

# Is a “Special Psychology” of Practice Possible?

## From Values and Attitudes to Embodied Dispositions

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**ABSTRACT.** Traditional theories of culture and socialization in the social and behavioral sciences have concentrated on how attitudes and values come to be “internalized” and thus shared by members of a collectivity. The emergence of practice theory challenges the classical theory of socialization and acculturation by shifting the focus of analysis away from explicit symbolic representations and towards tacit, motor-schematic procedures. In this paper I argue that even as they reject the traditional object of older socialization-based accounts, most practice theorists continue to operate with the same outmoded theory of socialization and acculturation inherited from classical sociology. I use Wacquant’s (2004) “carnal ethnography” of becoming a boxer to outline an alternative approach—grounded in recent research in cognitive neuroscience—which provides a more adequate explanation of how practices come to be acquired and transmitted from person to person.

**KEY WORDS:** culture, embodiment, learning, mirror neurons, motor schemes, practice, simulation, socialization

One important theoretical development in recent sociological theory has resulted in a dramatic shift in how sociologists think about the “social”: the emergence of what is now referred to as “practice theory.” For Talcott Parsons (1937), the social *sui generis*—that is, what clearly distinguished sociological analysis from psychological, economic, or other types of scientific considerations of human behavior—was a concern with values and normative justifications for action. Values were important for Parsons, because he thought they were a special type of goal and motivation for action that could not analytically be reduced to other forms of goal-like objects such as physiological or psychological needs (the realm of psychology) or purely instrumental

pursuits for instrumental gain (the realm of economics). Parsonian action theory was thus antithetical to such analyses of action as Lewin's (1935) field theory, which saw an unbroken conceptual continuity between theories of action that incorporated physiological and other organismic sources of motivation and those which spoke of "higher" motives.

For Parsons, values were also important because they could be verified—following the methodological precepts laid out by Max Weber—by the sociological analyst at the level of "meaning": that is, they were collectively and explicitly available in propositional form and could thus be expressed in explicit linguistic tokens. Socialization therefore consisted in the transmission of explicit and institutionalized value commitments from generation to generation. A "socialized" agent in this respect is one who has "internalized" (or learned) the system of explicit value orientations typical of her or his society and is able to apply them in practice by, for example, executing the appropriate set of actions when faced with a typified situation that requires that action. Thus, the Parsonian socialized agent can be represented by way of an artificial-intelligence-inspired "production-system" model in which "action *X* is engaged if situation *Y* is encountered" (Fararo & Skvoretz, 1986).

Yet, as the influence of functionalism waned during the 1960s and 1970s, sociologists became dissatisfied with this conception of "the social" as including only "normative value-orientations." Instead attention is now being paid to practices as the primary locus of the social (Bourdieu, 1990; Giddens, 1984; Ortner, 1984; Rawls, 2004; Swidler, 1986; Turner, 1994). It can be said without much danger of exaggeration that practices now play as central a role in sociological thinking as values and normative patterns did during the functionalist period (Schatzki, Knorr-Cetina, & Savigny, 2001).

Beyond the purely cognitive role of organizing theory and research, Parsonian values also played an institutional role in the system of disciplines, serving to demarcate sociological analysis and sociology as a distinct intellectual endeavor from other disciplines.

One distinctive characteristic of practices is that they are antithetical to this "autonomist" disciplinary project. As opposed to the notion of values for which meta-theoretical and philosophical defenses based on neo-Kantianism could be mounted in order to portray them as "irreducible" to (and thus impossible to understand in terms of) physiological, psychological, or materialist analysis, practices are a different animal altogether. They are a "mixed" phenomenon, blending together the material with the ideal, the bodily with the mental, the psychological and the social, formal and efficient causality (Bourdieu, 1990; Schatzki et al., 2001; Wacquant 2004). It is in this sense that practices, inscribed in the body in the form of techniques and hexis, are a sort of "biologico-sociological" phenomenon (Wacquant, 2004, p. 149).

