

# ‘Mirror Neurons,’ Collective Objects and the Problem of Transmission: Reconsidering Stephen Turner’s Critique of Practice Theory\*

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## ABSTRACT

In this paper, I critically examine Stephen Turner's (1994) critique of practice theory in light of recent research in neuroscience focused on the discovery of the "mirror neuron system" in the pre-frontal motor cortex of humans and other primates. I argue that the strength of two of Turner's strongest objections against the sociological version of practice theory—what I refer to as *the problem of transmission* and *the problem of sameness*—is substantially undermined when we take into account the theoretical and empirical implications of recently systematized accounts of embodied learning and intersubjective action understanding inspired by research into the structure and function of the mirror neuron system. In addition, I show that the sociological practice theory framework outlined by Pierre Bourdieu in the *Logic of Practice* and other works is, in contrast to Turner's portrayal of a confused hodgepodge of logical errors and empirical impossibilities, largely *consistent* with the latest evidence from neurophysiology and as such fundamentally foreshadowed more recent conceptions of the cognitive and neural foundations of the perception, understanding and organization of the motor schemes productive of action in the world and constitutive of *habitus*. Also in line with these newer developments in neuroscience, the practice theory-inspired focus on the *body* as the central matrix generative of tacit understandings and analogical operations responsible for "higher order" systems of classification emerges as the key to solving some of the thorniest problems in the theory of action: eliminating the need to resort to unwarranted "collective object" explanations for the origins of shared presuppositional frameworks.

## INTRODUCTION

In *The Social Theory of Practices* (1994) and *Brains/Practices/Relativism* (2002) Stephen Turner has produced a sustained and compelling (although heretofore under-acknowledged in the social scientific community) critique of some of the fundamental presuppositions and empirical implications of what can be generally be referred to as “practice theory” (Bourdieu 1990; Ortner 1984; Sewell 2005). Turner has taken practice theoretic accounts to task for providing apparently false and seemingly misleading conceptions of several social processes and outcomes, including: 1) the unfounded *a priori* postulation of a host of “shared” presuppositions and competences across social actors, and more importantly 2) an impoverished and downright confused account of *the specific mechanisms* through which these allegedly shared collective objects come to lodge themselves in each individual’s mind, which Turner refers to as the “problem of transmission” (Turner 1994: 43-77, 79-80). Further, 3) Turner castigates practice theory for putting forth ostensibly implausible and categorically nonsensical accounts of the practical learning process, the most egregious of which is the contention that individuals can actually “pick up” in an implicit way what are in fact the equally tacit competences of their alleged role models (Turner 1994: 47, 130). This account of learning flies in the face of most “common sensical” empirical reconstructions of the process, in which the object or action to be learned, consists of explicit and conscious instructions available to the discursive consciousness of all participants in the socialization process and not hidden away in some nether land of implicit “background competences and skills.”

What makes Stephen Turner’s critique of Practice Theory somewhat unique in the crowded marketplace of critiques and reconstructions of practice theory (see King [2000], Vanderberghe [1999] for standout formulations in the case of Bourdieu’s practice theory) is that instead of relying on a purely semanticist and “philosophical” method designed to expose the exclusively “conceptual” and logical contradictions of this line of thinking—which Turner (esp. 1994) still does do a lot of—he also relies on *empirical* evidence taken from the field of cognitive psychology, and neuroscience, such as connectionist models (2002: 25-26, see also Turner [forthcoming]). This adds to the plausibility of Turner’s deconstruction of practice theory, in that—if we follow Turner’s line of argumentation—it is shown not only to be conceptually confused and hopelessly incoherent project at a *theoretical* level, but is also shown to be *empirically* improbable given the newly emerging ideas and results from some of the fields most closely associated with cutting-edge, rapid-discovery contemporary science.

In this paper I use some—but not all—of Turner’s own tools to partially remodel Turner’s house. More specifically, I reconsider Turner’s critique of practice theory in light of recent research in the neurophysiology of motor perception and learning. I show that the two practice theoretical presuppositions used to account for the origin of shared practices that Turner’s finds most incoherent and objectionable, that is, the aforementioned *problem of*

*transmission* (the claim that tacit skills can be transmitted from individual to individual and that learning of tacit skills from role-models is not problematic but an ubiquitous process) and what following Turner can be referred to as the *problem of sameness* (that individuals are able to “pick up” in a relatively error-free manner the practical presuppositions of action from their role models and thus come to share similar practical competences and background assumptions based on purely “observable” behavior), are in fact conjectures that have recently begun to receive wide support in the empirical investigation of the neural processes that account for the production of motor action and the perception of the action of others.<sup>1</sup>

Furthermore, Turner’s objection that practice theory requires a mysterious “collective object” to guarantee sameness of tacit presuppositions is shown not to be an insurmountable obstacle, when recent practice-theoretical concerns with the role of the human body are brought to the fore. Thus, instead of being the Achilles’ heel of practice theory, these accounts of the mechanisms through which practices and implicit skills spread through a population of agents, are in fact plausible and *empirically verifiable* hypotheses that account for the processes through which implicit skills and competences—especially those rooted in the embodied automatisms and practical operations constitutive of the embodied *habitus*—come to be reproduced and transmitted within collectivities.

#### A note on The Definition of Practice

Practices, for the sake of the upcoming argument, are defined following Turner as those nonlinguistic conditions putatively required for the successful accomplishment of a given action that are learned: “By ‘a practice’ I will mean an activity that requires its genuine participants to have learned something of this tacit sort in order to perform” (Turner 2002: 23). Thus practices from this point of view can be considered synonymous with those implicit competences, automatisms and “postural schemes” talked about by practice theorists such as Giddens (1984, with his notion of practical consciousness) and Bourdieu (1990). Another important corollary of this view of practice is that it is intimately connected with the interaction between humans and other objects in the world (including other humans). The theoretical appeal of practice theory from this point of view, is precisely due

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<sup>1</sup> Turner’s broader deployment of connectionist theory and research to argue against the strategy of resorting to shared “premises and paradigms” to explain commonality of action and thought across actors is not directly addressed in this paper, which focuses on his most specific arguments against certain premises of *practice theory*, a theoretical tradition not necessarily equivalent to “paradigm” theory. It bears to mention that Turner’s (2002: 100) objections against the explanation of common action based on observable cognitive objects deemed as “premises” are perfectly compatible to the “embodied-cognition” approach proffered by practice theorists such as Bourdieu, which attempt to ground such ethereal cognitive objects in observable and transmissible patterns of practical and motor action in the world. Practice theory therefore is not synonymous—contra Turner—with explanations of action by way of “paradigms” and hidden frameworks, as long as these last are still conceptualized in the older “cognitivist” language of classical social theory (i.e. Durkheim 1995[1912]: 214).

to the fact that it does away with the separation (on conceptual and empirical grounds) between subject and object, observer and observed, action and perception, which has been a durable and pervasive set of dualisms in the history of Western thought and Western social theory (Bourdieu 1990; Giddens 1984; Joas 1997).

## TURNER' CRITIQUE OF PRACTICE THEORY

### The Critique of Practical Reason(ing)

One important part of Turner's case against practice theory revolves around his general distaste for arguments from "transcendental principles." This neo-Kantian strategy of argumentation—most recently put to very influential effect in Habermas' (1984, 1989) Theory of Communicative Action—establishes the *necessary* existence of some pre-empirical and thus unobservable "background" entity or process by postulating that the usual set of empirical phenomena to which we are customarily exposed and which are not normally called into question would not be able to have the coherence, order or organization that they seem to have if it were not for the underlying structuring power of the background process in question. This is the rhetorical strategy that Kant used in his *Critique of Pure Reason* to deflate the Humean empiricist skepticism regarding epistemic access to casual knowledge about objects and the general human ability to cognize non-empirical, but objective invariants in the (physical, aesthetic and moral) worlds. Kant famously did this by postulating the *logically necessary* existence of the *a priori* synthesizing capacities of the human mind. A similar Kantianism pervades Levi-Strauss' (1968) understanding of the structuralist explanation of the narrative and metaphorical organization of myths across human societies. The underlying structure explains the trans-temporal and cross-spatial similarity in organization (in the absence of a common "diffusionist" mechanism), a fact that would otherwise have to be thought of as a gigantic "coincidence."

For Turner, many arguments for the existence of shared practices or "collective logics" take this neo-Kantian form, albeit sometimes in a sociologized manner, in particular for those practice theorists who draw inspiration from the Durkheim-Mauss (1963) line of French sociological thinking such as Pierre Bourdieu (1990). In this respect it is important to remember that two major classics of French sociology, Durkheim's *Elementary Forms of Religious Life* (1995) and Bourdieu's *Distinction* (1984) are sociologizations of Kant's *Critique of Pure Reason* and *Critique of Judgment* (Rawls 1996; Loesberg 1993) respectively. Turner (2002: 11) summarizes this style of argumentation as going along the following demonstrative logic: "people do something, such as communicate; they could not communicate unless they shared the same framework; therefore they share the same framework."

