

## EPISTEMIC AUTONOMY & GROUP KNOWLEDGE

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### Abstract

I connect two increasingly popular ideas in social epistemology—*group knowledge* and *epistemic extension*—both departures from mainstream epistemological tradition. This allows me to generate two substantial results. The first is a novel framework for conceptualizing and organizing epistemology at large along several core axes. The second is the identification of a largely unexplored possibility space in group epistemology. The bulk of group epistemology to-date can accurately be dubbed *intra*-group epistemology: concern with epistemically salient happenings *within* groups. The possibility space I carve out is what I dub *inter*-group epistemology: concern with epistemically salient happenings *between* groups and other subjects and entities. I conclude this paper with two arguments intended to motivate the exploration of this frontier.

### Introduction

In this paper, I connect two increasingly popular ideas in social epistemology, both departures from the mainstream epistemological tradition. The first is *group knowledge*, by which I mean a group subject *qua* group possesses knowledge, regardless of whether any individual can or does also possess this knowledge.<sup>1</sup> This first idea is opposed to the traditional tenet that only individuals can possess knowledge. The second idea central to this paper is less straightforward. I call it *epistemic extension*, the idea that a subject can possess knowledge when other subjects possess some of the epistemic materials (e.g. evidence possessed, deliberations undertaken, inferences drawn, cognitive abilities exercised) generating it. This second idea is opposed to the traditional tenet I call *epistemic autonomy*, according to which the possession of knowledge entails possession of all the epistemic materials generating it.<sup>2</sup>

How the ideas of group knowledge and epistemic extension are related remains virtually unexplored by epistemologists. Connecting them allows me to generate two substantial results. The first is a general benefit for epistemology: a novel framework for conceptualizing and organizing epistemology at large along several core axes. I present this framework in section 2. The second result is more specific and forward-looking: the identification of a largely unexplored frontier in group epistemology. The bulk of group epistemology to-date is concerned with epistemically salient happenings within groups, and so can be dubbed *intra*-group epistemology. The possibility space I carve out in this paper is what I dub *inter*-group epistemology: concern with epistemically salient happenings between groups and other subjects and entities. I conclude this paper in section 3 by offering two arguments to motivate the exploration of this domain.

## 1. Epistemic Extension

The diverse accounts predicated upon or entailing epistemic extension were formulated independently, without a common term like “epistemic extension.” So, it is not immediately obvious that they are all linked by the same underlying principle. Given this, and given there is no survey in the literature, I begin this paper with a brief survey of epistemic extension.

The explanandum/explanans distinction in epistemology is the distinction between the appraisal and the thing appraised. The explanandum is some normative fact or set of facts (e.g. that justification is secured, that reliability obtains, that epistemic responsibility has been taken) deemed relevant by one’s preferred model of epistemic normativity. The explanans are the *epistemic materials* those facts are about (e.g. evidence possessed, deliberations undertaken, inferences drawn, cognitive abilities exercised). They are those things that do or do not meet the normative threshold of the appraiser’s model of epistemic normativity. Of course, internalists and externalists characterize epistemic materials

differently. Internalists say epistemic materials are all mental states or exercises or a subset of these. Externalists contend that non-mental cognitive states or exercises also qualify. But, for the most part, internalists and externalists alike endorse the traditional epistemological tenet that having *epistemic autonomy* is necessary for having knowledge. That is, possessing knowledge entails possessing all the epistemic materials generating it.

Proponents of epistemic extension argue that individuals can be epistemically dependent on others in a more radical way than is traditionally permitted in epistemology, even after the externalist and social turns. Epistemic extension is the idea that a subject can possess knowledge when other subjects possess some of the epistemic materials generating it. While epistemic extension is an externalist principle, it is not implied by externalism. A central disagreement between internalists and externalists is about what counts as an epistemic material—about whether some epistemic materials are things other than states or exercises of the subject's inner life. Epistemic extension is not directly about what kinds of things epistemic materials are. It is about who possesses them. Most epistemologists, including most externalists, maintain that the knowledge-bearing subject must bear all epistemic materials. They retain the claim that epistemic autonomy is necessary for possessing knowledge. In response to several famous problems, externalists retreated to the confines of the individual subject's cognitive apparatus. According to agent reliabilism, for example, epistemic materials are confined to the individual subject's cognitive processes (or dispositions). Proponents of more recent causal conditions on knowledge take all salient causes to be constitutive of the individual subject's cognitive apparatus. The common position among epistemologists, including externalists, is that cognitive operations of others involved in *S* coming to know that *p* are not epistemic materials. Instead, knowledge possession implies the possession of all epistemic materials. That is, epistemic autonomy is necessary for possessing knowledge.<sup>3</sup>

So, there are really two kinds of externalism at play: one according to which the individual subject's external states can constitute epistemic materials, and another according to which some epistemic materials cannot be ascribed to the individual. The latter is epistemic extension. Alvin Goldman, whose work has been central for both the externalist and social turns in epistemology, indirectly helps clarify this distinction:

A justified belief is, roughly speaking, one that results from cognitive operations that are generally speaking, good or successful. But "cognitive" operations are most plausibly construed as operations of the cognitive faculties, i.e., "information-processing" equipment internal to the organism. (1979, 187)

What Goldman expresses up to "i.e." involves a claim about what sorts of things count as epistemic materials: cognitive operations. What follows "i.e." suggests two further constraints. The first rules out the cognitive operations of others; it rules out epistemic extension in favour of epistemic autonomy. The second is that epistemic subjects are individuals; it rules out group knowledge, restricting knowledge possession to individuals.<sup>4</sup>

