Plural Voting for the Twenty-first Century

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Abstract: Recent political developments cast doubt on the wisdom of democratic decision-making. Brexit, the Colombian people's (initial) rejection of peace with the FARC, and the election of Donald Trump suggest that the time is right to explore alternatives to democracy. In this essay, I describe and defend the epistocratic system of government which is, given current theoretical and empirical knowledge, most likely to produce optimal political outcomes—or at least better outcomes than democracy produces. To wit, we should expand the suffrage as wide as possible and weight citizens' votes in accordance with their competence. As it turns out, the optimal system is closely related to J. S. Mill's plural voting proposal. I also explain how voters' competences can be precisely determined, without reference to an objective standard of correctness and without generating invidious comparisons between voters.

Keywords: epistocracy, meritocracy, epistemic democracy, collective decision-making, Condorcet's Jury Theorem, Q procedure.

Depending on one's perspective, 2016 either vindicated the democratic ideal or provided the best evidence yet that it is fatally flawed. Those in the former camp point to the successes of populist movements across the globe, which defeated powerful, entrenched, wealthy interests to advance their preferred policies and candidates.

Others look back with dismay: at Brexit, which economists across ideological lines warned would reduce output and wages; the Colombian people's (initial) decision to reject peace with the Revolutionary Armed Forces of Colombia after a half-century of civil war; and the election of Donald Trump, failed businessman and reality television star, as President of the United States. People in this camp, in which I include myself, increasingly wonder if injustice, poverty, and insecurity might be caused, not counteracted, by democracy.

Of course, for philosophers these worries are not new: Since Plato, at least, there has been a plausible (if not always aired) argument that the popularity contest that is democracy might not be the best way for a polis to make its decisions.

This abstract concern has been reinforced by contemporary empirical research: Three-fourths of the American public either knows almost nothing about public policy or is systematically misinformed;[1] many voters suffer from serious cognitive biases, like racism, which affect electoral outcomes;[2] and citizens both loathe their chosen representatives and keep reelecting them, election cycle after election cycle.[3] Most of these data come from the United States, but the situation in Britain does not appear to be better: Less than a quarter of Britons can name their Member of Parliament.[4]

In the face of this, it is natural to wonder if there might be a better way. But what would that better way be? One of the three goals of this essay is to answer that question. That is, I will describe and defend the form of epistocracy that is, given current theoretical and empirical knowledge, most likely to produce optimal political outcomes—or at least better outcomes than democracy produces.[5] Put differently, I want to answer the question, 'Suppose we wanted to replace democracy, as it is currently practiced, with an epistocratic alternative: How should we do it?'

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[1] The enormous literature on voter ignorance began with Converse 1964. For an up-to-date survey of the state of the electorate, see Brennan 2016.

[2] See, *e.g.* Pasek *et al.* 2009 and Piston 2010.

[3] Congress' approval rating—20% as of April 2017—has not cracked 50% since 2003. See <http://www.gallup.com/poll/208472/congress-approval-drops-down-february-high.aspx> accessed 2 May 2017.

[4] See Fox & Korris 2013.

[5] An 'epistocracy' is a system of government in which political power is not distributed to all eligible citizens equally, but in accordance with their abilities to make good political decisions. The term was coined by Estlund (2003). The most prominent contemporary supporter of epistocracy is Brennan (2009, 2011, 2012, 2013, 2016).

The most famous candidate epistocratic system is the one described by John Stuart Mill in *Considerations on Representative Government*.[6] Mill recommends *plural voting*, an electoral system under which all (eligible) citizens get a vote, and some of these citizens, owing to their superior education or occupation, get more than one. Mill's justification for this proposal has been interpreted variously,[7] but at least one ground seems to be, naturally enough for the utilitarian Mill, that plural voting produces better political consequences than 'one person, one vote' democracy—what I'll call *single vote democracy,* or *SVD*. In this way, Mill gives an *epistemic* justification for plural voting.[8]

The second goal of this essay is a historical one: to show that Mill, 150 years ago, correctly identified the system of political decision-making which theory now suggests is epistemically optimal.

The third and final goal is to intervene in the literature. Epistemic defences of democracy have proliferated in recent years (§1), yet the very theory that epistemic democrats appeal to in making their case requires us to abandon the principle of 'one person, one vote' in favor of plural voting. Epistemic democrats have ignored this implication. I explain why.

Two preliminaries: First, I shall have nothing to say here about issues of justifiability (see Mulligan 2015 for that). If democracy is a uniquely just form of government, or if epistocracy is categorically unjust, then the work done here may be regarded as a curiosity, never to be

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[6] Mill also discusses plural voting in *Thoughts on Parliamentary Reform* and 'Recent Writers on Reform'.

[7] It maximizes utility; it prevents a majority class from hijacking the political process; it 'benefit[s] *everyone* in comparison to the alternative of equal votes' (Beitz 1989: 38); it 'better promote[s] morally desirable outcomes than would unencumbered majority rule' (Arneson 1993: 133); it 'accords with the natural order of human life' (Rawls 1971: 232). For a historical analysis, see Miller 2015.

[8] We follow the usage of Cohen (1986) here.

implemented. This is an essay about what we might do under the assumption that epistocracy is not precluded on grounds of justice.

