

# Epistemic Structure in Non-Summative Social Knowledge

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**Abstract:** How a group  $G$  can know that  $p$  has been the subject of much investigation in social epistemology in recent years. This paper clarifies and defends a form of *non-supervenient, non-summative* group knowledge:  $G$  can know that  $p$  even if none of the members of  $G$  knows that  $p$ , and whether or not  $G$  knows that  $p$  does not locally supervene on the mental states of the members of  $G$ . Instead, we argue that what is central to  $G$  knowing that  $p$  is whether  $G$  has an epistemic structure that is functioning appropriately in accord with the action-related purposes of the group, and this structure may include non-agential elements such as devices that retain or process information. We argue that recent objections to non-summative group knowledge given by Jennifer Lackey do not in fact succeed in undermining the view, but do help to clarify the nature of non-summative group knowledge. The main upshot of our response to Lackey's objections is that groups put their knowledge into action in ways that often differ from how individuals do so, and social epistemologists should be careful to notice these differences, especially insofar as groups often structure themselves by employing various epistemically-relevant devices.

## 1 Introduction

*Why* do we humans assemble ourselves into groups? How do groups use *devices* to assist in the epistemic aspects of their functioning? Of course, given the diversity of human groups, answers to these questions are legion. But a general answer to the first question is that some groups exist in order to acquire, or at least to possess, information, and many other groups exist in order to engage in actions that require the acquisition or possession of information. In many of these cases, groups exist for the very reason that the epistemic features of the group's functioning would be impossible for any individual alone, or even a set of discrete individuals merely summed together, to possess. This is partly because groups that are designed (at least in part) to be epistemic agents often structure themselves epistemically with the assistance of non-human information-processing and information-retention devices, especially in our current technological era. Given the plethora of available tools, different groups may perform their epistemic functions in a variety of ways.

We do not take these considerations regarding epistemic aspects of group function and structure to be groundbreaking; nevertheless, in this paper, we argue that their import has not been fully appreciated by many social epistemologists. We argue that in at least some cases, group knowledge that  $p$  can be possessed by a group even when no individual member knows that  $p$ , and where the knowledge of the group is not reducible to the sum of knowledge of the individual members. This *non-summative* view of group knowledge has been held by others, including Alexander Bird (2010; 2014). In this paper, we defend an account based on that of Bird from some recent objections from Jennifer Lackey. We show that these objections are instructive in delineating some important contours of what we take to be the correct non-summative view. In particular, they show ways in which group knowledge differs from individual knowledge.

In this paper, we argue that a group can know that  $p$  even if none of the individuals in the group are *aware* that  $p$ . Relatedly, we endorse an

account of group knowledge which denies the local supervenience of group knowledge on individual mental states. Call this the *non-supervenient non-summative* account, or the *NSNS* view for short.

Our aim in this paper is to clarify the ways in which structure is important for group knowledge, especially in relation to the devices used by groups. This is important because although Bird uses an analogy between group knowledge and individual human knowledge, our NSNS account highlights a disanalogy between group epistemic functioning and individual epistemic functioning: groups are typically narrowly defined in their epistemic and practical goals, and have epistemic structures that match these narrow goals, and in this way characteristically differ from individual people, who must be adept at responding to a wide variety of situations without a limited set of pre-determined epistemic aims and functions.

## **2 Summativism, Non-Summativism, and Bird's Social Knowledge Account**

A central issue in group epistemology is whether the knowledge possessed by groups is best viewed as a summation of the knowledge of its individual members, or whether group knowledge emerges in some way. The former view, called *summativism*, takes a group's knowledge to consist only in the knowledge of its individual members. The latter view, called *non-summativism*, is a non-reductionist view of group knowledge. On this view, a group's knowledge that  $p$  may be something over and above the knowledge of its individual members. Non-summativists allow that it is possible for a group to have knowledge even if none of the members of the group knows that  $p$ . It should be noted that non-summativism can apply not just to knowledge but to other epistemic states such as beliefs and justification.<sup>2</sup>

Non-summativism has proven to be a philosophically controversial subject.<sup>3</sup> Notably, Bird (2010, 2014), de Ridder (2014, 2022), Palermos (2016, 2020), Rolin (2008), Tuomela (1992, 2004, 2006, 2011), Tollefsen

(2002, 2004, 2007a), and Wray (2001, 2007) have defended various accounts of group cognitive/epistemic states according to which groups can be in the cognitive/epistemic state despite the fact that none of its members are in it. In this paper, we focus primarily on clarifying and improving Bird's non-summative account of social *knowledge* in particular, though we will not be arguing in favor of non-summativism from the ground-up (aside from one example in §4). For those interested in a deeper elaboration and defense of non-summativist views of knowledge, other sources may be consulted (see especially Tollefsen 2002). Cognitive states *other* than knowledge are relevant to our project, and we briefly will note some of them below, in §4 and §6, but our emphasis here will be on knowledge.

It may be helpful to situate, briefly, Bird's non-summative account relative to other contributions to the social epistemology literature.<sup>4</sup> 'Group knowledge' typically refers to knowledge possessed by, or attributed to, organized groups such as small research teams,<sup>5</sup> juries, or committees. By contrast, Bird is primarily concerned with knowledge possessed by, or attributed to, semi-organized groups such as the scientific community.

Additionally, Bird departs from other non-summative accounts in the following two ways: First, Bird's social knowledge account does not rely on joint commitments, which makes it unlike the non-summative accounts offered by Gilbert (1994, 2000, 2002, 2004, 2009, 2013), Tuomela (1992, 2004, 2006, 2011), Rolin (2008), and Wray (2001, 2007).<sup>6</sup> Second, Bird does not provide a particular account of knowledge like de Ridder (2014: 42) or Palermos (2020: 6); nothing we say here will depend on any particular account of knowledge more generally.<sup>7</sup>

Our main aim is to defend Bird's non-summativism from recent objections and to provide a theoretical apparatus that makes sense of this particular form of *non-supervenient* non-summativism. A non-summativist about knowledge who accepts supervenience will hold that  $G$  can know that  $p$  without any member of  $G$  knowing that  $p$ , but will maintain that  $G$ 's knowledge of  $p$  depends entirely on the mental states of the members of  $G$ . On the other hand, an NSNS theorist will hold that

whether  $G$  knows that  $p$  depends on *more* than just the minds of the people in the group – it can also depend on certain non-cognitive, non-agential devices that the group uses, like the group’s notebook. It is this latter form of non-summativism, i.e. the NSNS account, that we will be clarifying and defending in this paper.