The fundamental opposition between epistemic autonomy and epistemic extension is crucial in a certain class of cases. A growing number of philosophers, on the basis of diverse models of epistemic normativity, claim there are cases of knowledge in which no individual has the capacity to possess all the epistemic materials generating it.<sup>5</sup> That is, some knowledge cannot be generated autonomously by any individual. Call these cases of *extra-individual knowledge* (EIK).<sup>6</sup> The most vivid cases of EIK are scientific. Consider the CMS and ATLAS particle-detection experiments, which are two of seven experiments centralized at CERN's Large Hadron Collider. More than 3800 physicists, engineers, technicians, data analysts, etc. of various sorts are actively involved in CMS, and more than 3000 in ATLAS. Some operate on-site but many operate remotely through the Worldwide LHC Grid. 42 countries and 182 institutes are actively involved in CMS, and 38 countries and 174

institutes in ATLAS. On July 4, 2012, the collaborations announced that their 2011 and 2012 results constitute strong evidence for the existence of the Higgs boson, the fundamental particle that gives mass to other fundamental particles. Arriving at the knowledge that Higgs particles exist involves the epistemic labour of, and inter-dependence between, many individuals with diverse expertise. This is a radically different picture of science than that suggested by the Royal Society of London's maxim, which to this day remains, "nullius in verba," meaning, "take nobody's word for it."<sup>7</sup>

If the epistemic materials generating EIK extend beyond any individual, who can possess such knowledge? This question was posed some time ago by John Hardwig (1985), though epistemologists since paid it virtually no attention.<sup>8</sup> Though Hardwig framed the issue in different terms, he recognized that proponents of an autonomy condition on knowledge and proponents of what I call epistemic extension will give different answers:

**Epistemic Autonomy:** to possess knowledge, a subject must possess all the epistemic materials generating it; so, EIK can be possessed only by the *group* subject across which epistemic materials extend.

**Epistemic Extension:** a subject can possess knowledge when other subjects possess some of the epistemic materials generating it; so, EIK can be possessed by *individual* subjects. That is, individuals can have *knowledge via epistemic extension*.

Proponents of epistemic autonomy have two options, one skeptical and one in tension with tradition. If only individuals can possess knowledge, then there is no such thing as EIK. However, if groups can possess knowledge, then EIK can be ascribed to the group across which epistemic materials extend. Thus, proponents of epistemic autonomy must contend that any EIK must be group knowledge. Proponents of epistemic extension contend that individuals can possess EIK because individuals can possess knowledge without possessing all the epistemic material generating it. The dilemma posed by Hardwig is that one of two traditional tenets in epistemology must be abandoned to permit EIK: only individuals can

possess knowledge, or knowledge-bearers must be epistemically autonomous. Hardwig's intuition in favour of the latter was stronger: if the only plausible autonomous knowledge-bearer is a group, the knowledge-bearer is a group. Thus, Hardwig favoured option (1) of his dilemma, negatively framing the alternative as "vicarious knowledge" (1985, 344, 348).<sup>9</sup>

In the remainder of this section, I survey a handful of diverse models of epistemic normativity, each predicated upon or implying epistemic extension. Each offers a way of endorsing option (2) of Hardwig's dilemma. I begin with Sanford Goldberg, who points out that most externalists understand the cognitive operations of others involved in an individual subject *S* arriving at testimonial belief as features of *S*' belief-generating environment, relative to which *S*' testimonial belief is appraised, but not as part of the belief-generating process itself (2010, 36).<sup>10</sup> Most epistemologists of testimony, reductionists and non-reductionists alike, take the scope of appraisal of testimonial belief to range over the testimonial exchange itself. The scope of appraisal is not taken to extend over the earlier formation of the testifier's belief or assertion that *p*, which consists of epistemic materials located perhaps a minute, a day, a week, a month, a year, or even further in the past. Yet, Goldberg argues that the formation of the testifier's belief is often a salient part of why the recipient of testimony arrives at the truth. If the normativity required for knowledge includes concern with the propensity to arrive at the truth, then the testimonial exchange is only the terminal phase of the testimonial-belief-generating process. Epistemological appraisal ought to extend over the formation of the testifier's belief (*ibid*, ch.4). In other words, some knowledge is EIK, and it can be possessed by individuals. Goldberg directly endorses epistemic extension.<sup>11</sup>

Many philosophers contend, or their models imply, that denying the possibility of EIK comes at a high skeptical price: many cases of what we want to call knowledge are not really knowledge.<sup>12</sup> Several of these philosophers agree with Goldberg's (2010; 2011; 2012)

underlying idea that the epistemic materials involved in a testimonial exchange itself often cannot satisfy the normativity required for knowledge, and so the scope of epistemological appraisal must extend beyond the testimonial exchange.<sup>13</sup> This means testimonial knowledge is often generated by the epistemic materials involved in a testimonial exchange plus those (past) materials ascribed to the testifier. Epistemic extension bridges the gap.

Boaz Miller (2015), for example, argues that sometimes when we want to say individual *S* knows that *p*, things could too easily have gone wrong in ways opaque to *S* (§V). Miller points to a famous episode in science history (§IV). Arthur Eddington's 1919 experiments involved two expeditions, one to Sobral, Brazil and the other (which Eddington accompanied) to the island of Principe, off the coast of West Africa. Images of the Hyades open cluster in the constellation Taurus were taken by both teams during the solar eclipse of May 29, 1919, when the eclipsed sun moved across the cluster. These were imposed on images of the cluster taken at night. Eddington concluded that the degree to which the Sun's gravity disturbed passing starlight aligned with Einstein's predicted values, not Newton's. However, according to Earman and Glymour (1980), Eddington discarded salient data that was less supportive of his conclusion. Suppose Earman and Glymour are right and that this undercuts the justification of Eddington's conclusion (Collins and Pinch 1993, 43-54; Waller 2002: ch.3). Miller has us consider Hyde, who correctly believes *via* a report of Eddington's conclusion that general relativity is correct. Contrast Hyde with Jekyll, who has an identical belief *via* an identical report but resides in a close possible world in which Eddington faithfully performed the experiments, and in which Eddington's conclusion lent sufficiently similar support to general relativity. The problem is that the recipient of testimony often cannot determine whether they are in a Hyde-like or Jekyll-like scenario; whether undercutting misconduct occurred is opaque to them. Miller points to data suggesting that Hyde-like scenarios are common, even in science (426-7).<sup>14</sup> Rather than allow the possibility

of Hyde-like scenarios to undercut epistemic success attained through Jekyll-like scenarios, Miller proposes the principle, Knowledge-Level Justification Communalism, a version of epistemic extension:

