Questioning Two Common Assumptions concerning Group Agency and Group Cognition

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Abstract

In this paper, we identify two common assumptions underlying popular accounts of group agency. The first assumption is that paradigmatic cases of agency are to be identified with individual organisms, typically human beings. The second assumption is that cognition requires the manipulation of mental representations. Combining these two assumptions generates the status quo account of group agency, namely that a group's agency ontologically depends upon the mental representations of the individuals that constitute the group. We provide a taxonomy of views about group agency along two axes, each corresponding to the extent to which the view endorses (or rejects) one of these two common assumptions. We believe that none of the standard conceptions of group cognition and agency reject both of these two assumptions. After developing brief arguments against both assumptions, we provide a brief sketch of what an account of group agency that rejects both assumptions might look like.

Keywords: ecological psychology; enactivism; group cognition; group agency; (anti-)representationalism

Introduction

Most popular accounts of group agency tend to share two common assumptions. The first assumption is that paradigmatic cases of agency are to be identified with individual organisms, typically human beings. This assumption implies that group agency is an exceptional case of agency. In the first section, we develop an argument against this assumption supported by recent arguments from biology. The second assumption is that cognition, typically understood as necessary for agency, requires the manipulation of mental representations. When these two assumptions are combined, we are left with what we identify as the status quo account of group agency, namely that cases of group agency ontologically depend upon the content of the mental representations of the individuals that constitute the group. What's critical about this combination of views is not that a group agent must be constituted by individual cognizers manipulating mental representations, but that the group's agency itself constitutively depends on the content of those individual mental representations. In the second section, we make the case that standard accounts of group agency are indeed characterized by the representationalist assumption and review arguments against representationalism in cognitive science. In the final section, we provide a taxonomy of views about group agency along two axes, each corresponding to the extent to which the view endorses (or rejects) one of these two common assumptions. Finally, we also show that virtually no account of group agency rejects both assumptions. To fill this lacuna, we sketch what an account of group agency that rejects both assumptions might look like. Our goal is not to defend an account of group agency that rejects both assumptions. To do so would require a much longer paper. Our goal is simply to identify this lacuna and provide some reasons why this is indeed a lacuna that ought to be filled. We conclude that further work ought to be conducted to determine whether a full-fledged account of group agency that rejects both assumptions is defensible.

Questioning Individualism

We routinely talk about groups as if they, the groups themselves, have thoughts and experiences, are capable of action, and ought to be held accountable for those actions. For example, we frequently mention the mood of the crowd, the desires of a corporation, the beliefs of a political party, even the goals of the ant colony. One of the sites of good philosophical work this century has been the debates whether to take such talk as literal or figurative. (See, for example, work by Philosophers Philip Pettit, Christian List, John Sutton, Deb Tollefsen, Bryce Huebner, Raomi Tuomela, Margaret Gilbert, Orestis Palermos, Georg Theiner and their co-authors). Central to much of this work, however, is a common assumption that agency is paradigmatically individual and that cases of group agency are exceptional. This assumption can be seen, in some way or another, in most influential accounts of group agency. In fact, the very question concerning whether we ought to take such talk of group agency as literal or as a mere analogy based upon similarities between groups and individuals suggests that the starting assumption for all philosophical work on group agency is that agency is, first and foremost, an individual phenomenon. If there is any truth to our talk of group agency, it must be because groups are capable, in some way, of doing what we already assume individuals can do.

This is the first assumption that we identify with standard theories of group agency. This assumption arguably rests on a deeper assumption that individuals are always ontologically prior to collectives, a popular assumption called into question by Saucedo (2022). In any case, the assumption is almost certainly supported, at least in part, by

