



# Tacit knowledge, rule following and Pierre Bourdieu's philosophy of social science

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## Abstract

Pierre Bourdieu has developed a philosophy of social science, grounded in the phenomenological tradition, which treats knowledge as a practical ability embodied in skilful behaviour, rather than an intellectual capacity for the representation and manipulation of propositional knowledge. He invokes Wittgenstein's remarks on rule-following as one way of explicating the idea that knowledge is a skill. Bourdieu's conception of tacit knowledge is a dispositional one, adopted to avoid a perceived dilemma for methodological individualism. That dilemma requires either the explanation of regularities in social behaviour as the result of the tacit representation of procedural rules ('legalism') or the self-conscious representation of behavioural goals ('voluntarism') by individuals. After explaining the apparent dilemma, I then argue that Wittgenstein's remarks on rule following actually undermine, rather than support, a dispositional solution. Nonetheless, the philosophy of social science can survive without a dispositional account of knowledge. Such a social science needs, firstly, to embrace one horn of the dilemma, voluntarism, provided that the relevant regularities can be explained as *unintended consequences* of agents' self-represented intentions. Secondly, such a social science should treat theorists' interpretations as unifying generalizations, not hypotheses about the acquisition of tacit knowledge. Finally, where appeal to cognitive psychology can distinguish otherwise equivalent theories in social science, social science should incorporate the data of cognitive psychology concerning tacit mental processes.

## Key Words

Bourdieu • cognitive psychology • habitus • rule following • tacit knowledge • Wittgenstein

## INTRODUCTION

Q. You often quote Wittgenstein – why is that?

A. Wittgenstein is probably the philosopher who has helped me most at times of difficulty. He's a kind of saviour for times of great intellectual distress – as when you have to question such evident things as 'obeying a rule'. Or when you have to describe such simple (and by the same token, practically ineffable) things as putting a practice into practice.

Pierre Bourdieu, interviewed by Loïc Wacquant (Bourdieu, 1992: 9)

Pierre Bourdieu is known for a huge body of ethnography and fieldwork in areas as distinctive and disparate as the Bearn peasant village in which he was born, the haute bourgeois academic politics of the left bank, postcolonial transitions in Kabyle society and a sociology of aesthetics, which takes as its object varieties of Parisian museum attendance. Beyond that corpus his now immense influence in social science derives from a conceptual framework he proposes for social scientific explanation in general. That framework, with its famous concepts, such as the *habitus*, *misrecognition*, the *logic of practice*, the *background* and '*structuring structures which structure structure*', is the object of this article which, therefore, concerns itself with Bourdieu's explicitly methodological and metatheoretic remarks.

Bourdieu's metatheory is not straightforward to interpret; a fact that Bourdieu himself attributes to the philosophical difficulties surrounding the concept of tacit knowledge, which is his central concern. *Tacit knowledge* is knowledge not consciously possessed by the agent or able to be articulated by her in propositional form but which nevertheless regulates her activities. Bourdieu's account of the concept draws from a philosophical tradition whose 20th century inspiration is Martin Heidegger, which treats tacit knowledge as practical ability or skill, acquired through habituation. The essential contrast is with a conception of knowledge which treats it as something gained and maintained by an intellectual faculty for abstract symbol manipulation. Bourdieu offers a version of tacit understanding as Ryle first put it of *knowing how*, rather than *knowing that*. In a famous early work he described it as something 'which exists in a practical state in an agent's practice and not in their consciousness or rather in their discourse' (Bourdieu, 1977: 27). Thus Bourdieu's way of drawing that practical/intellectual contrast and the use he makes of it in his explanations is the focus of this article. I shall argue that his conception of knowledge is, in effect, a dispositional one, which identifies knowledge with the socially acquired capacities, propensities or tendencies of an agent to act appropriately in given circumstances. I shall then argue that the dispositional account of tacit knowledge has some severe difficulties, ironically first diagnosed by Wittgenstein, who thus turns out to be a dubious ally for Bourdieu in his project of putting his account on a secure philosophical footing.

In Wittgensteinian spirit the purpose of the article is therapeutic but I shall attempt to prevent a common consequence of Wittgensteinian therapy, relapse. In a final section I shall make three suggestions, which, taken together, might be the basis for a social science which has no need of the dispositional account of tacit knowledge. I shall also suggest that if social science requires a theoretical account of tacit processes of perception, learning, memory and inference, the right approach is to use the sciences of memory, perception, and inference – in other words, to integrate social science and cognitive psychology.

First let me give a brief example of the apparently essential role played by tacit knowledge in social science. Social science takes as its data patterns of individual or collective behaviour, their correlations and fluctuations. Call these patterns *regularities*, such as rates of unemployment, imprisonment, drug dealing, marriage among groups defined in terms of occupation or the similarities between numbers of frequent flyer points accrued by academics in the social sciences. These regularities are, however, mere *data* unless they are transformed by interpretation into *evidence* for a *theory*.

Consider the explanation by a Bourdieu-inspired scholar, Phillippe Bourgeois, of regularities that help the sociologist define a culture of crack dealing among young male Puerto Rican immigrants in New York (Bourgeois, 1995). He explains coincident regularities of crack dealing, transient wealth, imprisonment and violence against women in terms of a code of masculinity transplanted from the Puerto Rican village into an urban service economy. In New York the drug economy is the only possible area of social life in which the status-based masculine hierarchy can be readily reproduced by Puerto Rican youth. So a social code, indigenous to Puerto Rico, is reproduced in New York by individuals who learn its rules by growing up where its transplanted form is the taken-for-granted *background* to everyday life.

Why should this be problematic? Bourgeois' explanation is as Bourdieu says 'simple' but also 'practically ineffable' for two reasons. Firstly, no one in the *barrio* explicitly says that they act to promote an imported code of masculine status. So if young Nuyoricans know that code, they must know it tacitly. That is to say the knowledge is something the ethnographer or sociologist infers from subjects' explicit words (insults must be revenged, women must be faithful) and their behaviour. But, and here is the second difficulty, if that interpretation is not just a story, and the inference is sound, the agents in question must really know the code of masculinity and use it to govern their actions. To put it another way, that knowledge must play a role in producing their actions. It must be constitutive of their agency. That is what is meant by *tacitly knowing a rule* by Bourdieu and it is close enough to what Wittgenstein meant by *following a rule* for Bourdieu to be correct in thinking that they are talking about the same thing.