...whether some of the true beliefs that *S* holds are sufficiently justified to amount to knowledge... depends on evidence (or other building blocks of which epistemic justification consists) which *S* does not possess or are not situated within *S*'s own cognitive system, but are possessed by, or situated within the cognitive systems of other relevant members of *S*'s epistemic community. (419)

Much of the support for epistemic extension is negative: reasons to reject epistemic autonomy as a necessary condition for possessing knowledge.<sup>15</sup> Yet, some epistemologists offer positive ways of explicating knowledge *via* epistemic extension.<sup>16</sup> These include some epistemologists of cognitive externalism, particularly of extended cognition.<sup>17</sup> According to extended cognition, cognition can extend 'outside the head', over artifacts, environmental features, and other subjects. When an individual comes to have knowledge *via* extending her cognition over the cognitive efforts of others, she does not possess all the epistemic materials involved. In such cases, epistemic extension obtains. I say this is a positive explication of knowledge *via* epistemic extension because it is a specific, psychological characterization of what is fundamentally an epistemological phenomenon. Furthermore, a minimal condition is placed on an individual *S* who depends on others for epistemic materials: all epistemic materials must fall within the scope of *S*' extended cognition.<sup>18</sup>

Berit Brogaard (2014, 57-60) places a more robust condition on *S*: *S* must *responsibly* extend her cognition over the cognitive efforts of others. Like Lackey (2007; 2009) and Vaesen (2011b), Brogaard rejects credit theories, according to which *S* knows that *p* only if *S* is creditable for truly believing that *p*, that is, only if all epistemic materials are creditworthy contributions of *S*. Brogaard contends that credit theories can't make sense of cases in which cognition, and therefore credit, extends beyond *S*. She proposes that when

*S* is not creditable with all epistemic materials, *S* can still possess knowledge by satisfying a responsibilist condition on her relationship to epistemic materials contributed by others.<sup>19</sup>

Adam Green (2012; 2014), on the other hand, aims to rescue credit theory by extending it. Citing Goldberg's work, Green conceives of a credit theory that characterizes all epistemic materials as creditworthy contributions but also permits *S* to possess knowledge when depending on others' creditworthy contributions. Although Green and Brogaard disagree about credit theory, they agree that an individual can possess knowledge without possessing all epistemic materials. Thus, both their views entail epistemic extension.<sup>20</sup>

Some proponents of epistemic extension offer mostly negative motivation toward epistemic extension and away from epistemic autonomy.<sup>21</sup> Others offer positive, psychological explications of knowledge *via* epistemic extension.<sup>22</sup> Others still are more narrowly concerned with placing conditions on an individual beneficiary *S* of epistemic materials possessed by others.<sup>23</sup> There is much left to explore about the nature of knowledge *via* epistemic extension. This is a major frontier in social epistemology.<sup>24</sup>

## **2. A Novel Framework for Social Epistemology**

Hardwig's dilemma entails that at least one of two traditional, individualistic tenets in epistemology must be abandoned: the necessity of epistemic autonomy for knowledge, or the idea that knowledge is possessed by individuals, not groups. One can endorse the non-traditional claim that groups can possess knowledge while retaining the traditional claim that epistemic autonomy is necessary for knowledge (e.g. Vaesen 2011a; Bird 2014; de Ridder 2014).<sup>25</sup> Alternatively, one can retain the traditional claim that only individuals can possess knowledge and simultaneously endorse the non-traditional claim that knowledge can be generated *via* epistemic extension.<sup>26</sup>

Here is another, virtually unexplored combination: one can endorse the non-traditional claim that groups can possess knowledge and also endorse the non-traditional claim that knowledge can be generated *via* epistemic extension. While the mere occurrence of EIK underdetermines group knowledge, there are many other reasons for thinking there groups can have knowledge. Some propose that groups can be ascribed with doxastic or doxastic-like states (e.g. beliefs, acceptances) that, like individual doxastic states, can satisfy the conditions on knowledge. Others propose that a group can be the type of agent or even person that constitutes a proper epistemic subject.<sup>27</sup> Just one example is the joint commitment account of group belief, according to which a group can have a belief that is irreducible to the individual beliefs of its membership.<sup>28</sup> A common example is a hiring committee that determines Jane is the best candidate even though no individual member of the committee believes Jane is the best candidate. This occurs because the committee's decision procedure is to average each individual committee member's ranked list of candidates. The winning candidate, Jane, has the highest average rank without being at the top of any individual member's list. Joint commitment accounts typically include a normative bind between group members who each commit to not contravene the group's view. In such cases, a complete description of a group's belief must include something in addition to the individual beliefs of a group's individual members (de Ridder, 40). A description of the hiring committee's belief includes the fact that the committee's membership jointly commits to the result of the group's decision procedure.

So, one's reasons for thinking groups can have knowledge needn't conflict with one's reasons for thinking epistemic extension sometimes obtains. This combination in cases of EIK opens up an intriguing idea: extended group knowledge, the idea that group subjects can be epistemically dependent on other subjects (individuals or other groups) and entities.

The distinctions between individual knowledge and group knowledge, epistemic autonomy and epistemic extension, and internalism and externalism run orthogonally to one another for the most part, generating six distinct combinations of views (fig.1):

fig.1

	Epistemological Internalism	Epistemological Externalism	
	Epistemic Autonomy		Epistemic Extension
Individual Knowledge/ Subjecthood	Individual subject <i>S</i> possesses knowledge that <i>p</i> , and all epistemic materials are internal states or exercises of <i>S</i> .	Individual subject <i>S</i> possesses knowledge that <i>p</i> , and all epistemic materials are internal or external states or exercises of <i>S</i> .	Individual subject <i>S</i> possesses knowledge that <i>p</i> , and some epistemic materials are internal or external states or exercises of subjects beside <i>S</i> .
Group Knowledge/ Subjecthood	Group subject <i>G</i> possesses knowledge that <i>p</i> , and all epistemic materials are internal states or exercises of <i>G</i> .	Group subject <i>G</i> possesses knowledge that <i>p</i> , and all epistemic materials are internal or external states or exercises of <i>G</i> .	Group subject <i>G</i> possesses knowledge that <i>p</i> , and some epistemic materials are internal or external states or exercises of subjects beside <i>G</i> .