Second, I am not arguing that we ought to replace SVD with an epistocracy. Whether this is true—whether we would in fact get better political results by implementing the system I outline here—I frankly have no idea. The underlying assumptions of the theoretical model that I adduce, which supports the superiority of epistocracy over SVD, are violated in myriad ways in the real world. But so too are the assumptions that underlie the models that democrats adduce. At the end of the day, whether some epistocratic system or SVD is epistemically superior is a matter which can only be settled *a posteriori*, through trial-and-error. Theory provides us with an imperfect map as we chart the course of our politics; while some of the routes it suggests may lead us astray, it is an invaluable tool which we should not neglect.

1. Collective Decision-making and Democracy

The problem of collective decision-making is the problem of finding the optimal way for a group to choose among several alternatives, where members of the group share a common objective but may disagree about which alternative achieves that objective. As an example, suppose that Jones is sick and must choose between two potential treatments, *A* and *B*. If he chooses the correct treatment, he will live; if he chooses the wrong treatment, he will die. Jones receives medical advice from several doctors. They all want Jones to be cured, but they disagree about which of the two treatments will in fact do this. Jones faces the challenge of weighing these conflicting opinions when making a decision about his treatment. How should he adjudicate among the doctors' recommendations? Should he select the treatment that commands majority support

among the doctors? Follow the recommendation of the most experienced doctor? Apply some other rule? The answer is not obvious.

The need for good collective decision-making is ubiquitous in human life. Consider, as examples, (1) a group of government economists debating whether some tax cut will increase aggregate demand; (2) members of a baseball front office arguing over which of several prospects will produce the most runs; and (3) a board of directors discussing which strategic merger option will maximize profits.

It is important to note that cases of collective decision-making are distinct from considerations of social choice theory. In situations of social choice, the goal is the 'fair' extraction of a single, group preference from competing individual preferences. In these situations, there is no objectively correct alternative, no fiducial standard against which to judge the alternatives, no intragroup agreement about a desired end. That stands in contrast to the case of Jones, in which one of the treatments *is* objectively correct—either *A* or *B* will save Jones's life, no one disputes this—and everyone is trying, in good faith, to figure out which of the two this is.

It is an open question, the extent to which political life is better modeled by collective decision-making or social choice theory.[9] As I'll discuss below, for epistemic democrats as for epistocrats, it's the former. For procedural democrats, it's the latter: They wish to 'identify a set of ideals with which any . . . procedure ought to comply. . . . Proceduralism holds that what justifies a decision-making procedure is strictly a *necessary* property of the procedure—one entailed by the definition of the procedure alone.' (Coleman & Ferejohn 1986: 7). This is

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[9] These terms—'collective decision-making' and 'social choice'—are not always used consistently in the literature, and so it is essential to check definitions.

precisely the mission of social choice theory, and most famously demonstrated by Kenneth Arrow's (1950) impossibility theorem.

The procedural democrat thinks that we need not fret over the 'correctness' of our political outcomes; either there is no fact of the matter about that, or there is but it is irrelevant to political justice. What is important, instead, is that the 'will of the people' be expressed through our politics. So long as, for example, (1) all adult citizens have a vote, (2) these votes count equally, and (3) the elections are not unfairly meddled with (*e.g.* voters are not intimidated and all votes are counted), then the result is just—whatever it turns out to be.

Now, among epistemic democrats and epistocrats, the question of what exactly we mean by a 'correct vote', the 'right candidate', *etc.* is a difficult one. In my view, it has not yet been satisfactorily explained (I offer some thoughts in my Manuscript). I note, however, that so long as we can reach some kind of agreement on a desired end, we move out of the realm of social choice and into the realm of collective decision-making. This end could be a very 'thin' one, such as the establishment of justice, with no further definition provided. And this could apply only to some subset of politics. But to the extent that we can agree, within some limited domain, that our goal is establishing justice, the important theoretical question is how to maximize the probability that the just alternative, whatever it be, obtains.

I need not address these complexities, since all scholars who defend democracy on epistemic grounds necessarily agree that political outcomes may be reckoned as right or wrong in this way: 'In the epistemic interpretation, democratic decision-making processes are valued at least in part for their knowledge-producing potential . . . the assumption of a "procedure-independent standard of correctness" is, indeed, one of the key characteristics of an epistemic approach to democracy' (Landemore 2013: 44). Epistemic defenders of democracy include

Dietrich & Spiekermann (2013), Estlund (1990, 1993, 1994, 1997, 1998, 2008), Goodin (2003, 2008), Landemore (2013), Peter (2007, 2008), and Talisse (2009).[10]

The most common and compelling theoretical justification for democracy's epistemic value in general, and its alleged superiority to epistocracy in particular, is *Condorcet's Jury Theorem* (*CJT*).[11] The theorem originated with the Marquis de Condorcet (1785), who pointed out a consequence of the Law of Large Numbers: If the decisions of a group (a jury, an electorate, *etc.*) are made by simple majority rule, then, as the group gets larger, the probability that it decides correctly increases monotonically, converging to 1 as the number of group members goes to infinity. This aggregative power leads List and Goodin to describe CJT as 'the jewel in the crown of epistemic democrats' (2001: 283).

