Democratic Reason: the Mechanisms of Collective Intelligence in Politics
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Abstract: This paper argues that democracy can be seen as a way to channel "democratic reason," or the collective intelligence of the many. The paper hypothesizes that two main democratic mechanisms—the practice of inclusive deliberation (in its direct and indirect versions) and the institution of majority rule with universal suffrage—combine their epistemic properties to maximize the chances that the group pick the "better" political answer within a given a context and a set of values. The paper further argues that under the conditions of a liberal society, characterized among other things by sufficient cognitive diversity, these two mechanisms give the rule of the many an epistemic edge over versions of the rule of the few.

Introduction

In this paper I propose that democracy is valuable in part because it is a collective decision-method that channels citizens' collective wisdom or, as I call it, "democratic reason." Traditional justifications for democracy emphasize non-instrumental arguments, such as those based on the ideas of freedom, equality, justice and fairness. Here I take seriously the old Aristotelian idea that "many heads are better than one" as an argument for democracy.[1] I explore theoretical reasons supporting the possibility that the rule of the many epistemically dominates dictatorship and any known variant of the rule of the few (where the few are either self-selected or elected once and for all). The boldness of the hypothesis presented here comes in part from the fact that I interpret both dictatorship and oligarchy in the best possible light, granting that the oligarchs and the dictator pursue the good of the greatest number as opposed to their narrow interests.

While the results of a comparison between the rule of many and the rule of one should be fairly intuitive (if, indeed, many heads are better than one), the second part of

[1] David Estlund is one of the first contemporary political theorists to have shifted the emphasis from the intrinsic value of the democratic decision-process to its instrumental value, arguing that the normative authority of democracy is also in part "epistemic," that is determined by the tendency of democratic procedures to deliver "correct" or "right" results overall (Estlund 1997, 2007).

the claim is more controversial. If the idea of collective intelligence or collective wisdom applies to the many, it applies to the few as well. How could a group of oligarchs not outsmart the rest of the people if the oligarchs are carefully selected? This is the very thought behind the ideal of aristocracy: the rule of the best and brightest ought to beat the rule of regular citizens. In this paper I surmise that this might not be the case. However counterintuitive that claim may sound, an oligarchy of even the best and brightest need not be generally smarter than the rule of the many because of the crucial role of one component of collective wisdom, namely "cognitive diversity" or the existence within the group of multiple ways to see the world and interpret it. Applying the theoretical findings of Scott Page (2007) about the relative importance of cognitive diversity and individual ability for collective problem-solving and predictions, I argue that since an oligarchy of even very smart rulers will generally display less cognitive diversity than a direct or representative democracy, the few can in general and on the long run not match the epistemic competence of many moderately smart but diversely thinking individuals. In other words, to the extent that cognitive diversity is more likely to exist in the larger than the smaller group, I argue that democracy is more conducive to collective wisdom than any version of the rule of the few.

The originality and power of the theoretical argument formulated here (if it is true) is that on that account democracy would still be preferable to oligarchy, even if one could identify in advance the smartest and most virtuous individuals in a given population.[2] On the view presented here, even assuming that we could agree on who the

[2] I emphasize the originality of the claim because in Estlund's approach for example, the epistemic comparison between rule of the many and rule of the few is precluded by the requirement that any claim to authority satisfy a "general acceptability requirement." According to Estlund, even if an oligarchy of knowers is probably more epistemically reliable than democracy, it would never pass the "general

best and brightest are, we would still be better off making the decision as a group rather than delegating the group decision to this subset of best and brightest. In other words the problem is not that we cannot know who the knowers are. The problem is that there are good theoretical reasons to believe (and some empirical evidence to support that belief) that the best knower is the group itself.

In order to support the view that democracy epistemically dominates any version of the rule of the few, I study two of the decision-mechanisms that can be said to give democracy an epistemic edge: maximally inclusive deliberation and majority rule under universal suffrage. I argue that, to the extent that cognitive diversity is correlated with the number of participants, deliberation among the many epistemically beats deliberation among the few. I also argue that given the same assumption of cognitive diversity brought by numbers, aggregation of judgments among the many can be epistemically as good as aggregation of judgments among the few, even if one makes unrealistic assumptions about the intelligence of the few. Combined together, the epistemic properties of those democratic procedures give democracy an epistemic edge over any variant of the rule of the few.[3]

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acceptability" test. I deny that this is necessarily the case and make the more ambitious claim that if we allow for the comparison to take place, emocracy is generally epistemically superior to oligarchy.

[3] This paper deliberately avoids considering potential epistemic failures in deliberative settings and voting, such as the well-documented problems of polarization, hidden profiles, informational influences, social pressures, or informational cascades (for an overview of these problems and references to a representative literature see Sunstein 2006: Chapter Three; for a more nuanced assessment of these problems, see Mackie 2008). To the extent that these problems exist and would arise whether the rulers are few or many, they are not discriminating in the comparison attempted here. Further, epistemic properties are only probabilistic and nowhere do I argue that rule of the many (or one or a few) is infallible. The question of the proper institutional answers to bring to those epistemic failures and risks, however important, cannot be addressed here. I do not address either the problem of potentially "tyrannical majorities." Popular as an argument against democracy since Tocqueville first magnified it, the problem of tyrannical rulers applies to minorities as well as majorities. It raises the liberal issue, orthogonal to the epistemic question addressed in this paper, of the proper limits of any collective decision method and any form of government.

This paper has five sections. In the first section, I theorize the concept of "democratic reason" as a label for the distributed collective intelligence of the people, and even, occasionally, their collective wisdom. The second section turns to deliberation as the first mechanism of democratic reason and the theoretical reasons that can be adduced for its epistemic properties. The third section briefly turns to the problem of deliberation on a large scale and the relation between representation and democratic epistemic performance. The fourth section turns to majority rule and considers successively three plausible theoretical accounts of its epistemic properties: the Condorcet Jury Theorem, the Miracle of Aggregation, and a model based on cognitive diversity (Page 2007). The fifth section consists in a long answer to Caplan (2007)'s objection that voters are "rationally irrational," which should make it impossible for what I call democratic reason to emerge. The conclusion recapitulates the epistemic advantages of the rule of the many over versions of the rule of few.

1. Democratic reason and epistemic competence

I define democratic reason as a certain kind of distributed collective intelligence specific to democratic politics. In what follows I use indifferently the term "collective intelligence" and "collective wisdom," even though the concept of wisdom is richer than the concept of intelligence, including notions of experience, time-tested knowledge, and more generally diachronic intelligence that are certainly part of democratic reason but that I do not have the space to deal with in this paper.[4] The only diachronic aspect of intelligence that I touch upon is that introduced by the institution of representation, which

[4] See for a broader reflection on the notions of collective wisdom and collective intelligence, Daniel Andler, in Landemore and Elster forthcoming 2010.

creates some temporal mediation between the input of citizens and its translations into actual policies.

"Democratic reason" is also meant in part to contrast with the less inclusive concept of "public reason" in Rawls, which works as a standard of liberal justification, and perhaps as a theory of limited government, but has, arguably, little to do with the reason of the real public, being in effect expressed by representatives, Supreme Justices and the like (Rawls 1993). The concept of democratic reason is, by comparison, meant to be a priori undiscriminating and maximally inclusive.

Since I partly build the concept democratic reason on insights from psychology and the cognitive sciences, let me say a few words about the latter. According to the cognitive sciences, intelligence is a broad ability for comprehending our surroundings and figuring out what to do, as opposed to mere book learning or test-taking smarts (Gottfredson 1997: 13). It is in that sense irreducible to IQ or other single-dimensional feature. Collective intelligence is just such a complex notion of intelligence premised of groups as opposed to individuals.

The second insight that I borrow from cognitive sciences is that although collective intelligence can theoretically be a direct function of individual intelligence (the sum of the parts), it is more aptly seen as an "emergent" or "supervenient" property (more than the sum of the parts). Examples of supervenient intelligence are displayed by groups of social animals, such as ants or bees, which display a form of intelligence at the level of the group that is not be found at the level of each distinct animal. Applied to humans, the idea of collective intelligence does not necessarily imply that no intelligence is to found at the level of individuals, but that

the emerging product is nonetheless of a different nature or quality.[5] As we will see, an essential ingredient of collective intelligence is the cognitive diversity of the group, a property which by definition cannot be found in individuals.[6]

The third lesson I draw from findings in cognitive sciences is that cognition and intelligence can be "distributed" (Lave 1981), over both space and time. Spatially speaking intelligence can be distributed over individuals and what is called "cognitive artifacts,"i.e. devices that help us accomplish complicated tasks and/or make smarter decisions or choices.[7] A famous study by the cognitive anthropologist Edwin Hutchins (1995) shows for example how the computation involved in steering a large ship does not take place in the head of any particular individual, not even the captain but in the coordination of the minds of different individuals equipped with navigational artifacts, such as landmarks, maps, phone circuits, and organizational roles.[8] The relevant cognitive unit in this case is no particular individual, but the system "crew+relevant cognitive artifacts" as a whole.

Some cognitive artifacts also allow cognitive processes to be broken down into successive tasks, distributing the cognitive effort not just through space but

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[5] I specify that this idea of collective intelligence does not commit me to a form of methodological or philosophical holism.

