

***Secrets, Errors and Mathematics: Reconsidering the Role of Groups in Social Epistemology***

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**Abstract**

This paper makes the claim that analytic social epistemology has slowed, if not halted, the development of social epistemology and the social sciences in general. Furthermore, I argue that social epistemology is unavoidably subjective due to its collective nature. Social epistemology, as it is generally understood, consists of the study of socially shared propositions and how they are understood by those communities. However, socially shared propositions of knowledge are not constrained by propositional logic<sup>1</sup> but are rather enabled by the limited quanta of reason and logic embedded in linguistic structure. From this viewpoint, analytic social epistemology is a sub-domain of social epistemology that, as the broadest domain in epistemology, is the study of knowledge and its creation and influence in real-life social settings.

The claims made in this essay run contrary to propositions by Alvin Goldman and his supporters who, following early suggestions in Wittgenstein's "Blue Notebook," view social epistemology as a sub-domain of analytic epistemology. From their view, "real" knowledge is constrained by propositional logic, which is derived from language and is constructed in social settings. The error of this view lies in its attempt to collapse social knowledge into propositional logic, thereby downplaying the many social groups and social practices that produce, create, restore and distort knowledge.

The "subjective" and group-oriented nature of social epistemology is demonstrated in this text by examples of secrets, errors and mathematics as discrete social domains in which knowledge is created and maintained. Examples in both philosophy and social sciences are important, since they reveal the weaknesses of strict analytic social epistemology. Sometimes, if not most of the time, a simple real-life example may be appealing to emotions and personal experiences of life whereas *Wittgensteinian* truth tables are rarely matters of personal attachment to anyone.

I believe that simple real-life examples are more interesting because they can easily capture both the social, emotional and logical meanings

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<sup>1</sup> By propositional logic I mean logical tradition based mostly on Russells' work, found in a majority of philosophy textbooks. This emphasis of "textbook logic" — a rigorous analytic orientation towards the study of knowledge and logic — is easily found in the majority of epistemological philosophy textbooks on the global scale.

attached to sentences, The *social* in social epistemology can only be properly considered from the viewpoint of social groups. Following an argument presented by Steve Fuller, I proceed to demonstrate that "knowledge" is not a self-maintaining quality of human life, but rather a qualia that is regenerated situationally. All epistemic activities build upon such reorganization as it is conducted within social groups which seek to regenerate knowledge both to make sense of the world and to make sense of their own selves.

## Introduction

Groups, I contend, are the source of meanings; the use of analytic philosophy in social epistemology has obscured the role of groups in the formation of meaning. To be more specific, I contend that the analytic tradition in epistemology has become disconnected from the social, and, as such, has become disconnected from the true goal of philosophy: *eudaimoneia*, happiness, the betterment of lives (Annas 1993). To remedy this, we must examine the *social* in social epistemology. We must start to tap into social lives and social practices that shape our societies, groups and eventually individual lives. Such a remedy, in terms of connecting epistemology to social problems that truly matter, starts with addressing the role of groups in forming knowledge.

At first, I will briefly consider the ways others have dealt with connecting social epistemology to socio-psychological problems. I emphasize the *social* in social epistemology to the extent that many other scholars in the field of social epistemology would consider my arguments to present contra-epistemology. Yet, as Wittgenstein demonstrates in *Tractatus Logico-Philosophicus*, little human knowledge is achieved through propositional logic, while most is gained through the everyday action of informal group epistemology. Hence, social sciences have much to offer to the development of epistemology and can make it a real superstructure of social sciences. By "superstructure" I mean that the social sciences are concerned with the allocation and organization of knowledge – even when the epistemic domain of a given quantum of research is buried under the specific methods and practices of some specific subdomain of the social sciences. Thus, the study of the social organization of knowledge is at least a latent part of any social scientific project. I believe that social science would benefit from making the social epistemic aspect of research projects and products more manifest as Fuller recently suggests (Fuller 2012).