By way of illustration, consider a jury of size N which must decide whether to deliver a verdict of 'guilty' or 'not guilty'. The jurors share a common objective (convicting guilty defendants and exonerating innocent ones), and decisions are reached by simple majority rule, as in SVD. Even if each juror's competence is quite mediocre—even if each juror has only a 0.60 probability of choosing the correct verdict, say—the probability that the jury gets it right, collectively, rises quickly with N. If $N = 11$—a typical jury size—then the probability that the jury chooses correctly is 0.75. Doubling the size to $N = 23$ yields a probability of 0.84. And a triple-digit jury is almost sure to choose correctly (with a 0.98 probability for $N = 101$). In

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[10] Some theorists, such as Estlund and Peter, are best regarded as hybrid epistemic/proceduralist democrats.

[11] Two other theoretical grounds are sometimes adduced: (1) the Miracle of Aggregation, which holds that if voter errors are random they will cancel out to allow a well-informed minority to prevail, and (2) the Hong-Page Theorem, which claims that cognitive diversity is more important than ability when it comes to group decision-making. The Miracle of Aggregation does not hold in the real world because voters suffer from systematic, not random, errors (see, *e.g.* Althaus 2003 and Caplan 2007), and the Hong-Page 'Theorem' has recently been shown to be unsound by Thompson (2014).

general, for a jury of size N (N odd), where each juror has a *competence p* (the probability that the juror chooses correctly), the probability that the jury, collectively, delivers the correct verdict is given by

$$P_N = \sum_{i=\frac{N+1}{2}}^{N} \frac{N!}{i! \, (N-i)!} p^i (1-p)^{N-i} \, .$$

If this classical formulation of CJT accurately modelled politics, then, given that millions of voters weigh in on major political decisions, the quality of democratic decision-making would be excellent.

CJT relies on several assumptions. These include:

(1) Dichotomous choice: voters choose between only two alternatives;

(2) Voter independence: Each voter's choice is statistically independent of those of the other voters;

(3) Minimal competence: $p > 0.5$; and

(4) Homogeneous competence: Each voter has the same probability p of choosing the correct alternative.

Obviously, some of these assumptions are regularly violated in the real world. Jurors, for example, receive common information during the course of a trial, and so their votes are

correlated, and so (2) does not hold. But the theorem has been extended to deal with many of these limitations, including the independence requirement.[12]

To undermine CJT as a justificatory ground for democracy, epistocrats must attack one or more of these assumptions (or otherwise argue for the presence of model error). Brennan, for example, does so by claiming that 'by far the most important assumption [of CJT] is that voters are on average more competent than incompetent' and then raising the possibility that this is not the case: 'There is strong evidence that voters are in systematic error and their average reliability is less than 0.5' (2016: 180).

In fact, this assumption is of little consequence. Suppose it were violated; that is, suppose that $p < 0.5$. This is just as epistemically useful as the case in which $p > 0.5$, because we would know that our political system would be almost certain to choose the *wrong* outcome. Thus, the social planner simply selects the outcome that does not obtain democratically. Brennan is right, of course, that this could pose a difficulty for implementation, but from the epistemic standpoint, the violation of (3) is unproblematic.

The real problem for epistemic democrats lies in (4): the assumption that all citizens share the same probability of choosing the correct alternative. Indeed, this is the epistocrat's whole point: We're not all equally likely to be correct about political matters. Some people enjoy the epistemic benefits that, say, education provides; some suffer from harmful biases, like racism and sexism; and so on.

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[12] On the relaxation of (1), see Lam & Suen 1996, List & Goodin 2001, Miller 1996, and Hummel 2010; on the relaxation of (2), see Berend & Sapir 2007, Berg 1993, 1996, Boland 1989, Boland, Proschan, & Tong 1989, Ladha 1992, 1993, 1995, Nitzan & Paroush 1985, Peleg & Zamir 2012, and Shapley & Grofman 1984.

Although this is a simple point, it has been overlooked within the literature on democratic theory. The few attempts by democrats to accommodate it are just wrong. Landemore, for example, says that 'while Condorcet believed that *each* voter had to have the same better than .5 correctness probability, modernized versions of the theorem make this demand on the *median* voter only' (2013: 73). But that's false, here's a counterexample: A three-person jury of competences {0.10, 0.60, 0.70} has a median competence of 0.60, yet has only a collective competence of 0.47.[13]

Now, it is true that the classical CJT holds if the *mean* voter has a competence over 0.5, but that doesn't matter, for once we relax the assumption of homogeneous competence, the case for SVD falls apart. I explain why in the following section. Here, I'll just point out one strange consequence of relaxing the assumption: Under *hetereogenous* competence, an *infinitely large* jury composed of jurors who *all* have a probability greater than 0.5 of choosing correctly might still only deliver the correct verdict 50% of the time.[14]

2. Collective Decision-making under Heterogeneous Competence

We return to the case of Jones, contemplating which of the two treatments to choose. Suppose that he consults five doctors, including four interns whom he evaluates as having a 0.60 probability of choosing correctly, and an experienced specialist, with a 0.75 probability of choosing correctly. If Jones makes his decision SVD-style—one doctor, one vote—then the probability that he chooses the correct treatment—the probability that he survives—is 73.4%. That SVD is a bad way for Jones to make this decision is plain when we compare it to the

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[13] $(0.1 \times 0.6 \times 0.7) + \big(0.1 \times 0.6 \times (1 - 0.7)\big) + (0.1 \times (1 - 0.6) \times 0.7) + \big((1 - 0.1) \times 0.6 \times 0.7\big) = 0.466.$

[14] See Paroush 1998.

probability that Jones survives when he simply follows the recommendation of the most competent doctor—namely, 75%.