In this regard, a concern with practices, in their status as "hybrid objects," and the post-functionalist placing of practices at the center of sociological inquiry, rather than closing off the discipline of sociology by building it around

an autonomous subject matter, opens it up to interdisciplinary integration and influence, with psychology being the most logical choice. This was undoubtedly recognized by Pierre Bourdieu in *The Logic of Practice* (1990), an unorthodox and highly eclectic (and for that reason largely misunderstood by most sociologists) theoretical statement. Bourdieu came of age in the unusual intellectual environment provided by the rise of structuralism in the French academic field which allowed psychologists, linguists, anthropologists, and sociologists to speak a common theoretical language for almost two decades (Dosse, 1999; Piaget, 1970; Schurmans & Bronckart, 1999). In this respect, Bourdieu and other theorists responsible for the "practice turn" in contemporary sociology have been much less attentive to disciplinary boundaries and "charters" for sociology than the founding fathers.<sup>1</sup>

In Bourdieu's (1990), work for instance, the influence of Piaget's constructivist psychology is clear throughout most of the abstract discussions of the role of adaptive cognition and the deployment of bodily schemes in the production of practices (Bloch, 1986; Lizardo, 2004; Schurmans & Bronckart, 1999). In addition, in contrast to most sociological thinkers of the time, Bourdieu did not hesitate to cite research in experimental cognitive psychology whenever his argument required explicit psychological mechanisms.<sup>2</sup> This reorientation of sociological thinking around practices and away from values—and the related "attitude" construct (Allport, 1924)—therefore provides a unique opportunity for the development of that hybrid science that would be a kind of "special psychology," in Durkheim's terms (Wacquant, 1996).

From this perspective, Marcel Mauss, a rather underappreciated figure of the sociological tradition, comes to acquire renewed salience in having presciently anticipated the central role that embodied practices could play as the concrete location of the "social," in particular in his essay on magic (1972) and his classic article on "bodily techniques" (1973). Mauss lays the groundwork for contemporary practice theory, as well as the epistemological and theoretical justification for engaging in a type of sociological analysis that transcends the very boundaries between sociology and psychology that his uncle, Émile Durkheim (1909/1982), worked so hard to erect.

### **Practical Socialization?**

Nevertheless, for all of the analytical and intellectual benefits that the practice turn has brought to sociology, and for all of the potential for interdisciplinary dialogue rather than isolation that it carries, the initial problem that resulted in mid-20th-century functionalism smuggling psychology through the backdoor still applies to practices as a sociological object. That is: some account of practical socialization must be provided. This account has to be up to the task of explaining how is it that these "practical" techniques and embodied presuppositions come to be taught and transmitted from one person to another

(Turner, 1994). In this respect practice theory is not that different from its functionalist predecessor, in requiring a “socialization theory” if practices are to function as a social object (and not as an idiosyncratic collection of individual “habits,” as in some interpretations of the pragmatist tradition; Turner, 2002).

However, precisely because practices are such different kinds of objects in comparison to norms and values, the old functionalist solutions to the “transmission problem” are clearly not viable. That is, rather than being consciously available at the level of meaning, practices are tacit (i.e., they are part of the cognitive unconscious). Rather than being easily available in explicit linguistic form, practices are encoded in a different format, which is difficult if not impossible to “redescribe” (Karmiloff-Smith, 1995) into the format of explicit linguistic statements and instructions. Practices, not being essentially linguistic (Bloch, 1991), cannot be thought of as forming part of an explicit “cultural system” (Geertz, 1973) that is patterned in organization and structure after systems of propositions encoded in linguistic (sentential) format or in the manner of arbitrary mappings between a domain of iconic or symbolic forms and a realm of non-material meanings.

Wacquant (2004) speaking of the unusual status of the “culture” of the boxing gym, highlights this point well. This culture, he notes,

...is not made up of a finite sum of discrete information, of notions that can be transmitted by words and normative models that would exist independently of their application. Rather it is formed of a diffuse complex of postures and (physical and mental) gestures that, being continually (re)produced in and through the very functioning of the gym, exist in a sense only in action, and in the traces that this action leaves within (and upon bodies). ... Pugilism is an ensemble of techniques in Marcel Mauss’ sense, that is, of acts traditionally thought to be effective, practical knowledge composed of schemata that are thoroughly immanent to practice. It follows that the inculcation of the dispositions that make the boxer comes down to a process of building the body, a particular (re)socialization of physiology in which [the body is] kinetically remodeled according to the specific demands of the field. (p. 59)

This unusual status of practices as shared competences, stored in *procedural* memory (Bloch, 1998), poses formidable problems to any account of cultural transmission that is modeled after traditional socialization accounts. These latter require explicit teachings of disembodied representations or conscious imitation of models and presume the encoding of *semantic* information on the part of the social agent (Gallese & Lakoff, 2005). Critics of practice theory (e.g., Turner, 1994), for instance, have noted that without this type of account the entire project of a *social* theory of practice is incoherent (but not necessarily one of an *individualistic* theory of practices).