J. Adam Carter helpfully distinguishes between a moderate and a radical form of Bird’s non-summative account of social knowledge:

**(1) *Socially Extended Knowledge-Moderate (SEK-M)*:** A group,  $G$ , can know that  $p$  even when not a single individual member of  $G$  knows that  $p$ . (Carter 2015: 713)

**(2) *Socially Extended Knowledge-Radical (SEK-R)*:** A group,  $G$ , can know that  $p$  even when not a single individual member of  $G$  is aware that  $p$ . (*ibid.* 714)

We will be arguing, along with Bird and Tollefsen, for a form of (2).

One common motivation for the moderate claim comes from the example of a US Navy ship (Hutchins 1995),<sup>8</sup> the USS Palau, which has its epistemic labor distributed such that, *qua* group, the ship can have knowledge that  $p$  attributed to it, despite the fact that none of its members know that  $p$ . To see how this might occur, consider the discrete members of a naval ship’s radar team and how each member, by possessing some individual piece of knowledge, contributes to the ship’s crew as a whole having knowledge about the ship’s location, even though no individual member possesses this knowledge. The ship still navigates successfully despite the lack of individual knowledge by the members of the team. We take the SEK-M formulation to be intuitively plausible, as motivated by this type of example.<sup>9</sup>

Yet Bird (in line with earlier work by feminist philosophers of science<sup>10</sup>) also explicitly endorses the stronger claim (SEK-R), and he gives the following structural requirements for a group to qualify as a social knower:

- (i) They have characteristic outputs that are propositional in nature (*propositionality*)
- (ii) They have characteristic mechanisms whose function is to ensure or promote the chances that the outputs in (i) are true (*truth-filtering*)
- (iii) The outputs in (i) are the inputs for (a) social actions or for (b) social cognitive structures (including the very same structure [the structure that produces the output]) (*function of outputs*). (Bird 2010: 42-3; quoted in Lackey 2020: 114)

For Bird, the *scientific community* satisfies these three requirements. First, the “characteristic outputs” of the scientific community are the publications and various other media which, *qua* epistemic community, they present to the world.<sup>11</sup> Second, the process of peer-review and other standards and practices in this community at the very least “promote the chances” that the articles and findings from (i) are true. Finally, the outputs from (i) produce action or influence cognitive structures, e.g. whether new policy change will be pursued in their wake or how the epistemic community will change based on these findings.<sup>12</sup>

Here is Lackey’s characterization of Bird’s account:

**SK:** Social Knowledge: A social structure, S, socially knows that *p* if and only if (1) that *p* is true, (2) S satisfies (i)–(iii), and (3) the information that *p* is accessible to the members of S who need it. (2020: 115)

Lackey objects to SK, saying that “knowledge is not socially extended in [Bird’s] radical sense” (Lackey 2020: 112). We defend the spirit of SK in §4, although we argue that condition (3) is not a necessary requirement for a group to have group knowledge that *p*. Furthermore, we claim that, given (1) and (2), condition (3) is not sufficient for a group to have knowledge. However, we also show that (3) is ultimately not a necessary feature of Bird’s own account, and we defend a view similar to that of Bird. Additionally, Bird makes significant use of an analogy between

group knowledge and individual knowledge (2010: §4). We accept that this is a helpful analogy in some respects, but will argue that it is misleading in one important respect – the very aspect that makes Bird’s view seem to be susceptible to the kinds of examples given by Lackey.

### **3 Two Main Objections from Lackey**

#### **3.1. Background**

In *The Epistemology of Groups* (2020), Lackey develops her own positive account of group knowledge, wherein such knowledge is not to be understood by either a strictly summative or non-summative analysis.<sup>13</sup> Lackey calls this the *Group Epistemic Agent Account* (henceforth GEAA), and she provides the following requirement as a key feature of the GEAA: in order for a group to have a justified belief, “...some of the operative members of a group have the relevant justified beliefs themselves.” (Lackey 2020:111). An “operative member”<sup>14</sup> is a member of a group that is responsible for a group’s belief. Operative members are constrained by the inner system of checks and balances of any group. For example, the operative members of a corporation *C* would be its board of directors. If *C* is to be understood as holding some justified belief that *p*, then Lackey requires that at least some of the operative members (i.e. some of the board members) of *C* have the relevant justified belief that *p*.

Lackey highlights that a number of philosophers endorse something like the following connection between action and knowledge:

**KAP (Knowledge/Action Principle):** S knows that *p* only if S is epistemically rational to act as if *p* or, equivalently, S is epistemically rational to act as if *p* if S knows that *p* (Lackey 2020: 118).

KAP has merits both intuitively and theoretically, and we shall grant that it is true in spirit, though we will clarify its letter momentarily.

Using KAP, Lackey proceeds to raise two main objections to the non-summative social knowledge account from Bird. These objections are that (A) Bird's SK account cannot rationally explain the connection between a group's belief that  $p$  and the group's action based on this belief, and that (B) the SK account cannot adequately adjudicate between cases in which a group can be held responsible when it *should have known* because information is accessible to it, and cases when it cannot be held responsible. For Lackey, (A) critically hinges on the accessibility of the information in question.

### **3.2. Objection 1: Non-Summative Group Knowledge Severs the Connection Between Belief/Knowledge and Action**

For Lackey, the upshot of her discussion of the KAP is that if groups possess knowledge that is accessible, but not in fact accessed by any individual in the group, then it is not epistemically rational for the group to act on such knowledge (Lackey 2020: 117). She presents the following case, revised slightly from Tollefsen (2007b):

**DISTRIBUTED INFORMATION:** The 47 members of the UN Population Commission are collecting data for a report that they will issue, *Charting the Progress of Populations*. Each member works independently and enters the information that he or she collects into a computer that, in turn, processes the data and provides various results as outputs. One such result is that the birth rate of Latinos is on the rise in the U.S., a conclusion of which not a single member of the UN Population Commission, or anyone else, is aware. This conclusion is then automatically sent to the New York Times, which writes, "According to the UN Population Commission, the birth rate of Latinos in the U.S. is on the rise." (Lackey 2020: 121)



Defenders of the NSNS account of group knowledge could argue that the UN Population Commission (henceforth UNPC) *does* know that the birthrate of Latinos is on the rise in the U.S. despite the fact that none of its members are even aware of this fact. Indeed, it is enough to say that the appropriate system is in place to respond to this information, wherein various members independently input data and outputs are generated automatically. If this is a case of non-summative group knowledge that  $p$ , Lackey's GEAA is unable to accommodate it, because none of the operative members in DISTRIBUTED INFORMATION know that  $p$  in the relevant sense. So, the non-summative group knowledge defender's response demands an answer.

