). *Origins of the modern mind*. Cambridge, MA: Harvard University Press.

Donald, M. (1998). Commentary on Michael Tomasello's 'Uniquely primate, uniquely human.' *Developmental Science*, *1*, 17–18.

Donald, M. (2001). *A mind so rare*. New York: Norton.

el Kaliouby, R., & Robinson, P. (2005). The emotional hearing aid: An assistive tool for children with Asperger syndrome. *Universal Access in the Information Society*, *4*, 121–134.

Evans, M. A., & Rubin, K. H. (1979). Hand gestures as a communicative mode in school-aged children. *Journal of Genetic Psychology*, *135*, 189–196.

https://doi.org/10.1017/S0272263108080297 Published online by Cambridge University Press

Frawley, W., & Lantolf, J. P. (1985). Second language discourse: A Vygotskian perspective. *Applied Linguistics*, *6*, 9–44.
Gallese, V., & Goldman, A. (1998). Mirror neurons and the simulation theory of mind-reading. *Trends in Cognitive Sciences*, *2*, 493–501.
Gal'perin, P. I. (1989). Mental actions as the basis for the formation of thoughts and images. *Soviet Psychology*, *27*, 45–65.
Gebauer, G., & Wulf, C. (1995). Mimesis: Culture, art, society (D. Reneau, Trans.). Berkeley: University of California Press.
Givon, T. (2002). *Bio-linguistics*. Amsterdam: Benjamins.
Goldin-Meadow, S. (2003). *Hearing gesture: How our hands help us think*. Cambridge, MA: Harvard University Press.
Goldin-Meadow, S., Alibali, M. W., & Church, R. B. (1993). Transitions in concept acquisition: Using the hand to read the mind. *Psychological Review*, *100*, 279–297.
Goldin-Meadow, S., & McNeill, D. (1999). The role of gesture and mimetic representation in making language the province of speech. In M. C. Corballis & S. E. G. Lea (Eds.), *The descent of mind: Psychological perspectives on hominid evolution* (pp. 155–172). Oxford: Oxford University Press.
Gullberg, M. (1998). *Gesture as a communication strategy in second language discourse*. Lund, Sweden: Lund University Press.
Gullberg, M. (2003). Gestures, reference, and anaphoric linkage in learner varieties. In C. Dimroth & M. Starren (Eds.), *Information structure, linguistic structure, and the dynamics of language acquisition* (pp. 311–328). Amsterdam: Benjamins.
Gullberg, M. (2008). A helping hand? Gestures, L2 learners, and grammer. In S. G. McCafferty & G. Stam (Eds.), *Gesture: Second language acquisition and classroom research* (pp. 185–210). London: Routledge.
Hadar, U., Dar, R., & Teitelman, A. (2001). Gesture during speech in first and second language: Implications for lexical retrieval. *Gesture*, *1*, 151–165.
Halliwell, S. (2002). *The aesthetics of mimesis: Ancient texts and modern problems*. Princeton, NJ: Princeton University Press.
Harris, R. (1998). *Introduction to integrational linguistics*. Oxford: Pergamon.
Harris, R. (2003). On redefining linguistics. In H. G. Davis & T. J. Taylor (Eds.), *Integrational linguistics: A first reader* (pp. 27–49). New York: Pergamon.
Haught, J. R., & McCafferty, S. G. (2008). Embodied language performance: Drama and the ZPD in the second language classroom. In J. P. Lantolf & M. Poehner (Eds.), *Sociocultural theory and the teaching of second languages* (pp. 139–162). Bedforshire, UK: Equinox.
Henzl, V. (1979). Foreigner talk in the classroom. *International Review of Applied Linguistics*, *17*, 159–167.
Jeannerod, M. (1997). *The cognitive neuroscience of action*. Oxford: Blackwell.
Jungheim, N. O. (1995). Assessing the unsaid: The development of tests of nonverbal ability. In J. D. Brown & S. O. Yamashita (Eds.), *Language testing in Japan* (pp. 149–165). Tokyo: The Japan Association for Language Teaching.
Kendon, A. (1972). Some relationships between body motion and speech. In A. Siegman & B. Pope (Eds.), *Studies in dyadic communication* (pp. 177–210). New York: Pergamon.
Kida, T. (2005). *Appropriation du geste par les étrangers: Le cas d'étudiants japonais apprenant le français* [Appropriation of gesture by foreigners: The case of Japanese students learning French]. Unpublished doctoral dissertation, Université de Provence, Aix-en-Provence, France.
King, A. (2000). Thinking with Bourdieu against Bourdieu: A 'practical' critique of the habitus. *Sociological Theory*, *18*, 417–433.
Kita, S. (1993). *Language and thought interface: A study of spontaneous gestures and Japanese mimetics*. Unpublished doctoral dissertation, University of Chicago.
Kita, S. (2000). How representational gestures help speaking. In D. McNeill (Ed.), *Language and gesture* (pp. 162–185). New York: Cambridge University Press.
Kulick, D., & Schieffelin, B. B. (2004). Language socialization. In A. Duranti (Ed.), *A companion to linguistic anthropology* (pp. 349–368). Oxford: Blackwell.
Lantolf, J. P. (2006). Language emergence: Implications for applied linguistics—A sociocultural perspective. *Applied Linguistics*, *27*, 717–728.
Lazaraton, A. (2004). Gesture and speech in the vocabulary explanations of one ESL teacher: A microanalytic inquiry. *Language Learning*, *54*, 79–117.
Liberman, P. (1991). *Uniquely human: The evolution of speech, thought, and selfless behavior*. Cambridge, MA: Harvard University Press.
Leont'ev, A. N. (1978). *Activity, consciousness, and personality*. Englewood Cliffs, NJ: Prentice Hall.