I have argued elsewhere (Lizardo, 2007) that this is an important problem for sociological practice theory and that no account that wishes to retain the notion that practices are *social* can do without providing an explicit set of

mechanisms that allow for such implicit, bodily (and motor) encoded objects to "jump" from person to person. Wacquant (2004) recognizes this issue when he suggests that "[t]o an essentially corporeal and little-codified practice, whose logic can be grasped only in and through action, corresponds an implicit, practical, and collective model of inculcation." This transmission is "effected in a gestural, visual and mimetic manner" which "somatizes the knowledge collectively held and exhibited by the members of the club at each level in the tacit hierarchy that runs through it" (pp. 99–100). It is in this regard that recent research in the cognitive neurophysiology of action recognition and perception can be of help to practice theory, precisely by providing empirically plausible neurophysiological mechanisms that explain how such "unconscious transmission" of the motor schemes that are instantiated in the "bodily techniques" productive of social practices can in fact be transferred from person to person.

In the rest of the paper, I show how recent developments in cognitive neuroscience provide a more nuanced picture of how individuals are socialized into specific interpersonal and ecological environments, using Wacquant's "carnal" ethnography in *Body and Soul* (2004) as an illustration. In particular, I show how taken-for-granted divisions in social theory, such as that between action and perception, and within the sociological treatment of perception and learning that between different modalities of perception and their relation to social action, are left either irrelevant or in need of deep rethinking. The primary theoretical implication is that the standard model of socialization (the same model that has come under recent attack from the generativist and evolutionary camps), weakened from its functionalist heyday but not quite dead, is a highly impoverished one (but not necessarily for the reasons pointed out by the "new preformationists"—e.g., Barkow, Cosmides, & Tooby, 1992; Pinker, 1994—as Piaget would have certainly have referred to them). This model can be improved, and our understanding of the ways that individuals are integrated into and become members of social collectivities can be deepened, but this will require a redrawing of extant disciplinary maps, and a renewed effort to rethink sociology as not only a "special kind of psychology" but also a special kind of "neuro-psychology."

### **Semantic versus Pragmatic Representations**

It is now widely accepted that the human brain stores information regarding the meaning of the actions of others in two different "formats": a "semantic mapping," in which information about action is stored in traditional linguistic and symbolic form, and a "pragmatic mapping," in which information about action is stored in a non-linguistic format, directly accessible as motor-schematic representations. This division is roughly isomorphic to the one that separates the two different memory systems, declarative and procedural. While semantic

information as to the meaning of action is available to consciousness (and also available to other mental systems), the pragmatic mapping is “informationally encapsulated” and tacit.

The contrast between semantic and pragmatic representations of action comes out clearly in Wacquant’s description of the pedagogical style of the gym’s trainer, who refused to believe that boxing could be learned from books or by imitating static “pictures.” The problem is that “[y]ou don’t get a sense of movement. Boxin’s movement. ... In a book everything’s standin’ still.” As Wacquant (2004) explains:

What the old trainer DeeDee objects to about the written text is its effect of totalization and detemporalization. The virulence of his reaction reveals practically the antinomy that exists between the abstract time of theory ... and the time of action, which is constitutive of it. (p. 101)

The capacity to understand and “grasp” the meaning and *telos* of action by other agents at an implicit, bodily level, without recourse to an explicit “theory of mind” of other agents, coupled with the capacity to “mirror” the action of others and engage in implicit imitation of the bodily techniques of others, provides a completely different perspective of what it means to be “socialized” into the “culture” of a given collectivity. Some of these mechanisms were clearly presaged in Bourdieu’s (1990) own theoretical reflections regarding the “implicit pedagogy” that was necessary for full socialization into a social group (Lizardo, 2007).

