Creative Synthesis: A Model of Peer Review, Reflective Equilibrium and Ideology Formation *

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Abstract

The formation of ideology can be modeled as a communication game that combines actors' psychological predispositions and their rational self-interest. I argue that we can explain ideological development by modeling the way in which political thinkers reason from first principles, and how they fail to ignore their own psychological and interest-based biases. I begin with a distributive model to provide a structure for people's interests and their psychological traits, and add in a model of reason (Rawls, 2001) to explain how those interests and traits will shape the development of ideology. The model develops the framework, based on the practice of peer review. This framework creates a tournament of potential ideologies and traces whether such a mechanism can explain the development of multiple competing ideologies.

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> "[T]he shaping of belief systems of any range into apparently logical wholes that are credible to large numbers of people is an act of creative synthesis characteristic of only a miniscule proportion of any population."
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> – Philip Converse, *The Nature of Belief Systems in Mass Publics,* 1964, p. 211

> "What gets us into trouble is not what we don't know. It's what we know for sure that just ain't so."
>
> – Attributed[1] to Mark Twain

Introduction

A fundamental element of both popular and academic approaches to politics is ideology. Politics at all levels, from ordinary voters to elite politicians to members of Congress, would seem to be at least in part organized by an ideological dimension that separates liberals from conservatives. This dimension has increasingly divided the two parties as well.

While political scientists believe that ideology is real, they disagree on where it comes from. This manuscript attempts to model ideology, integrating our best ideas about ideology's origins without reducing it to a caricature. A rich literature dating back to at least Adorno argues that ideology has psychological roots in personality traits. Meanwhile, another tradition dating back to at least Marx says that ideology is a rationalization of interests. Finally, for many, ideology is not just something that scholars study but something that they sometimes do. Ideological thinkers at least aspire to develop good theories of social order and justice, and to persuade others that they are right. Even if scholars believe ideologues are limited by their personalities or their self-interest, there is likely some consequence of their efforts to rise above those limits.

I model the interplay via the process of peer review, in which a small set of actors try to work out the best positions on a set of issues. They offer up "ideologies" that prescribe issue positions, and these ideologies are judged by another in the set. That process leads those actors to change

[1] Twain's actual words were, "It isn't so astonishing the things that I can remember, as the number things I can remember that aren't so." According to Twain biographer Albert Bigelow Paine, Twain was paraphrasing Josh Billings, who said, "I honestly beleave it iz better tew know nothing than two know what ain't so Keyes (2006) But it is the widely known apocryphal quote that is apt here.

their own beliefs about the issues under consideration. This sets up a tournament of ideologies, in which some ideologies survive and end up persuading some members, but other ideologies persuade others. The result is a lower-dimensional policy space, much like that we observe in modern politics.

Such a model is of course not the only possible explanation for the ideology we observe. But the model demonstrates that ideological patterns can emerge from simple assumptions about political communication. It is not necessary for any underlying binary tendency, and it is not necessary for actors to have strong biases in their sources of information. It is important to know that ideological disagreement can emerge even when otherwise smart and well-intentioned actors are trying to find good and just policies.

The paper proceeds in six parts. In Section 1, I provide a formal environment for understanding ideology. Section 2 discusses ideology's psychological-, interest-, and principle-based roots, and relates them to that formal environment. Secton 3 situates this model in the context of other efforts to model the development of preferences. Section 4 then sets up the approach taken in this manuscript, based on a model of philosophical reasoning advocated by John Rawls. While his notion of reflective equilibrium may have flaws as a normative prescription, it probably does describe the work of ideologues. It thus allows us to introduce philosophical reason to the origins of ideology. Section 5 discusses a formal model of the process of underlying Reflective Equilibrium. Section 6 presents results from simulations of that model. Section 7 discusses potential extensions.

1 Ideology as Constraint

I proceed from a sparse definition of ideology. Gerring (1997, p.980) surveys the literature and identifies one core element of ideology, coherence or constraint: "Ideology, at the very least, refers to a set of idea-elements that are bound together, that belong to one another in a non-random fashion."

This notion of constraint is generally operationalized as a set of policy positions that go together, often defining an ideological dimension (Knight, 2006). So, if we are to set aside *why* they are bound together for a moment, ideology is something that bundles issue positions. Ideology is about what goes with what.

