

Group-Level Cognition

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David Sloan Wilson has recently revived the idea of a *group mind* as an application of group selectionist thinking to cognition. Central to my discussion of this idea is the distinction between the claim that groups have a psychology and what I call the *social manifestation thesis*—a thesis about the psychology of individuals. Contemporary work on this topic has confused these two theses. My discussion also points to research questions and issues that Wilson's work raises, as well as their connection to externalist conceptions of the mind familiar since the work of Putnam and Burge.

1. Introduction. David Sloan Wilson (1997a, 1997b; D. S. Wilson et al. 2000) has recently revived the idea of a *group mind* as an application of group selectionist thinking to cognition. Since I am sympathetic to aspects of the multilevel view of natural selection that Wilson and Elliott Sober have articulated (see their 1994 and 1998), it seems to me worth exploring whether their reasoning could lead one to embrace an ontology that includes group minds, however extravagant that ontology may seem at first blush. In this paper I shall discuss Wilson's claims, which he casts in terms of there being group-level *cognitive adaptations*, with an eye to highlighting their significance for contemporary views of evolution and cognition.

Central to my discussion is the distinction between the claim that groups have a psychology and what I shall call the *social manifestation thesis*—a thesis about the psychology of individuals. One claim that I shall argue for is that contemporary work on this topic has confused these two theses; I also think that they are interestingly fused together in the historical traditions that Wilson sees himself as reviving, but I shall not argue for that claim here. While I will identify some problems with the postulation and defense of group minds, the discussion will also point to ways

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in which their revival highlights research questions and issues worth pursuing further. Finally, I hope to show the connection between these claims and the externalist conception of the mind familiar since the work of Putnam (1975) and Burge (1979). If my analysis of Wilson's claims is correct, then we can see his postulation of group-level cognitive adaptations as pointing us to reflect further on the nature of individual-level cognitive adaptations, and how they have been and should be studied.

2. The Group Mind Hypothesis. In order to make it clear from the outset what I mean by the revival of "group minds" thinking in evolutionary biology, and to indicate the sort of claims about group minds I will be considering, let me state what I shall call the *group mind hypothesis*:

Groups of individual organisms can have minds in just the sense that individual organisms themselves can have minds.

This hypothesis, I believe, adequately expresses David Sloan Wilson's application of group selection to group-level, cognitive adaptations. Group-level adaptations are species-specific phenotypes, including behaviors, that evolved because they conferred a selective advantage on their bearers, i.e., on the *groups* of organisms that have them. In extending the notion of a group-level adaptation to *cognitive* phenotypes, Wilson says,

Group-level adaptations are usually studied in the context of physical activities such as resource utilization, predator defense, and so on. However, groups can also evolve into adaptive units with respect to cognitive activities such as decision making, memory, and learning. As one example, decision making is a process that involves identifying a problem, imagining a number of alternative solutions, evaluating the alternatives, and making the final decision on how to behave. Each of these activities can be performed by an individual as a self-contained cognitive unit but might be performed even better by groups of individuals interacting in a coordinated fashion. At the extreme, groups might become so integrated and the contribution of any single member might become so partial that the group could literally be said to have a mind in a way that individuals do not, just as brains have a mind in a way that neurons do not. (1997a, S128)

Examples of group-level cognitive adaptations that Wilson cites here are foraging and resource allocation strategies in bee colonies (as discussed in Seeley 1995), human group decision-making (which Wilson discusses in detail in his 1997b), and what Prins (1996) has called "voting behavior" in buffalo herds when deciding which direction to move.

As the passage above indicates, at least part of Wilson's argumentative strategy is to show that cognitive or psychological processes are no excep-

tion to the general phenomenon of group-level adaptation. Wilson himself sees his defense of the group mind hypothesis as a revival of an idea that was once, some hundred years ago, widely accepted in thinking about human society. What Wilson finds problematic about such "early views of the group mind in humans" is that they "were usually stated in a grandiose form and without attention to mechanisms, similar to naive group selectionism in biology during the same period" (1997a, S131). His revival of the group mind hypothesis within a sophisticated group selectionist framework is a remedy to at least the latter of these problems. It is worth noting that group-level adaptation, and the process that putatively produces it, group selection, are themselves controversial within evolutionary biology, but this is a controversy that we will bracket here.