In response, Lackey raises two points. First, Lackey questions whether the automatic output from the UNPC is properly construed as an action at all, let alone an action undertaken by the commission *qua* group. She uses the example (2020: 122) of an elevator or automatic door opening to illustrate that, if these are not plausibly deemed to be actions, then the burden of proof is on the non-summative group knowledge defender to argue that there is a principled difference between the UNPC's automated output to the New York Times and an elevator door automatically opening. One quick way to dispel this worry is by simply maintaining that the UNPC is a group agent, capable of beliefs and actions, whereas an elevator door is not properly thought of in the same manner. It certainly seems plausible to claim that the UNPC is in fact a group agent.

But this response is a bit too quick, and moreover, Lackey raises the following deeper objection to the idea that the UNPC's automated output is an action. Namely, she worries that there is no connection between the UNPC's supposed belief and its actions. Lackey imagines a scenario in which a vote is called to increase funding for programs involving Latinos in the US. If the vote were to be called, then Lackey argues that the UNPC would vote "no" because they would have no reason to increase funding for such programs in the absence of evidence that the Latino population was indeed increasing. This produces the result that the UNPC's belief – that the birthrate of Latinos is increasing in the US – does not provide a rational explanation for their action – voting "no" on increasing funding

for programs for Latino-Americans. Lackey puts it simply as “... there would be absolutely no connection between the output of the computer and the voting of the members in such a case.” (Lackey 2020: 122).

We grant that Lackey successfully supports her view with *that example*. But we believe that this simply requires some clarification of the KAP. The fact that *some* actions do not connect to an agent’s knowledge relative to the same subject matter should not be surprising. For example, if an individual person is asked to respond to a question to which the individual knows the answer, but is caught off-guard, or is not given enough time to properly recall the answer, then the response from the individual will also not be properly connected to the individual’s knowledge. If an individual person is required to vote on an issue without being allowed to take a moment to collect their thoughts on it, then their vote might not be rational even if they have the relevant knowledge. But this does not go to show that individual knowledge is impossible; it just goes to show that KAP must have a hidden *ceteris paribus* or contextualization clause. We can make this explicit, albeit (for the moment) vague:

**KAP (contextual):** S knows that  $p$  only if S is epistemically rational to act as if  $p$  (given the appropriate contextual setup for such an action); equivalently, S is epistemically rational to act as if  $p$  (given the appropriate contextual setup for such an action) if S knows that  $p$ .

We will say more about the contextual setup below, but our initial response to Lackey’s objection is that asking individual members to vote on the funding of programs for Latinos in the US is not the appropriate contextual setup for the UNPC to act upon its knowledge that the Latino population is increasing.

We worry that the form of Lackey’s objection might show too much. Recall Hutchins’ (1995) example of the USS Palau, where no crew member knows the location of the ship, but the crew as a whole *does* know it. The ship is still capable of turning and performing its tasks even

though, if some of those tasks were entirely up to the crewmembers without the assistance of their navigational devices, the ship would be unable to perform its duties. If one were to ask the crewmembers whether the location of the ship was off-course by a certain amount, they would not be able to provide an answer. But that does not show that the crew/ship as a whole fails to know its own location. (Of course, one might deny knowledge to the crew as a whole, but we are only trying to defend NSNS against Lackey's objections, and not to justify it from the ground up.) The very point of Hutchins' example is that the ship performs its tasks adequately despite none of the crewmembers knowing its exact location. The contextual setup for putting the ship's knowledge about its location into action is not to survey its members about its location - that would be useless, given the ship's structure and aims.<sup>15</sup>

Furthermore, there are *other* actions the UNPC could take that *would* connect in an appropriate contextual setup with its (non-summative) knowledge. Imagine that prior to either collating the birth rate data or voting to increase funding for Latino-Americans, the UNPC proposes a conditional vote to act in accordance with its collected birth rate data. The conditional vote can go two ways: (a) if the birth rates of Latinos are increasing in the US, then the UNPC automatically casts its vote to increase funding for programs aimed at Latino-Americans or (b) if the birth rates of Latinos are decreasing in the US, then the UNPC automatically casts its vote to not increase funding for programs aimed at Latino-Americans.

With this alteration in mind, it does not strike us as implausible that the connection between the UNPC's belief that the birthrate of Latino-Americans is on the rise and their subsequent action, i.e. voting "yes" to an increase in funding, is maintained. At the very least, we can say that, *contra* Lackey, there *is* compelling evidence that the UNPC believes and therefore (assuming all else is epistemically proper) does know that the birthrate of Latinos in the US is rising, given the proper context for the UNPC putting its knowledge into action.

We should note that in this and likely many other cases of group knowledge, members of the group do have individual knowledge of

propositions that are connected to the proposition known only to the group as a whole. For instance, in our example, although individual members of the group may have knowledge of conditional propositions of the form “if the population is going up, then the vote will be to increase funding”, the individuals themselves don’t have knowledge that the population is going up and that the vote will be to increase funding. We point this out because groups are often created, structured, and maintained by individuals with purposes in mind, and often individual members have knowledge of many propositions that relate to those purposes, but for various reasons, the individuals on their own may be unable to possess knowledge of some other core propositions that the group as a whole knows (which explains, in part, the formation of the group in the first place).

Given the automated process under which the birth rate information is sent out to the *New York Times*, as stipulated in the original case, we take it that it is plausible that the UNPC might automate their voting with respect to this information. It is not particularly important that, when the time comes to vote given the data, whether the vote is cast using a wholly non-human process or by a human. But for our purposes here at least, it *is* important that, if the vote is cast by a human, that they have no awareness of the relevant birth rate data. This may sound a bit odd at first, but imagine that the UNPC has a contracted member or intern whose entire job involves the execution of tasks such as pressing a button during voting or some such similar activities. While this may be a dull task, we still think that this person can act upon the pre-set conditional vote set out by the UNPC without any awareness of the relevant data. In this way, the UNPC can possess the belief that the birthrate of Latinos is on the rise, *and* act on it in a rational manner by voting, without any of the UNPC’s members having any awareness of this belief.