But that too is suboptimal. Jones maximizes the probability that he survives when he follows the recommendation of the expert, *so long as at least one of the interns agrees with her about the treatment*. That decision rule yields a 76.3% chance of survival. There is no possible superior alternative.

The task facing Jones (and, by analogy, political theorists) is the identification of the optimal decision rule (political procedure) for choosing between alternatives (candidates, referenda choices, *etc.*) when our decision-makers (citizens) may differ in their abilities to select the correct alternative. Note that the epistemically optimal rule is not, *pace* List & Goodin, the 'rule which always tracks [the] truth without error' (2001: 280). No such rule could exist, given (1) human fallibility and (2) the fact that we expect our political decision-making processes to remain stable across multiple 'elections'. The optimal rule is simply the rule that maximizes the probability that the agreed-upon end (*e.g.* justice, health) obtains. In any particular case, this rule could fail to identify the correct alternative. But we would never know if it did, and even if somehow we obtained that knowledge, it would not justify abandoning the rule.

Now here is the critical point: Only in special cases, like homogeneous competence, will SVD be optimal. Theory tells us, in fact, that there is one generally optimal way to make decisions under conditions of heterogeneous competence: Weight each citizen's vote proportional to the log-odds of his competence, and then employ majority rule.[15]

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[15] The foundational work here was done by Grofman, Owen, & Feld (1983) and Nitzan & Paroush (1982).

In the case of Jones, the interns' votes receive a weight of $\log \frac{0.6}{1-0.6} = 0.405$, and the expert's vote receives a weight of $\log \frac{0.75}{1-0.75} = 1.0986$. The winning side is thus the one that commands a total share of the vote of $\frac{(4 \times 0.405) + 1.0986}{2} = 1.359$ or more. This happens when either (1) at least one intern votes as the expert does, or (2) all four interns vote unanimously. In this way, given any set of competences, one can determine, in a computationally easy way, the uniquely optimal decision rule.

For all the attention that CJT has received in the literature on democratic theory, I am not aware of any work that analyses the application of the theorem to politics when we accept that each voter does not share the same probability of being correct about the matter at dispute.[16] This is surprising for a few reasons, not least that (1) the assumption of homogenous competence is both implausible *a priori* and falsified by empirical research, and (2) the relevant work in decision theory—authored mostly by economists—is small but not obscure.[17] Moreover, that voters are of equal, or roughly equal, competence is precisely what the epistocrat denies—so the democrat implicitly begs the question against him. Finally, giving up the assumption of homogenous competence has important ramifications for collective decision-making in general and our politics in particular—the most important of which is that we can do better than SVD.

In sum, if we wish to maximize the probability that our polis chooses correctly, we should not follow the lead of democrats who advocate SVD on Condorcetian grounds. These democrats are simply mistaken about the theory. We should abandon the principle of 'one person, one vote' in favor of a weighted voting system. Observe that this is similar to Mill's

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[16] I can, indeed, find no reference at all to these results in the philosophical literature, with the exception of a footnote (n. 15) in List & Goodin 2001.

[17] See also Nitzan & Paroush 1984, 1985 and Owen, Grofman, & Feld 1989.

suggestion: Everyone gets a voice in her government, but some voices—those of more competent citizens—are louder than others. Indeed, the results I describe here may be made technically equivalent to Millian plural voting by setting the least able voter's weight equal to 1 and scaling the other weights accordingly. That yields a system in which each (eligible) citizen gets at least one vote, and more competent citizens get more than one. Votes may be fractional, but that is no impediment. These are 20th century results—Mill could not have known about them, but his work is prescient.

3. The Application of Theory to Politics

As we have seen, SVD is a generally suboptimal decision rule. In some cases it is the worst possible rule of all. Millian-style plural voting, on the other hand, is *always* optimal. But this knowledge can only take us so far; in the process of moving from theory to practice, problems may arise. The most significant and obvious of these is how to determine and subsequently update the competences we assign to voters. This is both a theoretical hurdle and a practical hurdle, since, depending on how it is done, citizens will be more or less inclined to accede to the differential distribution of political power. And depending on how it is done, we philosophers will be more or less willing to regard it as a justifiable constraint on our beloved ideal of political equality.

In this section, I consider this problem and suggest that there are reasons for optimism—optimism, that is, that competences can be assigned accurately. In the next section, I will argue that the procedure I endorse is superior, morally, to other possible evaluative procedures—more fair in the minds of voters and more plausible to philosophers.

Before advancing my own approach, I wish to consider, and reject, the two extant approaches to determining voter competence: (1) a voting examination, and (2) the use of a proxy, such as education (as Mill suggested).

A voting exam could work in one of two ways. First, it could serve as a mechanism to disenfranchise voters who, by virtue of their political ignorance, cannot contribute epistemically. These voters would be assigned a weight of 0, and thus would have no influence on the election at all.

Second, an exam, properly developed, could provide for gradations in assigned competence on the basis of performance: The higher a voter scores, the greater the weight her vote receives.