Wilson's examples of group minds actually point to *two* largely independent traditions of thought which have invoked group minds as an explanatory construct. In advocating the group mind hypothesis, Wilson sees himself as extracting what is correct within each of these traditions. Although I believe that lurking in each of these traditions is something of interest for broader contemporary reflection on cognition, here I shall simply provide a sketch of each sufficient to point to the connections between them and my discussion of Wilson's views.

The group mind hypothesis was held by many of the founders of social psychology and the social sciences more generally, including William McDougall (1920) in the former and Emile Durkheim (1898) in the latter, all of whom shared the view that human social groups acted in ways that were guided by their distinctive mental characteristics and activity. All of these views, which I will refer to as forming part of the *collective psychology* tradition of thought, were developed in the broader context of reflecting on the relationship between individuals and the societies that they constituted. Those in the collective psychology tradition typically defended some sort of non-reductionist view of this relationship, and despite their otherwise diverging interests and orientations, were committed to a view of this communal or collective aspect of psychology as autonomous and separable from both physiology and the experimental psychology that derived from it. The psychology of collectives was *emergent from* and thus not reducible to the psychology of the individuals in those collectives, and was to be studied as such.

The group mind hypothesis has an independent origin in biological work on the social insects that invokes the concept of the superorganism. The idea at the core of what I shall call the *superorganism tradition* in evolutionary biology is that in certain groups of animals—in particular, in colonies of *Hymenoptera*—it is the group, rather than the individual organism which lives in those groups, that functions as an integrated unit, having many of the properties that individual organisms possess in other

species. Individual bees, ants, and wasps function more like organs or (parts of) bodily systems do in those species. Colonies are independent, self-regulating groups that are organized to achieve specific biological goals—such as food collection and distribution, nest construction and maintenance, and reproduction—via dedicated strategies, where some of these strategies and the functions they perform can properly be thought of as psychological or cognitive. Since the members of these colonies often lack any or all of these goals and the accompanying strategies, these strategies and goals are emergent properties of the colony, in much the same way that a group mind was thought to be emergent from individual minds in the collective psychology tradition in the social sciences. William Morton Wheeler (1910, 1920) is perhaps the key figure in this tradition.

While both traditions postulate minds as emergent properties of groups of organisms, a difference between them regarding *group-level* traits is worth marking with some further terminology. In the collective psychology tradition, a group mind is what I will call a *multilevel* trait, since the mind is claimed to exist at both the level of the group and at the level of the individuals comprising the group. By contrast, in the superorganism tradition, a group mind is a *group-only* trait, in that it is claimed that it is only groups of social insects, not individual members of those groups, that possess a mind. Consider now two claims that have been run together in both contemporary and historical discussions of the group mind hypothesis.

3. Two Claims Distinguished. First, there is the idea that *groups* have properties that their individual members don't have, and which are not reducible to the properties of those members. This emergentist view of group properties, together with the further assumption that some of these properties are psychological, entails a version of the group mind hypothesis that postulates *group* psychological traits. These traits, while in a strict sense multilevel traits (such as being angry or irrational), are not actually possessed by the individuals in the corresponding social group prior to or simultaneous with their forming that group. In this sense, these group psychological properties are something over and above the properties of those individuals, and thus are more like group-only (rather than multilevel) traits.

Second, there is the idea that *individuals* have properties, including psychological properties, that are manifest only when those individuals form part of a group of a certain type; this is what I shall call the *social manifestation thesis*. Precisely how this sits with the group mind hypothesis is far less clear, since it makes a claim about the character of individual minds, and it would seem that any *group* properties relevant to this claim could be and indeed would likely be *non-psychological* in character. For example, suppose that individual people become angry or aggressive in

certain ways only when they form a certain type of group (e.g., a crowd). Then, unless they do so only because the crowd itself has a specific psychological profile, there is no need to posit group psychological properties, and so no role for the group mind hypothesis.

It could still be true, of course, that there are important senses in which the group behavior cannot be reduced to or be derivable from that of the individuals within it, even if what explains that behavior are the psychological states of individuals of whom the social manifestation thesis is true. These points together suggest that the non-reductionist motivation undergirding the collective psychology tradition does not lead indelibly to the group mind hypothesis.