[6] Although of course some analog of cognitive diversity within a group can exist within individuals when they make a conscious effort to see the world from different viewpoints, but that is a separate point.

[7] According to the exact definition, cognitive artifacts are "those artificial devices that maintain, display, or operate upon information in order to serve a representational function and that affect human cognitive performance" (Norman 1991: 17). Examples are language, inscriptional systems for representing language, maps, lists and calculators. The great advantage of cognitive artifact is that all that the individual has to know in order to solve a problem is how to use the cognitive artifact, which contains in itself the knowledge required to solve this particular problem. Thus to solve a complex multiplication, all I need to know is how to spatially display the digits on a sheet of paper and perform simpler calculus in a given sequence (Rumelhart et al., 1986 and Wertsch 1998). I can also use the superior cognitive artifact that is a calculator.

[8] This example is not meant as an example of democratic organization, just as an example of collective distributed intelligence (but distributed collective intelligence need not be democratic).

through time as well. For example, a list of things to do divides the cognitive process of remembering into at least three chronological steps: the construction of the list, the mental action of remembering to consult the list, and finally the actual reading and interpretation of the items on the list (Norman 1991: 21).

Applying the related notions of distributed collective intelligence and cognitive artefact to collective decision-making, I call "democratic reason" the kind of distributed collective intelligence distributed across citizens and a certain number of institutions and practices that can be seen as specifics to democratic politics. As said earlier, in this paper, I focus on the synchronic properties of groups of one, few and many and leave aside the temporal dimension of democratic reason that makes it a variety of "collective wisdom." (I do believe, though, that over time democracies are more likely to accumulate collective wisdom than oligarchies or dictatorships even though I will not defend that idea here). I also propose to interpret decision-procedures such as collective deliberation and majority rule as cognitive artifacts that help individuals perform a social calculus beyond their individual abilities.

The conceptual gain of this cognitive approach to democratic institutions of collective decision-making is that it allows us to explain how the individual citizen cognitively unburdens herself by letting others, as well as the environment, process parts of the social calculus. Against political scientists worried that individual citizens lack the capacity for self-rule, the concept of democratic reason allows one to reply that what matters is not just what individuals can do on their own, but what they can do with the help of political cognitive artifacts such as inclusive deliberation and majority rule (and

probably other political cognitive artifacts that I am not considering).[9] Another way to say this is that democratic decision-procedures are societal ways of making collective decisions that economize on individual intelligence, or epistemic competence. Notice that this is a distinct argument from the traditional idea that democracies economize on virtue.[10] In the following, I will use the term "epistemic mechanism," or "mechanism" for short, preferably to that of "cognitive artifact" but by mechanism I mean essentially the same thing as a cognitive artifact, namely a device—institution, practice, etc.—that helps us facilitate a calculus or a task. Deliberation and majority rule supplement each other in producing democratic reason. Of course to the extent that deliberation and majority rule are epistemic mechanisms available to oligarchs (and even, in a degenerate form, to dictators as well), I will explain why the combination of democratic deliberation and majority rule with universal suffrage beats the combination of deliberation among the few and majority rule among the few.

Closely related to the idea of democratic reason is the notion of "epistemic competence," which is the competence one has in virtue of knowing something or having a certain kind of knowledge. I distinguish it from "moral competence" or "virtue." Virtue ensures that a ruler wants to promote the common good rather than his or her private interest or that of a subset of the citizenry. Ideally we want rulers who are both smart and virtuous. One might be smart and morally evil—see the common good and refuse to choose it. In order to keep things simple here, I will assume that all rulers—whether one,

[9] The fact that collective intelligence can be distributed not just through space but over time as well introduces an important temporal dimension into the concept of democratic reason. Democracies should be able to learn, particularly from their own mistakes, how to immunize themselves against the worst forms of individual and collective cognitive failures.

[10] This classical argument is to be found for example in Machiavelli, Discorsi I, 58, where after marveling at the accuracy of popular judgment, Machiavelli ultimately credits this property to the fact that the people have more virtue, rather than more intelligence, than the prince.

few, or many—want the same thing, namely the common good. As already noted, by doing so I deliberately stack the deck in favor of oligarchy and dictatorship.

I also distinguish epistemic competence from the sheer possession of information. Information is the raw data about political facts that citizens are supposed to need in order to be able to form enlightened judgments. The relationship between information and enlightened judgment is often reduced to a simple equation by political scientists, as if the level of information was all that mattered to establish and predict epistemic competence. It is generally assumed that to the extent that citizens do not know a set of facts—the name of their senator, the capital of Japan, which candidate supports which economic platform, the meaning of "welfare" or "liberalism"—they are epistemically incompetent. I take it that this need not be the case, although not for reasons provided by the literature on the "reasoning voter," who supposedly use heuristics and cognitive shortcuts to vote based on little information roughly what she would have voted based on more exhaustive information (e.g., Popkin 1994). While this approach initially seemed promising, it does not provide much empirical evidence for either the actual use of such shortcuts and heuristics in voters or the fact that voters vote roughly the same with low or high information level. In fact the latter hypothesis seems falsified by the literature on the Enlightened Preference (e.g., Althaus 2003), which demonstrates substantial differences in policy preferences between the real public and the same public virtually (statistically) endowed with maximal political knowledge.

In any case, I will for now neutralize the information factor and assume that the same level of information is made available to all types of rulers (one, few, or many) be it through polls, information-markets, or boards of advisors. One might object that by do

doing I stack the deck in favor of democracy. I deny that this is necessarily the case but postpone a detailed answer to that objection to the last section, where I deal with Caplan's critique of the Miracle of Aggregation and his more general point about the fact that democracy creates disincentives in voters to get properly informed, which is a problem if low levels of information correlate with bad choices. In my view what matters for collective epistemic competence is not so much the level of individual information as the collective level of information as well as the existence of institutions that work as mechanisms gathering and processing this information for the group. I suspect that democratic institutions do not reduce the collective level of information (to the contrary) and I doubt that democratic citizens on average individually fall below the threshold that allows them to vote competently anyway, at least on most important issues.

Finally, I distinguish between collective epistemic competence and individual epistemic competence. As I said earlier, collective epistemic competence might be more than just the sum of individual epistemic competences, and indeed a property emerging from the right mix of individual epistemic competence and some other things. Controlling for virtue and information available at the level of the group, I propose that collective epistemic competence is essentially a function of two things: individual epistemic competence and the cognitive diversity of the group. To be clear:

(1) Collective Epistemic Competence = f (individual epistemic competence, cognitive diversity of the group)[11]

[11] I assume that the function f reflects the right degree of interaction between individuals. Since I assume oligarchy and dictatorship to be the best they can, I can afford to assume that the type of interactions between democratic citizens is of the kind that allow for individual epistemic competence and the cognitive diversity of the group to matter.

Once we have an answer to the question of which decision-procedure has, in theory, the higher collective epistemic competence given equal amount of information and virtue in the rulers, it will be easier to reintroduce the "information" and "virtue" components and see whether doing so modifies the conclusions reached.

2. Deliberation: the Forceless Force of the Better Argument

The first mechanism that arguably makes democracy an epistemically reliable collective decision-rule is inclusive deliberation, i.e., deliberation that involves, directly or indirectly, all the members of the group.[12] Deliberation is classically defined as an exchange of arguments for or against something (Aristotle, *Rhetoric*, I, 2). Contemporary deliberative democrats have added to that definition the goal of a rational agreement or consensus on the better answer or argument. Deliberation is also opposed to voting or bargaining and is not supposed to involve threats, promises, sophistry, or any form of "strategic" rather than "communicative" action.[13] The better argument is supposed to triumph through what Habermas famously calls its "forceless force," that is, its irresistible epistemic superiority.[14] Notice that this does not make unanimity a necessary goal of a successful deliberation, but simply its regulative ideal.[15]

Deliberation is generally credited for three properties arguably conducive to its epistemic properties. Deliberation is supposed to:

1) Enlarge the pools of ideas and information

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[12] I leave outside of the discussion of this paper the boundary question (of who belongs to the group), even though it is a central question for democratic theory.

[13] Whether self-interest can play a role in deliberation is an issue of contention among deliberative democrats (for a defense, see Mansbridge et alii forthcoming 2009).

[14] I summarize here a huge literature on the subject, following a recent survey by Martí 2006.

[15] When unanimity is imposed as a goal, the risk is to create incentives for strategic manipulation (see Feddersen and Pesendorfer 1998 about the inferiority of unanimous verdicts in juries).

2) Weed out the good arguments from the bad

3) Lead to a consensus on the "better" or more "reasonable" solution.

In order to illustrate such alleged effects of deliberation, let me consider two stylized situations of what occurs in a deliberative process. I borrow the first example from the film "Twelve Angry Men."