Mainstream epistemology has explored only two of six combinations of views (marked yellow). The increasingly popular claim that group knowledge sometimes obtains opens-up two new combinations of views (marked blue). Yet, if epistemic autonomy is assumed and epistemic extension is overlooked, two additional combinations are neglected (marked green). The combination of individual knowledge and epistemic extension (top-green) is a recent and radical development, but it has become increasingly popular.

The combination that remains utterly neglected is group-level epistemic extension (bottom-green). A good deal of the literature cited in this paper, and the bulk of group epistemology to-date, can be classified as *intra*-group epistemology: concern for epistemically salient happenings within groups (marked blue).<sup>29</sup> In the following section, I offer arguments to motivate the exploration of *inter*-group epistemology: concern for epistemically salient happenings between groups.<sup>30</sup>

### 3. A New Frontier: Inter-Group Epistemology

I want to do more than merely identify the unexplored possibility space in group epistemology that is inter-group epistemology. In this section, I offer two arguments to motivate the exploration of this frontier. These are arguments for the claim that, if there is group knowledge, some of it is knowledge *via* epistemic extension. If this is right, then epistemologists ought to analyze ways that groups are epistemically dependent on other subjects and entities.

Suppose some reason other than the mere occurrence of EIK succeeds in establishing that groups can have knowledge. I show that there are cases of knowledge in which epistemic materials extend beyond any individual and also beyond any group to which we can reasonably ascribe beliefs, acceptances, agency, personhood, etc. In such cases epistemic materials extend beyond any group picked out by available methods for individuating group subjects. These are cases of *extra-group knowledge* (EIK-G). In any case of EIK, epistemic materials extend beyond any individual. In cases of EIK-G specifically, epistemic materials also extend beyond any properly individuated group. So, EIK-G is a subset of EIK. For such cases, we have the options Hardwig proposed for analyzing any EIK. Thus, we can formulate a group-level version of Hardwig's dilemma. According to option (1), epistemic autonomy demands that the knowledge-bearer is identical to the bearer of all epistemic materials. This means EIK-G must be ascribed to extended, awkwardly-individuated, transient groups that generate knowledge in one-off fashion. On the other hand, option (2) permits epistemic extension, which permits us to ascribe EIK-G to epistemically dependant—though robust and persistent—groups which can be generate knowledge iteratively. Groups to which we can reasonably ascribe beliefs, acceptances, agency, personhood, etc. are the groups picked out by option (2), not option

(1). Thus, if some knowledge is EIK-G, option (2) offers the preferable analysis: some groups have knowledge *via* epistemic extension.<sup>31</sup>

On July 4, 2016, NASA's Juno spacecraft arrived at Jupiter. One of its many instruments is the JunoCam. The majority of this camera's targets are chosen by the public and data retrieved is analyzed partly by the public.<sup>32</sup> For at least some knowledge generated through use of the JunoCam, the collection of subjects contributing epistemic materials extends beyond NASA's Juno team. If we endorse option (1) of Hardwig's dilemma, the knowledge-bearing subject is the combination of NASA's Juno team of astrophysicists, professional data analyzers, engineers, technicians, etc., plus some loosely connected and extensive collection of amateur astronomers and data analyzers. Some of the latter may even be anonymous. They may include pairs or trios offering analyses under a single online pseudonym. It may be impractical or impossible to specify the group that possesses knowledge. Knowledge-generating labour seemingly extends not just beyond any individual, but also beyond any neatly-individuated group. If so, this is a case of EIK-G. If we instead endorse option (2) of Hardwig's dilemma—permitting epistemic extension—we can ascribe knowledge to a well-defined, structured, specialized, and persistent group—e.g. NASA's Juno team—while respecting the salient contributions of those not constitutive of it. Small, structured, and specialized research teams are paradigmatic candidates for possessing knowledge. Loosely defined, extensive, and transient groups are not.<sup>33</sup>

Consider another case. A jury finds the defendant, Colonel Mustard, not-guilty of committing murder. Among all the evidence deliberated upon by the jury, some salient evidence is received from expert witnesses—a clinical psychiatrist, a blood spatter analyst, and a forensic firearms expert. None of the expert witnesses walks the jury, step-by-step, through all her technical work. This would require each juror to complete the training and education required to become an expert. Instead, each expert witness offers a layperson

summary of her work to the court. Suppose the totality of evidence satisfies the normative conditions for knowledge that Colonel Mustard is not guilty. Assuming that no individual can possess all epistemic materials, this is EIK. According to option (1) of Hardwig's dilemma, the jury cannot possess this knowledge because the jury does not possess all the epistemic materials generating it. Knowledge is instead possessed by the group constituted by the jury plus the expert witnesses, since this is the only group that can satisfy an epistemic autonomy condition on knowledge possession. As in the previous case, knowledge-generating labour seemingly extends beyond any neatly-individuated group. If so, this is EIK-G. By instead endorsing option (2)—permitting epistemic extension—one can ascribe knowledge to the jury without failing to acknowledge the epistemically salient contributions of the expert witnesses.

On the individual-level version of Hardwig's dilemma, one deliberates about whether to ascribe knowledge to an individual scientist or to a research team; one deliberates about whether to ascribe knowledge to a single juror or to a jury. Option (1) at this level ascribes knowledge to groups with more substantive and persistent identities. On the group-level version of Hardwig's dilemma, one deliberates about whether to ascribe knowledge to a research team or to the research team plus non-members; one deliberates about whether to ascribe knowledge to a jury or to the jury plus expert witnesses. So, unlike option (1) at the *individual level*, option (1) at the *group level* ascribes knowledge to groups that are not picked out by available methods in social ontology for individuating group subjects—groups to which we cannot plausibly ascribe beliefs, acceptances, agency, personhood, etc. All that defines such a group is the participation of more than one individual in generating a particular case of EIK-G.