Both prospects are problematic. The idea of a disenfranchising voting exam will be a political non-starter for many given their nasty history in the United States. To be fair, exams under Jim Crow ('literacy tests') were not good-faith attempts to screen for political knowledge; they were, by design, impossibly hard, and they were only given to blacks. They were, that is, a thinly-veiled mechanism for disenfranchising a minority race.

To be sure, the problem with voting exams go deeper than that; Estlund (2008) considers them in some detail, finding them unjustifiable (I argue, in my 2015, that Estlund's whole approach is misguided). Issues of justifiability aside, it is hard to say with any specificity what we ought to put on such an exam and how it ought to be evaluated. Does knowing how a bill becomes law really make a person more likely to make good judgements about public policy or politicians' character? How should we regard someone with a PhD-level knowledge of economics who cannot find Iraq on a map? What do we do with the fact that some of our most knowledgeable voters are our least rational ones (Nyhan, Reifler, & Ubel 2013)? In short, we

lack sufficient information to formulate an epistemically useful voting exam. The idea is too handwavy.

Brennan, too, seems cautious about this approach: In his 2016, he raises the idea of a voting exam without explicitly endorsing it, and elsewhere he warns of the potential for mischief: 'In practice, the competence exam is ripe for abuse and institutional capture.' (2012: 108).

Perhaps most important, a voting exam would impose a cost on citizens and thus serve as a disincentive for political participation. And this we do not want. *Pace* Brennan, we should resist any modifications to our democracy that would shrink the electorate. I explain why below.

Note, too, that there are costs associated with both implementing voting exams for the first time and retesting. Political knowledge and the ability to reason well changes to some degree over time. We can take epistemic advantage of these changes if we subject citizens to voting exams at regular intervals—but there are obvious costs to doing so, and these costs must be balanced against the epistemic advantage obtained through retesting. Best of all would be a competence estimation procedure that updated automatically, at little marginal cost. This, too, is possible.

I turn to the second approach to estimating voter competence, which is the one that Mill employed: Find an appropriate proxy for political competence and use that. This is also the approach endorsed by Harwood (1998), in what is, I believe, the only other defence of plural voting in the contemporary literature. Harwood believes that (1) all citizens should have a vote; (2) voting should be mandatory; (3) the number of votes a citizen has should increase with her level of education (to a limit); and (4) education, at all levels, should be free and accessible to all citizens. No justification for these policies is given; Harwood simply asserts that they would

lead to more 'intelligent policies' and that 'political debate . . . would be less of an insult to the intelligence, hence the tone of public life would improve.' (p. 131).

Perhaps so. But, as above, this system is insufficiently grounded. Brexit and President Trump notwithstanding, the consistent historical success of SVD relative to other political systems provides strong, Burkean grounds to resist excessively speculative reform.

That said, it is worth noting that education is the most likely candidate to serve as an accurate proxy for voter competence. Delli Carpini and Keeter conclude that 'the most powerful predictor of political knowledge is formal education' (1996: 188). And, happily, this does not appear to be merely a correlation but a causal effect,[18] which opens the door for citizens to choose to exert greater political influence—so long as they are willing to responsibly educate themselves, *a la* Harwood.

Education is also negatively correlated with general cognitive bias (here too there appears to be a causal effect) and positively correlated with IQ (see, *e.g.* Ceci 1991). Moreover, there is evidence that educational attainment is negatively correlated with specific and salient forms of bias, such as racism (*viz.* Wodtke 2012). The proxy of education does pick out citizens who are better-informed and cognitively superior. While this does not strictly entail that the better-educated are more likely to get at political truth, vesting them with greater influence over the political process would seem like a reasonable place to start in our quest for better political outcomes. But we can do better.

I suggest a third approach to the problem of estimating voter competence, an approach which is grounded in twenty-first century research in artificial intelligence. To reiterate, the problem facing us is that optimal collective decision-making requires knowledge of voters'

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[18] Delli Carpini & Keeter 1996, Lambert *et al.* 1988, and Nie, Junn, & Stehlik-Barry 1996.

competences; without these, we cannot select the right decision rule. But these competences are not known. We do know how citizens have voted in the past, but of course we do not know if those votes were correct or not.

Surprisingly, it is possible to estimate a voter's competence—that is, estimate the probability that he will choose, now, correctly—by comparing his voting record (the candidates, policies, *etc.* he selected in elections past) to the voting records of other citizens. *Solely* from this information, and without *any* objective knowledge of which past candidates, policies, *etc.* were the 'correct' ones, we can determine, for any individual voter and to high precision, how likely he is to choose correctly this time around. We do so through a process called 'Q', developed by Baharad *et al.* (2011, 2012).[19]

This is a deeply counterintuitive result. To develop a sense of it, consider what we might think of some voter, Smith, who participates in two hypothetical elections. In the first election, Smith votes for candidate *A* but all of the other 120 million citizens vote for *B*. In the second election, Smith votes for *A* along with 59,999,999 million other voters, but *B* wins by a single vote.

We would seem justified in taking a dim view of Smith's competence as a result of what we know about his choice in the first election and that election's overall result. There is, *ex hypothesi*, a truth of the matter about whether *A* or *B* is correct, and Smith's judgement was contradicted by the independent judgements of 120 million other people. In the second election, no such view is justified. Put in a similar way, and under a minimal assumption about voter competence, a sizeable election which is decided (almost) unanimously is more likely to have been decided correctly than an election decided on a knife-edge. This is directly implied by the

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[19] See also Grofman & Feld 1983 and Parisi *et al.* 2104.

classical CJT. And this information, in turn, tells us something about the competence of the voters involved. This is the idea driving Q.