Unfortunately, in the social sciences as a whole, we have often assumed that the epistemic domain of our research is a given, and have thus taken for granted this epistemic "superstructure." For this reason, the actual knowledge-creation aspect of social-science research, as a cross-disciplinary matter, has gone without much discussion, and when it has been discussed it has been treated as a matter of propositional logic. This dismissal of the epistemic – knowledge related – function that most social scientific theories carry has led to an overemphasis of propositional logic and natural sciences as the main intellectual venue of our time. Certainty, as argued already in *Tractatus Logico-*

*Philosophicus*, is a property of analytic propositions of logic. Yet, in social sciences the researcher operates within a social world created of probabilities, errors, illogical arguments and even nonsense. Certainty is rarely, if truly ever, achieved in social science. Certainty is only certain to be achieved within propositional logical systems, such as mathematics, where two plus two is certain to equal four, each and every time. As such, mathematics has become the Foucauldian *épistémè* of our age; since the social sciences can not equal the certainty of mathematics, some social scientists have sought to substitute the precision of analytic logic for the probabilities of the social realm.

Despite the uncertain nature of social sciences and social epistemology, the ongoing tendency in analytic social epistemology is to value propositional logic as a higher, and superior, order of knowledge. Contrary to this view, I argue that knowledge-creation in social sciences does not need the same epistemic qualities as we require from natural sciences. The other, a thinking agent, is drawn to errors, creativity and the ongoing change and flux of thoughts, a process that presents a challenge to the study of social epistemology. This view makes it clear that pure logical certainty is not achievable in social science — and thus most of the time we must rely on probability and social interests as guidelines to human behavior.

Probability, a likelihood of events, runs contrary to the well-grounded epistemology we see in natural sciences. If we are to advance social scientific inquiry we need to show how certainty and uncertainty relate to human behavior. Knowledge, *episteme*, is to large extent a social practice made bewildering by the ever-changing ratiocination of our fellow humans. For this reason, a scientist would find it comfortable to gravitate towards natural sciences and propositional logic instead of the study of social attributes that constitute knowledge in *social groups*. Thus, it is obviously tempting from the viewpoint of analytic social epistemology to isolate epistemology from the troubles that scholarship other than physical sciences so often have. Most obviously, these challenges are subjectivity, difficulties in communication, problems of replicating scientific results, troubles with social biases. All these core difficulties of the social sciences arise from what make *les sciences humaines et sociales*, as Durkheim put it, so vital; the social scientist investigates a thinking object — another human being.

### **Classics Inspiring the Study of *Social* in Epistemology**

The problem of how to think about the thought of another thinking being is an old one. Many of the historical accounts of epistemology have dealt with the social aspects of knowledge, and thus these classic works in epistemology still inspire current scholars. As Angelica Nuzzo states elsewhere in this special issue: "What Hegel has to offer to us is a 'dialectical' social epistemology where truth is indeed the fundamental aim of science and yet it is a historical and collective construction of spirit" (2013, 10). Social epistemology, according to this view, has to take into account the socio-psychological "spirit" that human beings create in their interactions.

These interactions have intrigued pioneering scholars of social epistemology before the

launch of journals such as *Episteme* and *Social Epistemology*. For instance, one well-known early and arguably first American empirical scholar in the field of social epistemology, William G. Perry (1970), suggested in his work *Forms of Ethical and Intellectual Development in the College Years: A Scheme*, it is more the education of an individual that makes a human a thinking and knowing agent than does any other aspect of their formation. From Perry's viewpoint, individual perceptions of knowledge are acquired through socialization via social interaction. Therefore, the study of knowledge and perceptions of knowledge cannot be separated from the study of social psychology — a type of argument akin to those of psychological nominalists. We learn to share, create and accept knowledge within the social circles in which we live. Second, as Reider (2012) recently argued, "no philosophical question or approach can be free of competing claims as to the manner in which human beings think, communicate, act, and know".

Thinking, communicating, acting and knowing appear to be intertwined. This connectedness is strikingly present in social groups. Thinking, communication, action and knowledge are in one sense abstractions with fairly stable definitions, but are also ever-changing linguistic representations of things people do or have within a social realm. As such, they change in accord with the changes in culture, social environment and with respect to the life experience that agents gain from their interactions with others. As presented in the classic theories of group status and attribution error build within, our beliefs and knowledge are shaped by the "we" and "us" aspects of social life (Cooper 2007; Hewstone 1990; Tuomela 1995; Tajfel 1978).