### **A DILEMMA: LEGALISM OR VOLUNTARISM?**

Thus Bourdieu is apparently right to think that we might look to Wittgenstein's explanation of rule following for an account of the tacit knowledge social science apparently requires to anchor it, not only in physical and economic but in psychological reality. So his problem, like Wittgenstein's, is to discover what the rules are and how they are represented. Like Wittgenstein, he initially proceeds negatively, telling us what the rules are not and how they are not represented. An eliminative procedure, which seems to leave room for only one positive account of tacitly understood rules: a dispositional account which treats knowledge as *know-how* rather than *knowing that*.

On Bourdieu's account of dispositional tacit knowledge, agents learn to agree in practice without explicitly or consciously representing concordance as a goal. Thus the hierarchy of respect in the *barrio* is reproduced even though each individual is not consciously thinking that the rule which governs his actions is to 'preserve the hierarchy of respect'. The idea goes back at least to Aristotle's contrast between learning by habituation and learning by intellectual instruction in the *Nichomachean Ethics*

Now some think that we are made good by nature, others by habituation, others by teaching. Nature's part evidently does not depend on us, but as a result of some divine causes is present in those who are truly fortunate; while argument and teaching we may suspect are not powerful with all men, but the soul of the student must first have been cultivated by means of habits for noble joy and noble hatred, like earth which is to nourish the seed . . . The character, then, must somehow be there already with a kinship to virtue, loving what is noble and hating what is base. (*Nicomachean Ethics* 1179b-31)

Aristotle's point is that virtue, which on his account is a form of knowledge, is originally a matter of character rather than intellect. Furthermore, that character cannot be acquired alone. One acquires a character as second nature through living in a society in which standards for virtuous behaviour are embodied in practice. Aristotle's word for this type of socially embodied representation acquired through practical immersion in a culture is *Hexis*: Bourdieu captures the same concept by a term first used by Aristotle's medieval translators: *habitus*.

As a device of exposition we can contrast Bourdieu's conceptions of tacit linguistic knowledge with that of Noam Chomsky. Both agree that people know how to speak their native tongue. Furthermore, they both agree that linguistic practice falls into patterns/structures which are recognized and reproduced by individuals who learn a language. Those patterns can be analysed into a set of rules which are tacitly understood by language users, that is, as a grammar for the language, which governs correct use. Chomsky argued that the relevant rules are both formalizable and explicitly, though unconsciously, represented. In his early works he argued that linguistic knowledge was a body of propositional knowledge from which natural language grammatical structure was deduced: a classic intellectualist conception of knowledge. For Chomskians, then, linguistics is a science of the cognitive architecture of individual minds rather than the mere detection and classification of patterns in the surface language use of a community. For Bourdieu, however, tacit linguistic knowledge not only is not but *cannot* be represented as a set of rules and symbols recursively manipulated to produce speech. He calls this the *action as execution* model of rules and argues against it on the basis that language use, like all significant human activity, is too flexible and infinitely adaptable to novel circumstance to be produced by the execution of an algorithm.

This is his first argument against intellectualist conceptions of tacit knowledge. The situations in which it has to be deployed are too open-ended and indeterminate to be captured as a set of rules for action. Thus it cannot be *codified*.

Bourdieu calls intellectualist codification '*legalism*'. Legalism explains behaviour as governed by determinate, formalizable rules, whether they be the maximizing strategies of Rational Choice Theory, the algorithms of minimal lexical grammar or the formulae of Levi-Strauss' structuralism.

His second argument is that legalism, personified in this case by Chomskian linguistics, commits a fallacy by attributing to speakers knowledge of a linguistic code which is a theoretical abstraction. That is, it imputes a kind of psychological reality to a theory constructed by the linguist abstracting from the context-sensitivity and indeterminacy of actual linguistic practice, 'producing this conformity in the absence of the intention

to conform, by resorting to the *fallacy of the rule* which implicitly places in the consciousness of the individual agents a knowledge built up against that experience' (Bourdieu, 1977: 29, emphasis added). (Note, of course, that Chomsky does not think knowledge of grammatical rules is consciously accessible. The relevant linguistic knowledge is *tacit*. Bourdieu's use of the word 'implicit' is very confusing here. Perhaps he merely means that the agent's conscious experience of using language is regulated by Chomskian rules of which the agents are not themselves conscious, in which case Chomsky would certainly agree.)

In the case of tacit linguistic knowledge it is worth making the following two comments on Bourdieu's criticisms of the Chomskian program since those criticisms are emblematic of his approach to tacit knowledge in general.

Firstly, Chomsky is describing linguistic competence, the cognitive architecture of the brain, not performance, actual language use in context, the intuitive judgements of language speakers or their introspective reports (Chomsky, 1991). Consequently, any objection to his project must be an argument that a particular type of cognitive architecture cannot do the job for which it is postulated, and here the issue is empirical. The same must surely be true of the mental representation of the information on which the reproduction of culture depends. (See later in this article, in the section 'Psychology and Social Science'.)

On the second point, the imputation of psychological reality to rules abstracted by the theorist from his observation of actual behaviour, we need only note the following. If it is a fallacy to assume that agents represent rules inferred by a theorist from the observation of overt behaviour, then Bourdieu also commits it. Like Chomsky, Bourdieu imputes to agents tacit knowledge of the rules *he* postulates in order to interpret their behaviour. The difference is that Bourdieu has a different account of the nature of rules and their representation. The issue between Bourdieu and Chomsky as Bourdieu defines it is not the presence of tacit knowledge of rules but is whether we should try and understand tacit knowledge in an intellectual or practical way: as *knowing that* or *knowing how*.

Bourdieu's real objection to legalism, as a general theory of social action, is that treating tacit knowledge as *knowledge that* leaves us with an impoverished notion of *agency*. Legalism reduces the agent to an

impossible *homo economicus* subjecting his decision making to rational calculation, its actors performing roles or acting in conformity with models or its speakers selecting from among phonemes. (Bourdieu, 1977: 30)

In other words pure legalism makes agents robotic executors of a program encoded via their experience of the social world but inaccessible to them in that experience. It leaves out the fact that agents experience themselves as active originators of their actions rather than as passive executors.

However, if the social scientist is to include the subjective experience of agency as part of the explanation of regularities, she cannot take the obvious course of reducing it to conscious choice. Bourdieu calls this approach voluntarism, exemplified by a strain in phenomenology, of which Sartre is the obvious exemplar, which explains action in terms of the exercise of the agent's will or identification with a course of action. However, the concept of volitional action only applies to ends and means which are self-represented,

and it is clear that many of the regularities in which social science is interested are not the direct outcome of consciously entertained plans any more than a competent speaker's mastery of her language is the result of the conscious acquisition of a grammar. Furthermore, Bourdieu is wary of conceiving of agency as conscious choice, because part of his project is to show that regularities are produced by the way that social structure limits the horizon of choice for individuals. The language of Sartrean voluntarism, which is really that of the libertarian in the free will debate, tends to obscure the fact that the agent's options are partially foreclosed by her social environment (see the discussion of aesthetic judgement later in this article).