The UNPC’s NSNS knowledge of the target proposition is integrated into a wide array of propositions known by both the group and individual members as well, which might give the impression that the group’s NSNS knowledge is merely trivial or just of some conditional propositions. However, as in Hutchins’ case of the USS Palau, the knowledge of the

ship's location is not trivial but central to its mission, and because the ship is constantly changing location, is not something that individual members of the group could keep track of on their own. As just noted, this explains some of the very motivation for *why* people create some structured groups in the first place. Both the UNPC and the crew of the USS Palau are complex structured groups that require the division of cognitive labor in order to accomplish their aims. Indeed, many groups can only accomplish their aims by integrating tools and other devices, which are vital to the epistemic structure within these groups and enables them to effectively act on their NSNS knowledge of the relevant propositions.

We conclude from this that, *pace* Lackey, it is conceivable that the proper connection between belief/knowledge and action can be maintained in cases in which a group holds a belief that is not held by any of its individual members. And this poses a significant problem for Lackey's GEAA, which cannot account for the mechanism by which the UNPC can have knowledge, and *act* on it, in the absence of any operative members (or any members at all) possessing this knowledge. Of course Lackey might wish to give some *other* explanation of the situation, but the explanation according to which UNPC learned/knew that the Latino population was rising, and because of that, voted for more funding, is seemingly an intuitive and straightforward one.

### **3.3. Objection 2: Accessibility Is Not Necessary for Knowledge**

Even if Lackey were to grant that the NSNS account can uphold the spirit of KAP, she objects to non-supervenient group knowledge on the grounds that it does not properly adjudicate between cases in which one knows a given proposition and when one *should* have known a given proposition. This is essentially a matter of whether information relevant to a proposition was accessed or not. In this way, "accessibility", and what makes it different at the individual and group level, is what's at issue.

Lackey (2020: 128) gives an example in which a person is given an envelope so that they can access information, and is given good reason to

believe that they ought to open it, but they do not. This is a case as one where the person is culpable for failing to know something. But, according to Lackey, Bird's criteria of group knowledge, which employs an accessibility criterion, cannot make sense of these claims. On Bird's criteria (as stated above in §2), if a group has access to information, and meets the other relevant criteria, then a group knows the information. Thus Bird's view cannot account for a group's being culpable for failing to know something in this way, and this seems to be a problem for the account. Lackey provides the following example to make the concern more salient:

**MISSING CHILD:** Suppose that three police officers all work for the same unit of the Chicago Police Department (CPD). Officer A knows (1): that a seven year-old child, Jimmy Smith, has been reported missing from the Rogers Park neighborhood of the city since this morning. He knows this because it was communicated to him by his superior. Officer B knows (2): that Jimmy Smith was wearing a Frida Kahlo t-shirt this morning because he lives next door to the Smith family, and he remembers commenting on how he loves Frida Kahlo's work when he saw Jimmy walk out of the house. And Officer C knows (3) that he saw a seven-year-old wearing a Frida Kahlo t-shirt walking with an adult man while he was patrolling a park in Edgewater, the neighborhood just south of Rogers Park. Officer A knows only (1), but not (2) or (3); Officer B knows only (2), but not (1) or (3); and Officer C knows only (3), but not (1) or (2). Thus, the CPD knows (1), (2), and (3), even though no single police officer knows this.<sup>16</sup>

Lackey presumes that on Bird's view, the CPD, *qua* group, *knows* that

(4) there is a high likelihood that Jimmy Smith is the boy seen walking in Rogers Park

even though no individual police officer possesses this knowledge. Yet, as the example is formulated, it seems counterintuitive to hold any single officer accountable for not acting on this information. And it seems unsurprising why no one from the CPD attempted to intervene in Rogers Park.

Lackey's example is cleverly designed to elicit this very judgment, and it additionally calls into question the connection between the CPD's belief that the child is Jimmy Smith on the one hand, and possible actions to apprehend him on the other hand. In this respect, MISSING CHILD is similar to DISTRIBUTED INFORMATION.

But again, to say that the CPD's actions (or lack thereof) are disconnected from its knowledge in one case doesn't prove the general point that group knowledge is disconnected from group action, in the same way that sometimes, individuals can fail to act on their knowledge if the context isn't right. However, Lackey's CPD case is somewhat different. It is more like a case where an individual fails to make a further inference that follows from three facts that the individual knows. If it were the same person who comes to know (1), (2), and (3), but does not take a step to infer that (4), then we shouldn't attribute knowledge of (4) to that individual, even though (4) is accessible to the individual.<sup>17</sup>

On the NSNS view in this paper, the CPD likewise *fails* to know that (4), despite the fact that (4) is in a relevant way accessible to members of the CPD. And likely, the CPD should be held accountable for not knowing that (4) – an auditor could look into the way that the CPD integrated the information from the various officers and would recommend changes in their information-collating processes. That is because the CPD has failed to have a structure to process the information in (1), (2), and (3) in accord with its aim of locating missing children. So, the NSNS view can in fact account for group failures to access available information, which addresses the concern central to Lackey's "envelope" example.

While the letter of Bird's non-summative view merely states that groups must "have characteristic mechanisms whose function" is to produce true outputs (Bird 2010: 42), the spirit of our NSNS view is that

a group knows that  $p$  only when (a)  $p$  is such that the group's structure is *designed to access* information of the general type of which  $p$  is a token and (b) the group's epistemic structure is in fact functioning properly. (We defend this claim further below in §4.) So in Lackey's MISSING CHILD case, we submit that the CPD has failed to know that (4), given that it does not have in place a properly functioning structure that allows it to collate the information from the three officers properly.

To illustrate what would allow for the CPD to have knowledge, there is a slight modification of the example whereby both the CPD does know (4), and can act upon it (or should be held accountable for not acting upon it):

**MISSING CHILD\*:** At the Chicago Police Department (CPD), each officer submits their reports to a centralized system to be tabulated. When sufficient information (based on some preset standard) on a single case of a missing child has been collated by the automated system, a light goes on and a print-out is made. With these considerations in mind, now suppose that three police officers all work for the same unit of the CPD, and each come to know (1), (2), and (3), exactly as in MISSING CHILD (above). According to policy, each officer sends their data to the automated CPD system, which in turn collates this information and the light goes on and a print-out is made. Thus, the CPD knows (1), (2), and (3), even though no one police officer knows these things.

We take this altered version of MISSING CHILD to be similar to Lackey's original example but without producing a counterintuitive result. But we submit that in MISSING CHILD\*, the CPD *does* know that (4) despite none of its members knowing that (4). And, given the requirement of mandatory reporting to a centralized system as stipulated in MISSING CHILD\*, it is not counterintuitive to hold the CPD accountable for failing to *act* on this knowledge.