For instance, fairly recent empirical evidence shows (Pirttilä-Backman & Kajanne 2001) that our ideas of knowledge and the justification of that knowledge changes as we change and mature — or merely age. When we gain in maturity and life experience, we simultaneously change our lay epistemologies i.e. the way we justify knowledge. Drawing from the early studies by Perry and others, Pirttilä-Backman and Kajanne (2001) show that people change their views of knowledge throughout adulthood. Perhaps, one could think, this could be a reason why in some traditional cultures old people and their more mature knowledge is so highly valued. Experience brings balance to the difficult pursuit of meaningful knowledge. One could argue that the passing of time may be itself an epistemic watchdog, a helpful method in validating one's own personal experiences and knowledge gained from social groups.

Aspects of age and experience are aspects of socialization and dialogue. A dialogue, alongside socialization, is an epistemic device, as suggested in the dialectical approach to epistemology of Reider (2012), Nuzzo (2013) and Hegel. Eventually, who would claim that we do not develop and that we do not have conversations or dialogues in order to know? The goal of discourse, as Habermas (1984) would suggest, must be increase of knowledge, or conversation is nonsensical; such an understanding of the goals of argumentation is both commonsensical and the general understanding of the Frankfurt School.

All in all, one should not pass epistemology on a silver platter to an analytic philosopher

or to a scientist tied to a single paradigm of to study knowledge in a social context. To combine the lenses of socio-psychological and philosophical approaches might be a better way to gain understanding. Yet some contemporary authors argue that in our contemporary world the whole study of knowledge will become less psychological and less philosophical due to the increase of data at hand. The era of 'Big Data,' some have argued, will mean a new era of science in which empirical correlations and models can be constructed which will enable the explanation of questions asked and unasked.<sup>2</sup> In a world where sensors gather data about the universe, as well as above every shopper in every store, as well as about every online transaction, perhaps such optimism is understandable. But it is misguided. Cosmological and well data-driven social research are both highly valued in philosophical scholarship, both because of their closeness to the logical rigor of mathematics. But they still fail to inform us about — new social meanings and functions — even when we are dealing with cosmology. The disciplines of physics and data mining can co-exist with philosophy and they can be mutually beneficial, but it is within the social realm that meaning is produced, reproduced and transmitted.

Philosophy considers the role of concepts in interaction, whereas social psychology considers the role of concepts, or at least the possibility of notions in group settings. These two views on social interaction are not rivals but complementary. They both aim for meaning as the higher-order quality of social life. The meaningfulness of social life lies in the meanings people are able to share. An explicit view of propositional logic can, thus, be an occasional sub-domain that enters our daily conversations. But, again, it is within the social realm that meaning is produced, reproduced and transmitted. To argue otherwise is to miss the crucial insight of Wittgenstein; language is the locus of thought, and is a social phenomenon.

From the vantage point a bit further from areas of cosmology and data mining, I discuss a philosophical theory as a theory at its best. Theories will be needed as Big Data becomes more and more available. This is an opposing view to the well-known view of Nate Silver (2012, 9) but it would take more than a Kierkegaardian leap of faith to believe that we will ever have all the data at our hands and be apt to both process and *understand* it at the same time. Arguing that the Granger causalities which are the best which can arise between data points in these very large data bases will lead to causal models is optimistic at best, and will lead to endless data dredging at worst. The most Big Data, as construed by Silver, will produce is deductive reasoning, not the hypothetico-deductive procedure of normative Mertonian science. We will always need a theory — an articulated idea of what we think matters and how that normative and value-laden wish appears in our contemporary world — if we are to construct knowledge in the Hegelian sense of *Verstehen*. Following Fuller's understanding, I argue that values and theory cannot be

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<sup>2</sup> Big Data generally refers to the idea that the Internet and its applications provide so much data of human beings that theories become irrelevant. Everything, from this extreme viewpoint, becomes visible without theoretical thinking since the *data itself* contains, within itself and its intercorrelations, all aspects of knowledge including causal relationships. The "including causal relationships" clause is important, since it highlights the atheoretical stance that underlies most discussions of the nature of these "Big Data" arguments.

separated. It appears that social epistemology is a discipline that examines the connectedness of values, emotions and reasons as constituents of knowledge. This view of knowledge as a public good remains very controversial in the academia and in the public in general.