Legalism and voluntarism constitute a dilemma for Bourdieu which his account of tacit knowledge attempts to avoid. Legalism is a Charybdis because many aspects of human social life are too open ended and complex to be plausibly formalized as a closed system, and voluntarism a Scylla because agents' conscious intentions do not include the production of regularities. Furthermore, the horizon of agents' choices is limited by the pre-existence of regularities.

Bourdieu avoids this dilemma by weakening the notion of a rule from a determinately codifiable algorithm to something more flexible and subject to circumstance; and the notion of knowledge from assent to an explicitly represented proposition to practical embodiment of a rule in skilful activity. His expression for this type of embodiment is 'feel for the game', which preserves the element of conscious awareness which accompanies the control of skilled action. There is a way it feels to be a skilled tennis player who instinctively chooses the right shot, which is the product of a regime of drills and rehearsals rather than the learning of tennis rules and precepts from an instruction manual. From the observer's perspective we can formulate rules followed by the tennis player, but the 'fallacy of the rule' is to assume that those same rules abstracted by the observer are, as it were, 'in the agent's mind' operating as unconsciously represented algorithms which govern her actions. The agent's subjective awareness of volitional control of action is not a way of experiencing the operation of an algorithmic process.

For Bourdieu, we have to invoke rules to provide a unifying explanation of regularities with a suitable psychological dimension to do justice to the fact that regularities are produced by agents whose activities converge even if their conscious intentions do not. The alternative would be to treat human activity as 'chaotic', Bourdieu's word for a mere aggregate of singular case histories that cannot be theoretically unified. To answer a question as to why good right-handed tennis players approach the net off their backhand when receiving serve in the first court but not the deuce court, we need a unifying theory of tennis behaviour. Without the theory the observer has no explanation, only a catalogue of descriptions of thousands of individual points. But the player has no need of that theory, her practice and playing of thousands of points (the tennis *habitus*) has allowed her to embody the rule in her practice and equip her with the correct 'feel for the game'.

[T]o eliminate the need to resort to rules it would be necessary to establish in each case a complete description (which the invocation of rules allows one to dispense with) of the relation between *habitus*, as a socially constituted system of cognitive and motivating structures, and the socially structured situation in which the agent's *interests* are defined and with them the objective functions and social motivations of their practices. (Bourdieu, 1977: 76)

Or, in other words, rules allow us to see individual behaviour as an instance of a general principle embodied in the culture.

### **BOURDIEU'S POSITIVE ACCOUNT OF TACIT KNOWLEDGE**

In this section I want to consider whether Bourdieu's theoretical remarks succeed in avoiding the horns of legalism and voluntarism (if they constitute a real dilemma) by providing a dispositional account of tacit knowledge, or if they reduce to elaborate redescription of his dilemma. In other words, perhaps Bourdieu succeeds in articulating constraints on a theory of tacit knowledge rather than such a theory itself.

The notion of *habitus* is the central concept.

The structures constitutive of a particular type of environment . . . produce *habitus*, systems of durable transposable dispositions, structures predisposed to function as structuring structures, that is, as principles of the generation and structuring of practices and representations which can be objectively 'regulated' and 'regular' without in any way being the product of obedience to rules, objectively adapted to their goals without presupposing a conscious aiming at ends or an express mastery of the operations necessary to attain them, and, being all this, collectively orchestrated without being the product of the orchestrating action of a conductor. (Bourdieu, 1977: 72)

His second key explanatory concept is the notion of *cultural capital*, what might be called the prestige or value attached to cultural artefacts, occupations, identities and activities. Thus the tacitly understood imperative which governs the production of social structure is the maximization of cultural capital.

Bourdieu's other theoretical notions, field and strategy, are almost self-explanatory. A field is the domain of an activity, so that we are all actors in many overlapping fields, each of which determine strategies (plans) for maximizing cultural capital. *Habitus* is the crucial notion since it articulates the idea that maximizing cultural capital depends on knowledge of the constraints of the domain, the value of activities, and the ways to maximize them. This knowledge is acquired through habituation. The agent who has it does not have to intellectually plan her activities but simply recognizes and directly responds to her situation. She is like Aristotle's virtuoso who simply acts in character. The contrast between the assent of the intellect to a propositional formula and the form of knowledge Bourdieu is invoking is nicely expressed by Ryle when he contrasts a dispositional to an intellectual conception of belief.

[T]o believe that the ice is thin is to be unhesitant in telling oneself and others that it is thin, in acquiescing in other people's assertions to that effect, in objecting to statements to the contrary, in drawing consequences from the original proposition and so forth. But it is also to be prone to skate warily, to shudder, to dwell in imagination on possible disasters, and to warn other skaters. It is not only a propensity to make certain theoretical moves, but to make certain executive and imaginative moves, as well as to have certain feelings. (Ryle, 1949: 135)

Thus I think the best way to understand Bourdieu is to treat him as saying that, given the role tacit knowledge plays in explanation, the best theory is a dispositional one. And

it is here that Wittgenstein becomes relevant, since he is one person who seems not only to develop a theory of tacit knowledge as a set of dispositions acquired within a community but also to have offered an *a priori* argument that *all* knowledge, even of the most apparently intellectual character, reduces to this type of socially acquired concordance in conduct. As he said:

The Grammar of the word 'knows' is evidently closely related to that of 'can', 'is able to'. But also closely related to that of 'understands' (mastery of a technique). (Kenny, 1994: 89. All Wittgenstein references which follow are to this edited collection.)

### WITTGENSTEIN ON FOLLOWING A RULE

Thus Wittgenstein's remarks on rule following, which explicate the connections between understanding and practical ability, might allow Bourdieu to avoid his dilemma of voluntarism or legalism. The *Philosophical Investigations* do contain *a priori* arguments that the rules for a practice cannot be codified and that meaningful activity cannot be explained in terms of explicitly represented intentions, conscious or unconscious. Furthermore, the *Investigations* explain rule following as constituted by 'agreement in forms of life', which looks readily paraphrasable as the acquisition of a concordant set of dispositions by subjects as a result of their habituation within the same social surroundings. This no doubt is the source of his attraction for Bourdieu.

However, Wittgenstein is very careful not to identify knowledge of rules with agreement in dispositions between similarly acculturated subjects. Besides his arguments against legalism and voluntarism, similar considerations are advanced against a dispositional account of rule following or the identification of cognitive states with techniques of performance. Thus, ultimately, Wittgenstein reveals not only Scylla and Charybdis, but the shoals of indeterminacy which make passage between impossible.