The CPD process goes something like this: (1) base information acquisition; (2) base information transmission (to the centralized system); (3) knowledge tabulation (by the centralized system); *and* (4) the centralized system indicates via print out/light notification that knowledge has been acquired. This fourth step is particularly important to illustrate the NSNS account, because when knowledge is acquired, it is not necessary that any police officer be aware of the relevant knowledge. For instance, imagine that the Chicago mayor is especially concerned for the safety of Jimmy Smith. It just so happens that he contacts the CPD right when the centralized system indicates that it has acquired knowledge of Jimmy Smith's location. A CPD clerk is sent to pick up the automated print-out, *which the clerk does not look at*, and gives it to the mayor. Thus, the knowledge of Jimmy Smith's probable whereabouts is transmitted to the mayor from the CPD, despite the fact that no single individual in the CPD has knowledge of Jimmy Smith's probable location. Furthermore, if the CPD does not act on this knowledge, then it is appropriate to hold them accountable because they *should* have acted upon it. So, contrary to Lackey, the NSNS account *can* explain cases in which both (a) a group should have known a proposition and (b) should have acted upon its knowledge.

Had someone interviewed the three officers in question, they could have ascertained (1), (2), and (3) and inferred (4). What follows from this is that mere accessibility of knowledge to members of a group is not sufficient for group knowledge (even given that the other conditions, i.e., [1] and [2], in SK are met). This is contrary to an initial statement from Bird: "What makes the difference between being individually known by some (or many) people and being socially known, is the accessibility of the knowledge in question." (2010, 32). We take Lackey's MISSING CHILD case to refute this claim, because in this case, (4) is accessible to members of the group, but the group fails to know (4).

Groups must have some means to process information properly. But importantly, this need not be done by anything like an operative member, to use Lackey's terms. It is easy to see why Lackey (following Tuomela) is motivated to propose that an operative member is needed

for a group to have knowledge – it is helpful in many cases to have a single person both (i) collate information acquired by various group members and (ii) go about deciding upon the group’s actions – but these cases show that the function of an operative member of a group can be fulfilled even by a non-agential element of the group. This thus accounts for at least some of the motivation for Lackey’s view while still upholding the NSNS view.

One can further imagine a possible world in which the CPD has an automated system, as in MISSING CHILD\*, but in this particular case it malfunctions, without any of the human members of the CPD being aware of it. Call this case MISSING CHILD<sup>x</sup>. In MISSING CHILD<sup>x</sup>, the CPD fails to know (4) because, like in the original MISSING CHILD example, it does not process the information in (1), (2), and (3). A comparison of MISSING CHILD\* and MISSING CHILD<sup>x</sup> shows us that group knowledge does not supervene on the minds of the members of the group. The minds of the members are identical in the two cases, but in MISSING CHILD\*, the group has knowledge, but in MISSING CHILD<sup>x</sup>, the group does not.

#### **4 The Importance of Epistemic Structure in Group Knowledge**

So far in this paper, we have shown that Lackey’s most recent objections are not sufficient to undermine a non-summative view of group knowledge. Perhaps this should not have been surprising all along; some simple examples can demonstrate group knowledge without any individual awareness that *p*:

**The Pi Society:** A group of 1,000 people wants to be able to, collectively, know the first million digits of the decimal expansion of pi, and do so without the ongoing aid of a computer. They each memorize a distinct, non-overlapping sequence of 1000 digits, and the names of the members are written in the proper order on a piece of paper. The Pi Society might be said to know the first million digits of the decimal

expansion of pi, but no one in the Society knows it (or is capable of knowing it, given the limits of human memory).

Importantly, the knowledge of the first million digits is not *accessible* to any member, because of the limits on human memory. In the last section, we showed, in accord with Lackey's concerns, that accessibility is not sufficient for knowledge (assuming Bird's [1] and [2] are met). The Pi Society example shows that individual members' accessibility of the proposition known by the group together is not *necessary* for group knowledge. Also, importantly, if the paper upon which the names were listed were to be destroyed, then at that moment – regardless of whether anyone was aware of the destruction – the Pi Society would lose its knowledge of the first million digits of the decimal expansion of pi.

Although we believe that the case for the NSNS view is strong, our claim that the CPD lacks knowledge in the original MISSING CHILD example may seem to conflict with Bird's claim that scientific communities, and our own Pi Society example, are groups that possess knowledge. According to Bird, a scientific community can know that  $p$  just in virtue of  $p$  having been published in a journal; even if the authors of the paper have since died (along with everyone else who read the paper), the scientific community still continues to know that  $p$ . Lackey objects to this view (see 2020: §3.3), and we accept some of Lackey's criticisms. In particular, for reasons outside the scope of this paper, we should say that we do not endorse Bird's claim in full generality; whether a scientific community can be properly said to possess knowledge of certain particular theories depends on scientific *consensus*, which may in fact require *active* engagement by its current members. Moreover, some scientific publications can be said to be merely 'accepted' by their authors, rather than believed or known.<sup>18</sup> These specific issues regarding scientific knowledge deserve more complete treatment than space allows us here.

Nevertheless, we do wish to make one point in sympathy with Bird's (2010) treatment of the social knowledge of scientific communities, since we grant that in some cases, the scientific community

can have knowledge of particular facts in long-ago published material, even when no one alive is knowledgeable of it.<sup>19</sup> Bird writes of these cases that it is the mere accessibility of the publication that allows for the scientific community to have knowledge. But if that is the case, why isn't the mere accessibility of the CPD's knowledge of (1), (2), and (3) in the original MISSING CHILD case enough for it to know (4)?

The epistemic structure of the scientific community is quite different from that of the CPD, and this is because its *function* is different. In the original MISSING CHILD case, the CPD has an aim to act in order to prevent crimes, and as such, must act *quickly* in some cases. For it to fulfill these goals, for it to possess knowledge that is relevant to these situations, its information must be processed, and processed quickly, in order for it to be of use. Mere accessibility is not enough. That is why, in the original MISSING CHILD case, we judge that the CPD does not know (4).