As Chris Anderson of *Wired* magazine put the opposing view: the sheer volume of data would obviate the need for theory — and even more — make the scientific method useless whatsoever (Silver 2012, 9). Despite the growth of data in our hands, can we argue that the sheer increase of data has increased our knowledge of how to live happily and sensibly? Such a claim is absurd on its face; do we not, in a comparable sense, have all information about language existing in the corpus of the language itself? Can there be information about a language that exists outside of the language itself? Is that not, in a curiously reversed sense, the point of the Tarski theorem? Yet pundits like Silver remind the reader of the millennialist preachers of the Burned-Over District in the US in the early 19<sup>th</sup> century; the eschaton was at hand, almost; and Nate Silver is surely its prophet.

Consider the claims made by Akerlof in his Nobel winning work — curiously on the trade of lemons (Akerlof 1970). In his paper Akerlof demonstrated that in a market plagued by asymmetries of information the quality of goods will decrease and the market will come to be dominated by evil sellers and even more desperate buyers. Akerlof's basic point was that you would not want to buy a lemon without tasting it. Or, to take another example, no sensible person would buy a car without test-driving it.

As Nate Silver summarizes the problem provided by Akerlof (Silver 2012; 36):

The core problem in this case is that the stranger knows much more about the car — it's repair history, its mileage — than you do. Sensible buyers will avoid transacting in a market like this one at any price. It is a case of *uncertainty* trumping *risk*.

You know you would need a discount but cannot tell how much. And if the discount becomes large, your doubts increase. The result: there may not be a fair price at all. The factor that would make a difference is an acquaintance. Should there be someone to vouch for you the transaction would be easy — since we trust the people we regard as "reliable" we generate knowledge with our trusted ones — not with the strangers and not with the most brilliant analytic advocates.

We regard many things as "knowledge" largely due to our social trust and the pursuit of group membership (Vähämaa 2013, 13-14). Needless to say, the odds are that our acquaintances might be right or wrong. It is this fact that strikes the epistemologist as appalling, and leads to the quest for justification or to the shift to Pyrrhonian skepticism.

There may not be the rational or analytic way of knowing that one would desire. Yet, we cannot change the social wiring of human beings to bend the way people commonly think towards textbook logic. It is the researcher who needs to bend; our methods need to

change to meet the world, since the world will not change to meet our methods. A knowing subject is one that errs. Error and knowledge, it turns out, go hand in hand. This does not make the study of social epistemology easy. But it is the very errors that show the social organization of knowledge.

### **Errors Are Results of Creativity**

As said, social scientific study is unavoidably "subjective" due to its social nature. However, James Hamill (1990, 14) in *Ethno-Logic* gives us very good reasons not to give up the study of the *social* features of social epistemology in desperation:

When researchers cannot directly observe the elements that make up a body of study, they must study those elements by observing their effects — through indirect observation. This is as true for the "hard" sciences, such as anthropology and sociology, as it is for the "easy" sciences, such as physics and chemistry. I recognize that my use of "hard" and "easy" turns around the usual classification of the sciences into hard (physics, chemistry) and soft (sociology, anthropology). My classification is a crude measure of the interaction between the elements under study and the researcher: there is not much interaction in the hard sciences, and there is a great deal of interaction in the soft sciences. Largely for this reason, research in the physical sciences is easier to conduct than social science research. The objects studied by the physical sciences do not change their character radically as a result of being studied, unlike the case with the social sciences. The "objects" of social science research are subjects; because they are people, they create new meanings in response to being researched (Andreski 1972, 18-22). Nevertheless, although human creativity makes life difficult for social scientists, it also provides the key for discovering the structures that underlie human behavior.

Creativity, following Hamill's understanding of human thought and social processes, is the door towards knowing as a result of creative thinking, creative research and errors as common outcomes of any thought outside of the strictures of textbook logic. Hamill (1990, 14) argues that errors occur when creativity is possible. Furthermore, creativity is possible when errors occur, no matter where those mistakes come from. An error is an error precisely because of the knowledge system that creates it. Knowledge in the social world is, then, a boundary object — an object that has different meanings to different epistemic communities (Bowker & Star 1999). The boundaries of epistemic communities are the boundaries of different types of meaning given to the same object that is being observed and discussed. As Hamill states (1990, 14):

Almost anyone can think of activities that are wrong in one setting but perfectly right appropriate in another. Thus it is not a particular act that is in error; the existence of the error lies in the comparison of the act to a system that knowledge that stands behind and generates the act. Through a

comparison of mistakes to nonmistakes, the parameters of the underlying system emerge.