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a tendency towards a sort of anthropocentrism that continues to shape how we think about a variety of philosophical questions, particularly those related to agency. A strong version of such anthropocentrism may be that only human beings are capable of agency. Such a strong anthropocentrism, albeit historically popular, has received much criticism and has fallen out of favor. But, in its wake, there is a sense in which a combined animal-centric and scale-based bias now influence the systems that we identify as agential. The combination of these biases results in a tendency to look for agency in systems that have boundaries similar to those animals that are organized across a common range of scales as human beings. Conceptual challenges arise when we consider cases that challenge these biases in some way. Examples include social systems, the earth (i.e., Gaia), ecosystems, superorganisms (e.g., beehives), genetically diverse symbionts (e.g., holobionts) and so on. Similarly, proposals that identify components outside of what we traditionally think of as the boundaries of a system as constitutive to the system itself are often met with dismay, such as 4E proposals that cognition is constituted by components outside of the organism such as the environment (e.g., enactivism and ecological psychology), notebooks acting as external memory systems (e.g., Clark and Chalmers' (1998) extended mind hypothesis), other social actors (e.g., enactive accounts of participatory sense-making), and so on. What lurks behind these animal-centric and scale-based biases are underlying assumptions concerning what constitutes a biological individual and thus what kinds of systems are potentially agential in the first place. In short, even though we have mostly rejected a strong anthropocentrism that suggests paradigmatic cases of agency are to be identified with human beings, we find a weaker bias still rooted in that anthropocentrism that suggests only certain cases of biological individuality, specifically those that sufficiently resemble human organisms and are similarly scaled, constitute cases of agency.

Against what we claim to be the status quo conception of biological individuality, we cite the work of two biologists. Perhaps most notably, the work of Lynn Margulis challenges us to reevaluate the ontological status of the emergence of eukaryotic cells, which are often taken to be the paradigmatic case of biological individuality. According to Margulis (1967), eukaryotic cells did not evolve from prokaryotic cells through a gradual process of mutation, adaptation, and selection.[1] Instead, she argues that eukaryotic cells emerged through a process of symbiogenesis in which communities of prokaryotic cells became symbiotically interdependent to such an extent that the community's constituents could no longer live independently. Margulis' arguments have subsequently received much empirical support and her account of the emergence of eukaryotic life is now accepted as the standard theory. Later work by Margulis (2000; 2008) argues that the very concept of an organism is misguided. Instead of identifying a biological individual qua organism with the collection of genetically similar cells that constitute some physical system, Margulis argues that paradigmatic cases of living systems are what she refers to as holobionts, where a holobiont is understood as the symbiotic collective constituted by a host and a multitude of genetically dissimilar symbionts. For instance, we may wonder whether or not the diverse microorganisms that constitute the human gut microbiome ought to be considered to be essential parts of human beings or merely as a collection of symbiotic appendages. According to a holobiotic conception of life, we might simply reject the question and recognize that human beings are fundamentally collectives more akin to an ecosystem than the common conception of a discrete organism. Finally, Margulis has also devoted much of her career to defending the Gaia hypothesis. According to Margulis and her collaborator and engineer James Lovelock (1974), the entire earth is best understood not as an unliving environmental backdrop against which life emerges. Instead, the earth's atmosphere has both played a critical role in shaping the evolution of earthbound life and has itself been shaped by those processes. Consequently, Margulis and Lovelock suggest that it is better to understand the earth as a whole as a living system consisting of a multitude of interdependent and symbiotic processes.

A second biologist who challenges the status quo ways of thinking about biological individuality and agency is Michael Levin. Recently, he has claimed that collective intelligence is in fact the biological norm rather than the exception. Typical accounts of collective intelligence start with the assumption that individuals constitute the paradigmatic cases of intelligence and that collective intelligence is an exceptional case wherein a group of individuals, already assumed to be intelligent, coordinate their action as a group. As we will discuss in the next section, there seems to be good reason to believe that individual intelligence is not possible in a vacuum and can only emerge in the context of collectively coordinated dynamics that themselves exhibit what we might refer to as intelligence, or at least proto-intelligence. Such views have support in ecological and enactive theories of social cognition, but they are also supported by how biologists like Levin think about ontogeny. The process of morphogenesis, as Levin (2022) describes it, involves the coordination of a collection of cells to achieve a common goal, namely creating a complex, multicellular organism. He suggests that such collective coordination happens across multiple scales of organization of the human body, which is, as discussed earlier, often considered to be one of the paradigmatic cases of biological individuality (second, perhaps only, to the eukaryotic cell). Consequently, Levin (2023) argues that multicellular organisms consist of multi-scale competency architectures. The basic idea is that there are collective coordination tasks being solved across multiple scales of organization of a multicellular organism. Each coordination task is solved by a complex collective of biological

[1] This paper was originally published under the name Lynn Sagan (1967).

processes that exhibit plasticity and adaptability in their capacity to solve said coordination tasks. This plasticity and adaptability is crucially a consequence of the collective nature of the systems solving the task. Such considerations have motivated Levin and like minded biologists to challenge the often assumed notion that individual intelligence is the norm and collective intelligence is an exceptional case of intelligent behavior. Alternatively, he suggests that all intelligence is collective intelligence. Likewise, we conclude that we at least have good reason to doubt the common assumption that agency is paradigmatically an individual phenomenon and that we may need to revise our conception of group agency in light of the possibility that it may not necessarily be an exceptional case of agency. Indeed, group agency may be the norm for what it means for something to be an agent.