My exposition of Wittgenstein at this point is based on Saul Kripke's reconstruction of the connection between the private language argument and the rule-following considerations in the *Investigations* (Kripke, 1982; Boghossian, 1989). It is important to note that my conclusion does not rely on Kripke's interpretation of these issues; he is used here as someone whose exposition nicely displays problems and different theoretical options for dispositional theorists. According to Kripke, Wittgenstein first asks us to consider some significant act, such as using language, burying a relative, or playing a piece of music. In order for the act to be significant (i.e. meaningful), it must be governed by some normative standard. What distinguishes language or music from noise, or ritual from accidental or automatic behaviour, is the fact that it is responsive to a norm or rule for that activity. That is to say that there is something that counts as doing it right. Wittgenstein expresses the distinction as the difference between following and merely conforming to a rule. Where the rule plays a role in the production of the action, by making it sensitive to the possibility of mistake, we have agency. Where it does not, mere conformity.

Wittgenstein then asks us to consider an isolated individual, that is, consider in relation to only her intrinsic features, and to say what makes it the case that her actions are an instance of following, rather than merely conforming to, a rule.

The first thing to note is the rejection of the idea that the mere operation of an

algorithm could suffice. To be following a rule is to be sensitive in some way to the possibility of diverging from it and, hence, to be responsive to a norm for that activity. Someone who robotically follows an algorithm cannot determine whether in fact that algorithm is functioning correctly. Note that any attempt to avoid this problem via the operation of a master algorithm that detects if the first is being applied correctly just creates a vicious regress. What could make it the case that the second algorithm was functioning as a norm rather than a mere mechanism? This regress argument expands into a version of the 'frame problem' (Dreyfus, 1992), which is a serious challenge to computational accounts of context-sensitive cognitive capacities. However Bourdieu does not fight his battle with the legalists on that terrain (although perhaps he should). Answering Wittgenstein's question then becomes a matter of determining what it is about an agent that constitutes this sensitivity to the possibility of error. It cannot consist in overt behaviour because the problem is constituted by the fact that there is no behavioural difference between mere conformity and actual understanding. Nor can it consist in the mechanical operation of an algorithmic process.

Wittgenstein then goes on to show that the relevant sensitivity cannot consist in the fact that the activity is caused or accompanied by 'inner' mental events, be they intentions, construed as attitudes to propositions, or mental images. The short reason is that nothing 'inner' (a conscious or unconscious mental process) or 'outer' (a physical event, including a piece of behaviour, or object) bears a meaning intrinsically. In order to function as a sign, a physical or mental process, object or state, must be interpreted. The problem of making inner items meaningful is the same as that of making outer items meaningful. Neither are self-interpreting and both get their meaning from their role in a communicative practice. This is just as true of stop signs by the side of the road, or texts in a library, as inner speech or imaginary episodes. Thus one cannot explain why someone who sees a stop sign interprets that as an instruction to stop by saying that that perceptual experience prompts the occurrence of an inner instruction to stop. What is supposed to make it the case that the inner instruction, if such there is, bears that meaning? Another inner instruction? And so on . . .

If the meaning of the sign (roughly, that which is of importance about the sign) is an image built up in our minds when we see or hear the sign, then let us first adopt the method we just described of replacing this mental image by some outward object seen, e.g. a painted or modeled image. Then why should the written sign plus this painted image be alive if the written sign alone was dead? As soon as . . . the image thereby loses its occult character it ceases to impart any life to the sentence at all. (Kenny, 1994: 61)

The reason why nothing, inner or outer, bears an intrinsic meaning is that, considered in itself, any item can be said to accord with not just one semantic rule but an indefinite number. A stretch of behaviour, set of signs or mental images, can always represent (be interpreted) in an indefinite number of ways. 'This was our paradox: no course of action could be determined by a rule, because every course of action can be made out to accord with the rule' (Kenny, 1994: 98). Since the point of a semantic rule is to fix an interpretation, this indeterminacy threatens the very possibility of rules and hence of identifying understanding, tacit or explicit, with knowledge of them. If we think of a

rule as enabling a sign to function as a representation by linking that sign to a determinate referent, then, according to this argument, there can be no rules.

To recapitulate, Wittgenstein is an ally for the negative side of Bourdieu's argument which he (Bourdieu) presents as the dilemma of explaining 'objective regularities without subjective intentions' (Bourdieu, 1990: 62). Bourdieu's attitude to legalism can now be expressed as Wittgenstein's worry that explaining action as the execution of an algorithm (a codified rule) makes no place for the vital element of understanding. As Bourdieu puts it, the agent becomes a mere 'epiphenomenon of structure'.

Furthermore, Wittgenstein's criticism of the project of explaining action in terms of conscious intentions is even more corrosive than that of Bourdieu. Bourdieu objects to voluntarism because it gives the illusion that the agent's intentions are both transparent to her and unconstrained by external circumstances when in fact 'only in imaginary experience (in the folk tale for example) which neutralizes the sense of social realities does the social world take the form of a universe of possibles equally possible for any possible subject' (Bourdieu, 1990: 65). Wittgenstein is concerned to show that the notion of intention, understood as a subjective experience which confers meaning on significant behaviour, is incoherent, because such an inner event is just as meaningless as the outer event it is invoked to render significant.

However, it should now be obvious that these negative arguments apply equally well to a dispositional account of rule following. A disposition is just a set of propensities, liabilities and inclinations to behaviour and, if we follow Ryle, mental imagery, exhibited by an agent. Dispositions, *considered in themselves*, are aggregates of insignificant entities. Namely, bits of behaviour or inner occurrences which stand in need of interpretation. Thus, if Wittgenstein is right, a set of dispositions can no more determine a rule than can a regularity or a conscious intention.

Why then does Bourdieu find Wittgenstein 'a kind of saviour for times of great intellectual distress'? One might have thought that the scope of Wittgenstein's negative arguments would only exaggerate the distress of anyone trying to construct a dispositional account of tacit knowledge. The reason is, perhaps, that although the sceptical arguments undermine the notion of rule following by an isolated individual, Wittgenstein seems to suggest that a set of dispositions acquired and reinforced *within a community* can constitute the following of rules. So perhaps Bourdieu thinks that Wittgenstein is telling us that behavioural regularities can be properly interpreted as rule-governed if one can show how those regularities are acquired within a social context. Thus Wittgenstein might be providing a philosophical underpinning for the ideas expressed by the notions of *habitus* and *background*: the structuring structures which structure structure.