Recall the joint commitment account of group belief (or acceptance). Only the commitments of the jury's members constitute the jury's view. Only members of the jury

jointly commit to its decision procedure, to its outcome, and to not contravene the outcome once it is delivered. Indeed, jury members are prohibited from commenting on the trial. No witness, attorney, or judge partakes in the jury's decision procedure or is committed to not contravene the jury's decision. A witness, attorney, or judge can oppose the jury's decision. A witness might be free to comment on the trial. An attorney can file an appeal. A judge can write a dissenting opinion. According to option (1) of Hardwig's dilemma, the group that knows Colonel Mustard is not guilty is the jury plus expert witnesses, since this is the group that contributes epistemic materials. According to option (2), the group that knows Colonel Mustard is not guilty is the jury. Option (2) and the joint commitment account of group belief pick out the same group.

A second reason to favour option (2) at the group level is that the reasons for thinking epistemic extension obtains at the individual level are just as compelling, if not more compelling, when reformulated into reasons for thinking epistemic extension obtains at the group level. Goldberg (2010) shows that individual recipients of testimony can be dependent on others' epistemic materials. He argues that whether a recipient of testimony arrives at the truth often depends on the justification-basis of the testifier's belief or assertion. The same reasoning applies at the group level. In order to determine whether a group *G*'s testimonial belief (or acceptance) amounts to knowledge, appraisal ought to extend over epistemic materials that cannot be ascribed to *G*. All we need to accept is that groups (e.g. juries) can receive testimony (e.g. from expert witnesses). So, Goldberg's argument for extended individual knowledge is easily reformulated into an equally-compelling argument for extended group knowledge.<sup>34</sup>

Miller's (2015) argument that epistemic extension obtains at the individual level is *stronger* when reformulated into an argument that epistemic extension obtains at the group level. This is the case if the normative conditions on group knowledge are more difficult to

satisfy than the normative conditions on individual knowledge. This claim is defended by several philosophers.<sup>35</sup> For example, just one of Jennifer Lackey's conditions for a group  $G$  justifiably believing that  $p$  is that "[a] significant percentage of the operative members of  $G$ ... justifiably believe that  $p$ " (381). Recall Miller's (2015) argument and data showing that sometimes when we want to say individual  $S$  knows that  $p$ , things could too easily have gone wrong in ways opaque to  $S$  (§V). That is, Hyde-like scenarios are relatively common, even in science. Epistemic extension prevents the possibility of Hyde-like scenarios from undercutting the epistemic success attained through Jekyll-like scenarios. If a necessary condition for group  $G$  justifiably believing that  $p$  is that a "significant percentage of the operative members of  $G$ " must each justifiably believe that  $p$ , then things could go wrong in many more ways that are opaque to  $G$  than it can wrong in ways opaque to any one of its operative members  $S$ . For any given operative member  $S$ ' belief that  $p$ , there is the possibility of a Hyde-like scenario. For the group  $G$ 's belief that  $p$ , that possibility is perhaps as many times more likely as whatever number equals a "significant percentage of operative members of  $G$ ." If we resist epistemic extension, group knowledge is possible only if a significant percentage of  $G$ 's operative members can determine whether they are in a Hyde-like or Jekyll-like scenario. So, if we need epistemic extension to prevent the occurrence of Hyde-like scenarios from undercutting the epistemic success attained through Jekyll-like *individual* beliefs, then we surely need epistemic extension to prevent the occurrence of Hyde-like scenarios from undercutting the epistemic success attained through Jekyll-like *group* beliefs (or acceptances, results, etc.).

Option (1) of Hardwig's dilemma is independently less plausible at the group level because it ascribes knowledge to transient groups. These are not the groups picked out by available methods in social ontology for individuating group subjects. A second reason to favour option (2) of Hardwig's dilemma is that epistemic extension is just as compelling, if

not more, at the group level as it is at the individual level. An ever-increasing number of epistemologists think groups *qua* groups are proper subjects of epistemic analysis. I offer reasons for group epistemologists to explore ways that groups are epistemically dependent on other subjects and entities—a domain I call inter-group epistemology.

## **Conclusion**

In this paper, I connected the ideas of group knowledge and epistemic extension, both departures from traditional epistemology but both increasingly popular. This allowed me to generate a novel taxonomy for epistemology along three core axes: the distinctions between epistemological internalism and externalism, individual and group knowledge, and epistemic autonomy and extension (fig.1). One possibility space I identified was what I called inter-group epistemology: analysis of ways that groups are epistemically dependent on other subjects and entities. In addition to identifying this frontier in group epistemology, I offered two arguments to motivate its exploration.

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## Notes

<sup>1</sup> Those who claim groups can have knowledge include Schmitt (1994); Hutchins (1995); Knorr-Cetina (1999); Gilbert (2000; 2004); Kusch (2002); Tollefsen (2002; 2015); Goldman (2004); Bouvier (2004; 2010); Tuomela (2004; 2011); List (2005); Mathiesen (2006; 2011); Fallis (2007); Wray (2007); Rolin (2008; 2010); Hakli (2011); Vaesen (2011a); Dewitt (2012); Palermos and Pritchard (2013; 2017); Bird (2014); de Ridder (2014); Lackey (2014); Carter (2015); Palermos (2015; 2017); Wagenknecht (2016).