However, the problem with this line of reasoning according to Turner does not only lie in the self-serving logic, but also in the fact that practice theorists also fail to provide a *plausible account* of how those practices come to be shared in the first place, resulting in the classic fallacy of begging the question. This is most damaging for *sociological* practice theorists since

for this group practices are external entities, fostered by such collectivities as classes and status groups. Thus, practices *must be socialized into* individuals, so that these individuals can end up sharing those practices. Turner is distasteful of these kinds of arguments because the usual appeal to the obscure construct of “socialization” only serves in his view to gloss over the colossal problem of how such pervasive and highly collectivized objects are *taught* to each member of the society in an *unproblematic* way. Thus, for Turner, practice-theoretic talk of “collectively shared” competences flounders precisely because it cannot provide a *convincing* and *empirically plausible* account of how those practices come to be shared in the first place (which is yet another case of begging the question):

How do presuppositions or practices get implanted, if this is the right metaphor –how do they get to wherever they go in a person, and where do they go? How, also, are they imparted, or sent from this place, and in what form are they sent? Are they transmitted directly from individual, for example by imitation...Or do they go through some medium, some sort of collective ether, such as ‘the social’ or ‘discourse’? And if so, how does the practice get from the ether to the person? (Turner 1994: 44).

Turner concludes that holding on to this incoherent notion of sharing is nothing but a dead end and as such should be abandoned:

Practices talk...gets into trouble over the notion of ‘sharing’...the idea that there are ‘shared’ practices requires some sort of notion of how they come to be shared, and this notion in turn dictates how practices can be conceived. If we decide that these difficulties are insurmountable...we can dispense with the notion of sharing altogether (Turner 2002: 23).

### The Problem of Transmission

Turner’s primary objections against practice theory are not necessarily motivated by the fact that he is *a priori* hostile to any conception of sharing practices. If there was a plausible way for practices to be transmitted from individuals to individuals then Turner would have no objection to the notion of shared practices. As he makes clear (2002: 11-13), the primary shortcoming of practice theory is the fact that it *presupposes* this sharing, without giving an empirically plausible—or even logically consistent—account of how that sharing came to happen. Thus the sharing is always already there, and thus it constitutes a “skyhook”—an explanatory *Deus ex Machina* resorted to in order to save the day and provide ad hoc accounts—in Dennett’s (1995) sense. From this perspective, practice theory is deficient because it does not provide reliable *mechanisms* to explain how it is that people come to have a common set of practices and presuppositions to begin with. This is what he refers to as *the problem of transmission*:

The argument for “sharing” or sameness requires us to believe that there is some mechanism by which the same rules, presuppositions, or practices get into the heads of different people. But if we consider the various possible strategies for solving this problem of transmission, we soon see that it is insurmountable. The claim that the same practices,

presuppositions, and the like get into the heads of many people requires a means of transmission that is a little short of magical (Turner 2002: 11, italics added).

In the *Social Theory of Practices* Turner puts the matter this way:

The core issue is perhaps this: if practices or presuppositions are hidden things, or tacit, how do these things move through channels that are themselves public or open? The concept of imitation for example, works for public things, such as overt conduct. But unless the hidden thing can be converted into an out of overt conduct by the transmitter and the receptor, it cannot be conveyed (Turner 1994: 45).

Turner proffers three major arguments against the hidden account of transmission that practice theorists rely on. 1) First, tacit ideologies, skills, presuppositions etc. in order to be *collective*, have to be transmitted from person to person, and the obvious mechanism of transmission has to be some sort of *imitation*. However, Turner (1994: 61) notes that “only external conduct can be imitated” and that an “inner thing such as an idea or disposition, cannot be imitated, at least not directly.” 2) Second, the mechanisms associated with imitation and the process of habituation is not a “very good model for the processes of transmission that are required for the concept of practice.” Why? Because 3) these transmission mechanisms produce difficulties associated with the *location* and *sameness*. The problematic of location is familiar and persistent issue in the history of social theory: Where are “practices” located?

The practice-theoretical wing associated with the work of Pierre Bourdieu attempts to deal with the location problem by relying on the Maussian proposal that practices are equivalent to “bodily automatisms” and are thus located in the actual physical soma of the human body (Mauss 1973; Wacquant 2004: 14, 59-60). Even if we were to allow this partial solution to the location problem, Turner argues that the problem of sameness is still unresolved: transmission is a complex, uncertain process, subject to distortion and the contingencies of individual “interpretation.” If the practice theorist then says that the *interpretative capacities themselves* are practical skills that are transmitted from individual to individual (as Bourdieu would certainly say, since the *habitus* is not only a motor-schematic structure productive of practice, but also a *classificatory* and *perceptual* cognitive structure) then she is only postponing the ultimate deadlock, since now the analyst is forced to specify how is it that those second order assimilative skills themselves are transmitted with—near—perfect fidelity, thus producing a problematic infinite-regress (Turner 1994: 62).

Furthermore, since according to Turner, only “externals” can be imitated and only “observables” (that is overt behavior) can be learned, any kind of non-metaphorical use of the idea of practice transmission “would require the identification of some sort of process...that assured that the things transmitted were in fact the same” and these things were in fact an objective equivalent of “presuppositions.” Imitation falls short, because it can only “transmit...by way of externals.” Therefore “some sort of substitute for this process, by which the internal thing, such as the disposition, can be transmitted needs to be

found” (Turner 1994: 63). To make matters even worse for practice theory, this mysterious sort of process that transmits tacit information not contained in plainly observable acts is assumed to be “ubiquitous and pervasive...So we cannot settle for a mechanism that works only in rare circumstances.” This mechanism must also be *selective* and *restrictive* carrying the practical information only to the “right people.”

This, needless to say is a rather tall order for practice theory to fill, which underscores the effectiveness of Turner’s critique. But how insurmountable is the problem of transmission? Does it really require a “magical” solution? How unwarranted is the assumption of sameness? Do we really need to postulate a mysterious “collective object” from which presuppositions are “downloaded”? We will see below that we can indeed find non-magical solutions—perfectly compatible with the practice-theoretical account—which allow for the transmission of practices “at a distance” without resorting to the equivalent of a “sociological ether” that is, unverifiable and mysterious collective objects. These solutions emerge from recent work in the neurophysiology of motor production, perception and comprehension and are thus consistent with Turner’s turn toward cognitive neuroscience as a fountain of fresh solutions to classic problems in social theory. Thus a solution to the problem of transmission can be had without resorting to ethereal skyhooks, and instead relying on good, old fashioned “cranes” (Dennett 1995).

#### Turner’s Individualist Solution

Before turning to this material it is instructive to consider Turner’s own suggestions as to what a solution to the afore-mentioned theoretical problems might look like. Turner (2002: 13) concludes that “[t]he arguments of *The Social Theory of Practices*, I think, are fatal to the shared or ‘social,’ solutions, or at least to the standard ones. They favor the ‘individual’ solutions.” Turner further claims that idiosyncratic learning histories may in the end produce the same result as that which is the provenance of collectivist (sharing) theories to explain: the production of behavior consistent with a rule or the inducement of a state whereby the focal subject experiences the feeling of “getting it”, that is, learning when the rule is applicable or has been applied by others in the “proper” way. According to Turner, [w]hat people master depends on what they need to do to get around, to cope, to adjust. Each person winds up with something different out of this process, and gives something different back in the form of feedback to others.” Because of this, “[t]here is not need for a complex process of uploading and downloading from a collective object” (Turner 2002: 20).

Therefore there is no need to postulate interpersonal similarity at the local (individual) level. If we were to peer “inside the head” of a given individual we would see that her idiosyncratic learning history has left clearly recognizable but unique footprints, (a particular and individually unique wiring of the association areas of the cortex) that is not “shared” with anybody else. Yet, she produces behavior that is “similar” to other agents, and claims to understand the behavior of others. While practices, in Turner’s view, are anarchic and globally disordered, explicit linguistic discursive structures –what are usually referred to as

ideologies- do the work of gluing together the practical chaos. Thus, Turner inverts the standard ethnomethodological picture in which explicit ideologies are seen as locally incoherent and situationally improvised, while implicit practical competences serve as the grounding agent that serves to hold them together (Garfinkel 1964; Heritage 1984).

### Tacit Teachers and Implicit Learners

Turner primary argument against any view that relies on this implicit account of practice transmission focuses on the apparent impossibility of obtaining reliable *practical knowledge* of *other people's tacit knowledge*. For Turner plain old communication is already a difficult, almost improbable accomplishment (in the ethnomethodological sense), subject to myriad imperfections, errors, deletions and distortions. If people have trouble acquiring other people's *explicit* linguistic knowledge (consider for instance the cottage industry in the history of social theory built around trying to establish what X, Y or Z “really meant”), the practice-theoretical implicit assumption that people can actually acquire other people's *practical, tacit* knowledge seems downright absurd: how can I teach you what I am not even able to realize that I know? Turner puts it this way:

One version of the tacit-knowledge hypothesis, which I attack, makes the following astounding assumption: that people can (and routinely do) obtain perfect reproductions of the tacit possessions of others. In other words, people “share” extremely complex common frameworks. Moreover, somehow they acquire these frameworks through means that are radically less error prone than ordinary explicit communication is. Indeed, to really share they must be error free. The means in question must be much more effective than ordinary “training”, which is, of course, imperfect (Turner 2002: 11-12).