Humans have the ability to change their thinking and behavior in accord with new information from the environment. Most of the time, the primary sources for new information are social networks. The natural world offers stimulation as well, but the natural world itself cannot make mistakes. It is the meaning assigned to other humans' actions that we think may be wrong or erroneous in comparison to what we know. From the viewpoint of the person being "right" an "error or a mistake is a discontinuity between what is known and what occurs, when the meaning of a particular event runs contrary to the general system of knowledge or values in the context of the event. A rock cannot make a mistake because it has no knowledge and thus cannot assign meaning" (Hamill 1990, 19).

One can create discontinuity between knowledge in somebody else's eyes (even in one's own eyes) and one's creation. Social epistemology, from the viewpoint I present here, is futile when practiced in the context of analytic textbook logic. This means that truth tables and an analysis of mathematically driven truth does not need any social constituents. Yet, it appears, one can easily be creative and err within such coherent computational structure. On the other hand, a mistake does not have any universally shared textbook meaning in art where it is often the mistakes that create and stimulate new ideas, new ways of thought and new knowledge.

In my view, the commonly assigned desirability of creativity in human life is actually antithetical to the desirability of analytic logic as a higher order of knowing. I cannot image it easy to find people to say that we should get rid of creativity or even minimize its role in human life and societies. If we need creativity, then we need errors at the forefront of knowing. Hamill (1990, 21) argues in favor of creativity and a broader perspective on both logic and social epistemology in general:

...[A]ny general theory of culture must account for both universal and particular culture. It should explain not only universal error and common responses to syllogism tests, but also particular logical patterns found in only one culture. A good theory, must explain them by proposing principles from which both universals and particulars follow. Therefore the theory must include universals or both meaning and process.

The role of textbook logic as a higher order way of knowing leads us where we currently are: the points that connect epistemology to communication, learning and social order are largely unstudied in social sciences. This outcome is highly undesirable as it stops the development of many social scientific fields. Even *The Cambridge Dictionary of Philosophy* (1999, 856), writing from a viewpoint of analytic social epistemology, seems to neglect the role of *social* in social epistemology. The highly regarded dictionary gives only little hope for social factors to enhance epistemic pursuits. The *Cambridge Dictionary of Philosophy* (1999, 856) seems to see the social life as an epiphenomenon of

knowledge, rather than as its progenitor: "... social practices might enhance knowledge acquisition."

My dismissal of textbook logic as a role model in social epistemology does not mean dismissal of the natural sciences. The advances in natural sciences have come, to large extent, as a result of the computational clarity that has been developed by scientists in the fields of philosophy and analytic epistemology. As long as the domain of study is very well isolated from thinking beings, the coherence of propositional logic, differential calculus and statistical inference will yield remarkably clear results.

For instance, when we study bacteria in hopes of curing disease, or we study planetary movements to create a mathematical conceptualization of time and space, it is reasonable to think that a "truth" about something can be asserted fairly strictly by well-grounded standards of formal propositional logic, which we can call an epistemology. Obviously, such a working epistemology within restricted natural scientific domains does not need further justification.

But, as I argue, the analytic tradition in epistemology has become disconnected from the social, and, as such, has become disconnected from the true goal of philosophy: *eudaimoneia*, happiness, the betterment of lives. To remedy this, we must examine the social in social epistemology. We must start to tap into social lives and social practices that shape our societies, groups and eventually individual lives. Such a remedy, in terms of connecting epistemology to social problems that truly matter, starts with addressing the role of groups in forming knowledge.

A timely example of such scrutiny of secrets and their epistemic role in social life is Edward Snowden. It is not really Edward Snowden, whomever he might be, whom we all think know and do not know. Rather, we all know different versions of meaning that the revelation of secrets has created around him. Different newscasts, social media outburst and the like have formed epistemic communities with their versions of knowledge about the meaning of the event.