Here is how Q works in detail: We have a set of N voters, each of whom has voted in some subset of M elections. First, we assign each voter a provisional competence, $\{p_1, p_2, \ldots, p_N\}$. We can assign the same value to all voters, or these provisional competences can be metered by education level, or something else—this detail does not matter, since these initial provisional competences have almost no effect on the procedure's efficiency. Second, from these provisional competences and each citizen's voting history, we compute the probability that the various alternatives of the M elections were the correct ones. Third, we make a maximum-likelihood estimation of voters' competences; that is, we find the most likely set of N competences given the probabilities just computed. These, in turn, become our new provisional competences, and the procedure is repeated until equilibrium; until a new iteration produces no change in any voter's estimated competence.

This is a hill climbing algorithm, and as such it cannot be guaranteed, analytically, to yield the optimal set of competences (and, in turn, the optimal decision rule). However, numerical simulations find strong evidence that Q does in fact reach global maxima.

For our purposes, the important point is that Q has been demonstrated, numerically, to be epistemically superior to SVD. Just how much better depends on several factors: (1) the number of voters; (2) the number of the elections in which they participated; and (3) the distribution of competence within the electorate. For most plausible distributions of competence, Q's superiority to SVD quickly becomes stark as the number of voters and their voting history increases. And even under the restricted conditions that enable SVD to converge to perfect accuracy, Q performs better.

Two technical notes: First, there are no constraints whatsoever on the number of voters we must involve, which elections they must have participated in, the number of these elections, and so on. There can be gaps, that is, in the matrix of voters and elections.

Second, one might worry about the possibility that a wrong decision early in the series of elections might snowball: less competent voters get weighted more heavily after the first iteration, and over time this leads to systematically wrong estimates of competence. Implicit in this criticism, though, is the thought that any given voter will either *always* vote correctly ('good voters') or *always* vote incorrectly ('bad voters'), and that the probabilities that concern us are the probabilities that voters are good ones. But that is not how people actually are, and it is not how anyone—epistocrats or democrats—model collective decision-making. Instead, when we talk about a voter's competence, we are talking about the probability that she gets things right in any given election.

In any case, we can calculate the probability of arriving at systematically wrong competence estimates with precision. It is possible that Q will fail in the way described, but it would mean that the core assumption about voter competence had been violated, or very nearly so.[20] And this assumption is a weak one. Q assumes only that a unanimous vote has a greater than 50% chance of being correct. This is almost certainly satisfied in the political case; if (to take the American case) the fact that 130 million voters select *A* and none selects *B* does not imply that *A* is more likely to be correct than *B*, then there is no hope of epistemic quality in our politics.

To be sure, there are plenty of real world contexts in which the *appearance* of unanimity suggests that a political system is in fact epistemically poor. For example, in 2014, Kim Jong-un

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[20] This is equivalent to the following inequality: $\prod_i p_i > \prod_i (1 - p_i)$.

was 'reelected' with 100% of the vote (and with 100% voter turnout, to boot!) But this is a

different matter entirely. We, like the epistemic democrats, are interested in voters' *actual*

competences, and in particular how these may be harnessed toward the end of good political

decision-making. In North Korea, as in all despotisms, there is no epistemic element to the

political process. Either citizens are dissembling out of fear, or they are brainwashed, in which

case their votes are perfectly correlated with those of the despot, and therefore cannot contribute

to judgement aggregation.

An example of Q in action may be helpful. Let us consider an electorate comprised of

seven voters. I have arbitrarily assigned them the following competences: {0.25, 0.25, 0.50,

0.50, 0.75, 0.75, 0.90}. Observe that this is a mediocre group: two members (*viz.* v_3 and v_4) are

epistemically useless, and two members (v_1 and v_2) are in fact detrimental to the political process.

Nevertheless, the group satisfies Q's weak assumption about overall competence.

Now let us imagine that these 7 voters participate in 11 elections. In each election, the

voters must choose one of two alternatives. I have simulated the results of these elections and

summarized them in the table below. Without loss of generality, I have labelled the correct

alternative as 'A' and the incorrect alternative as 'B'. Whether in a given election a voter chose

correctly or incorrectly was determined by a die roll, weighted in accordance with that voter's

competence.

	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11
v_1	B	B	A	A	A	A	B	B	B	B	B
v_2	B	B	B	B	B	B	B	B	B	A	A
v_3	B	A	B	B	B	A	A	B	A	B	A
v_4	B	A	A	B	A	B	B	A	A	A	A
v_5	A	B	A	A	A	A	B	B	A	A	A
v_6	A	B	A	B	A	A	A	A	A	A	A
v_7	A	A	A	A	A	A	A	A	A	A	A

As expected, more competent voters performed better (*i.e.* more frequently cast correct ballots). Indeed, the most competent voter, v_7, voted truly every time.

We consider the perspective of the social planner, who must decide how to resolve these 11 elections. The social planner has no information about voter competence. She does know which alternative each voter chose in each election, but she does not know (unlike us) which alternatives were correct and which were incorrect.