In the famous film by Sidney Lumet, one brave dissenting jury member—number 8, played by the actor Henri Fonda—manages to persuade the other 11 jurors to reconsider the guilty sentence they are about to pass on a young man charged with murder. Asking the other jurors to "talk it out" before making up their mind, juror number 8 takes the group on a long deliberative journey, which ultimately ends in unanimous acquittal. "Twelve Angry Men" can be seen, in my view, as illustrating the phenomenon of collective intelligence emerging from deliberation. Juror number 8, left to his own devices, would have been unable to demonstrate that the sentence was beyond reasonable doubt. Only by harnessing the intelligence of the other members, including against their own passions and prejudice, does the group ultimately reach the truth.

The contributions vary and complement each other: juror number 5, a young man from a violent slum, notices that the suspect could not possibly have stabbed his victim with a switch-blade. No other juror was acquainted with the proper way to use a switch-blade. Juror number 9, an old man, then questions the plausibility of the time it took one of the key witnesses to cross the corridor. He too contributes to changing the collective perspective on the way the crime took place. One of the most rational jurors, a stock broker unconvinced by any of the other arguments, finally has to admit that a shortsighted woman is not credible when she pretends to have seen the murderer from her

apartment across the street, through the windows of a passing subway, while she was lying in bed, most likely without her glasses. The deliberation process in this scenario nicely idealizes real-life deliberative processes in which participants contribute an argument, an idea, or a piece of information and the group can reach a conclusion that no individual by himself could have reached.

Notice that in this scenario deliberation among several people has the three properties of good deliberation. Deliberation enlarged the pool of information and ideas for all jurors, bringing to the surface knowledge about the proper use of a switch-blade and a contradiction between this proper use and the description by the visual witness of the way the victim was supposedly stabbed. Deliberation also brought to the surface a fact that many in the group had noticed—the red marks on the sides of the nose of the witness—but did not know how to interpret or use. Here the proper interpretation of the fact was that the witness wears glasses, is most likely short-sighted, and the conclusion that this fact leads to is that the testimony cannot be trusted.

Deliberation also allowed the group to weed out the good arguments from the bad. Once they reach the conclusion that the visual witness is short-sighted, knowing that she reports having witnessed the murder while lying in bed, what is most likely: that she was, or wasn't wearing her glasses? Even the most stubborn juror has to admit that the argument that she was not wearing her glasses is stronger than the argument according to which she was wearing them.

Finally, deliberation leads to a unanimous consensus on the "better" answer, namely the decision to consider the young convict "not guilty" given the doubts raised by deliberation.

According to Lu Hong and Scott Page's results on the components of collective intelligence (Page 2007), what matters most to the quality of collective problem-solving of the type described in the previous example is "cognitive diversity." Cognitive diversity is the difference in the way people will approach a problem or a question. It denotes more specifically a diversity of perspectives (the way of representing situations and problems), diversity of interpretations (the way of categorizing or partitioning perspectives), diversity of heuristics (the way of generating solutions to problems), and diversity of predictive models (the way of inferring cause and effect) (Page 2007: 7). Cognitive diversity is not diversity of values or goals, which would actually harm the collective effort to solve a problem. Because of the importance of cognitive diversity thus defined, given four specific conditions, "a randomly selected collection of problem solvers outperforms a collection of the best individual problem solvers" (Page 2007: 163).[16]

The general point is that it is often better to have a group of cognitively diverse people than a group of very smart people who think alike. This is so because whereas very smart people thinking the same way will tend to get stuck quickly on the solution that seems best to them, a more cognitively diverse group has the possibility of guiding each other beyond that local optimum towards the global optimum. We can imagine that,

[16] The four conditions are fairly reasonable. The first one requires that the problem be difficult enough, since we do not need a group to solve easy problems. The second condition requires that all problem solvers are relatively smart. In other words, the members of the group must have local optima that are not too low otherwise the group would get stuck far from the global optimum. The third condition simply assumes a diversity of local optima such that the intersection of the problem-solvers' local optima contains only the global optimum. Finally, the fourth condition requires that the initial population from which the problem solvers are picked must be large and the collection of problem solvers working together must contain more than a handful of problem solvers. This assumption ensures that the randomly picked collection of problem-solvers in the larger pool is diverse and in particular more cognitively diverse than a collection of the best of the larger pool—which would not necessarily be the case for too small a pool relative to the size of the subset of randomly chosen problem-solvers or for too small a subset of problem-solvers in absolute terms. Notice that the first part of this fourth condition can be thought of as Madison's requirement in Federalist 10 that the pool of candidates to the position of representatives be large enough. For more on this, see Page 2007: 159-162.

in the scenario of Twelve Angry Men, if the jury had been composed of clones of juror number 8, the smartest person in the lot, they might have all shared the suspicion that the kid was not guilty but unable to turn it into the firm and argued conviction reached by the more diverse group.

Deliberation, however, is not by itself democratic. In effect deliberation can theoretically occur within one person (degenerate case) or among a few oligarchs. The two examples I gave occur among less than 12 people. What is the gain of involving large numbers? Further, isn't there a point beyond which large numbers can worsen the quality of deliberative outcomes?

The gain of involving large numbers is that it automatically ensures greater cognitive diversity. In that sense more is smarter.[17] One is thus tempted to generalize Scott Page "Diversity Trumps Ability Theorem" into a "Numbers Trumps Ability Theorem," by which what matters most to the collective intelligence of a problem-solving group is not so much individual ability as the number of people in the group. Thus if twelve jury members are more cognitively diverse than just one, then 43 are even more cognitively diverse, and thus smarter, than twelve and so would 123 or 500. Of course, this assumption that cognitive diversity correlates with numbers will not always be verified but it is more plausible than the reverse assumption.[18]

[17] Notice that to the extent that (and if it is the case that) cognitive diversity is correlated with other forms of diversity, such as gender or ethnic diversity, the argument suggests that positive discrimination is not just a good thing on fairness grounds but also for epistemic reasons. I will not enter that complicated debate here but it is clearly one of the potential implications of an argument advocating the epistemic properties of cognitive diversity (for a defense of cognitive diversity as being in fact the "only" reason to support affirmative action, see the conclusions of the French sociologist Sabbagh 2003).

[18] A complicating factor is probably the (s)election mechanism. In selecting, say, a hundred representatives, a system of proportional representation may produce more cognitive diversity than majority voting in single-member districts. This invites an epistemic comparison between alternative

An obvious practical problem that might dampen our enthusiasm for numbers, however, is a feasibility problem. Deliberation involving all members of the group is sometimes impossible. When the numbers are too large, deliberation turns into a chaotic mess, in which case the epistemic superiority seems to go by default to deliberation involving a smaller number of people, preferably the smarter or more educated ones. This is where the institutional device of political representation comes into play. Representation allows the indirect or mediated involvement of the many in a decision taken by the few. In other words, representation makes democratic decision-making possible when numbers are too large in a mediated way. I will now propose an interpretation of representation as the institutional solution to the problem of combining the manageability of a small assembly and the cognitive diversity of a large one.

3. Representation as a projection of cognitive diversity on a small scale

In order to defend the non orthodox view of representatives as simply reproducing on a smaller scale the cognitive diversity of the larger group, I need to establish two things. One is that an assembly of representatives is actually distinct from a group of oligarchs. Second, I need to show why an assembly of representatives can in theory be epistemically superior to an assembly of oligarchs.

Periodic elections and accountability are the two principles that ensure the democratic nature of representatives' functions (Manin 1996). Representatives are thus distinct from an oligarchy because they are elected to the position of decision-makers and legislators, as opposed to born into it (like aristocrats) or appointed by one or a few

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democratic selection mechanisms, some of which can produce more cognitive diversity with fewer additional members. See Elster this volume.

persons only (as might be the case of non elected magistrates or experts). Regarding that first criterion, one might object that elections do in practice retain an oligarchic, even aristocratic, flavor in that they involve a principle of selection, often on criteria that give more chances to the more educated and/or the richest members of society, who then tend to stay in power and reproduce themselves as a class (for a compelling critique of and solution to the problems of representative democracy in America, see O'Leary 2006). As a consequence, the individual ability of those groups might be high but it is unlikely that their cognitive diversity will be too. As an alternative to election, some authors have thus suggested selection by random lottery (e.g., Elster 1989: 78-103) and argued that lotteries are actually in principle more democratic and representative (e.g., Mulgan 1984: 539-560, Goodwin 1992, Duxbury 1999, Stone 2007 and Sintomer 2007). Lotteries would for sure not elevate the level of individual epistemic competence (by definition the expected individual ability of those selected would be average), but they would preserve the cognitive diversity of the group.[19] Regardless of the selection mode, however, the theory is that representatives are not meant to be an immutable elite of decision-makers, the way the best oligarchs ought to be.