### **Social Life and Secrets — The Problem of Other Thinking Beings**

As said, as soon as we start to think of the social life and the role of epistemology in our social worlds, the game changes immediately. We lose the ease that we enjoy in the analytic epistemology of natural sciences construed purely on propositional logic. Audi (2003, 69), as an analytic philosopher, relies on the strict rules of logic even when it comes to memories of knowledge:

When our memory beliefs are of propositions we remember to be true,  
they constitute knowledge.

A contra-analytical view would find it hard to see memories as illogical; not for the reason that propositional logic is not seen as a prerequisite of knowledge, but rather for

the fact that memories in general mean and matter so much for people. Memories put into words are often creative in the way that they are indeed often mistaken, compiled from flashes, partially forgotten, partially photographically remembered and partially constructed. Despite the creative flaws of our memories, they constitute meaning for our lives. We base most of our conversations on memories of what we have seen, read or heard.

Secrets, like the ones revealed by Snowden, the ones shared with our friends, spouses and other trusted ones are examples of epistemic objects shared within a limited epistemic community. Again, we face the idea of a boundary object. A secret is a boundary object understood differently within different epistemic communities. The CIA, in the case of Snowden, would have assigned a whole different meaning to the information held by Snowden — had it stayed secret. Yet, as revealed, the once-secret information invites a variety of interpretations in different communities of knowledge. The international community of politics, for instance, creates very different meaning to the knowledge leaked by Snowden than do the publics of various nations

Secrets, furthermore, are good examples of the switches that turn us from an easy epistemic reality of propositional logic to the diverse logic structures present in social life. Secrets, as commodities of the social life, will not yield very easily to propositional logic. To begin with, we tend to have the idea that at least somebody knows about the material that is kept secret from us (however we construe 'us'). Generally, when we think of secrets in social life, *knowledge* strikes us as a matter of epistemic groups that have whatever knowledge is embedded in the secret, and other epistemic groups that do not know the secret knowledge. By definition, one is either 'in the know' or not; by definition, these groups are epistemic in nature..

What would a secret be like without a community (even if the community is constituted merely by a pair of friends) that holds the secret? An analytically represented secret would be a one possibility, but an abstract secret would not satisfy the social structure of a secret. There needs to be something valuable to be held secret, somebody to keep it from, a trusted one(s) to share it with and a shared and comprehensible language among the trusted ones. Could only one person have a secret? Analytically, that is a possibility, but in terms of social epistemology there needs to be revelation of the secret at some point, , if we are to discuss it as a philosophical point Even if I merely say, "I have a secret," it is, to some extent, no longer a secret; the interrogand in an interrogation to some extent has had their secret divulged to some extent to an inimical community (their interrogators) – since their interrogators know their interrogand knows the secret, whose content at the current moment is secret.

As an example of social epistemology in practice, a secret is a matter of social order, communication and learning. The features of trust, comprehensibility, hiding and sharing are all social and all common aspects of organizing knowledge among people. Linguistic groups set natural boundaries to knowledge as well, and in many cases replace the intentional "hiding" of knowledge via incomprehensibility to speakers of another

linguistic group. In any event, the knowledge of any given group is limited and can be enriched only via interactions with social groups other than one's own.

For the analytic social epistemologist, truthful knowledge is typically something that can exist as theories outside of the social realm, while things such as secrets and social life are of less interest. But secrets, I argue, are not just matters of epistemic asymmetry where others know and others do not. Secrets as examples of epistemic social reality give us a hint of how people tend to organize knowledge. We do acknowledge that there are people out there who know things that we do not — all these secrets carry epistemic information as well as constraints with them ready to be acclaimed. We acknowledge that there are secrets out there that we are not entitled to know. And, importantly, we have learned all this long before we stumble upon our first textbook on epistemology.

I argue that in our everyday social lives it is secret or unachieved knowledge of things that we care about the most, and thus would most likely pursue if given an opportunity. We don't know what we don't know, but, more essentially, most people have an innate curiosity and tendency to err and create along the path of curiosity. Truth, then, would be a lower-order concept to curiosity, error, creativity and secrets. In practice, this would mean that we tend to pursue the truth carried by the secret. The aspect of secrecy carries the social importance with it, not the aspect of truth *per se*. The analytical truth itself is of little social interest. Following this line of argumentation, lying and incomprehensibility replace the philosophical concepts of "untrue" and "logically invalid argument". In the social world, we operate with the terminology that best captures the meaning of our actions.