One interpretation of Wittgenstein's remarks on rule following which might be congenial to Bourdieu is this: Wittgenstein is not a sceptic about rule following at all, even though he does tell us that we cannot construct a reductive account of rule following by isolated individuals. This argument is, however, merely preliminary to the construction of an anti-sceptical or positive account based on the acquisition of dispositions within a community, which might go as follows: imagine a musician rehearsing a piano concerto in the isolation of her contemporary performance space and that, as she is playing, she starts to wonder if she has made a mistake. To what fact about herself could she appeal to settle the matter? Her mental images, either recalled or imagined, cannot help her because they stand in need of interpretation. And it seems that she cannot just rely on

her dispositions, because she is starting to wonder whether they are in fact dispositions to play the concerto. The attraction of the community account is that it provides a standard against which the individual can measure her performance. If she is learning the piece or rehearsing with an orchestra and plays a wrong note, the rest of the musicians will stop and replay the relevant section. She will then replay the section until she fits in with the others. It does not matter to this procedure that, considered individually, each of the individuals may have a fallible memory and a less than perfect performance technique which produces the odd wrong note. Provided they are disposed to engage with each other and modify their performances accordingly, the procedure will produce a standard they can follow for any performance. Perhaps Wittgenstein is telling us that we follow rules by being members of communities with the disposition to reciprocally adjust our use of signs to that of the rest of the community. The presence of this *disposition to produce coherence in dispositions* is the primitive fact which determines the rule for the performance (Pettit, 1990; Gerrans, 1998). So, on this account, the sceptical arguments were not directed at the possibility of rule following *per se* but at an attempt to derive a rule from the conduct of a single individual abstracted from an historical practice.

I think that this is something like Wittgenstein's position, but we should note that it is more of an attitude than an argument, as we can see by considering Kripke's interpretation of Wittgenstein.

As he would point out about the orchestra example, if the *whole ensemble* starts to wonder if they are not playing Berlioz but Hume's concerto number 6 in A minor, which differs from Berlioz only after an as yet undisclosed number of performances, there is nothing anyone can do to reassure them. Considered from this sceptical viewpoint, the community is no better placed to ward off semantic indeterminacy.

It is for this reason that Kripke treats the invocation of the community as an acknowledgment of defeat, or sceptical solution. In other words, there are no rules, only equally consistent interpretations of regularities, and the community or external interpreter *arbitrarily* selects one. Note that a community could not escape this conclusion by legislating that a particular interpretation apply with the force of a rule, because the community would not be in a position to determine which rule is tracked by their regularity. The idea of determining a rule by collective intention is just as incoherent as the attempt to rely on individual intentions. Any intention 'does not point outside itself to a reality beyond' (Kenny, 1994: 77).

Irrespective of Kripke's textual fidelity, his sceptical reconstruction provides a problem for Bourdieu far worse than his original dilemma. Eventually, all Bourdieu's explications of the notion of *habitus* reduce to identifying significance with concordance in mutually acquired and reinforced dispositions. These, however, cannot constitute a basis for normativity because there is nothing about the practice of the community which could fix a unique rule. Thus, a social science theory that explains regularities as rule governed is an arbitrary interpretation of the coincident dispositions of a community. Hence it cannot be epistemically relevant for the individuals who comprise that community. That is, it cannot be an account of their tacit knowledge *unless* that knowledge itself is an artefact of interpretation, in which case social science could only proceed on the assumption of anti-realism, fictionalism, or instrumentalism about mental states.

Such a social science, in search of a philosophical foundation, could help itself to any

of the subtle philosophies which seek to explain exactly how it is that the content of mental states of individuals could simultaneously cause their behaviour, interact according to norms of inference, represent behavioural outcomes as goals *and* be a (mere?) artefact of the interpreter's practice. Donald Davidson and Daniel Dennett are two examples who come to mind. However, I want to suggest that a viable social science, that is, one which produces interesting and true explanations of behaviour with a psychological dimension, can exist without going down that path. The first step is to see how far social science can proceed without a notion of tacit knowledge at all and my first three suggestions, Cataloguing Regularities, Interpretivism and Unintended Consequences, take that route.

A fourth and final suggestion is that if it is genuinely the case that social science cannot acquire a suitable psychological dimension using only the minimal resources I develop here, then perhaps social science should help itself to the *psychological* rather than the social scientific theory of tacit mental processes.

### THREE SUGGESTIONS: MINIMAL SOCIAL SCIENCE

Bourdieu invokes Wittgenstein to explain 'conformity in the absence of the intention to conform'. Another way to put his point is to say that Bourdieu's problem is to explain the production of regularities by agents who do not consciously or unconsciously represent a rule which encodes instructions for the production of that regularity. Yet, unless regularities are rule governed, their explanation will reduce to either:

- (i) A chaotic aggregate of individual case histories, or
- (ii) A psychologically unconstrained theorist's interpretation.

A dispositional account of tacit knowledge is supposed to avoid these problems since it gives us a notion of uncodifiable rules embodied in practice and acquired through habituation. Wittgenstein is invoked to help put such a notion on a sound philosophical basis, but it turns out that his negative arguments also undermine the dispositional account.

How then should social scientists explain regularities? There seem to be three options consistent with the abandonment of the dispositional account of tacit knowledge.

#### Cataloguing regularities

The first is to accept the negative arguments and treat social science as an enterprise which merely catalogues coincident individual histories and describes the resultant regularities without theoretical unification. This would amount to chaos on Bourdieu's view but we should note that it would give predictive power. For example social science would be able to say useful things like 'unemployment is correlated with crime and drug addiction'.

This option of course leaves out any psychological dimension to social scientific explanation, which on Wittgenstein's view would be a good thing. In general he is hostile to the attempt to explain behaviour in terms of psychological hypotheses. ('The psychological processes which are found by experience to accompany sentences are of no interest to us', Kenny, 1994: 62.)

No supposition seems more natural than that there is no process in the brain correlated with associating or with thinking . . . I mean this. If I talk or write, there are,

no doubt, impulses going out from my brain and associated with my spoken or written thoughts. But why should the system continue further in the direction of the centre? Why should this order not proceed, so to speak, out of chaos? (Kenny, 1994: 218)

Similarly, one might say, when one interprets the religious rituals of the Fang, fashions in interior decorating, or the typical career structures of *homo academicus*, no supposition seems more natural than that the psychologies of individual agents are not correlated with the resulting structures. That is to say we can agree with Bourdieu that the resulting structures are not intended by the actors who produce them. Social structures are like the flocking behaviour of birds, or the scavenging of ants, which fall into very predictable patterns, but no individual represents that pattern as a goal which regulates his behaviour. Order out of chaos.

### Interpretivism

If this conclusion is too hard to swallow then perhaps social science could take Wittgenstein at his apparent word and treat its explanations as psychologically unconstrained interpretations of regularities. On this account competing interpretations of a regularity could not be settled by any appeal to what is tacitly known by the agents who produce it. For a social scientist who follows this recommendation there are different ways she might think of her interpretations.