The scientific community is different. *Many* papers are published, and part of the dissemination of scientific knowledge rests in decisions made by future researchers to access or to keep present certain research projects, knowing that published information does not disappear but can be accessed later. Insofar as we can consider the scientific community to possess knowledge of facts that are published in journals but that are not still present in the minds of living scientists, it is not simply because of the pure fact of the accessibility of the old publications but because the very accessibility of the information is acknowledged and built into the structure of scientific knowledge generation and maintenance itself. (That is why science has chosen to have journals, and sophisticated indexes for them, in the first place.) The fact of later accessibility in scientific communities may have led Bird to stress accessibility in his initial presentation of his account of social knowledge in his (2010), but accessibility to individual members is only a factor because it is what, in *typical* cases, leads to the possibility of action. Bird himself acknowledges this point near the end of his piece:

[I]t is not the accessibility of the knowledge that is essential to its being social knowledge; rather it is the capacity of the knowledge to play a social role (e.g. in decision making by the group) in virtue of the structure and organization of the group; accessibility is the principal means by which that is achieved. And so we should not expect direct access even ‘in principle’ in every case of social knowing. (2010: 48)

We think that this is correct.<sup>20</sup> Our hope is that the arguments in this paper show why Lackey’s objections are not successful in undermining the spirit of Bird’s view, given our elaboration of the nature of the epistemic structure and functionality of groups.

In cases like that of the CPD in Lackey’s initial MISSING CHILD case, the CPD can be said to not know because (as Lackey rightly points out), the information in (1), (2), and (3), despite being accessible, is not properly tied to the CPD’s ability to take action, given the CPD’s structure. But, again, to give an example of the CPD not having knowledge despite having accessibility does not undermine the spirit of the NSNS account.

We can imagine that the CPD has a police archive that contains a clue in a long-buried record, analogous to a fact in a long-ago published paper in a scientific journal, but where the CPD doesn’t have an epistemic *expectation* that police knowledge grows and is maintained through the use of this archive. If quite generally, police only consult the archive on an as-needed basis, and don’t perform index searches on the archives as is standard in academic research, then even though the clue is accessible to the CPD, it should not be counted as part of the CPD’s current group knowledge even when a similarly accessible journal publication *does* count as part of the scientific community’s knowledge.

The upshot of this may be somewhat counterintuitive: two groups may be similar with regard not just to the mental states of their members but also with regard to their access to pieces of relevant information, and one group may be said to know the information, and the other might not. This may seem odd, given that what it takes for a group to have knowledge (internal to the group), even if it does not supervene on the

minds of members of groups, might still have been thought to supervene on the relevant epistemic states of a group's members along with the group's epistemically-relevant devices and archives. However, if Bird's view of the knowledge of the scientific community is correct – and we think it is – then this is not so. The criteria for group knowledge must be relative to the *structure* of the group, which is created in relation to the goals of the group, in addition to being relative to more traditional epistemic standards such as belief and justification. But this fact does not seem to undermine our position. The goals and functions of the group will likely still supervene on the minds of at least some of the members of the group; our point here is just that whatever is required internally within a group for it to have knowledge, it does fully not supervene on the purely *content-related* and *justification-related* mental states of the members plus their non-agential devices.

Another case to illustrate this point uses the familiar example of a basketball team and a chess club who have all and only the exact same members.<sup>21</sup> On our NSNS view, the chess club does not know what a 2-3 zone is, and the basketball team does not know what the Zuterkort Opening is, even though these facts are not just accessible to, but sometimes in fact present in, the minds of the members of the two groups. This is because, once again, whether a group knows that *p* is determined by the structure of the group. In particular, the chess club - even one where the Zuterkort Opening has never been discussed - likely presumes, correctly, a familiarity among its members of various strategies and fosters discussion among its members; the basketball team does not. On the other hand, the basketball team has basketball practices in which it learns about and practices various defensive techniques; the chess club is not structured that way. One can still hold that all the *members* of the basketball team know what the Zuterkort Opening is, and that all the members of the basketball team might play a chess game after practice, but this is not the same as the basketball *team* itself knowing chess facts or the chess club knowing basketball facts. Group knowledge exists only insofar as the group itself is structured so as to know facts of that form. This result may be controversial, but we embrace it; it follows from our

claims (regarding the scientific community and the CPD) that it is group structure, rather than accessibility, which is central to group knowledge.

As noted above in §2, most accounts within group epistemology focus on highly integrated groups, such as juries or teams of various sorts. For instance, Palermos (2016, 2020) and Palermos & Pritchard (2013, 2016) focus on dynamical interactions between members for such groups (see also Wray 2007). Our account includes more than these kinds of highly integrated groups. (We agree with Rolin 2008, 118-119 that it is not necessary for a group to function in a deeply integrated manner in order for it to have collective beliefs or knowledge.<sup>22</sup>) In some knowledge-possessing groups, structure can be quite explicit and integrated, and in others, can be implicit and loose. While Bird employs the general category of “social knowledge” and writes of “distributed cognition” (see especially his 2010), we believe that the relevant cases can also indeed be properly categorized as *group* knowledge.

To illustrate, consider the formation of a very loosely structured group. Imagine three people who (independently, at first) walk their dogs in a particular park every Tuesday evening. Noticing each other after a number of weeks, they start up brief conversations, and after a few months become friendly. At this point, they do not have enough structure to count as a *group* under Ritchie’s (2015) definition (which we endorse), and *a fortiori* do not possess any group knowledge. At some point, realizing that the others might worry if one of them doesn’t show up on a Tuesday, they exchange numbers (which they store on their cell phones). At this point in time, they may be considered a group, since they now have a group structure and roles – identical ones: show up on Tuesday evenings, have a friendly chat, check in with others if something is amiss – within the group. But at this very moment, the group can also be attributed as having some amount of group knowledge: the fact that the three members will meet at the park on Tuesdays, facts about the park itself, the phone numbers, etc. This knowledge, though, can be attributed to its rudimentary structure (where each member, along with their devices, plays a role), which itself is due to the *goals* of the group: to meet

regularly at the park, to maintain friendly relations, and to look after each other.<sup>23</sup>

While the issue of whether to call this “social knowledge” or “group knowledge” may just be a mere matter of word choice, one of the aims of this example is to show that even some very loosely structured social connections have functions, and thus may rightly earn the title of being a “group”, even if they are not dynamically integrated or have a well-worn structure. And this example highlights a way in which a group can *become* structured, and therefore have knowledge attributed to it *qua* group, and is not intended to prove the NSNS (as opposed to a summative) view of group knowledge. We have mostly focused on complex groups such as the UNPC, CPD, and the crew of the USS Palau precisely because these groups have *complicated* functions and aims whose proper execution is made possible by a division of epistemic labor between individual members and the non-cognitive devices which they integrate into their group’s epistemic structure, and these are examples that show the inadequacies of summative and operative-member approaches. The Tuesday group has no *complex* function, and its group knowledge could potentially be explained by other accounts of group knowledge. But if the Tuesday group were to change its group aims or function to be increasingly complex, then it is likely that the members of the group would need to divide their epistemic labor and rely more heavily on integrated non-cognitive devices (such as their cellphones) to accomplish these new aims. And, if this occurred, then a NSNS account would provide a better and more complete analysis of their group knowledge, for reasons that we have already discussed.<sup>24</sup>