Representatives also differ from a class of oligarchs because they are held accountable to the people not only at the end of their mandate, but, one might say, throughout, in informal ways (being under the scrutiny of their constituents who can

[19] On the other hand, there are problems of incentives, motivations, and accountability (since selected people's hope to be re-selected is independent of what they achieve while in power) that render lotteries as a selection mode for representatives difficult to implement. As a result, election might be just the second-best in terms of reproducing cognitive diversity. The fact that elections are periodic (every four or five years) also ensures a minimal renewal of the rulers over time (although lesser than would be the case with lotteries), which is crucial in preventing representatives from turning into a group of similarly thinking oligarchs. I make here the plausible assumption that any initially diverse group of individuals will become less diverse over time unless periodically refreshed with new members.

write, call, and criticize them in other ways than voting them out).[20] This claim is both normative and empirical. It is normative, because on a democratic, as opposed to a Burkean reading of their role (e.g., Urbinati 2006), representatives are supposed to take into account their constituents' interests and judgments, not act and decide entirely on their own. Without advocating bound mandates, one can thus see the representatives' judgment as being regularly checked against the opinion of their constituency and factoring the latter in.[21] It is a practical reality, because representatives' re-election is conditional on constituents' satisfaction with what they are perceived as having accomplished while in power. As a result, representatives have an incentive to constantly keep in touch with public opinion. Representatives are not enslaved to their constituents. They can use their judgments as to the best means to the given results on which their constituents will judge them; they also have some wiggle room to the extent that failure to deliver pre-election promises can always be blamed on some other factors than their own incompetence. Nonetheless, representatives generally pay careful attention to polls and whatever signs—strikes, demonstrations, and even riots[22]—translate public opinion.

Now, how does a group of representatives theoretically compare with an equivalent group of oligarchs from an epistemic point of view? Compare the democratic solution of an elected assembly of, say, 500 congressmen with the oligarchic solution of 500 individuals (those numbers approximate the reality of the Republic of Venice in the 15th century, which was governed by a few hundreds of aristocrats). Historically it is

[20] I thus do not mean here the possibility of representatives being liable to be recalled at any time but simply the internalized pressure, in representatives' behaviors, to act as if they were constantly under the public eye and could be held accountable to the people at any time.

[21] Nadia Urbinati puts it in abstract but eloquent terms, arguing that, on her normative conception, and contra elitist definitions that pit against each other representation and participation (if not representation and democracy altogether), "representative democracy… is intrinsically, and necessarily, intertwined with participation and the informal expression of "popular will"" (Urbinati 2006: 10).

[22] Historically fairly normal elements of the political vocabulary in France for example.

doubtful that oligarchies were made up of the best and brightest but imagine for the sake of the argument that the 500 oligarchs of our example are extremely smart and knowledgeable and, on top of this, cognitively diverse as a group. It might then seem that an oligarchy of 500 such individuals is likely to be smarter than an assembly made up of individuals chosen by regular citizens. The problem is that such ideal circumstances, regardless of how implausible they are initially, could not be maintained over time, for at least two reasons. One is that absent periodic renewal of their members, the group of oligarchs is stuck with a given level and type of cognitive diversity. Second, absent democratic accountability, the group of oligarchs have no incentive to inform themselves about the larger, changing cognitive diversity of the larger group. In effect, no matter how smart the group of oligarchs is at the beginning, it is unlikely to remain so over time. The group of oligarchs may be characterized by high political IQ but ultimately not enough cognitive diversity.

In the case of representative democracy, by contrast, cognitive diversity of the assembly is preserved over the long run thanks to periodic elections that renew the pool of members. Further, an elected and accountable Parliament, which is at least minimally shaped by a larger public opinion, is more likely to stay cognitively diverse than a body of oligarchs that can only count on the discipline of its members to avoid the trap of "group think," self-serving biases, and isolation from popular input. So while there might be times when a large enough oligarchy might temporarily epistemically be equal, and perhaps even superior to, a democratic assembly of representatives, I think that over the long run this is not plausible.

On that reading of representation, the epistemic argument for deliberation among the many presented earlier translate to representative democracy as well, provided representation reproduces effectively the cognitive diversity of the larger group in the smaller one. The claim remains the same: deliberation involving the many, in a direct form (where feasible) or an indirect form (through representation) is superior to deliberation among the few, because to the extent that cognitive diversity is correlated with numbers (and provided that citizens are at least moderately smart on average), the more numerous the deliberating group, the smarter.

4. Majority Rule With Universal Suffrage

Deliberation is far from being a perfect or complete decision-mechanism, in part because it is time-consuming and rarely produces unanimity. In most cases, it needs to be supplemented, if not replaced, by another decision-procedure: majority rule. While majority rule is more efficient time-wise, it does not allow solving problems. It allows, however, choosing between pre-determined options, ideally defined in the deliberation period. I argue in this section that far from just being a fair way to settle disagreement about the choice of an option, majority rule is also a reliable way to improve the chances of the group picking the right one (where the "right" one is simply the better one compared to the other options). Majority rule aggregates individuals' judgments about the best course of action to take or the right candidate to elect. In other words, majority rule is not only a fair way to settle on a decision when time is running out for deliberation, but a way to turn imperfect individual predictions into accurate collective ones. Again, since majority rule is available to the lone tyrant (who is the majority by himself) and a group

of oligarchs, I further need to consider whether majority rule under universal suffrage is epistemically more reliable than majority rule used by a minority within the larger group.

There exist at least three related but distinct theoretical arguments for the epistemic properties of majority rule: the Condorcet Jury Theorem, the "Miracle of Aggregation," and Scott Page's "The Crowd Beats the Average Law."[23] I will provide only a brief account of the first two and focus on the last one.

4.1 The Condorcet Jury Theorem

The Condorcet Jury Theorem (CJT) demonstrates that among large electorates voting on some yes or no question, majoritarian outcomes are virtually certain to track the "truth," as long as three conditions hold: 1) voters are better than random at choosing true propositions (the enlightenment assumption); 2) they vote independently of each other (the independence assumption); and 3) they vote sincerely or truthfully (the sincere voting assumption). To briefly illustrate the power of large numbers harnessed by majority rule according to the CJT, consider 10 voters, each of which has a .51 probability to be correct on any yes or no question. A majority of 6 will have 52% chance of being right. Expand now the group to 1000 people and a majority of 600 hundred is almost 100% sure to be right. This is merely an implication of what is also known as the central limit theorem.

The CJT, first formulated by the marquis de Condorcet in 1785 and rediscovered by Duncan Black in the 1950s, has spawned many formal analyses in recent decades.

[23] Adrian Vermeule (this volume) and others consider the CJT a mere variant of the Miracle of Aggregation. This might well be the case (in which case the CJT would probably correspond to what I call the "democratic" version of the miracle of aggregation) but to the extent that the relevant literature still treats them separately, I will address each account as autonomous.

These analyses, however, usually fall short of drawing substantive normative implications, in part because the CJT is generally considered of little relevance to the real world. Its assumptions are analyzed as pure mathematical technicalities with no matching real-life application (e.g., Lhada 1992). Meanwhile, more philosophically oriented theorists remain unsure of the usefulness of Condorcet theorem for democratic theory. Even David Estlund, an unambiguous advocate of an (at least partially) epistemic theory of democracy, who repeatedly mentions the CJT in support of the superiority of majoritarian decisions over alternative decision-rules, ends up distancing himself from the theorem as "less than trustworthy" (Estlund 1997: 189) and more recently as entirely "irrelevant" (2007 : Chapter 12). I have tried elsewhere to establish the relevance of the theorem, by defending the empirical plausibility of its main assumptions (Landemore 2007). In the end, I conclude that independence is a crude mathematical simplification of a more complicated logic. The theorem has nothing to say about this logic and that is why we need a more fine-grained account of what is going on in judgment aggregation.

4.2 The "Miracle of Aggregation"

The "miracle of aggregation" (Converse 1990) is another explanation for collective intelligence distinct from the Jury Theorem, although also involving the law of large numbers. Unlike the CJT, the miracle of aggregation does not apply specifically to majority rule but explains why the average guess of large groups of people on matters with a factual answer tends to be uncannily accurate. It applies to majority rule only to the extent that majority rule is conceptualized as expressing the vote of the average voter.

The most established version of the "miracle of aggregation" explains it as the statistical phenomenon by which a few informed people in a group are enough to guide the group to the right average answer, as long as the mean of uninformed people's answers is zero.[24] Here collective intelligence actually depends on extracting the information held by an informed elite from the mass of "noise" represented by other people's opinions. As long as one person in the crowd knows the right answer and all the others make mistakes that cancel each other out, the right answer is still going to rise to the surface, so to speak. Applied to the famous example of "weight-guessing" involving the 19th century statistician Galton,[25] this explanation would imply that the reason why the average answer fell within one pound of the correct answer is because one or a few persons in the crowd knew the right answer and all the others made mistakes that cancelled each other.[26]

A more democratic version of the "miracle of aggregation" presents things slightly differently. This time everyone has an opinion that is roughly correct and the distribution of errors around each individual's "blurry" judgment is such that individual errors cancel each other out in the aggregate and the collective judgment is fairly accurate. In the example of the weight contest, this means that most people were not that

[24] This "elitist" version probably goes back to Berelson, Lazarsfeld, and McPhee (1954).

[25] Galton was attending a country fair, in which one of the attractions was a game of guessing. The goal was to guess the weight of an ox once slaughtered and dressed. Galton took the answers of the 800 participants or so and computed the mean, which turned out to fall within one pound of the right answer. Some versions of the story present Galton as taking the median (which immunizes against the problem of extreme outliers). We will assume in what follows that the distinction mean/median does not matter in the cases that interest us. For many more anecdotes, recounted in both Surowiecki (2004) and Sunstein (2006), vividly illustrate the same "miracle" of group intelligence.