If the social planner uses SVD to resolve these elections, then we can see (from our external perspective) that only 6 of 11 elections get resolved correctly (*viz.* E3, E5, E6, E9, E10, and E11). If the social planner had perfect information about voters' competences, then she could assign optimal weights to these voters, as described in §2. The relevant weights are {-1.10, -1.10, 0, 0, 1.10, 1.10, 2.20}. It may be verified that, given this information, the social planner would resolve all 11 elections correctly. But the social planner does not have this information; she cannot determine the optimal weights directly.

The social planner can, however, use Q to estimate competences. She arbitrarily chooses to initialize the procedure to {0.60, 0.60, 0.60, 0.60, 0.60, 0.60, 060}. From these initial, provisional competences, Q settles on an estimation of voter competences of {0.36, 0.18, 0.45, 0.63, 0.72, 0.81, and 0.99}. Observe how similar these are to the actual competences: {0.25, 0.25, 0.50, 0.50, 0.75, 0.75, 0.90}.

I stress that the values used to initialize the procedure have little effect on the final estimate. Q arrives at the very same estimation, for example, if the social planner has a little information about her voters' competences and initializes to {0.30, 0.30, 0.40, 0.40, 0.60, 0.60, 0.80}.

With Q's results in hand, the social planner is able to assign a weight to each voter. These weights are {-0.58, -1.52, -0.20, 0.53, 0.94, 1.45, 4.60}. It may be verified that by using these weights, which are her best estimates for voters' competence, the social planner selects the correct alternative in all 11 elections.

4. A Plural Voting Proposal

We now have the necessary theoretical tools to implement plural voting. The system I describe requires minimal modification to current practice. The voting authority (the Electoral Commission in the UK and the Federal Election Commission in the US) develops a database which contains a list of voters. As citizens are franchised, they get added to the database. The database contains information about not only the elections in which voters participated (in the US, this information is already recorded and is public record) but also *how* they voted—for Clinton or Trump, 'Remain' in the European Union or 'Leave' it, this person for mayor or that person for mayor, and so on. After voters cast their ballots, two things happen. First, Q is run on

the database to update competences. Second, the outcome of the election is decided not by determining which alternative was more popular, but by weighting citizens' votes in the theoretically optimal matter, using the competences in the database. I note that this system makes neither onerous storage nor computational demands.

Before describing the features that commend this proposal, I wish to rebut one objection: Namely, that this system of plural voting is susceptible to manipulation. If someone hacked into the database, we might worry, he could manipulate the numbers to obtain his desired electoral result.

This is true, but the worry is already salient, applying equally to any electoral process that uses computers—which ours obviously do. Voting has always been subject to manipulation, and we guard against it with careful auditing and robust security—which these days means both physical security and computer network defence. Plural voting is no more endangered by this objection than SVD is.

It is true that using Q requires giving up on the ideal of a perfectly secret ballot. But there are a few things to be said that mitigate this worry. First, knowledge of citizens' votes is limited to authorized members of the voting authority; one's choices remain secret from one's fellow citizens and from candidates, reducing worries about voter intimidation, vote buying, and the like. Second, there is the simple question of trade-offs: Whatever the value (moral, political) of secret ballots be, if Q can do better epistemically, then that value will come at the cost of justice, prosperity, and the other procedure-independent goods. Third, Mill (1859a, 1861) was dubious of the secret ballot on the grounds that voting is a public trust, and secrecy incentivizes people to vote with an eye toward their own, narrow interest, rather than the public good.[21] So

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[21] On Mill's opinion of the secret ballot, see Lever 2007.

for what it is worth, Mill would have not found this feature troubling, and still less because of the consequentialist benefits which Q provides.

Now, this plural voting proposal has several desirable features. First, administrative costs are low and it imposes no new burdens on voters; changing from SVD to this system would be transparent to them. Required equipment is off-the-shelf. In contrast to voting exams, updating competences in this way has zero marginal cost.

Second, unlike the use of voting exams or proxies for competence, this plural voting procedure prevents 'invidious comparisons' among citizens (to use Estlund's term). Under Q, determining optimal competences is easy; but going the other way around—calculating one person's particular competence, from his perspective—is very hard. It depends, in the American case, on not only the gross choices of over one hundred million voters but their individual choices in many elections. It cannot be done, practically. Because information about voters' competences would remain out of public hands—it seems to me that it could plausibly be classified at a very high level—no citizen could lord his greater political influence over another, since no citizen could be justified in believing that he had such influence.

Third, this system could serve quite an interesting intellectual purpose; namely, to test the hypothesis that citizens are, as some democrats claim, roughly equal in competence. If this is so it will be revealed in the data. And the system will, as a result, select SVD as the optimal rule. So this plural voting proposal accedes to the egalitarian democrat's preferred political rule— namely, SVD—but if and only if the egalitarian democrat's necessary assumption (*i.e.* homogenous competence or something close to it) is borne out by the evidence. It is hard to attack a system that has such a property; one risks self-defeat. And a finding of equal competence might have profound and positive implications for the role egalitarian principles

should play elsewhere in political philosophy. In this way, plural voting could end up being a boon to the egalitarian cause.

Fourth, this proposal justifies public spending on the least competent members of the electorate. Because these citizens are disproportionately poor and members of minority races, the net effect of such spending is the redistribution of resources to the poor, and to minorities, in the name of good political decision-making. The reason this is so is that theory suggests (Ben-Yashar & Paroush 2003) that the most efficient way to improve collective competence is by investing in the human capital of the least-competent members of the collective. No similar justification for redistribution is possible under SVD, which implicitly assumes that all voters share the same competence. Of course, not everyone will agree about the desirability of this kind of redistribution. I think that it is desirable on quite independent grounds of economic justice (Mulligan Forthcoming).