Questioning Representationalism

While the question concerning individualism is primarily concerned with identifying the type of relation between the constituents of an agent, the question concerning representationalism is primarily concerned with identifying what kind of process cognition is. A common view, not only among philosophers of group agency but also cognitive scientists and philosophers of mind more generally, is that cognition requires manipulation of mental representations. Enactivists and ecological psychologists, however, have argued that representations are not a necessary ingredient in cognitive processes. For our purposes, however, what is perhaps most important is how the assumptions of representationalism and individualism intersect in the most influential theories of group cognition. By assuming that individuals are paradigmatic agents and that groups are exceptional cases, and by assuming that cognition (and therefore agency) requires mental representations, debates in the group agency literature tend to focus on specifying the relationship between the content of an individual's mental representation and the group's agency. Thus, the mental representations of individuals are rendered necessary constitutive ingredients in making claims about the state of a group agent. In this section, we review the influence of representationalism on how we have understood group agency and associated concepts such as group minds and distributed cognitive systems.

Much of the early talk about the thoughts and experiences of groups referred to "group minds." In trying to make sense of the horrors of the just ended "Great War", McDougall (1921) writes "I have argued that we may properly speak of a group mind, and that each of the most developed nations of the present time may be regarded as in the process of developing a group mind" (ix). The question throughout the 20th century was whether what seem to be group minds are entities in their own right (Gilbert 1989) or mere summations of the minds of the individuals who make up the group (Bratman 1993). As a way to avoid some of the harder metaphysical questions in the vicinity concerning consciousness and the normative requirements of commonsense psychological notions like belief or intention, for the most part, the discussion turned in the 21st century to discussions of what are called 'distributed cognitive systems' (Sutton 2008; Theiner, Allen, and Goldstone 2010; Tollefsen and Dale 2012; Palermos 2016).

Distributed cognitive systems are beautifully exemplified by Hutchins's (1995) studies of navigation aboard U.S. naval ships. Hutchins describes the participants in on-ship navigation in bays and harbors as a multi-person, multi-tool computational process. The fix cycle, which is done every three minutes in bays and harbors begins with two people on deck, using tools called alidades to find the angular difference from magnetic north and two different objects; each person relays a number via telephone to another person who records those numbers, along with the time in a ledger. A fourth person uses another tool, a hoey, to draw lines on a map an appropriate number of degrees from the representation of the object. If the ship were not moving, it would be at the point on the map where those two lines intersect. Since the ship is moving, the process is repeated twice, yielding three points on the map that form a triangle. The ship is in this triangle. Locating the ship in this way is accomplished by four humans interacting with tools and with one another. The key, in Hutchins's description, is that this works, even though none of the individual humans might know how to complete the whole task or what role their activities play in the task; the task and the knowledge of how to accomplish the task is distributed across the whole distributed cognitive system.

In one widely discussed paper, Theiner, Allen, and Goldstone (2010) argue for distributed cognitive systems as genuine cognitive systems using what they call the 'social parity principle'. The social parity principle is derived from the parity principle described by Clark and Chalmers (1998): "If, as we confront some task, a part of the world functions as a process which, were it done in the head, we would have no hesitation in recognizing as part of the cognitive process, then that part of the world is part of the cognitive process" (8). Clark and Chalmers argue that this principle suggests that things like eyeglasses, notebooks, and smart phones are genuine parts of an extended cognitive process. Theiner, Allen, and Goldstone alter this slightly for their social parity principle: "If, in confronting some task, a group collectively functions in a process which, were it done in the head, would be accepted as a cognitive process, then that group is performing that cognitive process" (2010). Theiner et al. then proceed to pile on examples of things done by groups that, had they occurred inside a brain, would be considered cognitive. We will describe just one here: transactive memory systems. Transactive memory systems were introduced by Wegner (1986) to discuss how memory is organized in established groups of individuals, like families, couples, and teams of work colleagues. It is well established that participants in transactive memory systems remember a particular subset of things, know who knows what, and share a set of procedures that they use to encode new memories, to recall memories of the group, to allocate