[26] This explanation is not very convincing for the case of the weight guessing contest, as Scott Page remarks (2007: 179). This inadequacy does not seem to have struck Surowiecki or Sunstein.

far off the right weight, although none of them knew it exactly. Page and Shapiro apply this model to account for the rationality of public opinion.[27]

A third version of the miracle of aggregation consists in seeing the right answer dispersed in bits and pieces amongst many people. As long as people express a judgment that contains one accurate piece of information and a random opinion about the piece of knowledge that they lack, the same logic of cancellation of random errors is still going to produce the "right" prediction in the aggregate. This explanation is unlikely to apply to the weight contest example but if it did it would require that some people in the group knew the weight of the cow's tail, some other people the weight of the ears, etc., and that they randomized their guess about the other parts. On average all the pieces of information would aggregate to the right answer.

The "miracle of aggregation," in its elitist, democratic, or distributed version, is an appealing way to account for the epistemic properties of judgment aggregation, including through majority rule. In effect, Galton himself, though not thinking very highly of democracy, was prompted by his own result to compare the gambling situation with democratic voting and to conclude that: "The result seems more creditable to the trustworthiness of democratic judgment than might have been expected" (Galton 1907: 246). For some, the "miracle of aggregation" is an even better explanation for collective intelligence and why possibly democracy works than the more traditional explanation in

[27] According to them, people have meaningful opinions surrounded by noise and aggregation across individuals produces an aggregation of those real opinions. For example, some citizens underestimate and others overestimate the benefits of immigration. "Even if individuals' responses to opinion surveys are partly random, full of measurement error, and unstable, when aggregated into a collective response—for example the percentage of people who say they favor a particular policy—the collective response may be quite meaningful and stable" (Page and Shapiro 1992). What Page and Shapiro imply, without saying it in so many words, is that the public is epistemically more knowledgeable as a whole than any of the individuals that make it up, which is why politicians are right to promote immigration policies based on the public's judgment (a reasoning extended by Page and Bouton to foreign policy as well, see Page and Bouton 2006).

terms of deliberation and the pursuit of rational consensus.[28] Compared to the Condorcet Jury Theorem, the miracle of aggregation presents the advantage of not making high demands on the average voter. In its elitist version especially, the cognitive threshold for the average voter can in particular be much lower than that of a coin flip.

Two main objections can be raised against that explanation.[29] First, one can deny the empirical plausibility of the hypothesis of "random" or symmetrical distribution of errors. Caplan points out that it is much more likely that people are cognitively biased in the same direction so that majority rule is going to amplify individual mistakes, not correct for them (Caplan 2007). I address that objection at length in the last section of this paper. The other objection points out the implausibility of an explanation that presupposes an infinity of independent signals. I now turn to a more realistic and compelling account of collective intelligence, one that hinges on the existence of sufficient cognitive diversity within the group.

4.3 Cognitive Diversity

Scott Page proposes a different account of why large groups of people can make good judgments and in particular accurate predictions. Unlike the miracle of aggregation, Page's account does not rely on the assumption of an infinity of independent signals nor

[28] Cass Sunstein for example sees it as a "Hayekian challenge to Habermas" (Sunstein 2006). In fact it is both unclear that the miracle of aggregation is the same thing as the invisible hand mechanism at work in the emergence of the prices of goods or information in markets, and that democratic deliberation is made superfluous by information aggregation through majority rule, polls or markets.

[29] A practical objection would also point out that majority rule generally involves a choice between discrete options, but rarely allows for the kind of "quantitative" and continuous voting observed in the ox-weight guessing game or information-markets. This is not a very powerful objection since the logic of the miracle of aggregation theoretically works even with the reduced choices offered in elections.

on the idea of mistakes cancelling each other out.[30] What matters for collective intelligence is the existence of negative correlations between people's predictive models, which tends to lower the collective error and make the group smarter than the average individual within it.

Let me briefly present Page's two main results: The Diversity Prediction Theorem and the Crowd Beats Average Law. I will not enter into the details of the demonstration behind either of them but take them as a starting point for my reflection on the epistemic properties of judgment aggregation through majority rule. The first theorem states that a group's collective error equals the average individual error minus their collective predictive diversity (Page 2006: 208). In other words, when it comes to predicting outcomes (such as who is going to be a better president or whether a proposed document is the right kind of foundation for the European project, say), cognitive difference among voters matters just *as much as* individual ability. Increasing prediction diversity by a unit results in the same reduction in collective error as does increasing average ability by a unit.[31]

Remember that in the case of deliberation applied to problem-solving, we saw that cognitive diversity could actually trump individual ability. Here the theorem demonstrates that there is a strict tie between these two components of collective intelligence. This is so because unlike what happens in deliberation the better information, idea, or argument does not crowd out the worse. Judgment aggregation

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[30] Scott Page in fact dismisses both the Condorcet Jury Theorem and the Miracle of Aggregation because, in his view, they both implausibly presuppose that voters receive an infinity of independent signals that they pick up in order to make a prediction. In reality, he argues, people make up their minds based on a limited and highly dependent range of cues and sources of information. The infinity of signals assumption assumes more cognitive diversity than is empirically plausible. It is, according to Page, a "heroic assumption" (Page 2007: 192).

[31] In order for this to be meaningful, a common metric for error and ability is assumed.

aggregates everything, including the bad input, which occasionally makes the group less smart.

The second theorem states that the accuracy of the group's prediction is systematically better than the average accuracy of its members. In other words, the group necessarily predicts better than its average member. Further, the amount by which the group outpredicts its average member increases as the group becomes more diverse (Page 2007: 197). This "law" directly results from the Diversity Prediction Theorem. The implication for democracy is that we are better off making decisions that involve predictions through majority rule than we would be if the average member of the group made those decisions for us. Majority rule beats the rule of one (when the one is randomly chosen).

Notice now that because diversity does not trump ability when it comes to predictions (unlike what happens in problem-solving), we might be just as well as a group if a smaller group of smarter people made the decisions. Majority rule among the many does not beat majority rule among the few.[32] This is so because, unlike deliberation, sheer aggregation of judgment does not allow for the weeding out of bad information and ideas from good ones.[33] Majority rule averages out all expressed

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[32] Another result of Page is worse mentioning, even though it does not allow us to infer strong conclusions for democracy: the "Crowd's Possibly Free Lunch Theorem." According to this result, it can happen that a group of random people with diverse simple predictive models based on different interpretations of the world can predict a complicated function, which beats in accuracy that designed by expert statisticians (Page 2007: 234). Page admits that such a "free lunch" is unlikely but possible.

[33] It is the case, however, that keeping or adding a certain number of incompetent people in the group may occasionally improve the epistemic output of majority rule if the input of these incompetent people is negatively correlated with the equally wrong input of other members in the group. The first group then "neutralizes," so to speak, the mistakes of the other group and raises the level of collective intelligence. The best one can hope for, however, in adding people to the mix in the case of judgment aggregation is such a canceling out of errors. In the case of deliberation, however, adding more people ideally leads to actual progress of everyone towards the best possible answer (the group's global optimum) rather than to mere cancellation of mistakes.

judgments. As a result, majority rule used among a large random group might not yield a better collective judgment than majority rule used among a small group of experts, and further majority rule used among a large random group or a small group of experts might yield a judgment inferior to that resulting from a deliberation between the members of either group.[34]

As said earlier, the key to group intelligence in judgment aggregation is the existence of negative correlations between people's predictions. Concretely, negative correlations exist whenever a Democrat is more likely to make a correct prediction when a Republican is more likely to make a wrong one, and vice-versa (for example on predicting who the best candidate for office is). Their predictions are negatively correlated in the sense that if they were statistically independent of each other, the Republican should be right with the same probability when the Democrat is right and when he is wrong. Negative correlations come from the fact that people interpret the world differently, as a result of differences in their genetic make-ups, education, training, or simply life-experiences.[35]

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[34] In *Predictocracy*, Michael Abramowicz similarly compares the predictions of another judgment-aggregation mechanism, prediction-markets, and those of a deliberating committee, remarking that "in a prediction market, someone ordinarily trades on the relevant information, whereas in a committee, a member shares the information with others. A [deliberating] committee might, then, be superior to a prediction-market whenever decision making would be improved if all decision makers have access to all or at least most of the relevant information" (2007: 102). The advantage of deliberation as it is presented here is that it makes available for free the best information and ideally helps participants eliminate from their options the worst choices, which the sheer judgment aggregation of prediction-markets does not allow for. Abramowicz also mentions the interesting possibility of a "deliberative prediction market" that would combine the epistemic properties of deliberation and those of prediction-markets. In a way the argument presented in this paper suggests to see democracy as what combines the epistemic properties of majority rule and deliberation, or "deliberative majority rule."

[35] See Hong and Page 2009 for a demonstration that using independent interpretations entails negatively correlated predictions. More specifically, the gist of the paper consists in demonstrating that "seeing the world independently, looking at different attributes, not only does not imply, it is inconsistent with, both conditional independence of signals and independently correct signals" (Hong and Page 2009: 18). Except in the very implausible scenario where all reasonable informed individuals ignore each a different piece of information, their predictions will not be independent but negatively correlated.