Bourdieu referred to the individual (but socially instituted) system of cognitive structures that made possible coherent action in the physical and social world, using the Aristotelian term “habitus” (Lizardo, 2004; Wacquant, 2005). What this growing research on the cognitive neuroscience of action recognition and understanding shows is that not only does sociological practice theory need cognitive neuroscience in order to provide a consistent and convincing account of the very “social” status of practices, but that whatever it is, the habitus as a “system” of socialized dispositions is not only a “cognitive” object, but, insofar as practices are rooted in the bodily and motor “techniques” (Mauss, 1973) that each group transmits to their members from generation to generation, is also a *neural* habitus.

### **Motor-Schematic Mirroring**

How do individuals come to be “socialized” into new environments? As we have seen, traditional models of socialization inherited from mid-20th-century functionalism conceive of the socialization process as primarily involving the transfer of explicit representations (always at least potentially capable of being encoded into propositional forms) from socializing agents to the focal subject (Turner, 1994). Yet, as this model of the social has been

abandoned in favor of one which conceives of what is shared as largely implicit and embodied motor-schematic "representations," the problem of the transmission of practices has emerged. Mirror neurons provide a plausible neurocognitive mechanism that accounts for how actors come to be attuned to one another at an implicit, bodily level and how—through what Gallese (2000) refers to as "embodied simulation"—a chronic process of unconscious "imitation" triggered by the observation of the actions of others can result in the sharing of the same "bodily automatisms" (Bourdieu, 1990) responsible for the emergence of shared social practices (see Lizardo, 2007, for more details).

It is in this respect that the "diffuse pedagogy" that becoming socialized into a new collectivity truly entails always involves a process of collective but non-directed teaching from role models to novices. The gradual process of coming to be "socialized" in this sense into a new environment is clearly depicted in Wacquant's (2004) ethnographic account of his own experience of "becoming a boxer" at the Woodlawn Boys' Club in Chicago. Wacquant's report can easily be read as an embodied phenomenology of the process of motor-schematic mirroring that is responsible for the implicit acquisition of practical skills during the process of "acculturation" into a new environment. This requires a process of matching sensory input from various modalities (in particular sight and sound) with the motor schemes that are in the process of being acquired. The spatial and temporal arrangement of the gym facilitates this process. Wacquant describes this dynamic as follows: "The mere synchronization of movements in time and the physical proximity of the pugilists in space are such that one is seeing bodies in action at every moment—including your own when you are shadowboxing in front of the mirror" (p. 116).

As Wacquant is careful to point out, it is true that during the process of becoming a boxer long hours of training are required to achieve a respectable level of skill. This training however, is seldom of a solipsistic character (where the individual organism is faced with the learning task in solitude) but it is instead primarily a social activity. Learning is thus best conceptualized as a "task" which requires the constant visual presence of prospective embodied models to be effective. This makes the diffuse pedagogy of boxing a thoroughly collective activity, which "is not a dialogue between the sole teacher and his pupil but rather a conversation of multiple voices open to all the regular participants in the workout" (Wacquant, 2004, p. 113). This means that "each participant a potential *visual model* [italics added], positive or negative for all of the others" (p. 113). Training is only possible thanks to "the complete network of relations constitute the space of (physical, auditory and visual) exchanges." This implies that there could be an "epidemiology of practices"—as Mauss (1973) speculated when analyzing different patterns of hexis in French and American women—just as much as there exists an "epidemiology of representations" (Sperber, 1985).

## Mimetic Apprenticeship

In a section entitled “A Visual and Mimetic Apprenticeship,” Wacquant (2004, pp. 118–127) provides a clear description of the quasi-conscious attempt to focus on a visual model in order to attempt to imitate his bodily gestures and techniques:

His gestures are short, precise, restrained, and so well coordinated they seem almost mechanical. ... I follow him like a living model: when he doubles up his jab, I double mine up; when he bends his legs to deliver a series of short uppercuts by slipping under the guard of his imaginary opponent, I do likewise. (p. 118)