These two views are logically independent. Clearly, the social manifestation thesis could be true without entailing the group mind hypothesis if group minds did not exist. Conversely, the group mind hypothesis could be true without entailing the social manifestation thesis if the relevant groups were comprised of individuals that did not have minds at all. We will return to the relationship between the social manifestation thesis and the group minds hypothesis shortly.

4. On Having a Mind. Critical to determining the plausibility of the group mind hypothesis itself is some further discussion of what it means to have a mind at all. Indeed, I suspect that a common reaction to the group mind hypothesis, at least among working biologists, is that it has no real empirical content because mindedness, the property of having a mind, is so vague. In part, this is because of the ubiquity of cognitive metaphors in describing biological processes—from cell and even molecular *memory* in gene regulation, to antibody *perception* in the immune system, to *reading* and *writing* in DNA replication, to the reliance on the metaphor of *selection* itself as a way to describe the chief mechanism governing evolution—and the failure to perceive them *as* metaphors. And in part it is because of an ignorance of and an insensitivity to the conceptual work necessary to articulate what it is to have a mind. Here I think we can make some progress.

In order for something to have a mind, that thing must instantiate at least some psychological processes or abilities. Rather than attempting to offer a definition or analysis of what a psychological or mental process or ability is, let the following incomplete list suffice to fix our ideas: perception, memory, imagination (classical Faculties); attention, motivation, consciousness, decision-making, problem-solving (processes or abilities that are the focus of much contemporary work in the cognitive sciences); and believing, desiring, intending, trying, willing, fearing, and hoping (common, folk psychological states).

Intact, functioning, normal human beings are paradigms of creatures

that instantiate a wide range of these processes and abilities, and in virtue of that they possess what we might call *full-blown* minds. I know of no one defending a version of the group mind hypothesis who has claimed that groups have full-blown minds, and there would seem to be little explanationist motivation for adopting the full-blown group mind hypothesis. As is the case in striving to make sense of the idea of animal minds or of artificial intelligence, we should probably start with something less. Consider, then, *minimal mindedness*:

X has a minimal mind just in case *X* engages in at least one psychological process or has at least one psychological ability.

Given that we have full-blown minds, what the group mind hypothesis and minimal mindedness together entail is that groups literally engage in some of the psychological processes or have some of the psychological abilities that intact, functioning individual human beings have. This strikes me as quite a strong and striking thesis about group minds, and seems to me the right way to understand the group mind hypothesis insofar as it has formed part of the collective psychology and superorganism traditions, and as it has been revived within contemporary evolutionary biology.

While the notion of a minimal mind is a useful one for these reasons, its employment will likely raise the hackles of many of those within contemporary philosophy of mind. For example, those who either view consciousness as a necessary feature of any mind, or take mental states, of their nature, to be holistic, may find the notion incoherent. A complete defense of the notion would address these objections (amongst others).

5. The Contemporary Defense of the Group Mind Hypothesis. Wilson's most sustained defense of the group mind hypothesis (Wilson 1997b) is offered through a focus on the literature on human decision making, particularly on human decision making in groups, and this case study review is intended primarily to support the idea that human decision making has evolved both by individual selection and by group selection. Wilson begins by distinguishing two ways

in which human decision making can evolve to maximize the fitness of whole groups. First, individuals might function as independent decision makers whose goal is to benefit the group. This is the way we usually think about altruism (Sober and Wilson [1998]). Second, individuals might cease to function as independent decision makers and become part of a group-level cognitive structure in which the tasks of generating, evaluating, and choosing among alternatives are distributed among the members of the group. . . . At the extreme, the role of any individual in the decision-making process might become so

limited that the group truly becomes the decision making unit, a group mind in every sense of the word. (1997b, 358)

Wilson illustrates the second of these alternatives with an example of decision-making about food sources in honey bee hives, going on to suggest that although "we should not expect group-level cognition in humans to resemble the social insects in every detail" (1997b, 359), human social groups can be said to constitute what he calls *adaptive decision-making units*.