Now, it would seem that as more people's views are aggregated in the collective judgment, the more cognitive diversity and negative correlations are introduced in the mix and the smarter the group. In fact, there is a theoretical limitation to how much including more and more people improves collective judgment. Cognitive diversity in judgment aggregation is not a linear function of numbers and there are in fact diminishing returns to adding more people past a certain point. The reason, in brief, is that there are only so many different variables associated with a given perspective (say competence for office) that people can use when trying to make a prediction. In trying to predict the most competent candidate, some people will use as a variable the candidate's personal charisma, others his ideological affiliation, and some other still his past record as a politician. As the number of voters grow very large however, the number of variables that people use to make a prediction may remain proportionally quite small. To avoid positive correlations as the number of people in the crowd becomes larger, people must either use cluster interpretations or they must base their interpretations on different perspectives. I do not have the space to address this concern here. Suffice to say that to the extent that my argument is primarily a defense of representative rather than direct mass democracy, I do not see this problem as a major cause of concern, since an assembly of representatives form a group small enough for cognitive diversity to have increasing returns on that scale.

The comparative advantage of an assembly of representatives is that it is bound to be more cognitively diverse, at least on the long run, than an assembly of oligarchs. As such, an elected assembly of representatives regularly renewed

through periodic elections ensures the production of a certain amount of collective intelligence, which is much harder to produce through an oligarchy unless you can be certain that the members are and will remain over time the best and brightest on every single imaginable political issue. Of course, even an assembly of representatives is not immune to the problem of systematic biases diagnosed by Caplan but given a liberal society encouraging dissent and diverse thinking, Caplan's worst case scenario of a situation in which the average error is high and diversity low would not be very plausible.

What are the implications of those considerations for the idea of democratic reason? I have argued that majority rule and in fact any democratic mechanism that aggregates individual judgments into collective judgments have epistemic properties. Since the group's prediction beats that of the average citizen in the group, we have an argument why the rule of the many beats the rule of one (when the one is randomly chosen). That does not give us a maximal argument for majority rule though, since majority rule among the many does not systematically beat majority rule used among a few smart people. It is the superiority of democratic deliberation over oligarchic deliberation that allows us to derive the more ambitious claim. Before I tie all those conclusions together, let me however turn to a major objection to the idea that the group can outsmart any of its member, in particular its cognitive elites.

5. The Problem of Voters' "Rational Irrationality" and Systematic Cognitive Biases

According to Bryan Caplan, the main problem with the optimistic conclusions about group intelligence that I have derived above is that in some way or another they rely on

the assumption that there is a symmetrical distribution (random or else) of errors so that the mean of these errors is zero ("miracle of aggregation") or that errors are negatively correlated, when they might in fact be positively correlated (Page's model). In economic matters, at least, Caplan argues and documents that voters are systematically biased in the same (wrong) direction. How does that argument affect the hypothesis proposed here that democracy is the best collective decision-method? I argue that it does not refute it, although it certainly invites some caution in the definition of where democratic reason applies. Let me explain.

Using empirical evidence borrowed from the literature on "enlightened preferences" (essentially Althaus 2003), the Survey of Americans and Economist on the Economy (SAEE),[36] and the results of his own comparison between the public's preferences and those an "enlightened public" virtually endowed with a PhD in economics, Caplan diagnoses four main misconceptions in the average citizen with respect to economic questions: an anti-market bias, a protectionist bias, a pessimistic bias, and a job-oriented bias. Assuming that economists are right that all things equal otherwise market mechanism is a good thing, free-trade creates more riches than it destroys, growth is more likely than stagnation, and GDP increase matters more than job preservation, then the people are wrong to hold opposite views and ask for policies based on such beliefs. The problem is not solved (or only to an insufficient degree) by the fact that policies are made by a priori slightly more competent representatives. To the extent that representatives are held accountable to the citizens, they only have limited leeway to

[36] The survey is based on interviews with 1, 510 randomly selected members of the American public and 250 economic Ph.D.'s and designed to test for systematic lay-expert belief differences (52) by asking questions such as whether various factors are a "major reason," "minor reason," or "no reason at all" why "the economy is not doing better than it is."

improve the course of things. Consequently, Caplan concludes that, on economic questions at least, we would be better off with less democratic input. He himself suggests more delegation to economists and, whenever possible, to markets themselves.

The results analyzed by Caplan seem compelling on a number of points, for example the fact that unlike more economically savvy people, regular citizens tend to underestimate the benefits of free trade, thus pushing for more protectionist policies than is economically optimal. In what follows, I will however raise a series of objections to the anti-democratic implications of Caplan's book. This slight detour will allow us to address the larger question of the relationship between information and political epistemic competence.

The first criticism one may raise against Caplan's argument bears on the elitist premises of the book, which are reflected in the method used to measure citizens' incompetence. A second problem has to do with Caplan's description of the voter's motivation. Caplan's theory assumes in voters a form of self-interest incompatible with the epistemic framework of this paper. This theoretical divergence runs deep and leads to drastically different predictions about the epistemic quality of democratic output. There is also an incoherence in the description of the "rational purchase of altruism" (see Elster and Landemore 2008). Thirdly, even granting that Caplan is right about the economic incompetence of the average voter, I would argue that the implications for democracy are not nearly as bad as Caplan would like to suggest. Finally one might object to the alternatives offered by Caplan. It is indeed unclear that the oligarchy of experts that Caplan sometimes seems to advocate would necessarily do much better overall than a democracy. As to market mechanism, they are not a political alternative to any form of

government but a mere allocation tool in the hands of one, few, or many—thus leaving untouched the question of who should rule.

Let us first address the methodological question. There are at least four different standards in the book, serving as benchmarks of citizens' biases: objective facts with a verifiable answer, the simulated "enlightened preferences" of a public with high political IQ, the simulated preferences of an "enlightened public" with the knowledge of a Ph.D. in economics, and finally the policy preferences of economists themselves. I argue that objective facts are not a conclusive standard, that taking economists' knowledge as the standard begs the question of who has authority in politics in the first place, and that the other two—"enlightened preferences" or "enlightened public"—are in fact slight variations about either facts or expert knowledge. Let me go over each of those standards in turn.

The first benchmark of voters' bias is knowledge of objective facts. As Caplan observes, "the simplest way to test for voter bias is to ask questions with objective quantitative answers, like the share of the federal budget dedicated to national defense or Social Security" (25). Caplan, however, does not dwell on that first standard, acknowledging that "the main drawback of these studies [that measure the mastery of factual knowledge] is that many interesting questions are only answerable with a degree of ambiguity" (25). Indeed one could argue that *no interesting political question* can be answered without such a degree of ambiguity, which raises the general issue of the relevance of a great deal of public opinion research that measures the ability to answer textbook political questions. Since the standard of objective facts reappears through the

back door of the notion of "high political IQ individuals," let's say a few more words about why this standard is unsatisfying.

First, information is distinct from competence and the causal link between the holding of a certain type of information measured by surveys and the competence to make political choices is not easy to establish (however "intuitive" it is sometimes argued to be). In fact most existing studies (e.g., Luskin 1988, Delli Carpini and Keeter 1996) fail to demonstrate a causal link between the inability of people at answering certain types of political quizzes and their alleged political incompetence, namely the inability to make the right choices or holding the "right" policy preferences. This is so in part because the design of factual political questionnaires smacks of elitism, measuring a type of knowledge relevant for policy analysts and journalists, but not necessarily the only one conducive to smart political choices (Lupia 2006).

The difficulty of establishing a causal link between low information level and political competence comes also from the fact that it is hard to find a good empirical benchmark for political competence that would be distinct from a good benchmark for information level. The fact that educated people are good at answering political quizzes does not entail 1. that the policy preferences of the educated are better as a result (unless you take such policy-preferences as the standard but then you are begging the question), 2. that the policy-preferences of "know-nothings" or low political IQ people (as defined by such tests) are wrong.[37] The kind of factual knowledge measured by public opinion surveys is as crude a measurement of political competence and there is no reason why the

[37] After all, even the scenarists of the T.V. show "The West Wing" know that you can be a competent director of communication at the White House and be unable to say three correct things about the history of the White House (West Wing, episode 1).

burden of the proof should be on people who deny the connection between political IQ as it measured by existing empirical surveys and actual political competence.

Let us now turn to the second standard: the "enlightened preferences" of a hypothetical educated public, i.e., a group of people that is demographically representative except that they are as politically knowledgeable as possible. The method used by Althaus (2003) consists in administering a survey of policy preferences combined with a test of objective political knowledge to a group, estimating individuals' policy preferences as a function of their objective political knowledge on factual matters (e.g. how many senators each state has) and their demographics (income, race, gender), and, finally, simulating what policy preferences would look like if all members of all demographic groups had the maximum level of objective political knowledge. In other words, the goal is to compare the policy preferences of regular citizens with those of their "more educated" selves, controlling for race, gender, income and the like.