the storage of memories, to share stored memories with one another, and to elaborate memories. Notice that this list of features of transactive memory systems is exactly what one would expect in a computer or an individual rememberer. If we were to learn that inside each of us there were collection of brain areas where different kinds of memories would be stored and another set of brain areas that would instantiate a series of procedures for routing memories to the appropriate brain areas for storage, retrieving memories from where they are stored, and combining them with other memories, we would not hesitate to call these brain areas and their activities the individual's memory. By the social parity principle, then, the activities of the group of people that compose a transactive memory system are genuine instances of memory, and the group collectively makes up a genuine cognitive system.

One quick point, which Hutchins makes, is that these distributive cognitive systems are the best cases we have of evidence for the computational theory of mind. When we watch a crew piloting a large ship, we can actually observe the computations as they happen. When the sailor on deck uses the alidade to report a number to the bridge, they are visibly doing an analog to digital conversion: the information in the light is continuous, i.e., analog and the number they speak into the phone is digital. There are similar analog-to-digital and digital-to-analog conversions that occur throughout the fix cycle. These are computations and they are straightforwardly observable; we can see them happening. This is in sharp contrast to the attempts to observe computations inside the brains of humans. Whether a pattern of activity in a brain area represents something or computes a function is not detectable, even with our best imaging equipment. The activity that might represent, say, a grandmother's face is not observably different from that which might do a digital-to-analog conversion. This means that speculations about what a brain area represents or what function it computes are always that: speculations. Distributed cognition is often straightforwardly, observably computational.

That said, the "groups are real entities" versus "groups are mere summations" debate does not go away just because we talk about distributed cognition instead of group minds. Kirk Ludwig (2014; 2016; 2017), for example, argues for the mere-summations side in an article-length response to Theiner et al.:

> "what a group cognitive level process of the sort that we are interested in requires is that there be group level intentional states, a group level thinker, or cognizer, a group level possessor of representations of the task, a group level desire and intention to pursue it, and group level beliefs about how to do it, and, hence, a group level agent. Nothing follows, as we have seen, about there being a group level agent from the fact that the group solves the problem, because all this comes to is saying that each member of the group intentionally contributes to its solution." (Ludwig 2014, 26-27)

This argument suggests that the transactive memory systems that Theiner et al. discuss are not themselves cognitive systems because they do not themselves have thoughts, representations, desires, and beliefs. Ludwig thinks that only the individual agents who compose things like transactive memory systems do, and the apparent group exists because each individual purposefully tries to solve a common problem. The individuals are the ones with thoughts, representations, desires, and beliefs, and those exist inside the individuals. We can argue about whether this works as an argument against transactive memory systems as group cognitive systems, but it definitely does not work as an argument against the sailors engaged in the fix cycle comprising a genuine group cognitive system. The main reason for this is that the participants in the fix cycle are not typically trying to solve a common problem. As Hutchins points out, not everyone in the system needs to even know what the problem to be solved by the system is and not everyone has to be intentionally contributing to solving it. In the case of the fix cycle, the problem gets solved but not everyone is even aware of what the problem as a whole is.

Even more clear, however, is that this whole debate simply assumes that a representationalist theory of the mind is correct. Consider the parity principles described above:

> If, as we confront some task, a part of the world functions (a group collectively functions) as a process which, were it done in the head, we would have no hesitation in recognizing as part of the cognitive process, then that part of the world is part of the cognitive process (that group is performing that cognitive process).

These principles make clear that Clark, Chalmers, Theiner, Allen, Goldstone, and Ludwig all agree that the basic, incontrovertible cases of cognition are those that occur as transformations of representations in the head; that is, they all agree that most thinking and experiencing takes place in a hidden, inner realm, that is represented for the subject and invisible to outsiders.