Wacquant refers—following Bourdieu (1990) and Mauss (1973)—to what I am calling—following Gallese (2003; Gallese & Metzinger, 2003)—*embodied simulation* as “mimeticism,” explicitly recognizing the crucial role that it plays in the acquisition of practical skills. This process of acquisition is socially organized through the temporal and spatial arrangement of actors during “drills.” While beginning as a process of consciously paying attention to visually available role models, during the course of training this process of motor-schematic mirroring comes to acquire a habitual and tacit cast:

Training teaches the movements—that is the most obvious part—but it also inculcates in a practical manner the schemata that allow one to better differentiate, distinguish, evaluate and eventually reproduce these movements. It sets into motion a dialectic of corporeal mastery and visual mastery: to understand what you have to do, you watch the others box, but you do not truly see what they are doing unless you have already understood a little with your eyes, that is to say, with your body. Every new gesture thus apprehended-comprehended becomes in turn the support, the materials, the tool that makes possible the discovery and thence the assimilation of the next. (Wacquant, 2004, p. 118)

Drills thus serve to provide attentive and *perceptual* cues that allow the actor to focus on other embodied agents who may serve as role models and as triggers of process of unconscious imitation:

The temporal coordination of the drills is such that every boxer has at all times before his eyes a complete gamut of models from whom to draw inspiration. Pugilistic knowledge is thus transmitted by mimeticism or countermimeticism, by watching how others do things, scrutinizing their moves, spying on their responses to DeeDee’s instructions, copying their routine, by imitating them more or less consciously. ...Over the course of workouts one learns, in the tacit mode ... to spot potential models by finding one’s location in the subtle hierarchy, at once fuzzy and precise, and imperceptible to the non-initiated, that structures the space of the gym. (Wacquant, 2004, p. 117)

It is in this respect that the visual modality, largely ignored in most accounts of socialization (and when addressed, mostly relegated to the role of providing access to explicit visual *symbols*, such as those encoded in dress), is here a crucial gateway through which the practical, embodied culture of the gym is transmitted from person to person. This modality is also crucial, in that it triggers the implicit ability—present in humans since childbirth (Meltzoff & Moore, 1977)—to match the embodied representations of others' actions to our own proprioceptive body schema. The "socializing" process of the gym proceeds in a "decentered" manner without any central authority having to orchestrate it, akin to the emergent processes that arise in "multi-agent simulation" (MAS) systems. The primary mechanism appears to be centered on the visual access to potential practical role models, undergirded by the neurocognitive capacity to mirror—and thus create correspondences between visual stimuli and motor schemes—the ostensible practices of other agents, thereby "navigating" closer to their own position in sensorimotor space (Gallese, 2001).

### **Cross-modal Mapping**

We have seen that the extent to which sociologists appeal to psychological mechanisms—and the kind of psychological entities and processes that they appeal to—is constrained by their conceptualization of what it is that comes to be shared among individuals in order to make them members of a collectivity. Because most sociologists when thinking about what it is that is collective or shared across persons resort to the concept of "culture" and because culture is usually conceptualized as explicit propositional beliefs and normative representations, the language and forms of linguistically mediated instruction have for the most part been the primary ways in which sociologists have theorized the process of "cultural transmission" that socializes individuals into the group.

However, as noted by Bloch (1991), the primary lesson of cognitive science for the social sciences consists precisely in pointing out that in the very same way that most mental activity is "unconscious" (Lakoff & Johnson, 1999). Therefore, most of the stuff that is shared across individuals is not "culture" as traditionally conceived but consists of tacit, impossible-to-verbalize "know-how." Being part of a collective implies incorporating, in a very literal sense, embodied understandings and abilities that are encoded in procedural and not declarative memory (Bloch, 1998; Toren, 1999). From this point of view, the role of the sensory analysis of information from the environment has to be rethought. In the standard socialization model, for instance, sight and sound are important only insofar as they make available information that can be transcribed into explicit linguistic form. It is in the form of providing

access to verbalizable statements through which the “culture” is transmitted that the senses of hearing and sight come into play.

This also means that other forms of sensory stimulation, in particular that related to touch and our own proprioceptive “sense” of the body, come to be relegated to the background. Furthermore, from the traditional socialization perspective, with its focus on explicit linguistic instruction as the primary channel of socialization, sound and the comprehension and analysis of auditory information on the part of social agents only becomes important in its status as a physical embodiment of immaterial meanings (Saussure, 1966). This corresponds clearly to the case of the decoding of conventional symbols in language comprehension, as formulated in Saussure’s influential definition of the sign as an arbitrary mapping of mental semantic tokens with arbitrarily demarcated (“cut”) “sound images.”