Turner reconstructs three—*prima facie* objectionable—implicit assumptions of practice theory in this respect (Turner 1994: 46): 1) practices cannot be transmitted “through the ordinary epistemic routes” because they are not visible public objects but unobservable “tacit presuppositions” 2) since practices are not “directly” accessible, the only source of access that a possible recipient of a transmitted practice has is “through *inference*, often of a very indirect kind, involving particular kinds of comparisons and subject to various restrictions” (*italics added*). 3) Consequently, our access to practices cannot occur through the “usual” epistemological mechanisms (i.e. sensory perception followed by cognitive processing and memory storage), but must rely on other “covert” processes of an unconscious nature.

But because these learning mechanisms are implicit and not accessible to discursive consciousness (which are not synonymous notions), these “extra” processes seem like an unwelcome and un-parsimonious addition to our normal stock of run of the mill explanations for why people come to do the things that they do and know the things that they know. Using Occam's Razor, Turner (1994: 47) therefore concludes that the “burden of proof is thus on arguments against the sufficiency of known mechanisms.” In addition, since the “social wing” of practice theorists (i.e. Bourdieu) require not only some way of sharing practices, but also that the *same practices* come to be shared, even if we were to come

up with a plausible transmission mechanism, the account would be ultimately unsustainable. The reason for this is that these “very complex common frameworks” must come to be shared “through means that are radically less error prone than ordinary explicit communication is. Indeed to really share they must be error free.” Since acquiring tacit predispositions is a “training-like process” there is no guarantee of such error transmission that could create collective sharing. In fact, learning from experience is much more likely to create inter-individual differences in learning histories than it is to create any sharing.

In Turner’s view, the problem with this practice-theoretical account is that the hidden mechanisms seem like “magical” auxiliary hypotheses which force us to postulate such unlikely processes as “unconscious imitation” and the implicit “teaching” of tacit dispositions. These are unconscious versions of the familiar processes of learning and knowledge transmission with which we are familiar. In his critique of Bourdieu’s idea of the implicit reproduction or practices through the class *habitus*, Turner (1994: 47-48) notes accurately that Bourdieu’s account does rely on such an implied “psychological” model of unconscious learning, modeling and imitation. He chides Bourdieu for not troubling to “give a psychological account of how this might happen,” and in a way hedging his bet on a future explanation that will come out of learning theory and that will be compatible with the tacit transmission of practical knowledge. In this manner Turner shows that Bourdieu’s theory is incomplete and vulnerable to the fact that such a mechanism may never be found or worse, be shown to be completely incompatible with the neuropsychological reality of learning. However, if a minimalist solution could be found, one that did not rely on the ugly apparatus of unconscious modeling and the mysterious transmission of practical skills- then there would be no need to keep the practice-theoretical model of reproduction:

If an alternative to ‘reproduction’ could be constructed in terms of psychological mechanisms that are already well established on other grounds, one would not need to cash in metaphors, however attractive (as “reproduction” is), by matching them up with hitherto unknown or undiscovered psychological processes. Unfortunately, if the mechanisms of transmission cannot be those familiar from the epistemological tradition—seeing, sensing, the hearing of utterances of linguistic objects such as sentences and the like—we are at a loss. Our apparent alternatives are such dubieties as introjection and unconscious imitation. The list of alternative might be improved on. But the fact that there is no unproblematic mechanism puts the question up for grabs (Turner 1994: 48).

The unnamed “epistemological tradition” that Turner refers to—in these admittedly “weak” considerations—is of course none other than the classical empiricism of Hume, Locke and Mill, which only allows for “verifiable” sense data to be the object of transmission and perception and thus the only reliable source of knowledge. However, as we will see below, current research in the neurophysiology of motor perception forces us to move beyond the limitations of classical empiricism and allow for other objects and sources of knowledge beyond the usual “secondary qualities” allowed in the empiricist scheme (sounds, colors, etc.), such as image-schemas and motor representations. Further, we will see that there exist

plausible and empirically verifiable mechanisms—far from “dubieties”—which are indeed analogous to such processes as unconscious imitation and which are comparable to the imagery of reproduction of the “social wing” of practice theory.

#### MIRROR, MIRROR ON AREA F5 OF THE VENTRAL PRE-FRONTAL CORTEX...

Recent research on the neurophysiology of motor perception and the neural bases of action execution has uncovered a set of empirical findings that call into question Turner’s implicit assumptions about the “usual” and “known” capacities of the human cognitive system. In particular, they allow us to reconsider the apparent limitations of “imitationist” accounts highlighted by Turner. I argue that these developments are of such significance for practice theory that they allow us to concede Turner’s point that *practice theory is incoherent without allowing for a highly capacious job for the imitation process to perform in the origins of shared practices* while at the same time concluding that given recent reconsiderations of the idea of imitation (i.e. Gallese 2000, 2001, 2002, 2003a, 2003b; Gallese and Goldman 1998; Gallese and Lakoff 2005; Metzinger and Gallese 2003), *(unconscious) imitation can (and routinely does) do the job required by the “standard” practice theoretical account*.

I will show that these developments are sufficient to at least put into questions most if not all of Turner’s criticisms of sociological practice theory, the most damaging part of which has to do with the *empirically* and *logically* implausible claims that the theory allegedly makes about human cognitive and epistemic capacities and the related social processes that are dependent on these (i.e. the social reproduction of vertically stratified “communities of practice”). However, for Turner as we have seen, the empirical errors are much more damaging than the “logical” ones, since in many ways what “logically” follows is dependent upon the assumptions from which the argument begins. Furthermore, given that these assumptions are (at least in social science) usually selected so that they are in accord with how the empirical world operates, my argument will concentrate on the latter set of factors. In the following I go on to summarize and note the implications of these recent discoveries and systematizations of the role of imitation in the process of the understanding, learning and production of the embodied cognitive schemes constitutive of practices.

#### Mirror Neurons

Contemporary research and theory in the neurophysiology of action production and action understanding calls into question the following traditional assumptions: 1) that there is a radical separation and segregation between the underlying neural structures that implement the *production* of action and those that subserve the *perception and comprehension* (and thus learning) of action. 2) That the “implicit learning” of the practical skills of others is a highly demanding (in a cognitive-informational sense) process for the human organism, fraught with possible error, and inaccuracies, and that the learning of “tacit skills” is more problematic than the learning of “explicit teachings.” In contrast to (1) this research finds that neural structures physiologically and organizationally analogous to those that subserve

action production are involved in action *representation* and action *comprehension*. Instead of what we would expect given (2) we find that the “transmission” of practical knowledge (in the form of motor schemes) from one actor to another and the ready practical reproduction of those actions on the part of the receiver begins early in infancy and continues throughout the human life course.

Not only is the ability to “pick up” tacit practical skills from others unproblematic and less informationally demanding than learning explicit knowledge, but it appears to be the *dominant* manner in which (embodied) learning takes place (Meltzoff 2002). Furthermore, this type of learning is surprisingly accurate—even for non-human animals and newborns—and possibly less error-ridden than explicit learning, and is able to display some of the same “higher order” properties (i.e. generalization across sensory modalities) that more “advanced” cognitive structures dedicated to the representation and usage of information usually do (Gallese 2003a: 518). This calls into question Turner’s assumption that tacit practices a) cannot be transmitted from one actor to the next, and b) that such a transmission process is not only highly unlikely but also error-prone.

The central part of the account concerns the quasi-serendipitous discovery of “mirror” neurons in the ventral pre-frontal motor region of macaque monkeys (diPellegrino et al., 1992; Gallese et al., 1996; Rizzolatti et al., 1996, 2001, 2002). This area of the brain is of particular interest to neuroscientists since neuronal populations located here appear to respond in particular to visual stimuli that require a motor response on the part of the animal (such as graspable objects) and to the animal’s own motor attempts to interact with objects; they are thus dubbed “visuomotor neurons” (Fadiga et al 2000), since they appear to be involved in *both* visual perception and motor production (and in possible inter-modal mappings across these two domains). During research on the neurophysiology of object perception and motor interaction researchers were able to detect standard electrical potential readings from visuomotor neurons of the prefrontal cortex when monkeys were presented with various graspable objects, and when they proceeded to interact with those objects by performing motor operations upon them, such as grabbing them, holding them, and (in the case of objects such as paper) tearing them, etc. These are so-called “canonical” visuomotor neurons, in that they appear to respond *exclusively*, to the visual presentation of graspable objects and to the animal’s own production of motor activity intended to interact with those objects (Fadiga et al 2000: 172).

Some canonical neurons appear to be strictly differentiated according to the type of grasp that the object allows, while other respond generally to all “graspable” objects. It is of importance to underscore that these canonical neurons are not simply responding to the *sensory* characteristics of the objects (shape, size, color, etc.). Instead, different objects of different shape and size will elicit *similar* responses as long as it *affords* similar types of motor interaction to the animal. Thus, canonical neurons appear to be responsive to the character of the object that makes it potentially useful for the animal and various objects will be

“subsumed” under the same canonical visuomotor neuron response as long as they allow for the same type of pragmatic interaction (pinching, grabbing, etc.). As Gallese (2003a: 1235) notes “[w]hat is coded here is...the relationship, in motor terms, between the agent and the object of action.”