There is a deeper issue related to Ludwig's reply to Theiner et al. For Ludwig, being a cognitive system requires representations of the cognitive task being carried out. But for ecological psychologists and enactivists, this is not a requirement for being a cognitive system; these scholars are skeptical that thinking, perceiving, experiencing and the like are to be understood in terms of internal representations of an external world. According to many views of this sort, cognition is not defined in terms of internal representations of the environment. This requires rejecting the parity principles as originally written, which simply assume that the base case of cognition is hidden and inner. Rejecting that assumption actually makes cognitive systems constituted by individual groups of humans more plausible. Believing that cognition necessarily involves representations invites the following response to Clark and Chalmers's claim that smartphones are part of cognitive systems: it is not the smartphone itself that is part of the cognitive system, it is only the human user's internal perceptual representation of

the smartphone that is genuinely part of the cognitive system. Similarly, Sebanz and Knoblich (2021) argue that joint action – coordinated, goal-oriented engagement of two or more individuals completing a task – requires that each participant in the action have internal representations of the intentions and likely future actions of the others. As with the smartphone users, these hidden, inner representations of partners are part of each individual human cognitive system that participates in the joint action; there is no genuine group cognitive system.

In rejecting representationalism, we must replace the "were it to take place in the head" part of the parity assumptions with "were it done by an individual biological organism". We are left instead with something much more commonsensical.

> If, as we confront some task, a part of the world functions as a part of a process which, were it done by an individual biological organism, we would have no hesitation in recognizing as part of the cognitive process, then that part of the world is part of the cognitive process.

and

> If, in confronting some task, a group collectively functions in a process which, were it done by an individual biological organism, would be accepted as a cognitive process, then that group is performing that cognitive process.

This substitution removes the assumption of shared representations as a necessary ingredient in group cognitive systems. Sometimes you remember telephone numbers; sometimes you use your smartphone to remember telephone numbers. Sometimes you remember all of parts of a story; sometimes, in transactive memory, you use a long-term partner to remember parts of it. Tollefsen, Dale, and Paxton (2013) have made a related point in their discussion of what they call 'alignment systems.' An alignment system is a loosely interconnected set of cognitive processes that facilitate social interactions. Alignment systems are dynamic, multi-scale, and multi-component systems that are responsive to our intentions to engage with others, as in conversation or improvising music. Coupled alignment systems can also give rise to such shared activities. Humans engaged in social tasks form interpersonal synergies and are coupled to one another at multiple, interacting spatial and temporal scales. There are some that we are more comfortable calling 'cognitive' than others. For example, Walton et al. (2015) showed that the bodily movements of jazz musicians improvising may become coupled and that such bodily coordination is correlated with moments of melodic synchrony. We might think that the bodily coordination seems less straightforwardly cognitive than the interacting melody playing. But Tollefsen, Dale, and Paxton argue that what we see instead here is coupled cognitive systems at multiple scales so that the bodily coordination is no less genuinely cognitive than the playing of the melody.

To recap, we have attempted to show that representations need not contribute to our explanations of all group cognitive phenomena. On our reframing of the parity principle, we have good reason to infer that a process is cognitive if that process's occurrence in an individual biological organism would likely prompt the classification of that process as cognitive. Similarly, we propose a similar principle for group agency: if we observe group dynamics that achieve a level of coordination that prompts the classification of the group's behavior as an action, then we ought to consider the alleged group action as bonafide action (and thus bonafide agency) even if individual mental representations played no substantial role in the group's coordination.

A fourth, unexplored option

Thus far, we have attempted to motivate the claim that we need not appeal to the representational content of individuals in a group engaged in coordinated action to explain the group's action. This, however, is a direct challenge to status quo accounts of group agency. In Table 1, we carve out the conceptual space with at least one citation we take to be exemplary of the view. Note that this table is not intended to be comprehensive; rather, it is merely intended to provide a representative for each view.

Table 1: Taxonomy of philosophers of group agency

	Representational	~Representational
Individualism	Searle (1995) Ludwig (2015)	Stapleton & Froese (2015) Maiese (2022)
~Individualism	Huebner (2013)	Current paper / Future work

We believe most of the influential accounts of group agency fall in the upper left corner, which embraces both the representationalist and the individualist assumptions. Huebner (2013) is a notable exception to the individualist assumption. He treats group cognition in representationalist terms but without necessarily assuming that cognition is paradigmatically an individual phenomenon. Alternatively, Stapleton and Froese (2015) and Maiese (2022) embrace an anti-representational account of cognition but insist that agency and / or cognition is paradigmatically an individual phenomenon. Both of these views, albeit respectively representing a rejection of each assumption, do not constitute canonical accounts of group agency. By far the most common view on group agency includes the combination of individualism and representationalism, which shapes the contours of the status quo debate over group agency itself. Much of the concern involves spelling out exactly what type of content must be represented in the individuals of a group for that group to have a specific intention, or to engage in a specific action, and so on. For instance, debates over whether or not a group belief is formed through individual belief summation, or individual

commitment, or individual acceptance (three distinct but common views about group belief) are all just trying to determine the connection between individually represented content and group cognitive states. That there is such a connection and that such a connection is necessary for explaining group agency as a phenomenon in the first place isn't questioned. And, if we're right in this paper, this is due to a common acceptance, in some form or another, of the two assumptions discussed in the first two sections.