This ideology is generally treated as a single dimension, from a "liberal" or "progressive" left to a "conservative" or "reactionary" right. The issue space might also be modeled through more dimensions —social, economic, foreign policy, racial, etc. But part of the notion of "what goes with what" is exactly that social conservatism "goes with" economic conservatism, for example, even though those policies need not go together logically. The result is the single ideological dimension, familiar both theoretically (Downs, 1957; Black, 1958; Enelow and Hinich, 1989; Hinich and Munger, 1994) and empirically (Poole and Rosenthal, 1997; Poole, 2000).

The question of why things might go together looms large in such a sparse definition. We will return to that question in section 2. For now, ideology is constraint. But constraint can mean many things. Scholars generally operationalize ideology as constraint through a set of questions (or votes, or items) on which actors provide consistent answers. If you favor abortion rights, you should favor labor unions and oppose the War in Iraq. If you oppose abortion, you take the opposite position on those issues. Our first step, then, is to get more rigorous with our definition of ideology and of constraint.

1.1 A Model of Constraint

I begin with a set of issues and actors with positions on those issues. However, this is not a theory of general ideological adoption, but of ideological generation. Following Converse, we restrict the actors to those who are part of the "miniscule proportion of the population" that engages in the "creative synthesis" of ideology:

> The second source of social constraint [the first is interests, as in section 2.2] lies in two simple facts about the creation and diffusion of belief systems: First, the shaping of belief systems of any range into apparently logical wholes that are credible to large numbers of people is an act of creative synthesis characteristics of only a miniscule proportion of any population. Second, to the extent that multiple idea-elements of a belief system are socially diffused from such creative sources, they tend to be diffused as "packages," which consumers come to see as "natural" wholes, for they are presented in such terms ("If you believe this, then you will also believe that, for it follows in such-and-such ways"). 1964, p. 211

I accept without objection the mechanisms laid out elsewhere (see especially Zaller, 1992) for how those elite opinions reach ordinary voters. Much of the study of ideology has focused on the

attitudes once they have diffused into the electorate. The attitudes of voters are important, but if we believe the source of their attitudes is elite discourse, then we need to model that discourse. This is determined by these elite thinkers, whom I argue are making a good faith effort to decide what is best. We might call this group "the policy elite," "a discourse," "the chattering classes" or "the blogosphere." I will use the term "intelligentsia." They begin the process.

The model includes:

- X is a set of k binary issues.
- P is a set of n intellectual actors.
- $y_{ij} \in \{0, 1\}$ is the i^{th} actor's "position" on the j^{th} issue.
- $\mathbf{Y}$ is an n by k matrix of issue positions.

Constraint means that one's position on one issue determines or influences one's position on another. But if we are open to any sort of reason behind that constraint, then *any* pattern could be an ideology. Who are we to say that one bundling is more legitimate than another? For example, we might be inclined to say that a person who favors collective bargaining rights for labor unions but not a federally mandated minimum wage is not ideological, because those two policies are logically and politically connected. But a person who opposes the death penalty but favors abortion rights would seem to violate an equally valid logic. So we cannot rely on our subjective impression of which logic is binding and which is not.

In practice, scholars typically determine which pattern of constraint is valid empirically, by looking across the of the data. This is literally what NOMINATE and similar scaling methods do. Psychologists sometimes ask questions about whether or not actors seem to have a grasp of the ideological concepts that are used to organize issues, but those concepts tend to be chosen from those that are widely used by liberals and conservatives. And for our purposes, there is little wrong with this. "Liberalism" and "conservatism" (and some other, similar bundles, like "libertarianism") are the empirically observed ideologies that matter in politics.

And so, we can operationalize an ideology in this way:

- β is a **belief system**, or a set of issue positions that are meant to be internally consistent.

A belief system becomes an **ideology** when it is shared by many actors. We could then ask of an intelligentsia, how many ideologies are there, and how different from one another are they? It is useful to think of a matrix of issue positions, resembling a roll call matrix typically used in scaling techniques. In that case, we can identify the ideologies that seem to anchor the system and give it structure.

We can then apply this notion to the basic framework of issue preferences suggested by the matrix $\mathbf{Y}$. This model is widely used in models of distributive politics, and it has been imported from there to models of party formation (Schwartz, 1989; Aldrich, 1995) and ideology (Bawn, 1999). The use of the framework is thus directly comparable to these "long coalition" models, in which stable coalitions emerge as equilibrium strategies in a collective choice framework.

Table 1 provides an example. In it, there are five actors, labeled A through E, who have positions on five issues, numbered I through V.