## 5 Two Further Objections

Now, let us consider two possible responses that attempt to uphold the supervenience of group knowledge on the minds of the members of the group. First, one might claim that the computerized, automated system is itself a cognitive agent that is a member of the group – just a non-human



one. And so one can simply clarify the supervenience claim to say that group knowledge supervenes on both human and non-human cognitive agents. Perhaps something like this is true, but some of the mechanisms involved in our examples – an automated printout, for instance, could hardly be considered an *agent*. But we admit that the line between cognitive agents and non-agents is not so easy to draw. Perhaps a lesson of this paper, though, is that social epistemology should focus more on non-agential elements of group systems; whether or not the *agential* supervenience claim holds true would, at the end of the day, not be of great import.

Second, one might claim that because of the devices used within groups, the members of groups thus have *extended minds* (Clark & Chalmers 1998). And therefore group knowledge still can be held to supervene on the (extended) minds of the members of the group. For instance, if the collating computer is part of the CPD officers' extended minds, then, if the computer possesses the knowledge that *p*, then so do the officers. This result would undercut our claim that a group can know that *p* without any members even being aware that *p*. Our response to this objection is similar to our response to the prior one. While this is not our view, we cannot fully dismiss it in the space here, though we should point out that in the examples given, it is unclear *whose* extended mind the non-agential devices are part of; perhaps the devices are parts of *all* the members' extended minds - but that would seem to saddle the members with an inelegant overlap of mentation. It seems to us more suitable to say that, in these groups, there is *distributed cognition* of the entire group.

There is a rich and burgeoning literature in socially extended epistemology (see e.g., de Ridder 2014; Palermos 2016, 2020; Palermos & Pritchard 2013, 2016),<sup>25</sup> and our view should be seen as consistent with the general spirit of these views: our main point in this paper is to argue that it is not for the best, theoretically, to maintain that social knowledge supervenes on the minds of the relevant individuals. However, if one wishes to uphold the view that group knowledge supervenes on the (Clark-Chalmers-1998-style) extended minds of the

group's individual members, then a lesson of this paper should be that social epistemology should focus more on how extended minds integrate into group epistemic systems (see Harris 2020; Theiner 2018; Tollefsen 2006; Hiller & Randall ms. a). Whether or not supervenience on minds of group members holds true would then turn on questions of whether a *group* of individual minds can be extended in those ways; it would be that latter debate that should be of interest to social epistemologists rather than the simple (unclarified) supervenience question. Our own view is that social knowledge is *best* characterized as NSNS group knowledge - or perhaps distributed cognition - but fully defending that claim is beyond the scope of this paper.

## 6 Conclusions

We have shown that the NSNS view of group knowledge can withstand Lackey's objections to it. And we diagnose the objections as stemming from a view, explicitly held by Bird, that group knowledge is analogous to individual knowledge. The view in this paper is that NSNS group and individual knowledge are in some ways analogous and some ways disanalogous. They are analogous, for instance, in that both group and individual knowledge is propositional in nature and is often used as an input into mechanisms used for making decisions (see Bird 2010, §4.2). On the other hand, it is *disanalogous* insofar as groups tend to have limited and pre-defined epistemic and action-related goals, and groups are structured to be much less epistemically flexible than people because they are typically not required to respond to a variety of questions and inputs. For this reason, the contexts in which groups can put their knowledge into action will be limited. But given our revised version of the knowledge-action principle (KAP), there is no need to give up on the NSNS view of group knowledge.

As argued in §3, perhaps a motivation for requiring that groups have an operative member in order to have knowledge is for the group to be epistemically flexible. But we see no reason why this must be the case.

Unlike people as a whole, groups are typically designed with a *telos*, and a structure to fulfill that *telos*. Although we have said little about the metaphysics of group structure, one leading account of the metaphysics of groups – Katherine Ritchie’s structural account (2013 and 2015)<sup>26</sup> – argues that what is *definitive* about groups is their structure. And the structures of groups arise from the epistemic and action-oriented aims that are bestowed upon the groups in their creation and maintenance. Part of our point is that groups are highly heterogeneous in their aims and epistemic structures. Because of this heterogeneity, we cannot give a single account of group epistemic structure here, but we hope that the plethora of examples we have given show (in the spirit of Bird 2010) how a group’s knowledge is intricately tied to its structure, which itself is due to its aims.

Although we have not emphasized the metaphysics of groups in this paper, we would like to make one (too-brief) remark here in conclusion. We believe that the considerations in this paper closely align with a structure/function metaphysical account of groups as in Ritchie (2013, 2015) rather than a mereological (Hawley 2017) or set-based (Effingham 2010) view. The spirit of what we have been arguing is that groups – as distinguished from mere collections of unassociated individuals – are *artifacts* (see Hiller & Randall ms. b); they are created with functions, some of which are epistemic. If the members of a chess club are all present together, but meet with a goal of doing something that is *entirely* non-chess-club-related, such as play basketball, then the chess club is not really present even if the mereological sum of the members is present, in the same way that the parts of a valve collected together are not a valve unless they are structured to function together as a valve in the normal way. Perhaps the parts of a valve are also the exact parts of a mousetrap; this does not make the valve the same thing as the mousetrap. The same should be said of groups and their epistemic aims and functions.

We should also note that the lack of group epistemic flexibility that we have emphasized, contrary to Bird’s analogizing of individual and group knowledge, combined with group epistemic heterogeneity, might

lead one to wonder what *other* epistemic states can or cannot be attributable to certain groups. Certainly it seems to be the case that the USS Palau *determines* its location as it navigates a harbor. It might even be said that some groups *perceive* the world when the mechanisms are in place (such as cameras or microphones or humans in the role of perceiving on behalf of the group). However, many groups lack the need to perceive or determine anything. Perhaps the UNPC does not have episodic memories (but the Tuesday group does), and the Pi Society does not determine or perceive anything. Some groups may only play epistemic roles of collating or storing information. The fact that the literature in social epistemology has focused mainly on group *belief* and *knowledge* as opposed to other epistemic states obscures something that may be easily taken for granted but we take to be important: individuals' epistemic lives are quite different from groups', and that is owed to their respective sets of functions, and is instantiated in the very different cognitive structures possessed by individuals and groups.