The enlightened preference approach permits testing the plausibility of the theory of the "reasoning voter," according to which people vote roughly with little knowledge what they would vote if they had maximal information thanks to cognitive shortcuts, heuristics, and on-line processing. The major result of this approach is to show that, no, people would probably not vote the same way since they at least do not have the same preferences when they are little informed and very informed. They tend to be more socially liberal and economically conservative in the second case (Althaus 2003: 143). Scott Althaus uses the discrepancy between the public's preferences and those of its more "enlightened" self to criticize the representativity of opinion surveys and their usefulness in assessing the public's voice. Caplan goes one step further, using those results to

suggest that democracy itself, which follows more or less the unenlightened policy preferences of the many, is flawed.

Consider however that the definition of "enlightened preferences" hinges on a concept of education that is correlated with the ability to score well on political IQ tests ("a test of objective political knowledge"). The standard of "enlightened preferences" is thus not much different from the knowledge of objective facts (since it is highly correlated with it). But we just saw that knowledge of objective facts might well be both an elitist measure of political knowledge and potentially irrelevant to the ability to pass a political competent vote. So what this approach does is take as the standard of "enlightened" judgments preferences correlated with an elitist and possibly irrelevant form of knowledge and then argue that the discrepancy between the actual public's preferences and those "enlightened preferences" is meaningful, and in fact an embarrassment for democracy. Such conclusions, however, merely reflect a belief present in the premise, namely that regular people are wrong and the elites right. How is that not begging the question of who has epistemic authority in the first place?

The third standard consists of the economic preferences of a simulated public that is both demographically representative and endowed with the knowledge of the holder of a PhD in economics. The key difference between Caplan's approach and the previous approach is that "political scientists usually measure knowledge directly, while my approach proxies it using educational credentials" (55). So, in effect, whereas the second type of approach boils down more or less to using the standard of objective facts (through the notion of political IQ) to assess the public's preferences, Caplan's approach takes as the ultimate standard the knowledge of experts. Another difference is that the

competence that Caplan is trying to assess is slightly narrower than that measured by political scientists, since Caplan is interested only in political questions with an explicitly economic dimension, for which economic knowledge such as that measured by a PhD diploma might seem directly relevant (more so at least than "objective political knowledge" with respect to political competence).

So let us consider why the fourth standard—experts' knowledge—is problematic. First, Caplan constantly writes as if there was no difference between questions of economics (the science) and economic questions, which are political questions with an economic dimension. Just because PhD holders in economics are the best at answering questions in the science of economics does not make them the most competent in answering political questions with an economic component (although their input is most likely of value). In fact, if you deny that economists' political beliefs are absolute truths, the discrepancy between these beliefs and those of the public does not necessarily say much.

Despite initially acknowledging that political questions cannot be answered without a degree of ambiguity, Caplan does write as if the beliefs of economists were on a par with mathematical truths. Here is a typical example. Caplan argues that "elitist though it sounds, [inferring the existence of systematic biases in the public from the existence of systematic differences between economists and non economists] is the standard practice in the broader literature on biases" (52). Caplan goes on to appeal to the authority of no less than Kahneman and Tversky who describe their own method this way: "The presence of an error of judgment is demonstrated by comparing people's responses either with an *established fact*… or *with an accepted rule of arithmetic, logic,*

or statistics" (52).[38] Caplan thus draws a clear parallel between the consensual beliefs of economists on the one hand and objective facts or the rules of arithmetic, logic or statistics on the other hand. This parallel, however, is highly misleading. To the extent that economic beliefs are about facts (the share of foreign aid in the federal budget) or about mathematical theorems, they are not necessarily relevant, or not directly so, for political decisions. To the extent that these beliefs are more "political"—even the least controversial ones, like "free trade is good" or "people are not saving enough"—they are much more contingent on a shifting cultural and possibly ideological consensus among experts than Caplan allows for. By playing on this ambiguity between pure questions of textbook economics and political questions with an economic dimension, and by misleadingly identifying the beliefs of economists at a given time with factual truth or mathematical principles, Caplan in fact begs the question of who has authority in the first place. In his view, on anything remotely economical, economists know better. If you deny that premise however, none of Caplan's conclusions follow.

Both the "enlightened preference" approach and Caplan's "enlightened public" approach beg the question of who is politically competent in the first place, whether it is people with a high political IQ or economists. Caplan supports that way of proceeding by arguing that "the burden of the proof should be on those who doubt the common sense assumption that we should trust the experts" (2007: 82). One might reply, however, that democracy is premised on the very rejection of that "commonsense" assumption. For

[38] Caplan further comments ""established" or "accepted" by whom? By experts of course" (52). Notice however that unlike mathematical truths, which can be accepted by everyone too, not just experts, economic truths are never as universally endorsed.

democrats since at least the Sophist Protagoras,[39] politics is the realm where no one is to be trusted more than others to begin with. This is why, as Socrates could observe, the Athenian Assembly behaves very differently when the problem is to build an edifice or a ship, than when the question is to figure out the good of the city. In the first scenario, the Assembly calls in architects and shipbuilders and if someone who is not considered a competent technician in the relevant field speaks up to give his opinion, the crowd boos and shames him into silence. By contrast, Socrates goes on:

> When the question is an affair of state, then everybody is free to have a say—carpenter, tinker, cobbler, sailor, passenger; rich and poor, high and low—any one who likes gets up, and no one reproaches him, as in the former case, with not having learned, and having no teacher, and yet giving advice (*Protagoras* 319d).

For Athenian democrats, the real test of competence and expertise in politics is the ability to convince others in the Assembly. This is why, even if ultimately only the better arguments and information are supposed to triumph, everyone has the right to speak up.

I just criticized Caplan for begging the question of who is right in politics when defining the benchmark of competent answers as those of people who think like economists. Aren't democrats begging the question the other way around by denying that there are experts in the first place? And what kind of standard should democrats use then, if neither facts nor experts' opinions will do?

Notice that the positions are not exactly symmetrical. In Caplan's case, the question of who knows best and what the right answers are is a priori locked and determined. The economists know better, their answers are the right one, and thus any deviation from their position must be measured as a bias. On the democratic view, by contrast, there is genuine agnosticism as to who knows best and what is the right answer,

[39] According to Cynthia Farr, "Protagoras was, so far as we know, the first democratic political theorist in the history of the world" (1988: 77).

at least at the outset. Who knows best and what the right answers are can only be determined on the merits of different claims competing in the "market of ideas" that is, ideally, deliberative politics. Of course, just like economists' claims, the merits of such competing claims are only firmly established retrospectively, by judging how well the country did overall given that such and such policies were implemented or even by comparing expected to actual results for every chosen policy. That—future outcomes for now hidden behind the veil of the future—is the standard for democrats. At the moment of decision-making, however, when such hindsight is not available, the benchmark of right political answers is, for Caplan, whatever economists say, whereas for democrats the benchmark is only the "forceless force of the better argument" (which does not mean that the best argument will always triumph) and/or majority outcomes (which does not mean that the majority is always right). Given his pro-market inclination, it is surprising that Caplan does not appreciate this way of making decisions over the more dogmatic alternative.

Of course, when looking at the actual discrepancy between what the public thinks and what economists think, one cannot help but agree with Caplan that there are cases where the experts are probably right and the public probably wrong. For example people tend to think that "taxes are too high" or that "foreign aid spending is too high" (Caplan 2007: 57) whereas economists and the "enlightened public" sensibly differ. Where such biases do exist, it might seem to suggest that an oligarchy of knowers who avoid those mistakes would be superior to a democracy. There are however a few reasons why granting topical incompetence does not affect the general argument for democracy developed in this paper.

First, topical incompetence does not establish global incompetence and in particular the meta-incompetence to recognize one's topical incompetence. Even if we accept that citizens are bad at answering political questions of an economic nature, that does not mean that they are not reasonable enough, that is minimally competent, to acknowledge that fact and accept institutional arrangements that compensate for it, such as delegation of some decisions to acknowledged experts.

Second, delegation of some choices to experts does not imply the failure of democracy. Democracies that delegate some decisions to a few unelected individuals do not ipso facto turn into oligarchies. The fact that the consent of the people was initially obtained for this delegation to take place (directly or through their representatives) still makes the decisions of those experts "democratic" in a larger sense. To the extent that the independence of central banks itself was a democratic choice, it should testify to democratic intelligence on Caplan's view (since his story is supposedly voter-driven). Conversely, the decision-power of democratically authorized experts on some economic questions does not prove the superiority of oligarchy over democracy but simply establishes the necessity of having some efficient technocratic cogs in a larger and complex democratic structure of governance.[40] The relevant comparison for my purpose in this paper is not between democracy and that technocratic branch of the government but democracy and oligarchy when both are equipped with a competent technocracy of that kind. John Stuart Mill thought that the only virtue of a monarchy was its bureaucracy, whereas the virtue of a democracy was its bureaucracy plus the intelligence that goes into overseeing it (Considerations on representative Government, Chapter 5 and

[40] In fact, this voluntary delegation of technical economic questions to experts might be all that Caplan ultimately advocates.

6). Similarly I argue that when both democracy and oligarchy are equipped with a competent army of experts, democracy would on average outperform oligarchy.