Table 1: Hypothetical Intelligentsia with Five actors and Five issues

	A	B	C	D	E
I	1	1	1	0	0
II	1	1	1	0	0
III	0	0	0	1	1
IV	0	0	0	1	1
V	0	0	1	1	1

In this case, $\beta = \{1, 1, 0, 0, 0\}$ is an ideology, because actors A and B both hold it. In the terminology I am employing here, $\beta = \{1, 1, 0, 0, 1\}$ is a belief system, held by only actor C, and so not an ideology. But more interestingly, actor C *almost* holds the ideology of A and B. If we applied a scaling technique to these data, actor C would not have the same ideal point as actors A and B, but it would be close. In a one-dimensional model, C would be a moderate leaning toward A and B.

This is essentially what we mean by ideology. It is not that people who share an ideology agree on everything, but that they tend to agree on most things. That pattern of agreement, set against

a rival pattern agreement among a second group that largely disagrees with the first group, leads to structure among the preferences. That structure is ideology, especially when it consists of two ideologies that define the poles of a dimension.

1.2 Beliefs

There is one last feature of the world that we need to develop before turning to its dynamics. That is the certainty with which the actors hold their positions on the issues. Since the model uses Bayesian updating, this certainty can be captured in the agents' beliefs. Parallel to the positions held (y_{ij}), we can define the beliefs that they have about those issue positions, as follows:

- $b_{ij} \in (0, 1)$ is the i^{th} actor's beliefs about the j^{th} issue.

b is constructed to have a correspondence with issue positions, as follows:

$$y_{ij} = \begin{cases} 0 & \text{if} \quad b_{ij} < 0.5 \\ 1 & \text{if} \quad b_{ij} \geq 0.5 \end{cases}$$

Positions are binary, but beliefs are not. Beliefs closer to 1 correspond to $y_{ij} = 1$, while those closer to 0 correspond to $y_{ij} = 0$. Those with beliefs at exactly 0.5 are indifferent, and for the model, the tie will go to supporting the policy. Note that we are using the term "beliefs" in the Bayesian sense as beliefs about the state of the world. We are not referring to the notion of beliefs about the other actors in the game. A player's beliefs may be subject to influence and change. For the purposes of this model, we will consider communication among the actors as a way to change beliefs.

Finally, we would expect ideologies to involve a high degree of certainty. At least empirically, survey respondents who are very ideological also hold their issue positions with more confidence than do those who are not ideological.

1.2.1 Beliefs and the truth

There is nothing in the model that implies that beliefs have any connection to "the truth." Actors may believe that they are attempting to find the "right" or "just" position, but there is no defined "truth" in the model. In fact, this model has no objective truth in it.

This is a critical element of the model. In many models of social choice, we assume that actors' beliefs are at least positively correlated with the truth. In the Condorcet Jury Theorem (Condorcet, (1785), for example, actors each receive a private signal about the truth of a single proposition, and this signal is more likely to be accurate than not. When all of those signals are aggregated, say by majority rule, they lead to an accurate conclusion.

The assumption of the Condorcet Jury Theorem makes sense in contexts like juries, in which actors all have the same interests in finding the truth. Everyone wants to find an actually guilty defendant guilty, but find an actually innocent one innocent. Some models consider the possibility that that different actors have competing interests, and so would want to enact different policies given the same state of the world.

The present case considers a different problem. Here, all of our actors are trying to figure out something that can be justified as "true" regardless of interests. But they do not know the truth, and may not have reliable signals about it. This mirrors our own uncertainty about just policy. It is not my claim that there is no right answer, only that the model is as unaware of them as we are.[2]

2 Why Constraint?

If all we are interested in is the implications of ideology in some larger domain, the notion of constraint is sufficient. But we might also want to know why we observe the example of constraint that we do. There are numerous schools of thought on what holds together an ideology. Three stand out. One holds that ideology derives from a psychological or cultural trait, something buried in the way we think about politics. A second holds that ideology is a rationalization or justification for interests, or "shabby motives" (Apter, 1964). A third holds that ideology is some way of linking actions to principles.

[2]Without loss of generality, we might assume that judgments of $y_i = 1$ are "true" while judgments of $y_i = 0$ are "false." Such an assumption would reveal that, under this and many other models, when actors believe the wrong things are true, wrong conclusions are supported.