However, the big surprise came when it was discovered that neuronal activation increased in certain areas (i.e. F5) of the ventral pre-motor cortex not only when the animal itself performed an action on the object or was visually presented with the object, but when it perceived *another* animal (or sometimes the experimenter) performing that action on the object. These “hybrid” visuomotor neurons on area F5 of the ventral pre-motor cortex were baptized “mirror” neurons due to their apparent ability to be *exclusively* affected by the animal’s perception of particular types of motor actions performed by *other embodied agents* on certain types of objects. As noted by Gallese et al (1996: 600), “Mirror neurons are characterized by two main properties: responsiveness to the sight of meaningful actions and activation with active movement.”

What is the role or function of the mirror neuron system? Since it is not directly involved in the production of action, or exclusively in the perception of objects, the mirror neuron system’s role would appear to be ambiguous at best and superfluous at worst. However, it was quickly realized that the MNS might have an important functional role to play in the *representation and understanding* of action.<sup>2</sup> Fadiga et al (2000: 175) conclude that while the “visuomotor coupling” shown by canonical neurons could be at the basis of the transformation of visual information into motor action that is appropriate for the perceived object (cupping the hand at the sight of a round object), “the visuomotor discharge that characterize mirror neurons could be at the basis of action imitation and action understanding.”<sup>3</sup> In this sense the mirror neuron system in the F5 region can be seen as one

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<sup>2</sup> Since the seminal experiments by Giacomo Rizzolatti’s and Vittorio Gallese’s teams on macaque and Rhesus monkeys, an analogous mirror neuron system (located in an area of the Brain that is the possible evolutionary homologue to that of the Monkey’s) has been shown to exist in humans (Fadiga et al 1995; Rizzolatti et al 1996; Iacoboni et al 1999).

<sup>3</sup> In an experiment designed to discriminate between the hypotheses that mirror neurons are a purely “perceptual” structure versus the possibility that they are involved in more abstract processes of action understanding, Umiltà and collaborators (2001) recorded activity in the mirror neuron system under two conditions: in the first the monkey was shown a fully visible action directed towards an object, while in the second condition the same action was presented but with its final most important part (i.e. hand-object interaction) covered behind an opaque screen. Consistent with the notion that the mirror neuron system is involved in action understanding, activity in this neural area was detectable in both conditions, but *not* in a hidden object control condition in which the animal did not know what was behind the screen. These and a large quantity of other evidence (see Rizzolatti, Fogassi and Gallese 2001: 665, 2002), supports the notion that action understanding relies not simply on the visual analysis of a given scene (as in traditional “empiricist” account of learning), but instead we appear to “...understand actions when we map the visual representation of the observed action onto our motor representation of the same action.” The “understanding” hypothesis has received further confirmation in a more recent series of experiments, in which mirror neuron activation was observed not only when the monkey *observed* a given action, but also when the monkey

possible substrate of not only of the practical capacities *productive of action* (which are mainly subserved by traditional “motor” neurons in the pre-frontal region) but those which are in charge of the practical, *representation, coding and comprehension of the practical action of self and others, and which may be involved in the implicit matching of the practical skills of others to that of other actors and vice versa*; precisely the neurocognitive capacity that according to Turner (1994) belonged in the realm of high-speculation and/or logical impossibility and incoherence.

### The Neural Bases of Practical Generalization

Two surprising features of this “mirror neuron system” (MNS) are its simultaneous generality and specificity: some mirror neurons will only fire at the sight of very specific (but sometimes relatively complex) motor actions (such as holding a cup), while others “generalize” their mirroring activity to entire “class” of actions (i.e. grasping any object). These have been dubbed “strictly congruent” and “broadly congruent” mirror neurons (Gallese et al 1996: 602, 605). Broadly congruent neurons “...are much more “generalist” and are capable of extensive “generalization” responding to a broad class of movement and being generally indifferent to direction in 3-dimensional space and the orientation of the hand in relation to the object.” Mirror neurons, in contrast to sensory visual neurons located in the occipital cortex do not encode primarily *sensory* information, but appear to encode a more general classification scheme for objects based on *their possible motor affordances*, and thus “generalize” across objects of different shapes if they lend themselves to similar types of motor manipulations. Thus, “... mirror neurons seem indifferent to the type of object, being more likely to differentiate between different types of objects only if different types of actions are directed at those objects” (Gallese et al 1996: 605).

The mirror neuron system appears to be a fairly specialized, yet highly flexible (in its capacity for proto-conceptual “generalization”) neurocognitive structure primarily charged with forming fairly abstract representations of *practical action upon objects in the world performed by other actors*. In this sense mirror neurons appear to encode practical information about objects in the world (i.e. not what objects “are” in the abstract semantic sense of early cognitivism (Fodor 1975), but instead “what they are *for* [me or others like myself]” in a practical embodied sense, and as such “classify” objects, not based on the usual “list” of semantic features, but *based on a practical classification scheme keyed to the uses that an object has for others and therefore the (inferred) use that the object might have for the actor*. How broad is this capacity for “generalization”? In a recent series of experiments, Kohler et al (2002) show that mirror neurons are not only responsive to the *sight* of other actors performing a given action, but that certain parts of the MNS become activated when the animal *hears* the same action. Thus the MNS not only generalizes across the sensory properties of objects to their pragmatic affordances for the animal but also appears to generalize across the *modes of sensory presentation*

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*heard* noises consistent with another actor performing the same action (Kohler et al 2002). Mirror neurons were not active when the monkey was exposed to a series of control noises not consistent with any known or learned action (Metzinger and Gallese 2003: 553).

*of the actions of others* (visual, auditory, etc.) toward an abstract practical understanding of the motor act.

The same division between narrow and broad discrimination among mirror neurons is also observed in the case of aural information regarding an action (tearing, breaking, smashing, etc.). This implies that the MNS is responding not to purely *perceptual* features of the act, but that it is produce an implicit and pre-linguistic *generalization across sensory modalities* and as such can 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, 2003a). 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 and 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.

In its ability to generalize from one observed use to other uses and from one sensory modality to the next the MNS appears to be the neural structure that subserves the practical capacity for what Bourdieu (1990) refers to as “bodily generalization” where the same set of practical schemes are transposed by the actor from one object to another, and thus to different areas of practice (Bourdieu 1984: 175; 1990: 89). This impression is reinforced by Gallese et al (1996: 606-607) when they note that given the presence of “Neurons with visual properties similar to those of mirror neurons in the region of the temporal sulcus” (an area distinct from are F5 where mirror neurons can be found), there is a possible functional differentiation between these two neuronal populations, that might be isomorphic with the neurocognitive division of labor between “*pragmatic* and *semantic* cortical maps...one can postulate that superior temporal sulcus is the semantic representation of hand-object interactions, while F5 is the pragmatic one” (italics added).<sup>4</sup> This is in line with the practice theoretical differentiation between two types of knowledge representations regarding the sources and aims of action: one “theoreticist” (Bourdieu 1990) and given to the explicit formulation of aims and ends of action (i.e. the “semantic mapping” of objects and practices) and the other a more “practical” representation which dispenses with explicit schemes such as the traditional “production system” if-then approach to the description and implementation of action systems popular in “good-old fashioned” artificial intelligence circles (Haugeland 1997: 15; Fararo and Skovretz 1986).

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<sup>4</sup>As Fadiga et al (2000: 174-175) note, it is important to eliminate alternative hypotheses as to the function of the MNS, in order to establish what the Mirror Neuron System is not. First, the MNS, is not a structure that deals with the “preparation” for action on the part of actor (mirror neurons don't fire when objects are presented or made available to the animal), it is also not a system that it is involved in the generalized “intention” to perform an act, since that cannot explain the object and action specificity of mirror neuronal activity.

### The Empiricist's Error

This breakdown of the practical/conceptual division does not bode well for Turner's critique of practice theory, which is primarily sustained by holding on fast to the analytical and empirical separation of "overt conduct" and "the hidden things" of practice. This "hidden thing" is of course nothing other than tacit presuppositions and skills (Turner 1994: 45). Turner flounders here by stubbornly failing to question the beleaguered—given recent research on the neural basis of concept formation (Gallese 2003b; Gallese and Lakoff 2005) and classical phenomenological social theory (Merleau-Ponty 2002[1962])—empiricist assumption that the *informational content* of overt acts of conduct is exhausted by its "external" empirical sensory properties and that as such overt conduct *cannot be the carrier of implicit conceptual presuppositions* (the old sensory/ideational divide). But from the practice-theoretical viewpoint, and consistent with recent neuroscientific research, the "hidden stuff" of practices is "hidden" in the last place that anybody might care to look for it: right out in the open!