It should be clear that only the second of Wilson's alternatives represents the sort of emergentist view of group psychological properties that I outlined in Section 2 as part of the collective psychology and superorganism traditions, and only in "the extreme" would such a view support the group mind hypothesis. Insofar as the first of the alternatives Wilson presents states a view about psychology at all, it expresses a version of the social manifestation thesis: individuals have a psychological character that confers benefits on the group as a whole, and does so only because of properties of that group, such as having a high proportion of altruists or imposing severe social costs for non-altruists.

Wilson continues by discussing the second of these alternatives, equating it with the idea that groups are adaptive decision-making units, and focusing on an assessment of the performance of group and individual decision making. This discussion is aimed largely at offering support for the idea that human decision making evolved in part by group selection. But it is worth asking whether the phenomenon to be explained by an appeal to group selection concerns the character of *individual* decision making or that of *group* decision making. Wilson seems to imply that it is both when he says "[i]f human cognition is a product of group selection, we should expect individuals to be innately prepared (Tooby and Cosmides 1992) to easily 'hook up' with other individuals to form an integrative cognitive network" (1997b, 359). Wilson seems to think that these two alternatives are intimately related—a possibility to which we shall return—but note here that it is only formation of an "integrative cognitive network," not the innate preparedness of individuals to form such a network, that is directly relevant to the group mind hypothesis, rather than to the social manifestation thesis.

If Wilson is to keep with the emergentist aspect of the collective psychology and superorganism traditions, then the integrative cognitive networks that he postulates must be something more than individuals being innately prepared to hook up with one another. The same holds for his multilevel property of decision-making: having a group mind with this property must be more than having individual members with it. In some trivial sense, a club makes a decision (say, by majority vote) about whom

will be their next president simply by each of the members publicly expressing a decision on this matter. Even if the decision here is viewed as distinct from those of the individual voters—since individuals by themselves cannot elect a new leader—if there is a group mind here it is nothing over and above the minds of individuals. Given the distinction between the group mind hypothesis and the social manifestation thesis, there must be something more to having a group mind than there being individuals with socially manifested psychological characteristics.

There is a real problem for Wilson's views here, at least when construed as a revival of the group mind hypothesis. With respect to *human* decision making, he would seemingly need to show that this functions at the group level by individuals relinquishing their own decision-making activities, for it is only by doing so that he could point to a group-level psychological characteristic that is, in the relevant sense, emergent from individual-level activity (cf. social insects, whose group mind is a group-only property). Now those in the collective psychology tradition, and especially those writing from 1870–1895, did think that this happened, but claimed that it typically led to a *degradation* of individual abilities (e.g., LeBon 1895). Crowds, for example, had their own psychological character, one that involved the transformation of autonomous individuals into members of *madding crowds* (McPhail 1991). What became known as “crowd psychology” was a phenomenon that made individuals irrational, and less able to act in their own best interests. But Wilson must distance himself from this aspect of the collective psychology tradition—and does so in his discussion of Janis's more recent concept of *groupthink* (1997b, esp. 363–366)—since he wants to defend the view that groups are *adaptive* decision-making units, i.e., units that have properties that promote fitness. Thus, he must look for ways in which collectivities *confer* benefits. But if those benefits are nothing more than benefits *to individuals*, then collective behavior would seem to be explained by an individual, not a group, psychology. If individuals simply enhance their own individual decision making by forming groups of a certain character, then we may have the beginnings of an argument for the social manifestation thesis; but we are no closer to the group mind hypothesis.

So the group mind hypothesis has been run together with the social manifestation thesis. But what of the social manifestation thesis itself?

6. The Social Manifestation Thesis and Its Implications. The social manifestation thesis says something important about the nature of cognition and its relation to individuals, but it is important to be clear about what is important here. It says that some psychological states of individuals are manifested only when those individuals form part of a social group of a

certain type. Both the "social" and "manifestation" parts of the thesis require further explanation.

One way of understanding this pair of notions is in terms of the idea that individuals have their psychology *transformed* through social membership, a thesis that played a central role within the collective psychology tradition, where the relevant social groups were "crowds." There are, however, different ways to think about this process of transformation. On one, the guiding idea is of an individual as a self-contained bundle of psychological dispositions, with membership in a crowd temporarily causing some of these—the irrational, the unconscious, the emotional—to be manifested, and those of the rational individual to remain inert within that individual. Here an individual's social circumstances play a *triggering* role in the expression of pre-existing psychological dispositions. Alternatively, we can think of individuals as constituted by psychologically rational states, but who come to *lose* their rationality altogether and acquire a new set of psychological dispositions when they become part of a crowd. On this view, the social circumstances change what dispositions an individual has in a more *creative* way: there is a more radical form of transformation of the individual than that suggested by the triggering view mentioned above.