https://doi.org/10.1017/S0272263108080297 Published online by Cambridge University Press

Luria, A. R. (1979). *The making of mind*. Cambridge, MA: Harvard University Press.
Maran, T. (2003). Mimesis as a phenomenon of semiotic communication. *Sign Systems Studies*, *31*, 191–215.
Marx, K. (1967). *Capital* (Vol. 1). New York: International Publishers.
Marx, K. (1973). Theses on Feurback. In K. Marx & F. Engels, *The German ideology* (pp. 121–123). New York: International Publishers.
McCafferty, S. G. (1998). Nonverbal expression and L2 private speech. *Applied Linguistics*, *19*, 73–96.
McCafferty, S. G. (2002). Gesture and creating zones of proximal development for second language learning. *Modern Language Journal*, *86*, 192–203.
McCafferty, S. G. (2004). Space for cognition: Gesture and second language learning. *International Journal of Applied Linguistics*, *14*, 148–165.
McCafferty, S. G. (2006). Gesture and the materialization of second language prosody. *International Review of Applied Linguistics*, *44*, 195–207.
McCafferty, S. G. (2008). Material foundations for second language learning: Gesture, metaphor, and internalization. In S. G. McCafferty & G. Stam (Eds.), *Gesture: Second language acquisition and classroom research* (pp. 47–65). London: Routledge.
McCafferty, S. G., & Ahmed, M. K. (2000). The appropriation of gestures of the abstract by L2 learners. In J. P. Lantolf (Ed.), *Sociocultural theory and second language learning* (pp. 201–218). Oxford: Oxford University Press.
McNeill, D. (1992). *Hand and mind*. Chicago: The University of Chicago Press.
McNeill, D. (2005). *Gesture and thought*. Chicago: The University of Chicago Press.
Nelson, K. (1996). *Language in cognitive development*. New York: Cambridge University Press.
Neu, J. (1990). Assessing the role of nonverbal communication in the acquisition of communicative competence in L2. In R. Scarcella, E. S. Andersen, & S. D. Krashen (Eds.), *Developing communicative competence in a second language* (pp. 121–138). Rowley, MA: Newbury House.
Newman, F., & Holzman, L. (1993). *Lev Vygotsky: Revolutionary scientist*. London: Routledge.
Nobe, S. (1993). Cognitive process of speaking and gesturing: A comparison between first language speakers and foreign language speakers. Unpublished master's thesis, University of Chicago.
Palmer, G. (2006). Energy through fusion at last: Synergies in cognitive anthropology and cognitive linguistics. In G. Kristiansen & R. Dirven (Eds.), *Cognitive linguistics: Foundations and fields of application* (pp. 263–304). Berlin: New Mouton Series.
Piaget, J. (1952). *The origins of intelligence in children*. New York: Norton.
Ramachandran, V. S., & Blakeslee, S. (1998). *Phantoms in the brain*. New York: Fourth Estate.
Ratner, C. (2006). *Cultural psychology: A perspective on psychological functioning and social reform*. Mahwah, NJ: Erlbaum.
Rizzolatti, G., & Arbib, M. A. (1998). Language within our grasp. *Trends in Neuroscience*, *21*, 188–194.
Rizzolatti, G., & Gallese, V. (1997). From action to meaning. In J.-L. Petit (Ed.), *Les neurosciences et la philosophie de l'action* (pp. 217–229). Paris: Vrin.
Roth, W.-M. (2002). From action to discourse: The bridging function of gestures. *Journal of Cognitive Systems Research*, *3*, 535–554.
Roth, W.-M. (2003). From epistemic (ergotic) actions to scientific discourse: Do gestures obtain a bridging function? *Pragmatics and Cognition*, *11*, 139–168.
Roth, W.-M., & Lawless, D. (2002). How does the body get into the mind? *Human Studies*, *25*, 333–358.
Ryalls, B. O., & Gul, R. E. (2000). Infant imitation of peer and adult models: Evidence for a peer model advantage. *Merrill-Palmer Quarterly*, *40*, 188–202.
Schwartz, D. L., & Black, J. B. (1996). Shuttling between depictive models and abstract rules: Induction and fallback. *Cognitive Science*, *20*, 457–497.
Taranger, M.-C., & Coupier, C. (1984). Recherche sur l'acquisition des langues secondes: Approche du gestuel [Research on the acquisition of second languages: A gestural approach]. In A. Giacomi & D. Véronique (Eds.), *Acquisition d'une langue étrangère: Perspectives et recherches* [Acquisition of a foreign language: Perspectives and research] (pp. 169–183). Aix-en-Provence: Université de Provence.
Tartaro, A., & Cassell, J. (2006, August). Authorable virtual peers for autism spectrum disorders. Paper presented at the 17th European Conference on Artificial Intelligence (ECAI06), Riva del Garda, Italy.
Tomasello, M. (1999). *The cultural origins of human cognition*. Cambridge, MA: Harvard University Press.
Tomasello, M. (2003). *Constructing a language: A usage-based theory of language acquisition*. Cambridge, MA: Harvard University Press.