2.1 Traits

A rich literature (e.g., Adorno et al., 1950; McCloskey, 1958; Constantini and Craik, 1980, see Jost et al., 2003, for a more complete review) argues that ideology has psychological roots in personality traits. Some people are more dogmatic, have a strong need for order, have a higher fear of threats and greater moral salience. These people are more likely to be conservative. Others have high tolerance for uncertainty, are more open to new experiences, can manage complexity, and tolerate system instability. These people are more likely to be liberal. Scholars have found strong correlations between physiological measures and ideological self-identification (Kish, 1973; Alford, Funk and Hibbing, 2005; Amodio et al., 2007; Mendes et al., 2007; Oxley et al., 2008). For example, Oxley et al. (2008) find that conservatives have a higher galvanic skin response to threats.

These findings suggest that one of the things that drives ideological differences is just that different humans have different predispositions.[3] These predispositions are still filtered through the social and political system, so that actors do not admit to (if they are even aware of) being driven by their biological urges. They instead appeal to general principles and norms, perhaps without fully embracing them.

While the notion of traits underlying ideology has considerable evidence, it also leaves some questions unanswered. For one, these underlying traits appear to be related to a primary ideological dimension in a complex way.

For example, psychological traits do predict a multidimensional ideology. Feldman and Johnston (2009), for example, show that among ordinary Americans, there are two distinct ideological dimensions, an economic and a social dimension. They show that predispositions about equality are related to the economic dimension, but not the social. And predispositions about morality are related to the social but not the economic. Similarly, many of the traits we associate with conservatism are nonlinearly related to a single ideological dimension (Greenberg and Jonas, 2003). Those with the highest levels of aversion to change, for example, may be conservative, but moderates have the lowest levels. The curve bends back up among liberals, but it does not reach the same level as it usually does among conservatives. Moreover, preferences tend to be more multidimensional-

[3] A related question is whether such predispositions have genetic roots or are socialized. For the purposes here, all that matters is that these traits precede political behavior.

dimensional among the less ideological and less sophisticated. That suggests a process in which some aspect of unidimensionality either requires more sophistication, or else the more sophisticated are more likely to be exposed to unidimensional messages.

Work that traces these traits to genetic sources concurs that biological tendencies can be at odds with those imposed by social forces. For example, Hatemi, Eaves and McDermott (2012) conclude that we should attempt to integrate psychological or biological determinants with social processes, which is precisely what this model aims to do.

In the model presented in section 1, these traits might be seen as shaping the initial beliefs (b) of the actors. Some are inclined to favor one policy over another. In particular, traits might induce certain correlations among the confidence levels, so that those with certain traits will have similar priors across a number of issues. That could translate into patterns among issue positions that we observe as ideology.

2.2 Interests

Meanwhile, another tradition (Marx and Engels, 1845; Mannheim, 1955; Downs, 1957; Bawn, 1999) says that ideology is a rationalization of interests. Policies make winners and losers. Those who will be made less well off by a policy will wish to oppose it. But they may not wish to express their opposition in such naked terms. Instead, they appeal to abstract principles, applying those principles in service to their own well-being.

As with traits, interests would seem to shape the prior beliefs (b) of the actors in the model above. When an issue presents itself, an actor's first impulse is to favor the policy that would best serve them. But, again as with traits, this belief would need to be translated into a position. Actors can be persuaded that the policy that would best serve them might still not be "just" or best for the "common good." There is considerable evidence (e.g., Sears et al., 1980) that people do favor policies that are against their objective self-interest.

The role of interests becomes more complicated if we consider the potential for logrolls. Bawn (1999) argues that ideology might be seen as an equilibrium in a policy setting game. Actors in such a game might enter into a "long coalition" (see also Schwartz, 1989; Aldrich, 1995) with

others, enacting a permanent logroll. The long coalition induces the actors to have preferences on issues they otherwise have no stake in.

One problem with Bawn's argument, however, is that the equilibrium selection mechanism is highly unrealistic. Bawn's model involves a group choosing the coalition, as in a legislative setting. This is an apt model for say selecting a party's platform, but ideologies evolve. Ideologies are also bound together by a more subtle glue. They appeal to principles, not loyalty. At least in theory, such principles could induce actors to choose policies that violate their self-interest or their predispositions.

2.3 Principles

For many of our colleagues, ideology is not just a phenomenon to be explained. Political theorists are actively shaping what it means to be liberal or conservative, communitarian or libertarian, in their prescriptions for what is right and just. Ideological thinkers at least aspire to be developing good theories of social order and justice, seeking to persuade others that they are right. Even if we believe ideologues are limited by their personalities or their self-interest, there is likely some consequence of their efforts to rise above those limits.