- (i) If genuinely convinced that her explanations were fictional interpretations, she might revert to the modest cataloguing of regularities.
- (ii) Alternatively, social scientists might treat their interpretations as more like literary interpretations 'Heroic, supercilious and vainglorious acts of *interpretation*', as Mario Vargas Llosa once called them, and subject to the same theoretical standards.
- (iii) Or, possibly, the social scientist would treat her interpretations as useful unifying generalizations about regularities, which then suggest further enquiries about the psychologies of the agents involved or the ways in which other regularities and material conditions correlate with the interpreted regularity. For example, if certain classes of western women are less subject to the codes of conduct typical of more patriarchal societies (unifying interpretation), the social scientist can treat that interpretation as a preliminary datum to seek out other relevant information, such as the connection between education, birth rate, social mobility and self-ascribed attitudes and motives. In other words, 'Interpretative generalizations are not, properly speaking, confirmable or disconfirmable theories. [About the tacit psychologies of agents.] They are usable or unusable tools.' (Sperber, 1975: 28; my bracketed insertion.)

### Unintended consequences

Before we deflate social science too far, and in order to examine my third suggestion, consider Bourdieu's famous account of aesthetic judgement in *Distinction: A Social Critique of the Judgement of Taste* (1984).

*Distinction* discusses, *inter alia*, the correlations between class and aesthetic judgement

and the logical impossibility of successful snobbery. There is an extremely close correlation between class, measured by income, education, occupation, voting behaviour and family background, and aesthetic judgement (not only in France, although that is where Bourdieu's studies of the formation of aesthetic opinion are set). Bourdieu can successfully predict the content of a person's bookshelves and their opinions about Sylvie Guillem's defection to the Royal Ballet from the Opera from a few skeletal details about their age, postcode and income. He can do so, of course, because these regularities are so robust. As he notes, however, they are not the result of the agents' intentions, nor can a set of rules linking aesthetic judgements to class be codified. This latter point is absolutely crucial to the account he goes on to develop of the *nouveau riche habitus*.

The non-codifiability of the rules of distinction explains why there is a separate aspirant class of snobs who have tried, unsuccessfully, to encode as rules for self-management what is taken for granted in the class to which they aspire. With Bourdieu's relish for paradox he describes the situation this way: The aspirant class is created by an insurmountable barrier to access to the uppermost classes, constituted by the fact that 'lack of instrumental calculation is a necessary condition of instrumentally defined success'. Trying to attain distinction is bound to be self-defeating because the mark of distinction is not to try.

Bourdieu is correct about this, but his explanation is inadequate. He thinks that the barrier to class jumping is maintained by tacit knowledge acquired by the uppermost classes from within their privileged *habitus*. They then strategically deploy this tacit knowledge to keep modifying the field, introducing slight irregularities into their practice which ensure that the rules of distinction forever outrun the efforts of social climbers to codify them. An example which springs to mind is the wearing of a brown bowler hat to Ascot by the Prince of Wales in 1926. Although sensational, this departure from sartorial regularity was immediately recognized as an acceptable variation on a social theme by those in the enclosure. Their 'feel for social game' enabled them to incorporate this innovation into their fashion repertoire without a *frisson* of discomfort. Furthermore, this departure could not be encoded by the aspirant *nouveau riche* seeking a recipe for social acceptance. The reason is that any attempt to derive a rule of etiquette from previous practice would have foundered on the purest form of the inductive paradox which Kripke places at the heart of Wittgenstein's remarks on rule following. Namely, up until 1926, all bowlers observed at the Derby had been black. However, this does not mean that a rule that bowlers be black could be derived from this evidence. After all, this datum is also consistent with another rule: hats were black until 1926, then they could be brown or black. The point is that until 1926 the available data were consistent with both rules, and, for that matter, many others. Wittgenstein: 'this was our paradox: no course of action could be determined by a rule, because every course of action can be made out to accord with the rule' (Kenny, 1994: 98).

However, on the version of rule following Bourdieu seems to endorse, the disjunctive rule (black or brown bowlers) was in force in 1925 and was tacitly known and used by the upper classes to modify the *habitus* slightly to fortify it against invasion by social climbers. Surely, however, explaining these marks of distinction in terms of tacit knowledge of such a rule only adds an additional problem, namely explaining how that knowledge was acquired. To say it was 'tacitly' acquired is not to say anything.

Is it not simpler to say that up until 1925 there was a convention in force that bowler

hats were black; a convention which changed in 1926? Furthermore, why not endorse a version of legalism in these cases and say that race-goers explicitly represented a rule encoding that convention or perhaps some other rule of etiquette which produced it as a by-product. For example, 'Wear what the Prince of Wales wore last year.'

Or consider another case. According to some anthropologists, harvesting, circumcision, story telling, medicine, marriage and funeral rituals within some West African cultures are all designed to propitiate occult forces that influence fertility. This invocation of an occult *geist* provides an elegant interpretative unification of a variety of superficially unrelated activities. However, from the work of Pascal Boyer and others (Sperber, 1975; Boyer, 1994), it seems that no one in, for example, Fang society, even the shamans and healers who invoke the occult forces of the forest on ritual occasions, consciously believes an integrated theory of occult cosmology. Does this mean we ought to say they believe it tacitly? *If, and only if, there is an increase in explanatory power by attributing the Fang or the Dowayo with tacit knowledge.* But, in fact, as in the previous case, we would merely gain an additional explanatory burden: the need to give an account of the way in which these tacit beliefs, in this case about a complex integrative cosmological theory, are formed.

Bourdieu invokes tacit knowledge in cases like these:

to escape from the philosophy of the subject without doing away with the agent, as well as from under the philosophy of the structure but without forgetting to take into account the effects it wields on and through the agent.

How?

by grasping the principle of the dialectical relationship that is established between the material universe of properties and the classificatory schemes of the *habitus*, that product of the social world through which there is a social world. (Bourdieu, 1990: 121)

Unfortunately this, like the definition of *habitus* itself, is a redescription of his dilemma rather than a solution. More accurately and charitably, it sets conditions which would have to be met by an account of the knowledge on which social structures depend. It has to be tacit, uncodifiable and able to determine actions in accordance with objective circumstances, consistent with the agent's experience of acting on intentions, but not reducible to them.