Thus there is not defensible empirical or analytical division between the "hidden" presuppositions of practice and the overt conduct *through which* practices are transmitted, since these hidden presuppositions are "coded" in the bodily automatisms and motor schemas constitutive of practical action, in what Mauss (1972: 91) in reference to lack of separation between actions and representations in the practice of magic, called "practical ideas." As Bourdieu (1990: 69) notes, there is not clear differentiation between the "symbolic" and the practical, since practical teachings tend to bear "...the hidden persuasion of an implicit pedagogy which can instill a whole cosmology, through injunctions as insignificant as 'sit up straight' or 'don't hold your knife in your left hand,' and inscribe the most fundamental principles of the arbitrary content of a culture in seemingly innocuous details of bearing or physical and verbal manners." Consistent with this account, recent neurophysiological evidence shows that there exist plausible neurocognitive mechanisms that appear to subserve the "picking up" of representational/cognitive "content" *purely from the observation of overt conduct* (Gallese et al 1996; Fadiga et al 2000; Gallese 2003a).

Overt conduct, from this point of view (and contra the empiricist separation of "raw sense data" from ideational contents) is fraught with hidden "conceptual content" that is readily graspable by our neurocognitive system. Gallese and Lakoff (2005: 456) put the matter in strong terms: "We...argue that conceptual knowledge is embodied, that is, it is mapped within our sensory-motor system. [and] that the sensory-motor system not only provides structure to conceptual content, but also characterises [sic] the semantic content of concepts in terms of the way that we function with our bodies in the world." In other words, "*imagining and doing use a shared neural substrate*" (italics in the original). This is consistent with the recent findings that the motor understanding of actions and the *conceptual* understanding of objects in the world also share similar neural structures (Fadiga et al 2000; Gallese 2003a; Metzinger and Gallese 2003).

Turner thus errs in considering the *conceptual content of practice as analytically and epistemically separable from its embodiment in over action*. This leads Turner to suppose (ex cathedra) that “tacit presuppositions” cannot be transmitted via the practical imitation of conduct, and to propose *that it is only by the re-translation of practical presuppositions into “public language” of explicit instruction that a plausible account of the transmission of the “hidden objects” of practices can be constructed*. However, this *reductio ad absurdum* argument (no such explicit teachings of “hidden presuppositions” can be observed, and even if they were, it would be a massively inefficient process unable, like the behaviorist theory of language as criticized by Chomsky, to account for observed levels of competence), itself presupposes both the conceptual informational sterility of overt conduct, and thus the strict separation of conceptual content from practical action (patterns of motor activity), and the related inability of the human neurocognitive system to gather and process the implicit conceptual information encoded in patterns of overt behavior.

However, the breakdown of the division between observable conduct and conceptual content is a key component of recent neurocognitive theories of learning, such as Gallese’s (2003b) “embodied simulation” theory, and Metzinger and Gallese’s (2003; Gallese and Metzinger 2003) “motor ontology” framework, theoretical accounts themselves inspired by the discovery of the Mirror Neuron Matching System. Furthermore the human neurocognitive system has been shown to be able engage in patterns of cross-domain mapping with relative ease (Gallese 2001, 2003b: 518; Fadiga et al 2000). This cross-domain mapping allows the person not only to match patterns of observed action to actual execution, but through the pervasive activation of embodied simulation whenever the actions, gestures and organism-object interactions of other agents are observed, to actually *infer* the unobservable intentional states (goals, desires, emotional valences) of other embodied actors without having to rely on an explicit, proposition-based “theory of mind.” According to Gallese (2003b: 523), “[In humans] Action observation automatically triggers action simulation...This process of automatic simulation constitutes also a level of understanding, a level that does not entail the explicit use of any theory of symbolic representation.” Conceptual content is thus immanent on and irreducibly inseparable from—via the embodied simulation mechanism—the overt actions of other social agents.

Not only that, but these implicit acts of embodied simulation are precisely the source of the background pre-understandings and hidden presupposition that are the subject of practice theory. These are the “implicit certitudes” that the human brain as an embodied system appears to have. Gallese (2003: 521) suggests that multiple “levels of organism-organism interactions, whatever the complexity of the relational specifications defining them might be, rely first on the same basic functional mechanism: embodied simulation.” This embodied simulation process is critical, since it “...enables the constitution of a shared and common background of *implicit certitudes* about ourselves and, simultaneously, about others... embodied simulation is a pervasive brain mechanism, *intimately related to apparently ‘abstract’ aspects of human cognition*” (italics added). Not surprisingly, it is precisely the mirror-neuron matching

system which for Gallese (2003) is the primary neural structure in charge of embodied simulation. Furthermore, Gallese's (2001, 2003) contention that action observation (neurophysiologically not just "logically") *implies* action simulation, and if action simulation in its turn implies the practical learning, comprehension and representation of the action of other agents and the "implicit certitudes" carried by this action, then this deals a grave blow to Turner's *problem of transmission* objection against practice theory.

This is consistent with Bourdieu's analytical differentiation between *mimesis* (the analogue to Gallese's embodied simulation in his rendering of practice theory) and *imitation* (the rudimentary mechanism introduced by Tarde to counter the Durkheimian account of the origin of shared culture). For Bourdieu (1990: 73),

...the process of acquisition—a practical *mimesis*...which implies an overall relation of identification and has nothing in common with an *imitation* that would presuppose a conscious effort to reproduce a gesture, an utterance or an object explicitly constituted as a model—and the process of reproduction—a practical reactivation which is opposed to both memory and knowledge—tend to take place below the level of consciousness...The body believes what it plays at...[i]t does not represent what it performs, it does not memorize the past, it *enacts* the past, bringing it back to life.

Insofar as action observation and its automatic correlate, *action simulation* is an endemic and chronic state of affairs for any individual located in a given sociodemographic lifeworld (Bourdieu's [1984] "life conditions"), then both the "enactment" of practices on the parts of others and thus practice transmission toward other co-present actors (with the processes reversing as the other actors respond to the initial transmission with practical productions of their own) is, in contrast to Turner's portrayal, a rather common and somewhat unexceptional state of affairs. This process rather than being conscious and deliberate, is instead "...*automatic, unconscious, and pre-reflexive*" (Gallese 2003b: 521, italics in the original). Thus by *virtue of being part of a given social world*, humans will be exposed to countless acts of practical teaching and will be the subject of practical learning during the course of their everyday existence (Bourdieu 1990).

Therefore, this type of "practical transmission," rather than being "little short of magical" (Turner 2002: 11) is in fact commonplace. If by magic Turner means the apparent ability to draw *implicit* "theoretical" and conceptual *inferences* regarding the background assumptions encoded in the action of others, and thus engage in apparent "mind reading" then this requires no magic at all (Gallese and Goldman 1998; Gallese 2003b). As Gallese (2001: 41-42) observes, this sort of mind reading (grounded in what he refers to as the "motor equivalence" between the observed agent and the observer) instead appears to be a routine operation of the human perceptual and action-production and action-execution system:

When a given action is planned, its expected motor consequences are forecast. This means that when I am going to execute a given action I can predict its consequences. Through a process of 'motor equivalence' I can use this information also to predict the consequences

of actions performed by others. This implicit, automatic, and unconscious process of motor simulation enables the observer to use his/her own resources to penetrate the world of the other without the need for theorizing about it...without the need to necessarily use propositional attitudes. A process of action simulation automatically establishes a direct implicit link between agent and observer. Action is the ‘a priori’ principle enabling social bonds to be initially established. By an implicit process of action simulation, when I observe other acting individuals I can immediately recognize them as goal-directed agents like me, because the very same neural substrate is activated as when I myself am bound to achieve the same goal by acting. In sum, my suggestion is that through a process of ‘motor equivalence’ a meaningful link between agent and observer can be established. Mirror neurons are found in cortical regions endowed with motor properties because premotor neurons are able to establish relationships between expectancies and results.

### Unconscious goals and the transmission of practice

The preceding account can help us make sense of various conceptual puzzles related to the practice-theoretical view of action that have bedeviled previous commentary on the subject. Most importantly, practice theory requires an account of goal-directed action which does without the traditional action theoretical means-ends schema (i.e. Parsons 1937), especially its emphasis on conscious, well worked-out ends that precede practical engagement, *without abandoning the more abstract analytical concept of purposive action*. This leads practice theorists such as Bourdieu (1990, 1998) to attempt to speak of goal directed action, while at the same time abandoning the traditional Parsonian straitjacket of conscious (voluntaristic) representation and selection goals and the (quasi)rational selection of “means.” For critics (i.e. Alexander 1995) this comes very close to a logical and a category mistake: the existence of “unconscious strategies” which renders these accounts “reductionist” and fundamentally at odds with a truly “voluntaristic” account of action. Because the notion of strategies is seen as *semantically* (“intensionally”) incoherent without a notion of conscious purposes, this is seen as a terrible logical blunder, which renders the idea of unconscious strategies *extensionally* empty (it refers to no known or even potentially knowable process).

Practice theorists such as Bourdieu are unapologetic about resorting to the catachrestic notion of unconscious strategizing, but avoid the dilemma of explicitly suggesting the actual existence of such a process. This is usually done by resorting to *metaphor* (Lakoff and Johnson 1999), which allows the setting up of cross-domain correspondences between familiar objects and situations (source domains) and the now highly counter-intuitive concept of action as being governed by a “purpose without goals” (the target domain). The most famous metaphor from Bourdieu’s practice theory is that of purposive practical action as being governed by a “feel for the game.” A feel that does not require pre-meditated goals or carefully thought-out plans that are formulated and developed prior to engagement in the field of action, but which can still be characterized as driven by “purposes” and “interests” (Bourdieu 1968).