https://doi.org/10.1017/S0272263108080297 Published online by Cambridge University Press

Tomasello, M., & Call, J. (2007). Ape gestures and the origins of language. In J. Call & M. Tomasello (Eds.), *The gestural communication of apes and monkeys* (pp. 221–240). Mahwah, NJ: Erlbaum.
Vandenabeele, B. (2002). No need for essences: On non-verbal communication in first inter-cultural contacts. *South African Journal of Philosophy*, *21*, 85–96.
von Raffler-Engel, W. (1976). Linguistic and kinesic correlates in code switching. In W. C. McCormack & S. A. Wurm (Eds.), *Language and man: Anthropological issues* (pp. 269–286). The Hague: Mouton.
Vygotsky, L. S. (1978). *Mind and society: The development of higher mental processes*. Cambridge, MA: Harvard University Press.
Wittgenstein, L. (1969). *On certainty*. Oxford: Blackwell.
Zhao, J. (2006). The communicative functions of gestures in L2 speech. *SLAT Arizona Working Papers*, *13*, 1–18.
Zhao, J. (2007). *Metaphors and gestures for abstract concepts in English academic writing*. Unpublished doctoral dissertation, University of Arizona, Tucson.
Zinchenko, V. P. (1994). Cultural-historical psychology and the psychological theory of activity: Retrospect and prospect. In J. Wertsch, P. Del Rio, & A. Alvarez (Eds.), *Sociocultural studies of mind* (pp. 37–55). New York: Cambridge University Press.
Zlatev, J. (2002). Mimesis: The "missing link" between signals and symbols in phylogeny and ontology? In A. Pajunen (Ed.), *Mimesis, sign and language evolution* (pp. 93–122). Turku: University of Turku Press.
Zlatev, J. (2006). Embodiment, language, and mimesis. In T. Ziemke, J. Zlatev, & R. Frank (Eds.), *Body, language and mind: Vol. 1. Embodiment* (pp. 297–337). Berlin: Mouton de Gruyter.
Zlatev, J., Persson, T., & Gardenfors, P. (2005). *Bodily mimesis as "the missing link" in human cognitive evolution*. Lund, Sweden: Lund University Cognitive Studies.

https://doi.org/10.1017/S0272263108080297 Published online by Cambridge University Press