Either of these conceptions of the social manifestation thesis would seem to be continuous with the individualistic tradition of thinking about psychological states familiar from contemporary cognitive science, since an individual's psychology itself can (and should) still be understood in abstraction from that individual's social environment. Individualists hold that an individual's environment can be "bracketed out" when one is engaged in systematic theorizing about that individual's psychology. If the social environment plays either of the sort of triggering or creative roles in altering an individual's psychological states that I outlined in the previous paragraph, then it can be bracketed out from psychological taxonomy as a non-psychological distraction. In neither of these cases do the psychological dispositions themselves become social, that is, become *constituted* by the social circumstances in which they are manifested.

Such individualistic understandings of the social manifestation thesis, I suggest without further argument here, are unstable hybrids, since they rely on the tendentious notion of an individualistic disposition that has what I have elsewhere called a *wide* realization (Wilson 2000a, 2000b). Psychological dispositions, whatever else they are, are properties of individuals, but the realization for these properties is sometimes *locationally* wide or non-individualistic, i.e., it includes the corresponding individual as a proper part. But if the realization of a given property is wide, then that property is likewise wide, since realizations are metaphysically sufficient for the properties they realize. Thus, this pushes us towards a view

of the social manifestation thesis as positing psychological states that are wide, and in this case, to a view of them as being *socially* constituted. This interpretation would make the thesis an apt, general characterization of the externalist conception of mind that depicts cognitive processes as themselves intrinsically social in nature.

The social manifestation thesis, so understood, provides a middle ground between an individualistic psychology and the group mind hypothesis. In contrast to individualism, the wide psychology demarcated by the social manifestation thesis views psychological states as both taxonomically and locationally *embedded* in broader social systems; in contrast to the group mind hypothesis, it does not ascribe psychological states themselves to entities such as the group, the community, or the nation, larger than the individual and to which the individual belongs. Thus, while the individual is not a boundary for psychological theorizing, psychology does posit individual-level, rather than group-level, traits. To put this the other way around, socially manifested psychological traits are properties of individuals, but since they occur only in certain kinds of group environments, it is unlikely that they can be understood in individualistic terms.

One implication of the social manifestation thesis is that discussion of the evolutionary and cultural conditions that give rise to psychological states of which it is true are integral to a consideration of their existence. Viewing cognition itself as fundamentally social, at least in part, casts a number of dominant approaches to this topic, such as evolutionary psychology and the Machiavellian hypothesis, in a rather different light than that in which they have typically been viewed. For example, work within the framework of the Machiavellian intelligence hypothesis (e.g., Byrne and Whiten 1988; Whiten and Byrne 1997) largely has been focused on the role of social complexity in producing mental complexity in the individual, and thus on exploring the forms that both types of complexity take and the relations between them. But if cognition itself is social, not simply a product of the social, then this suggests both a more intimate connection between forms of (say) group living and intelligence and a move away from research programs that attempt to isolate and then explain individualistic modules for intelligent cognitive performance.

The social manifestation thesis should also lead us to rethink some of our ways of thinking about the "levels" at which selection operates. For example, it has been common within debates over the units of selection to contrast individual-benefiting traits that evolve by individual selection with group-benefiting traits that evolve by group selection, and at least in the hands of those who think that the "selfish gene" is *the* unit of selection, to discount the latter altogether. But this putative dichotomy becomes less compellingly exhaustive once we consider traits, including psychological

traits, that benefit individuals because those individuals are members of groups of a certain type. In this sort of case, individual-level and group-level traits are metaphysically *entwined*, and it is unclear that natural selection is a fine-grained enough mechanism to distinguish between entwined properties.