Such unconscious strategizing, while it may offend the semantic Puritanism of the philosophically inclined, is in fact a real, routine, neurophysiologically instantiated process grounded in the embodied cognitive ability to “read-off” goals and purposes from other actors *from the direct, “subpersonal” attunement and coordination of motor schemes across agents*, without ever resorting to conscious deliberation about goals and purposes. As noted by Gallese and Metzinger “As it turns out, the motor system constructs goals, actions, and intending selves as basic constituents of the world it interprets.” Purposes, intentions and usable objects are part of the *taken for granted furniture* of the world of all embodied agents (Garbarini and Adenzato 2004). Furthermore, [e]mpirical evidence now clearly shows how the brain actually codes movements and action goals in terms of multimodal models of organism–object relations” (2003: 385). When presented with a “field” of objects and other agents acting on those objects, the actor does not need to consciously deliberate how she will act in respect to those objects and those actors, since each of those objects and agents will afford a specific use to the actor depending on the local situation. Goals and strategies are not locked inside the head of the actor but are immanent in the organism-object and organism-organism relations made possible in a given field of striving, which provides its own set of objective possibilities.

However, if we apply Turner’s (1994, 2002), critique of practice theory as a primarily question-begging theoretical strategy we are bound to ask: Where does this “feel for the game” come from? An actor that at time  $t$  has a “feel” for the game, must have, at time  $t-1$ , not had such feel, but instead a much more blunt and awkward set of immature competences not yet honed in into an ineffable (and skillful) “feel.” At some point Turner would argue, practical knowledge must have been *transmitted somehow*, and *taught* to the actor in a “non-practical” way. It is Turner’s wager that by forcing the proponents of practice theoretical accounts of action to “retrace their steps” back to the genesis of practical competences, that it is possible to force the theorist to get off of her practice theory bandwagon, ultimately compelling her to admit that before knowledge is practical it must first be (at some point) conscious and transmittable “through the usual” public channels of conscious and linguistically mediated learning and instruction, fraught with the possibilities for error, and individual improvisation.

However, the discovery of the Mirror Neuron System provides a way out of this problem and provides the practice theorist with a powerful weapon to respond to Turner’s challenge. The reason for this is that the existence of the mirror neuron system provides a plausible neurocognitive mechanism to sustain the practice theoretical implication that *practical instruction may never have to be translated into “public” explicit teachings*. In other words, pace Turner, practice theorists are not foolish in sustaining that certain practical competences (for Bourdieu [1984], the *most important* practical competences constitutive of the “class *habitus*”) are *never the subject of explicit instructions, but are “picked up” by the actor by virtue of being surrounded by other actors who display the same competences*. They are “...social necessity turned into nature, converted into motor schemes and body automatisms” (Bourdieu 1990: 69).

Turner is correct in noting that for most practice theorists the actual processes and mechanisms that account for this mysterious “picking up” (or as he dismissively refers to it “downloading from a collective object”) are seldom explicitly laid out. However, he is incorrect in concluding that both *logical* and *empirical* criteria of coherence and propriety dictate that we abandon any type of “implicit teaching” mechanism for the sake of explicit instructions through the “normally accepted channels.” The Mirror Neuron System provides a completely justifiable neurocognitive mechanism to explain how *implicit knowledge of action consequences* is “picked up” from the world. As Gallese et al (1996: 606) note,

When an individual emits an action, he ‘knows’ (predicts) its consequences. This knowledge is most likely the result of an association between the representation of the motor act, coded in the motor centers, and the consequences of the action. Mirror neurons could be the means by which this type of knowledge can be extended to actions performed by others. When the observation of an action performed by another individual evokes a neural activity that corresponds to that which, when internally generated, represents a certain action, the meaning of it should be recognized, because of the similarity between the two representations.

This is precisely the learning mechanism that Bourdieu (1990: 73-74) proposes as being at the basis for the transmission of practices and the formation of *habitus*, especially in “informal” everyday life situations:

So long as the work of education is not clearly institutionalized as a specific, autonomous practice, so long as it is the whole group and a whole symbolically structured environment, without specialized agents or specific occasions, that exerts an anonymous, diffuse pedagogic action, the essential part of the *modus operandi* that defines practical mastery is transmitted through practice, in the practical state, without rising to the level of discourse. The child mimics other people’s actions rather than ‘models.’ Body *hexis* speaks directly to the motor function, in the form of a pattern of postures that is both individual and systematic, being bound up with a whole system of objects, and charged with a host of special meanings and values. But the fact that schemes are able to pass directly from practice to practice without moving through discourse and consciousness does not mean that the acquisition of *habitus* is not more than a mechanical learning through trial and error.

Bourdieu here rejects the empiricist (and “connectionist”) notion of learning as involving long stretches of “training” through trial and error while endorsing the apparently mysterious notion of a direct transmission of “schemes.” However, as we have seen this account of practical learning is fairly consistent with neurophysiologically inspired “embodied simulation” formulations (Gallese 2000, 2001, 2003; Metzinger and Gallese 2003; Gallese and Metzinger 2003; Gallese and Lakoff 2005). Thus the neural structures that subserve the capacity to draw correspondences between the motor representations of the actor’s own action (and its consequences) and that which comes to us from our observations of other persons’ actions (and their consequences) constitute a plausible mechanism for the “transmission of practice” that provides the individual with a pre-conscious source of

potentially rich understandings of discrete practical schemes and their consequences, without resorting to explicit instructions regarding the “proper” way to align actions and goals and what the most appropriate goals should be in the first place (i.e. standard socialization theory accounts such as that proposed by Parsons and Shils [1951]).

In this way, the natural correspondence between the motor schemes for action across actors supported by the “common-ground” that is the human body, provides a way for skills and “lessons” regarding means-ends associations to be transmitted from actor to actor, without having to resort to the “normal epistemic channels” (Turner 1994). In fact, it is possible that a strong version of the practice theoretical account, in which the normal epistemic channels (i.e. explicit teachings) only serve to reinforce what has already been learned at a practical level can be sustained (Bourdieu 1984, 1990). The reason for this is that explicit instruction about how to perform operations on objects in the world (the basis of the practical competences emphasized in practice theory) can only provide a rather impoverished picture of those objects, since these descriptions are based on the explicit semantic features of action and objects. In this sense it may be the “normal epistemic channels” that Turner challenges practice theorists to come back to in order to establish their case, the ones which are not up for the task of explaining the genesis of the tacit competences responsible for the generation of practice.<sup>5</sup>

This “traditional” idea of knowledge generation and learning as involving explicit and intersubjectively verifiable representations of action and objects has come under increasing fire in more contemporary research in cognitive science (Lakoff and Johnson 1999; Lakoff and Nunez 2000; Turner 2002). The standard cognitive-scientific view primarily viewed object representation as implemented by way of a system of “categorization” where objects were instantiated in the cognitive system as a searchable “list” of necessary and sufficient semantic features. The discovery of the Mirror Neuron system as a parallel center for object representation that does not rely on explicit semantic or verbally mediated representational tools provides support for the “new fangled” cognitive scientific and artificial intelligence view (Haugeland 1997) that we should really speak of representational *systems*, and that the semantic representation of objects as composed of abstract bundles of features may be secondary to the representation of objects as a bundle of motor-schemes, which provide spatially grounded and body-centered “descriptions” of the world keyed to the relationship between objects and the motor schemes and motor operations usually applied to those objects (Gallese 2001, 2003a; Gallese and Lakoff 2005). That is, instead of knowing what

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<sup>5</sup> This criticism does not wholly apply to Turner’s (2002: 29, 100) connectionist account of learning, which as Lucich (1991) notes is perfectly compatible with practice theory, but is aimed at his earlier (1994) claim that the transmission of practical skills from one agent to another *cannot occur by way of imitation* (Turner 1994: 45). The connectionist view of learning provides in this sense only a very rigid schema of the learning process, based on “brute force” exposure of the neural net to explicit feedback from the outside world.

objects *are* in a decontextualized sense, humans may be better at knowing what objects are good *for*.

### The Body as a Collective Object

While it is possible to concede that the above arguments constitute a strong response to Turner's worry about the incoherence of the practice-theoretical account of the *transmission of practices*, none of this addresses Turner's other major objection, based on what he deems to be the mysterious "mechanism by which the same rules, presuppositions, or practices get into the heads of different people." Thus the *problem of sameness remains*. As shown by the quote above, Turner's solution (more recently [2002] drawing on connectionist models of learning and cognition) is to reject the sameness assumption and to endorse a more traditionally British/American "pragmatist" solution (which he contrasts to the deficient "social" solution), in which the search for hidden practical commonalities is given up, and a strong contextualist/individualist argument is submitted instead. From this point of view, there are now collectively shared practical presuppositions, but instead each person instead winds up with the practical competences that pertain to their unique and idiosyncratic interactional history.