From the point of view of the model of “practical socialization,” however, sounds are also important because they have non-arbitrary connections to types of action, and therefore the processing of auditory (and visual) stimuli not only points to a realm of disembodied meanings but in its connection to practical activity also points to an implicit realm of embodied motor schemes. Thus, if practices are primarily embodied and consist of sensorimotor schemes, the role of sight and sound in the process of socialization can be reformulated. Instead of providing access to linguistic and iconic symbols through which the abstract “meanings” constitutive of culture are encoded, the primary role of vision, hearing (and possible tactile) stimulation in the process of socialization is to provide access to the wealth of practical knowledge encoded in the sensorimotor schemes embodied in other persons. That is, as with the case of vision, auditory information becomes relevant whenever it enables a cross-modal mapping between what is heard with what is done as a practical matter.

Wacquant, for instance, describes his immersion in the environment of the gym as primarily a sensual experience. However, in contrast to the standard “phenomenological” depiction of sensations as internal experiences available for inspection to a disembodied *cogito*, for Wacquant vision and sound are relevant only as they connect (or are “cross-mapped”) to his ongoing acquisition of the practical, embodied culture of the gym. As we saw above, this culture is encoded in recurrently activated motor schemes. It is in this manner that the embodied agent becomes integrated into a novel sensory environment—composed of constantly repeated sights and sounds. However, rather than being separate from—or interfering with—his ongoing acquisition of the motor schemes necessary to be a competent boxer, this constant “sea” of sensory stimulation constitutes a key enabling factor in the implicit learning of skills even after exhaustion sets in:

I’m wasted, but it does me a world of good to work like this in unison in such a maelstrom of punches, exhalations, slips across the ring, jumping and efforts of all kinds. ... After a moment, it is as if you were in an altered state,

carried forth by the collective cadence of the drills and by the noise ... intoxicated by moving and shaking at the same time as everyone else, you let yourself get swept along. (Wacquant, 2004, p. 116)

Recent research in the neurophysiology of motor perception and action understanding provides us with concrete neurophysiological mechanisms that are helpful in understanding this very different role of the auditory—and, as we saw above, visual—information in the process of understanding the actions of others. In an attempt to ascertain whether the cross-modal mapping of visual information to motor representations of action first uncovered for the case of mirror neurons extended to other forms of sensory access to the actions of others, Kohler and collaborators (2002) recorded activity in the mirror neuron system of macaque monkeys while the animal was exposed to auditory sensory stimulation consistent with the execution of “noisy” actions (tearing, breaking, etc.). They found that a consistent percentage of mirror neurons in the F5 area fired whenever the animal was exposed to noises that were consistent with typical actions. Similar rates of activity were detected in this area whenever the animal *saw* the actions being performed by others, whenever the animal *saw* and *heard* the actions being performed by others, and whenever the animal itself *executed* the same motor acts. Most importantly, there was no discernible activity in the same area whenever the animal was exposed to a series of control noises not consistent with a form of motor activity.

The fact that mirror neurons respond to features of actions across different modalities implies that the Mirror Neuron System (MNS) is not responding to purely perceptual features of the act, but is producing an implicit and pre-linguistic generalization across sensory modalities and as such can be said to provide the subject with an abstract, practical representation of an action-type in which the goal of the action and the inherent, embodied relationship between the object and the actor are implicitly encoded (Gallese, 2002, 2003). Thus mirror neurons appear to be involved in the cross-domain mapping between the perception of the abstract motor scheme associated with the action performed by other actors, and the actor’s own embodied scheme for the performance of similar actions (Garbarini & Adenzato, 2004). This allows for the ability to draw correspondences between the motor schemes associated with the representation of the animal’s own body and the meaning of its actions and that associated with the representation of the bodies of others and the meanings and goals of their actions.