Fifth, this system protects the suffrage. It is a bad idea to disenfranchise voters because the accuracy of Q rises with the number of voters it analyses. So we are justified in not just protecting the franchise but expanding it. The idea of limited suffrage does not bother Brennan (indeed, he regards it as required by justice), but it has always made me uneasy: I have a certain optimism, which is a bit out-of-fashion I suppose, about the inexorable march of progress—and eliminating a right which so many people have fought so hard for, and which has seemed like such a moral victory each time it is gained, seems epistemologically and morally implausible to me.

Plural voting suffers from no such implausibility. The system I recommend not only suggests expanding the franchise but cultivating civic participation as well—since Q becomes

more accurate, the more information it has on citizens' voting history. That is, we want as many citizens to vote as possible, and we want them to vote as frequently as possible.

In this way (and this is not the only way), plural voting has an Aristotelian flavour: We cultivate civic virtue by encouraging people to participate in the political process; and this participation, in turn, redounds to their benefit through epistemically superior decision-making. Under SVD, no learning is possible between elections: An electorate with probability X of choosing correctly in 2016 will have probability X of choosing correctly in 2020 (holding human capital fixed). Plural voting under Q learns.

Plural voting is, thus, a modest form of epistocracy, and it has always been regarded that way. Even an egalitarian like Rawls entertained its justifiability (when he never would have countenanced restricted suffrage, I think): 'Now the ship of state is in some ways analogous to a ship at sea; and to the extent that this is so, the political liberties are indeed subordinate to the other freedoms that, so to say, define the intrinsic good of the passengers. Admitting these assumptions, plural voting may be perfectly just.' (1971: 233).

I note, too (without endorsing the idea), that there may be an argument for cosmopolitanism here, since the widest possible suffrage would include every thinking person in the world.

5. Conclusion

An essay like this is necessarily speculative. As I noted in the introduction, we must give due weight to the fact that the assumptions underlying the theory I make use of here are violated in actual practice. But this is true of nearly all decision theoretic and economic models, and they

remain useful things. In any case, this is the theoretical terrain on which epistemic democrats have chosen to do battle; we epistocrats must meet them here.

To summarize the lessons of this essay: First, the principle of 'one person, one vote' is epistemically indefensible. If it is required, morally, it must be for procedural reasons. Whether this makes theorists who care about epistemic quality epistocrats or not depends on how we define our terms, but I think that many people would consider the 'one person, one vote' principle a *sine qua non* of democracy.

Second, contemporary theory verifies what Mill suspected; namely, that optimal decision-making consists in a variant on majority rule, in which citizens' votes receive different weights, in accordance with their competences. This is a non-trivial result, and so Mill's insight here, as elsewhere, was profound.

Third, I have advanced a concrete epistocratic system, relying on the Q procedure. I have argued that this system is most likely to produce optimal political outcomes under the assumptions made by epistemic democrats. Unlike the other candidate epistocratic systems in the current debate, there are no further theoretical or empirical hurdles to be surmounted. Plural voting under Q could be implemented tomorrow, if we could muster the necessary political will.

Only real world testing can tell us if this plural voting system or any other epistocratic proposal performs better than SVD (on this I agree with Brennan (2016)). In a similar way, the best argument for the epistemic value of democracy is not the formal theory but democracy's estimable history.

We are, however, justified in believing that plural voting under Q is the most promising of the epistocratic systems currently on offer. This is because we lack the empirical data just

described: At this point, we can only rely on *a priori* grounds to prefer one epistocratic system to another, and no other detailed approaches have been offered for scrutiny.

Consider Brennan's idea of 'government by simulated oracle' (2016: 220-2), under which (1) there are voting exams, (2) the government collects demographic information on voters, and then (3) elections are decided by looking at what voters would have chosen were they fully-informed (which may be inferred from (1) and (2)).

The idea is interesting enough, but, as I mentioned in §3, we have little idea what ought to be on a voting exam. The costs involved with such a system are likewise unknown. Even if we had a well-formed idea of what government by simulated oracle would look like, no guidance for its implementation has been given. It might be especially problematic from the point-of-view of justification; after all, if you're from a group (*e.g.* African-Americans) that has lower human capital owing to historical injustice (slavery) and contemporary discrimination (racism), your *ex ante* opinions count less. Since there is no formal model, we cannot simulate the oracle's ability to get at political truth, and thereby get a sense of the precision involved. On the other hand, when it comes to plural voting under Q, these points have been covered—either in this essay or in the referenced work.

Democrats have not provided good reasons for us to trust in the epistemic power of their favored system of governance. We have seen why this is so theoretically, and why a system of plural voting would be superior in that respect. And, depending on one's view of the politics of 2016, the inferiority of SVD may have been demonstrated not just in theory but in practice as well.

The real-world transition to epistocracy would be unsettling, and it would come at the cost of a procedural rule—'one person, one vote'—which we have long assumed to be a

worthwhile one. In light of recent political developments, this may be a price worth paying for

the political system that can best obtain prosperity and justice for us all.[22]

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