Notice that this formulation is not necessarily incompatible with *all* practice theoretical formulations, but it is certainly incompatible with the stronger non-trivial formulations of practice theory in particular its most stringently *sociological* counterparts (Bourdieu 1984; Rawls 2001). It is in this sense, that Turner's (2002) own resolution of the practice-theoretical dilemmas that he identifies lead him toward a highly stylized "pluralist" notion of human action activity grounded in connectionism, and as such his solution ends up being radically *anti-sociological*, if we take this term in its traditional Durkheimian sense. In this sense, Turner appears to largely overdraw the differences between Bourdieu's theoretical system and the empirical and theoretical implications that he draws from modern cognitive theory. We can identify at least three ways in which Turner account loses its plausibility.

First, it is not clear whether contemporary connectionism *necessarily* leads to the asociological individualist pragmatism that Turner defends. Second, Turner errs in not reading Bourdieu as a cognitive theorist, instead throwing him together with the largely obsolete line of "collectivist" French thinkers that were clearly repudiated by Bourdieu (1990: 35, 43). As noted by recent commentators (Lahire 1999; Lizardo 2004; Lucich 1991: 228; Potter 2000; Pickel 2006) the *habitus* is a cognitive object, and its incorporation into Bourdieu's account makes his theory a socio-cognitive ("individualist" in Lahire's [2003] view) theory, in the line of those put forth by the late Levi-Strauss and the Piaget of *Sociological Studies* (1995). In this vein, Bourdieu's theory rather than relying on obscure psychology is based on relatively modern cognitive psychological considerations, and it is thus not necessarily incompatible with connectionist thinking (although it is certainly incompatible with Turner's own construal of this research program). Third, we have already rejected the notion that sociological practice theories require "downloading from a collective object" since this

implies that presuppositions are inherently separable from action and thus must reside in their own ontological compartment. Instead, we have shown that practical presuppositions are immanently encoded in overt bodily action, and as such do not require special epistemic routes of access. Furthermore, these presuppositions are not a background hidden away from action but can be “read-off” directly via embodied simulation from the observation of organism-object and organism-organism interactions (Gallese 2003b).

However, the problem remains: what kind of constraints on the practical production of action would be compatible with a stronger sociological conception of the (partial) collective sharing of practical presuppositions? If these presuppositions are an inherent part of action, then any constraints on practical presuppositions must by necessity be equivalent to constraints in the production of practical action itself. In this sense both Bourdieu’s (1984: 475-484, 1990) and more recent formulations of models of action production and the cognitive processing of motor behavior (i.e. Gallese [2001, 2003], Lakoff and Johnson [1999], Gallese and Lakoff [2005]) agree that such a constraint not only exists, but that it is operative in most instances of action production, category formation and action interpretation and comprehension: it is the human body itself. Furthermore, I submit that Turner’s turn towards a radically pluralistic and individualistic account of practice, can be traced to his embrace of the largely *disembodied* version of contemporary cognitive science represented in connectionist modeling, which while an improvement over the even more disembodied “production system” symbol-manipulation perspective (and definitely not as compatible as Turner makes it out to be in his attempt to be an “agnostic” regarding which theory fits his argument better), does not pay enough attention to the very real constraints on practice, and the related capacity to serve as a “common ground” (Merleau-Ponty 2002[1962]: 104) of the human body.

Bourdieu (1984: 474) makes clear that the body is both the center of practical social cognition and its most important point of reference:

So nothing is further removed from an act of cognition, as conceived by the intellectualist tradition, than this sense of the social structure which...is social necessity made second nature, turned into muscular patterns and bodily automatisms. Everything takes place as if the social conditionings linked to a social condition tended to inscribe the relation to the social world in a lasting, generalized relation to one’s own body, a way of bearing one’s body, presenting it to others, moving it, making space for it, which gives the body its social physiognomy.

For Bourdieu, socialization leaves traces not so much at the level of conscious representations but at the level of practical competences and styles of motor production or what he referred to as “quasi-bodily dispositions” (Bourdieu 1990: 63). This process of direct inscription of the motor schemas of ostensive teachers into the focal actor is one possible socio-cognitive mechanism in which the unspecified diversity which could theoretically lead each person winding up “with something different out of this process” (Turner 2002: 20) is cut down. The other way in which the body intervenes is by highly

circumscribing the opportunities for learning and for the transmission of practical action, and in fact the mechanism through which it is guaranteed that *the logic of practice has to be a bodily logic based on bodily motor schemes*, is what Gallese refers to as the fundamental “embodiment of intended goals.”<sup>6</sup>

This comes out more clearly from the fact that the Mirror Neuron System is one that appears to respond *exclusively to embodied agents of action* and not to mechanized or otherwise disembodied proxies for those agents. For instance, while Mirror Neurons will fire at the observation of actions performed by other persons, they will not respond to the observation of similar actions performed by the same agent using a tool. Gallese connects this selectivity to the requirements necessary for the understanding of practical action performed by others, in particular the need to draw direct correspondences between the agent’s own conception of her embodiment (represented in motor schemas) and her perception of the embodiment of the other’s actions:

These results tell us that in order to understand the intended goal of an observed action, and to eventually re-enact it, a link must be established between the observed agent and the observer. My proposal is that this link is constituted by the embodiment of the intended goal, shared by the agent and the observer. We can speculate on the mechanisms enabling the embodiment of the intended goal to be shared. My suggestion is that the embodiment of the action goal, shared by agent and observer, depends on the motor schema of the action, and not only on a purely visual description of its agent. When the motor schema of the agent is different from that of the observer—as in the case of the mechanical demonstrator, or for mirror neurons, in the case of grasping achieved by using a tool—the observed action cannot be matched on the observer’s motor repertoire, and therefore the intended goal cannot be detected and/or attributed to the mechanical agent (Gallese 2001: 36).

Cross-personal attunement through embodiment, however, is not enough. In order for action to acquire a specifically *social* practical logic, it must be embedded in *systems* of correspondences and oppositions with other acts (Bourdieu 1990). A stronger case for practice theory could therefore be made if the embodied simulation mechanism could be shown to be not only capable of responding to isolated acts, but to *sequences of action in a concrete context*. Recent experiments that have shown that a subset of mirror neurons is not

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<sup>6</sup> The intellectual lineage of Bourdieu’s solution to the problem of sameness can be traced all the way back to Durkheim’s very similar “practical” argument against Hume and the empiricists. According to Anne Rawls, both Hume and Durkheim agreed that practices are directly “felt” at an experiential level by the individual. However, Hume (like Turner) proposed that the feelings generated by engaging in practice produced highly contingent individualized responses in each individual. Durkheim on the other hand, by grounding his sociology of religion on the direct (an embodied) enactment of psycho-physiologically synchronized ritual practices (Bellah 2005; Rappaport 1999), argued that specific practices are “designed to” produce an *implicit attunement* with “...all who assemble to participate in any given practice simultaneously” (Rawls 2001: 51-53). Thus the late Durkheim’s solution to the problems of classical empiricism in *The Elementary Forms* can be thought of as the first practice-theoretical response to Turner’s problem of sameness objection.

only responsive to the sight of actions, but is more intensely activated at the sight of an action *in a meaningful goal-related context* are consistent with this view. The embodied simulation mechanism thus appears not only to be able to *reproduce* the observed isolated actions of others, but also to *anticipate* which actions should “logically” follow the observed one given the context of observation. Thus, “...observing an action in a specific context recalls the chain of motor acts that typically is carried out in that context to actively achieve a goal” (Iacoboni et al 2005: 533). This implies that motor schemes can acquire a “practical logic” derived from their endemic diachronic juxtaposition in recurrent situations. Social agents can implicitly internalize this sequential system, interpreting subsequent perceptions of isolated performances as “requiring” the enactment of previously observed subsequent actions in order to be fully understood and recognized as a meaningful act.

### Taking metaphors seriously

Practices, from this point of view, can only be transmitted from one *embodied agent* to another and as such must carry meanings that are fundamentally embodied and as such constrained by the representational capacities of this grounding matrix (Garbarini and Adenzato 2004; Gallese and Metzinger 2003). Any “higher order” meanings derived from the embodied simulation of practice must therefore be obtained through recourse to *metaphor* with the body serving as the common analogical source domain (Bourdieu 1990; Lakoff and Johnson 1999). Thus, this strong requirement that the logic of practice be *embodied* (Bourdieu 1990, 1984), serves to highly delimit the forms that “practical presuppositions” about the world can take, since practical presuppositions about the world must be necessarily “grounded” in metaphors that have at their origin embodied experience (such as left/right, high/low, upper/lower, straight/curved, etc.). It is in this sense that the body is an “analogical operator” (Bourdieu 1990: 71, 89, 94) serving to draw correspondences between different socially delimited practical domains:

When the properties and movements of the body are socially qualified, the most fundamental social choices are naturalized and the body, with its properties and movements, is constituted as an analogical operators establishing all kinds of practical equivalences among the different divisions of the social world—divisions between the sexes, between the age groups and between the social classes—or, more precisely, among the meanings and values associated with the individuals occupying practically equivalent positions in the spaces defined by these divisions...In other words, when the elementary acts of bodily gymnastics (going up or down, forwards or backwards, etc.) and most importantly, the specifically sexual, and therefore biologically preconstructed aspect of this gymnastics (penetrating of being penetrated being on top or below, etc.) are highly charged with social meanings and values, socialization instills a sense of the equivalences between physical space and social space and between movements (rising, falling, etc.) in the two spaces and thereby roots the most fundamental structures of the group in the primary experiences of the body which, as is clearly seen in emotion takes metaphors seriously.