With this in mind, consider my third suggestion. Namely, that social science avoid Bourdieu's dilemma by embracing one of its horns: voluntarism. That is, explain the production of regularities in terms of the agents' consciously entertained beliefs. Bourdieu, of course, objects to this on the grounds that agents do not consciously intend the regularities their actions produce. Nonetheless, individual intentions that are explicit and consciously entertained might produce *unintended* regularities as a consequence. In fact the production of regularities as *unintended* consequences of explicit intentions seems far more likely to be the explanation of most regularities than their tacit representation. Inflation and the other regularities which form the data of economic theory are obvious examples. It makes no sense to assume that the individuals whose actions

produce these regularities tacitly intend them. These macro-level regularities, discernible at the social level, are explained by economists as unintended consequences of the explicitly represented intentions of agents pursuing their own short-term micro-level agendas in their individual transactions.

One objection to this proposal might be that economic phenomena, and for that matter the flocking behaviour of birds, are less obviously cultural or social phenomena than religious ritual or drug dealing. So that while the former can be explained as unintended consequences, the latter require the invocation of tacit knowledge of rules. But why is an explanation of the regularities of the *barrio* or Fang wedding ceremonies in terms of the explicit intentions of the actors insufficient?

The only answer seems to be that those explicit intentions will not include representations of the interpretation postulated as a rule by the theorist to unify the disparate individual histories. This is true, but what is gained by attributing the individual's involved tacit knowledge of that rule if the relevant regularity can be explained as an unintended consequence of their explicit intentions?

There is another point to note. Even if we postulate tacit instructions for the production of a regularity we will still need to explain how the agent's explicit intentions produce that regularity. For it is those explicit intentions the agent will self-represent as she controls her behaviour. For example, let us say that we credit someone with a tacit intention to reproduce patriarchy, because we have observed that their actions contribute to the production of the regularities we have interpreted as a patriarchal social structure. The agents involved do not self-attribute that intention as they patronize, belittle and discriminate against their female colleagues. Instead they tell themselves and others that they are protecting and assisting them and upholding neutral standards of professional competence. In this case the social theorist who interprets the resultant regularity as patriarchal must surely owe us an account of the way these explicit intentions can produce patriarchy as an unintended consequence. After all, women are not being helped in accordance with the explicit intentions, but subjugated. Furthermore, the theorist then needs to tell us how the tacit intention to subjugate women transforms itself, in the process of guiding an action, into the explicit intention to help them, which then has the consequence of subjugating them in accordance with the original tacit intention. Isn't this explanation a little over intricate? In general this approach to social science suffers from an ill that was diagnosed long ago and associated most clearly with symbolist approaches to anthropology: actors never know why they are doing things, only the interpreter knows. Yet there is no means of verifying the interpreter's hypothesis other than by pointing to the presence of the regularity it interprets and saying it is consistent with the interpretation. Reference to the 'tacit knowledge' of the agents in question is not a solution to this problem unless the interpreter has a theory of acquisition and employment of that knowledge.

Furthermore, treating regularities as unintended consequences of explicit intentions has another benefit. There are many cases where aiming directly at the production of social structure is self-defeating (Elster, 1979, 1983). Paradoxes of individual rationality (can you plan to be spontaneous?) have analogues at the collective level. In such cases interpreting regularities as the result of explicit intentions is bound to be self-defeating, since explicit intentions cannot produce the regularities in question. Voting paradoxes are a case in point. It would be a mistake to think that where, for example, John Sparrow

was elected as Warden of All Souls, despite the explicit intention of all the electors to have him as their second choice or lower, that it must have been the tacit intention of all the electors to have him as their first choice! To adopt the language of cognitive science, the outcome of his election may have been implicit in the voting system itself, produced by the architecture of the system rather than the representations (the voters' intentions in this case) manipulated by that system.

Of course how the social scientist interprets regularities is up to her. The aggregate of individual actions may reproduce Patriarchy or Class Oppression, and these unifying terms or others such as Renaissance Humanism or Occult Cosmology may serve as a useful unifying interpretation in the sense that it is a suggestive tool for coordinating further enquiry. However, the justification of these interpretations should not consist in the attribution to individuals of tacit knowledge of the concept expressed by the interpreter's unifying generalization.

I might add that the three suggestions I have made are mutually inclusive, not exclusive. That is to say social scientists could regard themselves as cataloguing regularities, making interpretations which unify them theoretically, and justifying those interpretations by showing how the regularities they unify can be produced as unintended consequences of the intentions of the individuals involved. (We can note that if the regularities result directly from explicit intentions to produce them, social science becomes almost unnecessary: reducing to asking people why they did things! Surveys and focus groups will rule.)

Thus the way out of Bourdieu's dilemma is, in typical Wittgensteinian spirit, not to treat the sceptical arguments as a search for a solution, but a therapeutic dissolution of the assumptions which create that dilemma. Bourdieu can relieve his intellectual distress, not by what Elster calls 'the obsessive search for meaning' but by taking seriously another of Wittgenstein's remarks: 'the mistake is to think there is anything that meaning consists in' (1973: 16).

## PSYCHOLOGY AND SOCIAL SCIENCE

Integrating these three projects is perhaps sufficient for a social science but it would be a social science restricted to the explanation of regularities without invoking the cognitive capacities of agents. It is a social science not anchored in psychology.

However, the question of how the agents in question produce their dispositions may still be relevant. After all, the psycholinguist is not content to catalogue the dispositions of informants but wishes to verify a theory about the cognitive processes by which those dispositions are produced. This was Chomsky's aim: to codify the rules which produce the regularities and thereby a psychological theory of linguistic knowledge, not a sociological theory of language use.

We do not have to adjudicate the success of Chomsky's project (observing only that it does in fact survive Bourdieu's criticisms – Chomsky, 1980; Wilson and Keil, 1999: 439 ff.) to suggest that it may be methodologically adequate to provide a psychological anchor for *any* sociological theory. If such a project is to succeed it requires a theory of cognition, of mental representation and of the way in which particular cognitive processes produce particular actions.

Dan Sperber puts the point well when he says:

[W]e might be tempted to say, then (as many philosophers have e.g. Ryle, 1949), that a belief is a disposition to assent to, express, or otherwise act in accordance with, some proposition. *As psychologists however* we will want to go deeper and find out what kind of mental states might bring about such a disposition. (Sperber, 1994: 86, emphasis added)

Sperber is certainly right about psychology, but what about social science? A social scientist unhappy with my three suggestions given earlier might well follow Sperber and for exactly the same reasons. She will want to know not just what regularities comprise her domain of investigation, how they coincide and correlate and what significance can be imposed on them by an interpreter, but *how they are produced*. Such a social scientist would surely not regard it as a sufficient explanation to say that regularities are produced by the tacit knowledge of the agents involved, where that is just another way of saying that agents are unaware of the theorists' interpretation of their behaviour. It is at this point that cognitive psychology becomes relevant, precisely because it offers theories of the unconscious mental processes by which dispositions are produced.