Third, even if Caplan is right about voters' topical incompetence, particularly in economic matters, why does he not consider the possibility that such topical incompetence might be solved over time through education and public debates? Caplan seems to equate observed ideological preferences with deeply entrenched (bad) cognitive biases and heuristics. In the same way that people are known to suffer from base-rate neglect[41] or to be subject to framing effects,[42]Caplan suggests that they are systematically anti-free-trade and pro-job security. But an anti-market or a pro-job bias is of a different nature than an inability to calculate probabilities correctly or see a glass as equally half-full and half-empty. Such economic biases are less due to the limits of human cognitive abilities and more to cultural factors. After all while all human beings may suffer from some form of base-rate neglect, Americans are actually much less obsessed with job security than Europeans. President Clinton during his presidential campaign could thus warn the American public that "they would have to change jobs 7 to 8 times in a life-time"—a discourse utterly unthinkable in a French context. Racial and sexist prejudices have considerably diminished in most Western democracies over just a few generations.[43] These facts suggest that some biases can be corrected, at least partially. Maybe economic biases are of a more enduring nature but Caplan does not demonstrate this for a fact. Education and more democracy, however trite that may sound, may well be the answers to (at least some) of the flaws of democracy.

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41 The base-rate neglect or fallacy consists in neglecting the prior probability of some hypothesis H when trying to assess the conditional probability of this hypothesis given some evidence E.

42 They give different answers to a same question that frames things differently.

43 The US has now a Black president.

The final objection one can raise against an apparent implication of Caplan's indictment of democracy—that we would be better off with an oligarchy of experts—[44] is that groups of experts are not fool-proof either. Philip Tetlock showed in his study of "political judgment" that when it comes to assessing a problem and making political predictions, political "experts" do hardly better than lay people and, on the purely predictive side, are in general outperformed by simple statistical regressions. Tetlock concludes that it does not really matter *who* the experts are (economists or political scientists or philosophers...), nor *what* they think (ideologically, i.e., whether they tend to be pro-market or socialist). What matters is the *way* political experts think, namely whether they think as "foxes" or as "hedgehogs." Tetlock characterizes "foxes" as eclectic thinkers with an ability to use different frameworks and theories. By contrast hedgehogs are dogmatic thinkers with a one-size fits all theory of the world. From what Tetlock could empirically observe, foxes are almost always better forecasters than hedgehogs. Tetlock also shows that both foxes and hedgehogs are generally outperformed by statistical regressions. If political experts—pundits, political campaign leaders, diplomats etc.—tend to overestimate their knowledge, analytical skills, and ability to predict what will happen, it is probable that economists—who tend to fit the model of the "hedgehog" or dogmatic thinker described by Tetlock—suffer from the same cognitive failures.

Do Tetlock's results imply that there is no added value to expert advice compared to the judgment of well-informed laities? Concludes Tetlock:

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[44] Caplan would deny that this is the solution he advocates, yet everything, from the cover of the book to many assertions in it invite an anti-democratic reading. Caplan could have tried harder to dissuade the reader from thinking that what he ultimately advocates is rule of the experts, in the same way that he claims that he would have liked to see Tetlock be clearer about the fact that his book does not establish the superiority of the layman over the expert (Caplan 2007b).

> In this age of academic hyperspecialization, there is no reason for supposing that contributors to top journals—distinguished political scientists, area study specialists, economists, and so on—are any better than journalists or attentive readers of the New York Times in "reading" emerging situations" (Tetlock 2005: 223).

In reply to this, Caplan argues that one should not misinterpret the meaning of Tetlock's results. According to him, all that Tetlock shows is that experts are bad at answering difficult questions, not easy ones, which does not imply that laypeople would do much better on either types of questions (Caplan 2007). Fair enough, but that still not does give us a decisive argument why we should ultimately trust economist experts more than laypeople (or their representatives) when it comes to making political decisions, including when those decisions have an economic component. In fact, the argument from diversity presented above implies that lack of cognitive diversity among experts can offset the advantage represented by their individual expertise, while, on the contrary, the cognitive diversity of large groups of non-experts can to a degree compensate for their lack of individual expertise. In terms of predictive accuracy alone, large groups of laypeople may do just as well as small groups of experts.

Conclusion

I have defended the view that as a collective decision-procedure democracy is a priori more epistemically reliable than oligarchy. This is so because, even assuming that we could identify the best few, they would either not be numerous enough, and therefore cognitively diverse enough, to compete with many averagely smart people (in a direct democracy), or they would not be cognitively diverse enough over the long run (in a representative democracy).

I have shown that deliberation and majority use have epistemic properties of their own, which are maximized when their use is most inclusive, because of the key factor of cognitive diversity. Combining the epistemic properties of deliberation and majority rule, I conclude that democracy—in theory at least--beats any version of the rule of the few, including when we make unrealistic assumptions about the intelligence of the few. The good thing about democracy is that it naturally economizes on individual intelligence, while maximizing through sheer numbers the key factor of cognitive diversity.

Remember now that we neutralized the impact of two other factors of collective epistemic competence, namely virtue and information level, stacking the deck against democracy in the first case and, apparently at least, for democracy in the second case. Holding both the virtue and information factors constant, the rule of the many beats the rule of the few. What happens when we (again, theoretically) reintroduce those two variables?

If we reintroduce the virtue dimension all other things being equal, it should be obvious that it harms dictatorship and oligarchy more than it harms democracy. It would take saints in a dictatorship or an oligarchy not to abuse an unchallenged power to do what can best serve the ruler(s), even if they have to make some concessions to the masses to keep them quiet. By contrast, it is a long standing argument that the rule of the many, which is structurally designed to rule for the greatest number, economizes on virtue. To the extent that collective epistemic competence is also a function of the decision-makers'virtue, democracy a fortiori beats the rule of the few when we reintroduce the virtue component.

If we now reintroduce the information component, what happens? One the one hand, democratic citizens have arguably fewer incentives to get informed than oligarchs since their vote matter less to the outcome and since they only have to bear an infinitesimal cost for their decisions. But this does not necessarily apply to the decisions of representatives, who are judged on their ability to deliver good results and do need to become informed and, conversely, to inform their constituencies. Further, it remains an open question whether low levels of information directly translate into low epistemic competence, especially if the relevant epistemic competence consists only in identifying competent representatives or answering general questions on referenda. The democratic mechanisms of deliberation and voting might be precisely why citizens need not become more informed individually, if those mechanisms are able, as I hypothesize, to turn their relatively weak input into a much better output.

On the other hand, we saw that the great property of deliberation among many diversely thinking individuals is to bring out relevant information more efficiently than deliberation among the few like-minded. As long as voting occurs after sufficient public debates, one can argue that democracy is at least as well off in terms of the information available at the level of the group as an oligarchy would be. Notice that here I am talking about information that has direct relevance for the question at hand, since it is brought up in context, not the type of information measured by empirical surveys. Whether the amount of information made collectively available through democratic deliberation (not to mention other democratic institutions such as a free press) more than compensates for voters' disincentives to become informed remains an open question. To what extent this problem of information really matters is not at all clear either. All in all, I do not think

that reintroducing the information variable harms democracy or gives oligarchy an advantage.

The argument put forward in this paper forms a theoretical, autonomous argument in favor of democracy, distinct from arguments relying on theories of consent or equality or justice. This is not the place to defend the superiority of an epistemic justification of democracy over other justifications. Let me just suggest that whatever might be, or might have been, the initial reasons to prefer democracy over dictatorship or oligarchy, collective wisdom (democratic reason) might help explain why we keep it. Josiah Ober (this volume and 2009) argues on the basis of historical evidence that the superiority of Athens over rival city-states came from the epistemic properties of its democratic institutions, in particular the deliberative institution of the Council of 500 and the non-deliberative practice of "ostracism." I see his contribution as historical evidence supporting the theoretical claim presented here. [45]

Let me add a final word on the conditions for democratic reason to emerge. I have insisted on the importance of cognitive diversity for the emergence of the phenomenon of collective intelligence. Without it, the mechanisms of deliberation and majority rule risk producing democratic unreason. I have assumed throughout this paper that more people bring in more cognitive diversity. In order for this correlation between numbers and cognitive diversity to remain plausible though, one must be considering a specific kind of society, characterized, among other things, by the existence of a free "market of ideas," ensuring that the constant conflict of points of view and arguments renews perspectives, interpretations, heuristics, and predictive models—the toolbox of democratic reason. The

[45] I consider here that majority rule is both a way to pass a collective judgment about the past and present qualities of a leader, representative, or policy, and to make a prediction about the future ability, success or relevance of that leader, representative, or policy.

emergence of democratic reason is thus conditional on the existence of a social and cultural context that nurtures and protects, among other differences, cognitive differences.

Although I do not pretend to be able to substantiate that claim here, my guess is that to the extent that the epistemic argument for democracy is true, it shows that democratic reason and liberalism go together. In other words, democracy is more likely to be smart if it is, also, liberal and applies to an "open society." Illiberal or authoritarian democracies that foster conformism of views and stifle dissent risk turning both deliberation and majority rule into dangerous mechanisms for collective unreason, depriving themselves in particular of the possibility to come up with efficient solutions to collective problems, accurate information-aggregation, and reliable predictions. Other key factors are probably the independence of the media, as well as an educative system nurturing cognitive differences and the ability to express them.

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