As noted in both the case of interests and of traits, actors appeal to principles and values in defending their positions. In those accounts, principles are essentially window-dressing, concealing the true source of preferences. But why would such window-dressing be so appealing? Most people would hold the normative position that something like principles and values *ought* to guide our political positions. If so, it is reasonable to conclude that some people, attempting to abide by this norm, actually succeed.

In the model outlined above, such principles would be unlike priors. Rather, they are something that guides us across many issues. So they would influence the β's in the model above. More precisely, β's no doubt reflect a constellation of principles, creatively brought together. Conservatism, as it is understood and advanced in the United States, is largely about personal freedom and personal responsibility. But it is also about traditional relationships, which conservatives believe bolster and protect their conception of freedom. American liberalism, on the other hand, is

largely also about freedom, but freedom conceptualized as opportunity. And other values, such as equality, are deeply integrated into how such opportunity is to be achieved.

These interlocking principles then proscribe positions on the many policy issues in the polity. If those principles become widespread, they would form the basis of an ideology. The principles that ideologues appeal to are arrived at by the thinking of political thinkers of various degrees of sophistication.

2.4 Psychology, interests and principles, together

The model treats psychological traits and interests in a parallel way, and principles in a different way. This has its advantages and disadvantages. The model does not pry apart the role of psychological tendencies from interests. One advantage of formal modeling in general is that it helps us see how possibly different processes might be isomorphic. In the case of this model, different things that limit our ability to be objective are similar, even if they do so in different ways.

At the same time, there may be important differences not captured. Psychological tendencies are probably more stable than interests, for example. Strongly held interests might be harder to unseat than weakly held predispositions. Differences of this sort may be important, but they are not considered here.

3 Existing models of idea formation

Given the influences in the previous section, we would like a way to formalize the process of thinking about principles and values. That is, we would want to formalize the process of normative political theory. We might think this is an absurd task: How do we formalize the creative process? However, we can turn to one of the giants of normative theory for an approach that can at least allow us to model some of the features of the process.

While there is no model that directly captures what I am attempting to do here, there are several other attempts to model the development of preferences in a strategic environment.

The broadest tradition in the literature is attempts to model deliberation (e.g. Hafer and Landa, 2005; Meirowitz and Landa, 2006; Austen-Smith and Fedderson, 2006; Hafer and Landa, 2007;

Bench-Capon and Prakken, 2010; Perote-Pena and Piggins, 2011). This work usually considers one issue at a time, and attempts to capture the way in which the revelation of information, perhaps strategically, might nevertheless be informative for the receivers of that information, and thus might change their preferences. Among the more relevant of this tradition is Patty's 2008 model of "Arguments-Based Collective Choice," which considers the role of linking commonly held values to policy positions through a sequence of arguments.

Patty builds on work (Richards, McKay and Richards, 1998; Richards, 2001) on shared mental models. These models might also function similarly to ideologies. These models, however, do not explore the emergence of these shared models in conjunction with the issues at hand.

As with much of the deliberation literature, the focus is on a single issue, and not how principles will unite preferences from issue to issue. While the deliberation literature is important, it does not get at the underlying question of the origins of ideology.

A more similar model is Axelrod's 1997 model of the dissemination of culture. Axelrod posits a space in which individuals have randomly selected "cultures," and then choose to interact with neighbors, especially those that are similar to them. The result is that neighbors tend to become more similar, but distinct cultures can arise in distant regions. The result is a global polarization.

The logic of Axelrod's model is very similar to that presented here. The present model, however, more explicitly takes on features of a discourse, including selection that is unrelated to geography, and focuses on the choice of issues, which more closely resemble political conflict.

Another approach is to view opinion formation as the result of biased information. Gentzkow and Shapiro 2006, for example, model media bias as the consequence of media outlets attempting to satisfy the priors of their readership. This can lead to reinforced beliefs, but it is not designed to explain the emergence of such structures in the first place.

But a media bias approach can be adapted to that question. The closest model to the one in this paper is in (DeMarzo, Vayanos and Zweibel, 2003), who model bias in opinion formation. They, too, are interested in the emergence of a unidimensional set of opinions. They model preferences similar to the model above. Actors then receive information that might affect their preferences from other actors. The actors in the model incorporate this information rationally, but they receive signals

more frequently from their neighbors. If actors do not account for the fact that their neighbors have also received the same information, then they will treat each new signal as an independent signal. This overweights the significance of the information from their neighbors, and it induces bias.