Why, otherwise than for aesthetic reasons, would we seek to provide such a psychological dimension to social science? After all it is *social* science, not psychology. The reason is a general methodological one. Where we have two theories of a domain both consistent with the regularities of the domain we should prefer the one that is consistent with what might be called theories of the domain at a deeper level, or theories of *mechanism*. Consider for example the way appeal to mechanisms of inheritance resolves disputes about the inheritance of traits. Are Basques more or less closely related to other European clades? Language, social traits, and domestic architecture are suggestive ways to investigate the question in the absence of a theory of mechanism, but the answer is in their blood type and DNA (Cavalli-Sforza, 1994).

There may be social science disputes in which cognitive psychology can play an analogous role. For example it might be the case that two social science interpretations of the same regularity can be distinguished by appeal to what is known about psychological aspects of the behaviour in question. One explanation may, for example, attribute individuals with an implausible psychological capacity. For example, an interpretation which treats 'world views' as tacitly represented theories acquired by acculturation looks implausible when actual psychological theories of memory, innately constrained inductive inference and abductive inference are applied to individual learning histories and behaviour. On Pascal Boyer's account of Fang cosmology the idea that each individual Fang member acquires an integrated cosmological worldview by tacit inductive inference from her exposure to the culture is unwarranted. Each individual constructs a belief set adequate to her idiosyncratic experience, using an innately constrained conceptual repertoire, but no one represents a total integrated theory of Fang cosmology. Furthermore, it is not necessary to invoke tacit knowledge of the integrated cosmology in order to explain the regularities discernible to social science which are produced by coincident dispositions of individual Fang (Boyer, 1990, 1994).

This is not the place for a manifesto for cognitive social science, which will stand or fall with cognitive science as a whole. (Minimal Social Science in accordance with my three suggestions given earlier will, of course, survive irrespective of the fate of the cognitive sciences.) Rather to suggest that if social science is to extend from the minimal

approach, which seems to follow from the difficulties with the dispositional account, and acquire a genuinely psychological dimension, then it should not proceed independently of the sciences of tacit mental processing.

## APPENDIX

A referee for this article has suggested that the dispositional theorist of tacit knowledge has another weapon at her disposal: connectionist or neural network theories of mental representation. The attraction of these non-classical, non-symbolic, theories of cognitive architecture is that they allow a system to learn to recognize and reproduce regularities without representing those regularities via language-like rules and symbols. Their representational architectures enable them to perform operations over statistical regularities in their environment and adjust their output appropriately by allowing weights in their hidden layers to evolve to suitable values. The hidden layers form a non-symbolic distributed and holistic architecture in which there is no data-process distinction.

However many social scientists overestimate the extent to which non-classical theories of neural computation can be used to support a dispositional theory of rule following or concept acquisition. (In so far as a concept is a rule for the production of representationally-mediated behaviour it is not too misleading to equate them.)

The reason is that they confuse the tacit representation of a rule in a network in which the output represents a regularity with the iteration over basic representational inputs of very simple rules which produces systemic regularities (dispositions) *as an emergent property* of the network. This type of systemic evolution would only be the acquisition of tacit knowledge of a rule if the hidden layers of a network acquired a representational structure, which resembles the rule postulated by the theorist.

But the real attraction of neural network theory is the demonstration that the representational architectures evolved by networks often do not approximate the rules hypothesized by theorists on the basis of emergent systemic behaviour. The emergence of representational structure in hidden layers of a network is neither predictable from the initial conditions nor readily inferable from output regularities. (Perhaps this is what Wittgenstein meant by order out of chaos, and his positive theory of rule following shows that he took the moral to be that the *cognitive properties of any system were irrelevant* to its semantic interpretation.)

Lest this is very obscure to non-cognitive scientists let me give an example and then discuss it in the vocabulary of this article.

A classic and tractable test case is syntax. Can a network correctly generalize from a training set to regularize the English past tense for regulars using the rule (stem + ed) while not overgeneralizing to the case of irregulars (e.g. saying 'runned' instead of 'ran')? Some classicists in cognitive science have argued that networks can *only* learn to do this (evolve to approximate a target algorithm) if the rule is prewired into a dual route network. Irregular forms are stored in an associative memory network which operates like a filter on inputs. So a word like 'help' or 'run' is compared to memorized forms in this associative network and, if there is a match, the appropriate output is produced: 'ran'. If there is no match the word passes as input to another network which regularizes by applying the default rule (stem + ed): 'helped'. Of course if there is no match for an irregular the systems will overregularize, as do human infants before they have learnt which verbs have irregular forms.

Such networks are implementations of classical rules and symbols architectures and if they correctly capture human representational architecture would vindicate a legalist approach to tacit knowledge for the case of grammar. One position in cognitive science is that only such 'legalist' or classical networks can explain the acquisition of tacit grammatical knowledge (Pinker, 1999).

However, there are non-classical alternatives, and it is these which should be of most interest to dispositional theorists. Thomas and Karmiloff-Smith (2002) have trained a network to approximate human performance on regularizing the past tense without representing the rule (stem + ed) in a dual route network. Instead they used a single route network and adjusted the sensitivity of input layers to *phonological*, not syntactic, properties of inputs. They found that their single network approximated human performance on learning to pair the correct outputs with inputs for regular and irregular forms as well as classical networks.

Although the interpretation of the results is controversial and tainted by debates about the connection between classicism and nativism (Gerrans, 2003), one conclusion to draw (about not only this but many other non-classical examples) is that a system can produce a regularity without representing a rule that describes that regularity as a goal. In this case the system models the performance of English speakers without representing the rule (stem + ed).

Someone who observed the regularities in output of the network and said that it produced them by tacitly representing the (stem + ed) rule would be wrong. Thus connectionist models like this are not good news for someone who wants to defend a dispositional theory of grammatical tacit knowledge. The system is not applying a grammatical rule but learning phonological regularities. Thus the value of such models is not in showing that rules postulated by theorists to explain regularities are tacitly represented, but that they are not represented at all.

The moral for social science is clear. If it is to go down the psychological route network models are almost mandatory, but their effect will in many cases be to show that a dispositional theorist's postulation of a tacitly represented rule is incorrect.

This should be obvious from the many cases in which social regularities emerge as a result of unintended consequences. Neural networks simply replay the emergence of macro patterns from micro interactions at an intra-individual scale. A faulty hypothesis about the emergence of the macro pattern (that it is produced by following a rule) cannot be defended in the case of individuals or groups by simply identifying the rule with dispositions of the system. The dispositions are exactly what stands in need of explanation since they are the macro pattern under an intentional description.

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