In analytic philosophy, one pursues a knowledge structure not constrained by the meanings attached to the social world; the analytic philosopher has the "view from nowhere" that is unmoored in a social setting. But the development of social epistemology is linked to a social world and to the "things that truly matter". It is this information that matters the most and which ranks highest in the epistemic hierarchy of people – the "agenda" of communication research.

The value of a secret is purely social, given by people, but it is nonetheless a way of administering and defining important knowledge. To extrapolate, one can say that we value knowledge in general because it relates us in some meaningful way to our social groups. We do not value information for its face value. For instance, scholars have used rigorous analysis and propositional logic to make some of our knowledge computational since its contents already *matter* so much to us. Computational coherence and clarity can help spread knowledge within social groups. Yet, the higher order of the process is the delivery of meaning, not the delivery of logic. If any object of interest would not matter socially why would one bother to clarify or share it in the first place?

In computer science, for instance, we symbolize and give ones and zeros to things that we think can gain in meaning in the process, not in order to lose meaning. Eventually, any construct of knowledge will gain its "true" meaning when interpreted in social groups. In

a same way any construct of knowledge will lose its significance if it will not gain ground in groups for which the knowledge is intended. If nobody cares about the knowledge portrayed, it is probably due to social issues and interest. Interest towards knowing something is built upon both our group's standing and our personal interests. The pursuit of truth as an ultimate epistemic goal is rarely on our minds. Rather, agents pursue personal and social satisfaction and gratification.

### **Mathematics as an Example of Group Influence**

To know is a matter of making sense of the social world and to accept the social status of knowledge. A person "who knows" is important to others due to the fact others can learn from her. For this reason, most of the time, "knowing" is a social practice. Therefore, to a social epistemologist it appears difficult to divorce the universal theory of "epistemology" as an independent discipline from the particular theories of allocating knowledge: communication theory, theories of learning and social theories. At this point, the analytic epistemologist takes another route.

Despite the rigor and elegance of analytic philosophy, empirical evidence continues to mount in support of other approaches to the allocation of knowledge. Consider the success of the theory of two-step flow of communication. A recent empirical study (Nisbet and Kotcher 2009) showed that knowledge of global warming was typically allocated by trusted group members. These trusted "opinion leaders" have influence on the perceptions the group comes to hold as knowledge. Thus, the group affiliation and opinion leaders work together as social codes to set the compass of knowledge for group members.

To switch our example to concern epistemology as a discipline, I would go as far as to claim that analytic epistemology as well as social epistemology are social group practices, like many academic disciplines, with their very own opinion leaders. While we organize our thoughts and activities, we simultaneously build and need an epistemology to be able to have those thoughts and activities. Epistemology and social psychology are difficult to separate.

Groups are important for the social epistemologists, since groups make errors and creativity possible. An error — a creative interpretation of an object discussed — reveals to us within our groups what is known since the error emerges through action. Social epistemologies arise and emerge through this type of rapid feedback from errors. Feedback from the groups make our existence and learning in social groups possible (Wide 2009). Sometimes it is hard to separate "erroneous" beliefs from "correct" ones. In many cases there is no universal or easily achievable understanding of what "correct" or "error" even means. In such cases only comparisons among different groups can help us to understand how different types of "knowing" arise and how "knowledge" is allocated in social groups.

For example, recent studies of epistemic judgments of mathematics show how diverse

perceptions of mathematics occur against the backdrop of what is considered known (Vähämaa and Härmälä 2011; House 2006). Math seems to be surprisingly social in terms of how it is defined and whether or not it is liked. One could easily assume that most individuals believe math is an exact science, where social issues play little to no importance. Yet, this is not the case.

The study conducted in Norway and Finland by Vähämaa and Härmälä (2011) showed that meanings given by students regarding mathematics often ran contrary to the general system of knowledge employed in schools and universities. Students are typically expected to adopt meanings that are in line with the "right way of thinking" of what mathematics is and on what criteria mathematical knowledge builds upon.