Rejecting individualism involves understanding agency as an emergent phenomenon constituted by collectively coordinated dynamics and an account of how the collective coordination of individual agents may allow for the emergence of a genuine group agent. Just as we need not understand the goals, beliefs, and desires of our cellular constituents to understand human agency, we likewise need not understand the goals, beliefs, and desires of constituent individual agents to understand group agency. To be clear, we're not rejecting the significance of accounts of group agency that do involve reference to individual agential states. What we're suggesting is that there may be a minimal account of agency wherein collectively coordinated dynamics may be sufficient to identify an emergent agent. If this is the case, then there may be group agential processes that emerge without any necessary reference to individual agential states. We thus pair such an anti-individualist account of group agency with anti-representationalist cognitive science insofar as such accounts provide the most plausible dynamicist account of cognition. We consider such an approach to group agency and cognition to be consistent with what Chemero (2009) has referred to as radical embodied cognitive science. Consequently, we conclude that more attention ought to be given to a minimal account of group agency wherein group agential states emerge due to underlying collectively coordinated dynamics that do not require any reference to individual representational states in order to be explained.

To fill this gap, we propose more attention be given to developing an account of group agency that is non-representational and conceptualizes agency as constituted by the collective dynamics of the constituents of the allegedly agential physical system. Of course, we recognize that, in some sense, grounding agency in this way entails that any given biological system may be understood as agential. We believe that this may be a virtue of such an account rather than a weakness. Although any given biological system may be understood as agential, this does not preclude there being a continuum on which systems may be more or less agential. Indeed, we encourage the exploration of group agency on this continuum, but we caution against the composite assumption that for a group to act it must in some way involve the representations of the individuals that constitute that group. In many cases, we believe there is bonafide group action and cognition without the goals and desires of the individuals playing a role. We take this to be, in particular, one of the difficulties of understanding patterns of systemic discrimination and oppression. Certain groups may act in specific ways to specific groups of individuals as a consequence of underlying dynamics, often as a consequence of deeply entrenched historical and cultural processes, that none of the individuals intend and to which none of the individuals are committed, at least not in any way that involves explicit representational intention and / or commitment.

Before concluding, it is worth noting some work in that has already moved in this direction. For example, di Paolo (2023) suggests that we ought not think of hierarchical levels of agency. Instead, he argues that agency at different scales constitue "unfinished processes of mutually influenced becoming" (1). According to this view, we ought not expect one "level" of agency (such as the group level) to constitutively depend upon a lower level of agency in some special way. Rather, we ought to think of agency and cognition as an emergent phonenomenon possible at any scale of organization without any necessary reference to the individual representational states of the agent's constituent processes. Similarly, de Oliveira (2023) challenges the ontological priority typically given to what we think of as individuals. He suggests that such an assumption necessitates that collective action must be reducible to individual agential states, but that we need not hold such an assumption, especially if we reject the leveled, hierarchical conception of nature popular in philosophy of science (see Potochnik (2021) for a critique of the use of levels in philosophy of science). Such work is consistent with Simondon's (1964) sweeping critique of the ontological priority given to individuality in the history of philosophy. He argues that indviduals are not pre-given in the ontological structure of the world. Rather, individuation is a process of becoming. We ought not take for granted that individual beings are statically baked into the ontological structure of the world. Finally, it is worth noting that Stapleton and Froese (2015), although seemingly committed to the individualist assumption, do entertain the possibility of a robust conception of group agency that, on our reading, rejects both individualism and representationalism. However, they ultimately don't defend such a view. The only group agents they consider to be bonafide agents are eusocial insects. As mentioned above, they seem to land on a conception of group agency that remains individualist.

Consequently, we conclude that more work ought to be done in the direction suggested in this paper. We believe that, by developing a non-representationalist and non-individualist conception of group agency and cognition, we are in a better position to understand how group dynamics may develop an autonomy of their own independent of the cognitive and agential lives of the individuals that constitute the collective.

CoGNiTiVe ScIeNcE

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