These results suggest that constant exposure to auditory information consistent with a series of recognizable actions will activate the individual motor schemes which are involved in the *production* of similar actions (Metzinger & Gallese, 2003, p. 553). Thus the role of the auditory system during the socialization process may not only involve its recruitment for the recognition and comprehension of speech patterns (the standard language-mediated socialization

mechanism). In addition, given the coupling of the speech and auditory perception system with systems responsible for the activation of motor schemes, it is possible that individuals “hear” practices, even as this “picking up” of bodily automatisms through the auditory systems is largely implicit.<sup>3</sup> As Keysers and collaborators (2003) put it,

When we say that we recognize that someone just knocked on the door, we mean that we matched the sound of this action with our internal representation of what “knocking on the door” is. A striking property of audiovisual mirror neurons is the fact that they match the sound and the vision of someone else’s actions onto the monkey’s own motor repertoire. It is therefore likely that these neurons participate in the recognition of an action: We recognize someone else’s actions because we manage to activate our own inner action representation using mirror neurons. ... In this context, it is paramount that audiovisual mirror neurons not only discriminate between actions in all modalities, but that the action producing more activity in one modality is the action producing more firing also in the other modalities. (p. 635)

### **The Social Organization of Embodied Simulation**

During this paper, I have concentrated on the benefits that attention to neuroscience can provide for sociological theorizing. As a way to conclude, I would like to provide some short remarks on the reverse: what benefits can attention to sociological processes and mechanisms provide to the recent discoveries in neuroscience regarding the neural basis of action understanding and imitation?

The setting aside of long periods during which the individual is bombarded with visual and auditory stimulation that easily refers to other people’s actions serves not only to recall what these actions mean in a purely semantic sense, but—as we will see below—to reactivate the very same neural substrate that is responsible for the production of these actions. This is one way of understanding the importance of that Wacquant (2004) saw in the fact that at Woodlawn Boys’ Club regular shadowboxing drills make “each participant a potential visual model, positive or negative, for all the others” (p. 113). Wacquant gives a perceptive first-person account of the role of the embodied simulation of other agents during this period, connecting this embodied simulation with Durkheim’s (1912/1995) depiction of the power of ritual amassment of bodies: “This continuous visual and auditory reinforcement generates a state of “collective effervescence” quite reminiscent of the frenetic excitement of the great aboriginal totemic ceremonies of colonial Australia” (Wacquant, 2004, p. 116). Thus Wacquant concludes that “if there are fewer than four or five [boxers practicing in the gym], the ‘collective effervescence’ effect is nullified and one disposes of too few models in action, or the models are too remote to spur you on” (p. 123). This suggests that

learning in natural environments may differ in crucial ways from learning in artificial environments—such as the standard laboratory situation in psychology—with crucial implications not only for the *rate* of learning, but also for the sustained *motivation* to learn (and thus be socialized), topics which initially formed a key line of communication between psychology and sociology (e.g., Lewin, 1942/1997) but which have since taken distinct disciplinary forms (with sociologists and anthropologists focusing on collectively mediated learning in natural settings and psychologists on individualistic learning in artificial settings).

Rituals and conventions structure learning and processes of embodied simulation by restricting the organization of time and space, thus enabling the amassing bodies at designated times, and helping to produce the collective synchronization of embodied rhythms that aid in the encoding and retrieval of practical information. As Wacquant (2004) notes,

... at the heart of the apparatus of pugilistic apprenticeship stands the common rhythm that envelops all of the gym’s activities and saturates them with its specific temporality. Like a human stopwatch, DeeDee sings out the gym’s peculiar tempo all day long alternately yelling “*Time in!*” to indicate the start of a round of exercise and “*Time out!*” to mark its end. (p. 113)

## Notes

1. Insofar as it deeply influenced Piaget’s work, structuralism may also be seen as responsible for instigating the “cognitive revolution” in American psychology.
2. For instance, Bourdieu cites Attneave (1953) in his discussion of how chronically recurrent experiences in a given class environment produce unconscious expectations for similar events in the future, and the developmental cognitive psychologist—and Piaget’s collaborator—Paul Fraisse (1964) when considering the origins of divergent subjective experiences of time across class fractions.
3. It is suggestive that Keyzers et al. (2003, p. 635) point to a possible Hebbian learning mechanism as a source of this coupling between vision, hearing, and action.

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