Interestingly, the study found no universal meanings given to mathematics. Rather, the results of these studies gave information to educators of the multiple "home-made" meanings — meanings that often carried "errors" with them — of mathematics that may be helpful while teaching and communicating the general system of mathematical knowledge.

Lay ontologies of mathematics appeared surprisingly versatile, which pinpoints that the epistemic environment for learning varies with the social environments. In the study cited above, over 200 Norwegian and Finnish university students (with similar average age and similar variety in their majors) were sampled to define their definitions of mathematics, rate their like or dislike toward the subject, and to describe how they thought mathematics was useful in their everyday lives. A variety of lay ontologies of math were found, as well as surprising correlations.

Statistically significant predictors of liking mathematics were nationality, primary school high achievement, secondary school high achievement and "abstract perception of applicability of mathematics". Abstract perceptions of applicability were called those perceptions in which students "emphasized conceptual skills" and thought that mathematics can be applied in a variety of conceptual tasks that transcend the everyday routines. Students with concrete ontologies, on the contrary, emphasized purely the practical nature of math. Usefulness of math was seen in the completion of quotidian tasks such as counting money and inspecting paychecks. (Vähämaa and Härmälä 2011, 82-83)

As defined, those who held abstract applicability perceptions were the ones who saw the usefulness of mathematics in conceptual skills in thinking and creating meaning. Such abstract view of applicability of mathematics seems to feed strongly to the liking of math. Perhaps more interestingly, gender did not predict like or dislike of math, although such a stereotype is very common. To the interest of a social epistemologist, the key social and individual factors that predict student's abstract or concrete perception were controlled in a regression model.

Out of gender, nationality, primary school high achievement, secondary school high

achievement, perception of mathematics and perception of numbers only one variable was found to matter ( $p < .001$ ): *nationality*. Other variables were not statistically significant at all. The large scale social environment, a type of "big social epistemology" appears to surround even such an internationally recognized and common topic as mathematics. The study concluded it likely that culturally different features of schooling and communication cultures around mathematics create different types of epistemic communities. These communities generate and reinforce perceptions and attitudes towards mathematics. In sum, then, national modes of education likely generate national epistemologies, even around something as 'neutral' as mathematics.

### **How to Bend it Like an Analytic Epistemologist?**

As the math example shows, social epistemologies arise in different domains and areas of the world. Epistemic communities, as was discussed in the case of boundary objects, rapidly emerge around topics of interest. The emergent nature of social epistemologies in real-life situations makes them difficult to study without at least some analytic bending of the situations and objects being studied.

By "bending," I mean that it is necessary to combine the sensitivity towards the social features of knowing and clarity of analytic epistemology in order to create scientific studies in social epistemology. Clarity in language, common comprehensibility and robustness in methodology are needed for the scholarly work of the social epistemologist.

We owe the importance of these achievements largely to steps taken in analytic philosophy. It is the bending of analytic philosophy towards the social, not the abstract analysis itself, that links epistemology to social science. We borrow from analytic philosophy its coherence, but we generalize and attempt to share our findings in social circles. The *bending*, then, is not a side effect but the act of creative thinking combined with scientific methods and scientific writing.

Unfortunately, though, I argue that the emergent and hard-to-capture nature of real-life epistemic practices has stalled the study of social epistemology in favor of advancing the theoretical frontiers of analytic epistemology. Social epistemology has been seen as a philosophical curiosity even though social epistemology is at the very core of communication and social organization of life. At least it appears that the epistemic edge of already existing social scientific theories is often viewed as a side conversation, if it is considered at all. Because so much lies in what is collective, we should focus on collective factors of emerging social epistemologies in order to better educate, better communicate and, indeed, to know better.

In everyday lives we tend to accept the fact that the division of epistemic labor and epistemic asymmetries are always there: the aspects of "knowing" and "not knowing" are fluid parts of the social life and interaction among our peers and betters. As children, we grow and are socialized to know by knowing that there is always more to know. Social epistemology, as a developing universal discipline, is to a large extent connected to

particular theories of communication, social order and learning. I argue that findings of social epistemology will improve social science when brought to the forefront of planning, conducting and communicating social scientific research. And such an observation should not be kept secret.

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