Thus, the fact that the body “takes metaphors seriously,” and given that the body is the primary source domain of these analogical operations—relevant for the “loftiest” of pursuits such as mathematics or philosophy (Lakoff and Johnson 1999; Lakoff and Nunez 2000)—means that not only should we observe “limited diversity” in the forms of logics of action that undergird actual practice, but that *any social setting that acts directly upon the body for a given collective will necessarily result in the sharing of similar “practical presuppositions” about the world.* The reason for this, is that any ecological and/or social technologies that serve to modify the body (Wacquant 2004), will also result in the “transmission” and “embodied simulation” (Gallese 2000), of other members of the group of similar bodily techniques, and thus the “picking up” of the embodied concepts embedded in those patterns of practice. It is this *social genesis* of shared practices hypothesis that strong practices theorists propose.

For Turner’s highly pluralistic outcome to obtain, not only do we have to ignore the bodily constraints on practice, but also the socially instituted constraints on patterns of bodily activity common to those who share similar class positions. While the Turnerian world of highly idiosyncratic interaction histories resulting in infinitely diversified and unique sets of bodily and motor schemes for each individual (and thus different practical presuppositions about the world) is not *a priori* excluded by the strong sociological view of practice, it is certainly regarded as a highly unlikely empirical occurrence (it would deny the social structuring of bodies and embodied experience, or postulate a highly pluralistic set of social environments inconceivable in class differentiated societies).

As Gallese notes (2003: 517) learning is—given recent neurophysiological evidence on the mirror neuron “matching system”—an *irreducibly intersubjective process*, based on the “embodied simulation” of the practical action of other agents as part of our common motor and neurophysiological embeddedness on a “shared meaningful intersubjective space.” This means that learning processes, especially those having to do with practical activity in the world, are *highly constrained* to match those practices already produced by our role-models, and correlatively to draw implicit correspondences to the tacit conceptual presuppositions encoded by those actions (Bourdieu 1990).

The reason for this as Metzinger and Gallese (2003: 551) note, is that for any given actor, “[t]he observation of an action leads to the activation in the brain of the observer of the *same* neural network active during its actual execution...The shared, overlapping computational space leads to the implicit detection of the *same end-state* in the observed behavior of the agent” (italics added). Because embodied actors exposed to one another’s observable productions come to occupy similar locations in this abstract and multidimensional “overlapping computational space” which Gallese (2001; 2003: 524) refers to as the *shared manifold*, sameness of practical contents follows as an unproblematic result. As Gallese (2002: 175) suggest, “...*sameness of content is shared with different organisms.*” This shared semantic content is the product of modeling the observed *behavior* as an *action* with the help of a

matching equivalence between what is observed or heard and what is executed” (*italics in the original*).

Thus, the onus is on the radically “anarchic” and individualist reading of the connectionist evidence by Turner to demonstrate its applicability to reality and not on the “sociological” accounts that stress a common integration of the learning agent in a given social, material and symbolic environment. While Turner’s argument might be applicable to the collectivist straw-man of traditional French sociology, it is hardly applicable to an account such as Bourdieu’s which clearly grounds its conception of practice not only on a cognitive object and cognitive structures (Bourdieu 1996: 1-3; Lizardo 2004; Pickle 2006; Lahire 2003), but also on the body as the common matrix where practical activity is located (not the sociological “ether” of the collective). This makes Bourdieu’s account much more compatible with current neurophysiological accounts of learning, cognition and socialization than Turner realizes.

Finally, it is important to underscore that Turner’s contention that practices are *not* the result of the common possession of a “tacit rule book” (Turner 2002: 33) is in agreement with the central core of practice theory. In fact the strand of practice theory developed by Bourdieu was primarily designed as a reaction against any conception of practice as produced by way of the operation of unconscious rules—this was (and still is) the claim of Claude Levi-Strauss, for whom the “deep” rules that govern all myth and classification should ultimately be found to equivalent to common structures in the human brain. As Bourdieu (1990: 39) notes, it is illicit for the analyst to “...slip from regularity, i.e. from what recurs with a certain statistically measurable frequency and from the formula which describes it, to a consciously laid down and consciously respected ruling...or to unconscious regulating by a mysterious cerebral or social mechanism.”

Bourdieu, in opposition to Levi-Strauss and in apparent agreement with Turner, was hostile to the idea of practices as derivable through unconscious rules precisely because this lead to an empty formalism, in which the analyst became more preoccupied with “uncovering” (while in fact constructing by way of the mechanical application of an externally constructed formal system to the ethnographic material) the “deep” rules that while seen as allegedly constitutive of practice. However, when all was said and done this structuralist reconstruction of the tacit rules of practice represented nothing more than a secondarily objectified set of differences and oppositions far removed from the true embodied structures of perception, classification and motor action that are truly productive of practice “on the ground” (Bourdieu 1990). The more “realist” account of practice which pays close attention to how practical action was inscribed in the body, by way of the most minute automatisms and habitual everyday activities (Mauss 1973; Wacquant 2004), is for Bourdieu the proper way to understand the production of action.

## CONCLUSION

In this paper I have argued that Stephen Turner's critique of sociological practice theory, while composed of a seemingly impressive set of apparently unassailable logical and empirical arguments is not as "fatal" to the practice-theoretical project as it at first seems. The reason for this is that contrary to Turner's initial impression, plausible and empirically verifiable neurocognitive mechanisms exist which actually do the job of transmitting practices (and thus tacit presuppositions regarding the physical and social worlds [Bourdieu 1990]) "at a distance." Thus, we can grant that Turner's *problem of transmission* is an important (if often implicit) part of the practice theoretical package, without agreeing that "practical transmission" is impossible.

As shown by recent reconsiderations of "imitation" inspired by contemporary discoveries of the neural bases of action understanding, "embodied simulation" is in fact a routine and "low-cost" cognitive capacity (which as noted by Gallese [2003] must also be *phylogenetically* prior to explicit, linguistically-mediated learning capacities), which humans (and other animals) deploy unproblematically in their interaction with other agents and objects in the world (Gallese 2003). I further argued that Turner's reticence to consider that "tacit presuppositions" can be picked up from overt behavior was in the end traceable to *philosophical*, not empirical considerations ultimately based on an empiricist commitment to sharply separate "perceptual" information from "conceptual" and "symbolic" knowledge.

Consistent with Bourdieu's (1990) account which summarily broke with this empiricist strand, most recent neuroscientific evidence shows that the semantic/practical distinction, at the level of the neural structures that subserve the cognitive-representational capacities of the learning agent is not set in stone. In fact "pragmatic" and conceptual representations of the world of objects and persons interact in complex ways, with "pragmatic" object representations. In fact, these last sometimes "override" and enrich the purely semantic understandings of the object-environment. This pragmatic representations rather than being unique and idiosyncratic as in the connectionist solipsism outlined by Turner, are *irreducibly intersubjective*. This means that these are constrained to match—through the pervasive activation of embodied simulation routines in social actors—the representations of proximate others.

Motor action, according to Gallese (2000, 2001, 2002, 2003a, 2003b) and consistent with Bourdieu's (1990) formulation, not only carries purely spatial and visual information regarding the external location and physical attributes of objects, but is also connected to motor schemes of action understanding and appreciation that stores information about what objects are for, and the connection between action-in-the-world performed by others (and its implicit ends) and our own capacities to act in the world (and our implicit goals). Thus, tacit presuppositions regarding the goals and meaning of social action, rather than being "locked" in the mind, are "out in the open" being chronically transmitted from one embodied agent to another in the course of routine social interaction.

These considerations show that neither Turner's *problem of transmission* nor his *problem of sameness*, are valid objections to the sociological practice theoretical account. The problem of sameness, based on philosophical presuppositions that presume a purely "disembodied" and materially ungrounded learning agent, can be solved by grounding learning experience on the "collective object" that all human learners share: the human body. Drawing on Bourdieu's "embodied sociology of practice," and Gallese's (2003) fairly compatible "embodied simulation" framework, I showed that this account of the interaction between bodily automatisms circumscribed by our interaction with the world and the socializing agents that act directly on the body, serve to highly delimit the natural diversity of possible logics or "forms" of practice.

This also means that the possible "tacit presuppositions" that the social agent might carry vis a vis the social and natural worlds (and the related metaphorical correspondences that may be drawn between these two domains) are also constrained. These deliberations, coupled with recent discoveries in metaphor theory (Lakoff and Johnson 1999) which see the human body as the primary source domain for our tacit understandings and explicit representations of most everyday life social situations (and systematized bodies of knowledge), lend credence to a *sociological* theory of practice, such as Bourdieu's (and Mauss'), which grounds the tacit presuppositions of the human agent on our common, but ultimately socially distributed, embodied experience in the world.

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