<sup>2</sup> Proponents of epistemic extension include Thagard (1997; 2010); Giere (2002; 2006; 2007; 2011; 2012); Goldberg (2010; 2011; 2012); Fagan (2011; 2012); Green (2012; 2013; 2014); Shieber (2013); Palermos (2014; 2016); Kelp (2013; 2014); Brogaard (2014); Miller (2015). “Epistemic extension” is derived from Goldberg’s (2010) “epistemic extendedness.” It can apply to states other than knowledge but I talk mostly of knowledge in this paper. All proponents of epistemic extension cited above are concerned with knowledge ascribed to individuals, not groups. Some are only indirect proponents of epistemic extension. They endorse views entailing epistemic extension, such as certain views about extended cognition. I return to the relationship between epistemic extension and extended cognition later. Normative properties are not epistemic materials. Rather, epistemic materials are subject to normative appraisal. So, for example, epistemic materials can stand in reliability relations but reliability properties are not epistemic materials. To conflate these is to conflate the explanandum/explanans distinction in epistemology, as I explain in section 1. I clarify the distinction between epistemic externalism and general epistemological externalism later.

<sup>3</sup> Alston (1995, 11-12, 15-16) understands “proximate” causes of a belief, by which he means those located within the individual cognitive apparatus, as the only epistemically salient ones. Some epistemologists maintain that epistemological appraisal is relative to belief-generating environments (e.g. Janet’s perceptual beliefs are reliably formed relative to normal lighting conditions). An aspect of the social turn in epistemology extends this to stress the relevance of belief-generating *social* environments. But on such contextualist accounts, features of belief-generating environments are not epistemic materials. Rather, such accounts call for *contextual* appraisal of the epistemic materials involved. This does not imply epistemic extension. In this paper, I focus mostly on reliance on epistemic materials possessed by other people. But what I say can apply, *mutatis mutandis*, to reliance on epistemic materials attributable to institutions, systems, or social practices. I thank Sandy Goldberg for prompting this clarification.

<sup>4</sup> I am not claiming that Goldman (1979) had epistemic extension or group knowledge in mind at the time. I am only making use of this passage as expressing a common combination of views. Goldberg (2010, 121-2) employs the same passage for a similar purpose. More recently, Goldman (e.g. 2004; 2014) has endorsed the claim that there is group knowledge.

<sup>5</sup> e.g. Hardwig (1985); Schmitt (1994); Hutchins (1995); Thagard (1997; 2010); Knorr-Cetina (1999); Gilbert (2000; 2004); Kusch (2002); Giere (2002; 2006; 2007; 2011; 2012); Goldman (2004); Bouvier (2004; 2010); Tuomela (2004; 2011); List (2005); Mathiesen (2006; 2011); Fallis (2007); Wray (2007);

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Rolin (2008; 2010); Hakli (2011); Tollefsen (2002; 2015); Goldberg (2010; 2011; 2012); Vaesen (2011a); Fagan (2011; 2012); Dewitt (2012); Green (2012; 2013; 2014); Shieber (2013); Kelp (2013; 2014); Palermos (2014; 2016); Palermos and Pritchard (2013; 2016); Bird (2014); Brogaard (2014); de Ridder (2014); Lackey (2014); Carter (2015); Miller (2015) Palermos (2015; 2017); Wagenknecht (2016).

<sup>6</sup> In this paper, I do not endorse the claim that some knowledge is EIK. I explore the relation between certain fundamental ideas in epistemology and the idea endorsed by a growing number of philosophers that some knowledge is EIK. To this end, I assume the occurrence of EIK.

<sup>7</sup> For the original CMS and ATLAS results, see Chatrchyan *et. al.* (2012) and Aad *et. al.* (2012), respectively. The officially specified authors of these articles are “The CMS Collaboration” and “The ATLAS Collaboration,” respectively, though lists of the 2900 and 2932 individual authors, respectively, are appended. For important results since 2012, see Aad *et. al.* (2015), which is a co-authored report of coordinated CMS and ATLAS measurements. The officially specified authors of this article are “The ATLAS and CMS Collaborations,” though a list of the 5154 individual authors is appended.

<sup>8</sup> See Miller (2015) for why early work in the epistemology of testimony, which was in part prompted by Hardwig (1985), does not address the fundamental issue raised by Hardwig.

<sup>9</sup> Hardwig himself only tentatively endorsed option (1) of his dilemma. He claimed only that his intuition in favour of epistemic autonomy was stronger than his intuition in favour of the claim that only individuals can have knowledge (348-9). His more immediate concern was with posing a dilemma about how to analyze EIK. Several philosophers have more recently forwarded an argument directly from the occurrence of EIK to the claim that groups must possess this knowledge, without addressing the possibility epistemic extension (Vaesen 2011a; Bird 2014; de Ridder 2014). This move goes through only if epistemic autonomy is necessary for possessing knowledge. No philosopher I am aware of espoused epistemic extension when Hardwig wrote in 1985. Yet, Hardwig rightly recognized it as a live option. Today, a fair number of philosophers espouse epistemic extension. So, it is fair to say that proponents of this move from EIK to group knowledge err by overlooking epistemic extension as an alternative analysis of EIK. After all, if epistemic extension is a viable principle, it undercuts this move. I take this direct and heretofore unscrutinized move to be evidence that connections between the ideas of epistemic autonomy, epistemic extension, and group knowledge remain unexplored.

<sup>10</sup> Goldberg focuses on process reliabilists, who, contrary to epistemic extension, typically understand the cognitive operations of others as relevant for determining the local reliability of the testimonial process generating *S'* belief that *p* but not for determining its global reliability.

<sup>11</sup> Goldberg finds an uncontroversial analogue in memorial beliefs. *S* has a memorial belief that *p* when *p* is inferred from (or is otherwise saliently dependent upon) *S'* memory of her previously acquired belief that *q* (65-7, 85-6). If *S'* belief that *q* was faulty upon acquisition, so is *S'* present belief that *p*: garbage-in, garbage-out. Most epistemologists agree that the epistemic materials generating memorial beliefs extend across time. Goldberg argues that for some testimonial beliefs they (also) extend across agents. If so, *S* can have knowledge without having all epistemic materials. In all the epistemically relevant ways, a memorial

belief can be just like an extended testimonial belief. In many cases in which *S* derives a memorial belief that *p* from *S*' previously acquired belief that *q*, the original epistemic materials that generated *S*' belief that *q* are opaque to *S*. Likewise, for an extended testimonial belief that *p*, the epistemic materials that generated the testifier's belief or assertion that *p* are opaque to the recipient. There is only one difference between these two kinds of cases: in the former, everything of epistemic importance happens in an individual subject's head; in the latter, it does not. To accept the uncontroversial model for memorial beliefs and, without additional argument, reject epistemic extension for some cases of testimonial belief, is to insist upon epistemic autonomy for its own sake.