Group knowledge can typically only be generated and put into practice by a group in prescribed ways, in accord with the group's structure, which is typically dictated by the group's purpose. Contrary to Lackey, this does not mean that without an operative member, groups lack knowledge. Instead, we should be careful, when doing social epistemology, not to expect individual-style epistemic and agential structures from groups, and we should attend to the structures by which, and purposes for which, groups conduct their epistemic and practical toils.

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<sup>1</sup> This paper is fully collaborative between the co-authors; author ordering is alphabetical and is not intended to denote primacy of authorship.

<sup>2</sup> For an influential account of collective (non-summative) group belief, see Margaret Gilbert (1994, 2000, 2002, 2004, 2009, 2013).

<sup>3</sup> For (non-exhaustive) major contributions to this literature on non-summativism, see Alexander Bird (2010, 2014), Jeroen de Ridder (2014, 2022), Raul Hakli (2007), Christian List & Philip Pettit (2011), S. Orestis Palermos (2020), Kristina Rolin (2008), Deborah Tollefsen (2002, 2004, 2007a), Raimo Tuomela (1992, 2004, 2006, 2011), K. Brad Wray (2001, 2007).

<sup>4</sup> Thanks to an anonymous referee for their helpful suggestions for this section.

<sup>5</sup> For an interesting debate about which parts of the scientific community can possess non-summative collective knowledge, see Wray (2007) and Rolin (2008). Wray argues that small research teams are the *only* parts of a scientific community to which non-summative collective knowledge can be attributed (2007: 342-3). Conversely, Rolin argues that "some assumptions adopted by scientific communities are properly understood as collective knowledge in a plural subject sense." (2008: 119)

<sup>6</sup> de Ridder (2022) offers a recent defense of joint-commitment accounts, although his joint-commitment account is a modified version which differs considerably from those that have been traditionally offered in the literature.

<sup>7</sup> Additionally, Palermos (2020) focuses on cases of continuous and reciprocal interaction between agents within a group; at least some of the cases of social knowledge that we are concerned with do not have that feature.

<sup>8</sup> See chapter 8 of Hutchins (1995) for an in-depth discussion of the distribution of epistemic labor on the USS Palau and its navigation of San Diego harbor.

<sup>9</sup> Palermos & Pritchard (2013) and Palermos (2016) are also explicit in discussing the role that artifacts play in distributed cognition.



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<sup>10</sup> An emphasis on epistemic communities as the bearers/producers of knowledge (rather than individuals) can be found in the work of Lynn Hankinson Nelson (1990, 1993, 1995), who writes: “[epistemic] communities are the primary loci -- the primary generators, repositories, holders, and acquirers -- of knowledge.” (1993: 124) In a similar vein, Helen Longino (1990) provides a provocative critique of the supposed ‘objectivity’ of the scientific method, and, like Nelson, advocates for the primacy of groups vs. individuals as the base unit of analysis. Longino writes: “Refocussing on science as practice makes possible the second shift, which involves regarding scientific method as something practiced not primarily by individuals but by social groups.” (1990: 66-7) Thanks to an anonymous referee for pointing out the historical significance of these sources.

<sup>11</sup> There has been some recent debate over whether the scientific community can be said to “assert” *any* proposition. For more on this, cf. Dang & Bright (2021).

<sup>12</sup> Such policy changes are plausibly held to be “non-epistemic” consequences. For a helpful discussion of non-epistemic consequences of scientific assertion, see Franco (2017).

<sup>13</sup> In her recent review of Lackey’s *The Epistemology of Groups*, Tollefsen offers convincing reasons to consider the *GEAA* a “*sophisticated summative account*” (2021: 4).

<sup>14</sup> The term “operative member” is taken from the work of Raimo Tuomela and his non-summative, *joint acceptance account* of justified group belief (quoted in Lackey 2020: 27).

<sup>15</sup> Thanks to an anonymous referee for pushing us to clarify our argument here.

<sup>16</sup> This case is adapted very slightly from Lackey (2020: 130). We have added the title ‘MISSING CHILD’ to this example in order to more easily refer to it throughout this section.

<sup>17</sup> One way to think of this issue is to appeal to the distinction between *propositional* and *doxastic* justification. See Silva & Oliveira (forthcoming) for an overview. The CPD could be said to have propositional justification without doxastic justification (or a proxy thereof).

<sup>18</sup> See Cohen (1995) for a classic source on this distinction; also cf. Dang & Bright (2021).

<sup>19</sup> We should point out an inadequacy in Lackey’s critique of Bird’s account of the knowledge of scientific communities (Lackey 2020: §3.3). Lackey argues that, on Bird’s view, the minds of group members cannot contribute positively to group knowledge, but can contribute negatively (as defeaters), and this seems theoretically deficient. However, we cannot see the force of this objection: given that former members of a group did publish the paper in question, minds did positively contribute; if the paper in question merely materialized without anyone writing it (or justifying its contents), then the scientific community should *not* be said to know its contents. And the reason why *current* minds don’t positively contribute to knowledge of long-ago published facts is because it is already known by the scientific community. Secondly, Lackey argues that, given that members of the scientific community are constantly questioning previous findings, the scientific community may be said to know much less than one might think. But we believe that this is a welcome conclusion; science involves much less knowledge than one might believe (see Dang & Bright 2021).

<sup>20</sup> In a footnote (2020: 115, fn. 6), Lackey notes that Bird does not in the end require accessibility as a condition on group knowledge, but nevertheless Lackey goes on to include an accessibility condition in the account of SK that she attributes to Bird and which she goes on to criticize.

<sup>21</sup> Cf. Ritchie (2015: 313) for a similar example and discussion.

<sup>22</sup> Bird (2010: §3) writes of the scientific community having a Durkheimian “organic solidarity”. On our own view, all that is required for group knowledge is enough structure so that the members of the group can collaborate to perform its function. And Bird himself does not require the kind of dynamical integration such as in Palermos (2016).

<sup>23</sup> There is an interesting parallel here with Grice’s (1989) notion that conversations are *cooperative* endeavors insofar as the participants have shared goals, even if the goals aren’t made fully explicit.

<sup>24</sup> We thank two anonymous referees for their suggestions in clarifying this section.

<sup>25</sup> Giere accepts that there is distributed cognition, but he denies that there is an irreducible group cognitive agent (2002, 2007) that possesses knowledge (2006, 2007). Thanks to an anonymous referee for suggestions here.

<sup>26</sup> See also Hiller (2013) for a structure-based view of group ontology.