Concentration on the social manifestation thesis in an evolutionary context thus may direct us to think about ways in which individual and group selection can be mutually reinforcing processes, rather than conceived of primarily as forces that are opposed in evolutionary change. An important species of case in which they *do* work in the same direction would be one in which socially manifested traits are selected at the level of the individual, while group-level traits, whether psychological or non-psychological, are selected at the level of the group. This would be a sort of coevolutionary process in which there is a mutually reinforcing causal loop between socially manifested psychological traits and group-level traits. This suggests that, although the social manifestation thesis and the group mind hypothesis are distinct views, they may be most interestingly defended *together*.

REFERENCES

- Burge, Tyler (1979), "Individualism and the Mental", in Peter French, Theodore Uehling, Jr., and Howard Wettstein (eds.), *Midwest Studies in Philosophy: Metaphysics*. Minneapolis: University of Minnesota Press, 73–121.
- Byrne, Richard W. and Andrew Whiten (eds.) (1988), *Machiavellian Intelligence*. New York: Cambridge University Press.
- Durkheim, Emile ([1898] 1953), "Individual and Collective Representations", reprinted in *Sociology and Philosophy*. Translated by D. F. Pocock. Originally published in *Revue de Métaphysique et de Morale*, Vol. vi. Glencoe, IL: The Free Press, 1–34.
- LeBon, Gustav ([1895] 1968), *The Crowd: A Study of the Popular Mind*, 2nd ed. Dunwoody, Georgia: Norman S. Berg.
- McDougall, William (1920), *The Group Mind*. New York: Putnam.
- McPhail, Clark (1991), *The Myth of the Madding Crowd*. New York: Aldine de Gruyter.
- Prins, H.H.T. (1996), *Ecology and Behaviour of the African Buffalo*. London: Chapman and Hall.
- Putnam, Hilary (1975), "The Meaning of 'Meaning'", reprinted in *Mind, Language, and Reality*. First published in K. Gunderson (ed.), *Minnesota Studies in the Philosophy of Science*, Vol. VII (Minneapolis: University of Minnesota Press), 131–193. New York: Cambridge University Press, 215–271.
- Seeley, David (1995), *The Wisdom of the Hive: The Social Physiology of Honey Bee Colonies*. Cambridge, MA: Harvard UP.
- Sober, Elliott and David Sloan Wilson (1998), *Unto Others: The Evolution and Psychology of Unselfish Behavior*. Cambridge, MA: Harvard University Press.
- Tooby, John and Leda Cosmides (1992), "The Psychological foundations of culture", in J. Barkow, L. Cosmides, and J. Tooby (eds.), *The Adapted Mind*. New York: Oxford University Press, 19–136.
- Wheeler, William Morton ([1910] 1939), "The Ant-Colony as an Organism", reprinted in his *Essays in Philosophical Biology*. Cambridge, MA: Harvard University Press, 3–27.
- ([1920] 1939), "The Termitadoxa, or Biology and Society", reprinted in *Essays in Philosophical Biology*. Cambridge, MA: Harvard University Press, 71–88.

- Whiten, Andrew and Richard W. Byrne (eds.) (1997), *Machiavellian Intelligence II*. New York: Cambridge University Press.
- Wilson, David Sloan (1997a), "Altruism and Organism: Disentangling the Themes of Multi-level Selection Theory", *American Naturalist*, 150 (Supplement): S122-S134.
- (1997b), "Incorporating Group Selection into the Adaptationist Program: A Case Study Involving Human Decision Making", in J. Simpson and D. Kendrick (eds.), *Evolutionary Social Psychology*. Hillsdale, NJ: Erlbaum, 345-386.
- Wilson, David Sloan and Elliott Sober (1994), "Reintroducing Group Selection to the Human Behavioral Sciences", *Behavioral and Brain Sciences*, 17: 585-654.
- Wilson, David Sloan, Carolyn Wilczynski, Alexandra Wells, and Laura Weiser (2000), "Gossip and Other Aspects of Language as Group-Level Adaptations", in Celia Heyes and Ludwig Huber (eds.), *Evolution and Cognition*. Cambridge, MA: MIT Press, 347-365.
- Wilson, Robert A. (2000a), "The Mind Beyond Itself", in Dan Sperber (ed.), *Metarepresentations: A Multidisciplinary Perspective*. New York: Oxford University Press, 31-53.
- (2000b), "Two Views of Realization", *Philosophical Studies*, forthcoming.

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