Another process reliabilist proponent of epistemic extension is Joseph Shieber (2013), who calls for a general, extended reliabilist account of knowledge, according to which,

- (1) Individuals are the primary bearers of knowledge.
- (2) Some individual *S* knows that *p* iff
  - a. *p*
  - b. *S* believes that *p*, and
  - c. *S*'s belief that *p* was produced by a process that reliably produces true beliefs, where
- (3) Such processes may include the properties and actions of agents other than *S* as well as properties of the environment (i.e., instruments, etc.). (290)

Shieber requires of process reliabilism "only that the notion of process be broadened to include genuinely social belief-forming processes" (290). Like Goldberg, he directly endorses epistemic extension.

<sup>12</sup> e.g. Hardwig (1985); Schmitt (1994); Thagard (1997; 2010); Knorr-Cetina (1999); Giere (2002; 2006; 2007; 2011; 2012); Tuomela (2004; 2011); Staley (2007; 2010); Goldberg (2010; 2011; 2012); Fagan (2011; 2012); Green (2012; 2013; 2014); Palermos (2014); Palermos and Pritchard (2013); Shieber (2013); Kelp (2013; 2014); Briggs *et. al.* (2014); Brogaard (2014); Cheon (2014); Goldman (2014); Tossut (2014); Miller (2015).

<sup>13</sup> e.g. Hardwig (1985); Green (2013); Shieber (2013); de Ridder (2014, 47-8); see especially Miller (2015, 421-2). I take it that epistemic extension is consistent with each of the reductionist, non-reductionist, generation, and transmission views of testimonial justification. See Miller (2015) on this point.

<sup>14</sup> According to an anonymous survey of 3200 scientists published in *Nature* (Martinson *et. al.* 2005), 6% of scientists report "failing to present data that contradict one's own previous research," 12.5% report "overlooking others' use of flawed data or questionable interpretation of data," 13.5% report "using inadequate or inappropriate research designs," 15.5% report "dropping observations or data points from analyses based on a gut feeling that they were inaccurate," and 15.5% admit to "changing the design, methodology or results of a study in response to pressure from a funding source." Presumably, these results are subject to the underreporting phenomenon that psychologists have established as common for studies in which subject are asked to offer critical self-reports, even anonymously. Furthermore, mathematical journals have higher than expected rates of substantial errors that survive the peer-review process. Grear (2010) and Nathanson (2008) separately argue that this problem has troubling epistemic

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consequences for the field. Frans and Kosolovsky (2014) and Geist, Loweand, and Van Kerkhove (2010) argue for more stringent conditions under which mathematical knowledge can be acquired through testimony. Sismondo (2009) shows that ghost-writing is increasingly common. Miller also shows that Hyde-like scenarios are clearly not Gettier cases. In short, they are common, not coincidental, and involve blameworthy error, not luck (427-8).

<sup>15</sup> Goldberg (2010) does offer positive motivation of epistemic extension in his meta-epistemology of reliabilism and of the nature of epistemic assessment.

<sup>16</sup> Thagard (1997; 2010); Giere (2002; 2006; 2007; 2011; 2012); Green (2012; 2014); Kelp (2013; 2014); Brogaard (2014); Palermos (2014; 2016).

<sup>17</sup> Two collections of essays concerned with the epistemology of cognitive externalism are *Philosophical Explorations* 15(2) (2012) and *Philosophical Issues* 24(1) (2014). For the relationship between epistemic internalism/externalism and cognitive internalism/externalism, see Carter *et. al.* (2014). Clark and Chalmers (1998) prompted discussion of cognitive externalism in the philosophy of mind.

<sup>18</sup> Goldberg (2010, 127-132) rightly points out that epistemic extension, being a strictly epistemological claim, does not imply extended cognition. So to be clear, I am not attributing commitment to cognitive externalism to Goldberg, Miller, or any proponent of epistemic extension besides certain epistemologists of cognitive externalism. Beside Green (2012; 2014), the proponents of cognitive externalism cited in this paper endorse epistemic extension only indirectly. They contend that an individual can know that *p* *via* extending her cognition over the cognitive efforts of others. Thus, their views on knowledge *via* extended cognition entail epistemic extension.

<sup>19</sup> In correspondence, Miller suggested a similar condition on *S*. Pritchard (2010), like Brogaard, argues that a version of virtue epistemology beside credit theory is compatible with cognitive externalism. Michaelian (2014) disagrees.

<sup>20</sup> Vaesen (2011b; 2013), Kelp (2013; 2014), and Green (2014) debate the merits of extended credit theory.

<sup>21</sup> Goldberg (2010); (2011); (2012); Fagan (2011; 2012); Shieber (2013); Miller (2015). As noted earlier, Goldberg (2010) does offer some positive motivation.

<sup>22</sup> Thagard (1997; 2010); Giere (2002; 2006; 2007; 2011; 2012); Green (2012; 2014); Kelp (2013; 2014); Brogaard (2014); Palermos (2014; 2016).

<sup>23</sup> Brogaard (2014) places a responsibilist condition on *S*. Green (2012; 2014) places a creditworthiness condition on *S*. Palermos (2014), Clarke (2015), and Wray (2018) compare, on the one hand, *S* extending her cognition over the cognitive efforts of other agents, and on the other hand, *S* competently employing or integrating herself with technology. Palermos argues that these scenarios can be epistemically analogous: in both cases, *S* can competently extend her cognition without having to double-check epistemic materials possessed by others. That is, how technology works need not be transparent to *S* in order for *S* to be able to use it properly. Analogously, the cognitive operations of others need not be transparent to *S* in order for *S* to benefit epistemically from them. Wray disagrees to some extent. He

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contends that *S* must take responsibility for all epistemic materials and that this is complicated in important ways when other agents, as opposed to technological artifacts, are involved.

<sup>24</sup> Ronald Giere (2002; 2006; 2007; 2011; 2012) argues that some knowledge-how is knowledge *via* epistemic extension. He appeals to distributed cognition rather than extended cognition. Both theses involve the idea that cognitive labour extends beyond any one individual. But in cases of distributed cognition, there is no central individual. Giere relies on Ed Hutchins' (1995) famous study of navigation. Giere agrees with Hutchins that the cognitive labour involved in many naval operations, such as a ship entering port, is necessarily distributed across large, complex, organized systems that cannot be internalized by any individual. Yet, Giere resists the claim that knowledge of how to enter port ought to be ascribed to the crew as a whole or, as Knorr-Cetina (1999) and Vaesen (2011a) claim, to the ship as a whole: crew plus artifacts. Giere insists that it is the navigator (and maybe her assistant) who knows. He aims to avoid what he deems unnecessary, inflated social ontology, or "extended epistemic agency," which he targets more pointedly elsewhere (Giere 2007). As such, his view entails epistemic extension, according to which an individual can possess knowledge without possessing all epistemic materials. I argue elsewhere (Dragos 2019) that there cannot be knowledge-how *via* epistemic extension. Yet, my argument there does not apply to knowledge-that *via* epistemic extension.

<sup>25</sup> de Ridder (2014) is an interesting case. He claims that an individual can possess "derivative" or "secondary" knowledge that *p* when "she doesn't have access to all of that non-testimonial evidence herself, because it is partly beyond her cognitive reach... [when] she doesn't fully understand all the evidence for *p* and how it supports *p*..." (48-9). Proponents of epistemic extension agree that such an individual does not herself possess all epistemic materials. They agree that any individual knowledge generated this way "derives from the collective," since this just means *S* cannot alone satisfy (SJ). So, de Ridder seems to allow for some knowledge *via* epistemic extension. Yet, he contends that extended individual knowledge necessarily "derives from the collective," which is "the primary subject of knowledge in these cases" (50). In other words, there must always be a bearer of autonomously generated knowledge, and when it cannot be an individual, it must be a group. In other words, it is assumed that epistemic autonomy is necessary for knowledge.

<sup>26</sup> The combination of individual knowledge and epistemic extension is employed by all proponents of epistemic extension I am aware of beside de Ridder. None but de Ridder also invokes group knowledge. At the same time, I am not aware of any of these philosophers denying the possibility of group knowledge. Fagan (2012, 829) may be an exception.

<sup>27</sup> So-called "believers" claim that groups have beliefs, while so-called "rejectionists" claim that groups have acceptances. How exactly we ought to conceive of the relevant group states is immaterial for the purposes of this paper. For more on these issues in relation to group epistemology, see Gilbert (1989; 1994; 2000; 2004); Tuomela (1992; 2004); Mathiesen (2006); Wray (2001; 2003; 2007; 2014); Mathiesen (2006; 2011); Staley (2007; 2010); Hakli (2007; 2011); Rolin (2008; 2010); Andersen (2010); Beatty and Moore (2010); Bird (2010; 2014); Bouvier (2010); Baumann (2011); Fagan (2011; 2012);

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Briggs *et. al.* (2014); Cheon (2014); de Ridder (2014); Gilbert and Pilchman (2014); Tollefsen (2015, chs. 1, 2); Weatherall and Gilbert (2016). On group agency, see List and Pettit (2006; 2011; 2012); Mathiesen (2011); Briggs (2012); Cariani (2012); Pettit (2014); Tollefsen (2015, ch. 3); List (2016). On group personhood, see Kusch (2014); Smith (2018).

<sup>28</sup> Gilbert (1989; 1994; 2000; 2004); Tuomela (1992; 2004); Rolin (2008; 2010); Gilbert and Pilchman (2014).

<sup>29</sup> Andersen and Wagenknecht (2013) is another example.

<sup>30</sup> Dragos (2016a; 2016b) are small, exploratory steps into this domain.

<sup>31</sup> If a proponent of epistemic extension is committed to the traditional tenet that only individuals can possess knowledge, she can (in principle) analyze all cases of EIK, including all cases of EIK-G, as extended individual knowledge. For such a person, there is no group-level version of Hardwig's dilemma, only special cases of EIK in which option (1) prescribes that knowledge be ascribed to transient groups.

<sup>32</sup> See <https://www.missionjuno.swri.edu/origin> for more information on the JunoCam.

<sup>33</sup> In Dragos (2016a; 2016b), I am concerned with the relationship between research teams and their parent scientific subfields.

<sup>34</sup> I claim that Goldberg's argument is just as compelling when reformulated at the group level. However, part of what makes Goldberg's argument compelling is the analogy he draws between testimonial knowledge and memorial knowledge. A memorial belief that *p* is a belief that is inferred from (or is otherwise saliently dependent upon) a previously acquired belief that *q*. This is also true of many group beliefs (or acceptances). For example, important coordinated measurements were undertaken in 2015 by the CMS and ATLAS Collaborations. The data are co-published by the collaborations in Aad *et. al.* (2015). This work builds upon important measurements taken independently in 2012 by the CMS and ATLAS Collaborations. The data are published in Chatrchyan *et. al.* (2012) and Aad *et. al.* (2012), respectively. Presumably, the coordinated 2015 results depend on the 2012 independent results, such that were a fundamental problem with the 2012 results, this would negate or undercut the 2015 results. So, I think the memory analogue can be drawn at the group level.

<sup>35</sup> This claim, or the claim that groups face unique epistemic hurdles, is proposed by Briggs *et. al.* (2014); Wray (2014); Lackey (2016); Weatherall and Gilbert (2016). Margaret Gilbert's (2000; 2004) well known joint commitment account of group belief has been both criticized (Wray 2001; Mathiesen 2006; Bouvier 2010) and defended (Beatty and Moore 2010) for making group knowledge, especially group scientific knowledge, more difficult to attain than individual knowledge.