The DeMarzo, Vayanos and Zwiebel model is quite useful, but its findings hinge on the bias induced by social networks. The question is whether, empirically, people are exposed to selective-enough messages for it to have this effect. Research on deliberation (Mutz and Mondak, 2006; Mutz, 2002) suggests that people can be exposed to a fairly diverse set of opinions. When they are not, it is usually because they are in environments that are structured around politics (Wojcieszak and Mutz, 2009). In other words, ideological fragmentation may come first, and the biased social networks come later. At any rate, it would be useful to know whether ideology can form without any tendency to only listen to those who are similar to us.

The paper's main contribution to existing work is thus twofold. First, the focus here is on the relationship among issues. What causes constraint? Second, the answer is sought in attempting to formalize the process of thinking about principles and values. That is, we would want to formalize the process of normative political theory. We might think this is an absurd task: How do we formalize the creative process? However, we can turn to one of the giants of normative theory for an approach that can at least allow us to model some of the features of the process.

4 Reflective Equilibrium

Throughout his career, John Rawls attempted to develop both a normative theory of justice as well as the reasons why we should accept that theory. We are less interested here in his "principles of justice" or even the "original position" used to justify them. The focus here will be on the broader process called "reflective equilibrium," which we will define shortly. Since ideologues are essentially trying to do political theory, albeit perhaps less rigorously than academic theorists, we can look to what political theorists are attempting to do as a model for ideological thinking.

4.1 Who Participates

To some degree, this requires that we think rather highly of ideologues, putting Rush Limbaugh in at least the same category as Robert Nozick. Many popular ideologues are probably not engaging in the kind of intellectual honesty that seems to be required of reflective equilibrium, but this model is going to consider those who are. Where we draw the line would be important empirically, but theoretically we can restrict ourselves to those who are trying to find and articulate the truth. We include Limbaugh and Keith Olbermann if we think they are trying to articulate a just policy, or at least if their fellow ideologues think they are doing so. These are the "minuscule proportion of the population" Converse discussed.

Excluded are most citizens. Certainly, most ordinary Americans who are very ideological do not meet the standard of sophisticated political theorists. The model probably will not explain the preferences of people like George Bailey, Willie Loman, or Homer Simpson, because they would take cues from ideological elites but not participate in forming ideologies.

4.2 The Reflective Equilibrium Process

The method I propose for their work is the "reflective equilibrium," advanced by Rawls (1971, §9; 2001, I§10; see also Daniels 1979). The model is one adapted from the practice of positive science (Goodman, 1955), in which scientists work back and forth, inductively and then deductively from theory to data, to develop useful theories of the world.

Reflective equilibrium is not an equilibrium concept in game theory. What follows here is not an attempt to develop such a concept and apply it to a game. Rather, this paper develops a game that reflects a thinking process like that Rawls describes, and that has short-run and long-run properties we can compare to reflective equilibrium.

Rawls argues that humans have a "capacity for reason" and "a sense of justice." Using these, they reach judgments about what is right and wrong. These judgments are not unimpeachable. Some ought to be reconsidered. But some, which Rawls calls "considered judgments or considered convictions," are so well founded that they ought not be questioned lightly. "Some judgments we view as fixed points: ones we never expect to withdraw, as when Lincoln says: if slavery is not

wrong, nothing is wrong' " Rawls (2001, p. 29).

Even so, some of our judgments are in conflict with one another. A philosopher should resolve these conflicts by finding "the conception of political justice that makes the fewest revisions" in those initial judgments. This resolution, in which "general convictions, first principles, and particular judgments are in line" is a "narrow reflective equilibrium" (p. 30).

Consider a brief illustration: Following Rawls' example, Abraham Lincoln offers slavery as an issue on which we should have a considered judgment. The South's holding of slaves was unjust, and warranted policies to eventually end slavery.[4] We can use this fixed position on slavery to evaluate other principles, perhaps the simple form of utilitarianism. Utilitarianism favors politics that maximize satisfaction and minimize pain. But such a philosophy could justify slavery, if the pain suffered by those enslaved is offset by greater gains to the slave-holders. We do not conclude from this that slavery might be acceptable after all, because we know that slavery is wrong. Instead, we rule out at least the simplest form of utilitarianism.

More than this narrow reflective equilibrium, however, Rawls says we should pursue a "wide" reflective equilibrium, which is "reached when someone has carefully considered alternative conceptions of justice and the force of various arguments for them" (p. 31). Finally, Rawls argues that since everyone is working toward a public conception of justice, we all should arrive at the same wide reflective equilibrium.

The distinction between narrow and wide reflective equilibrium is where Rawls introduces something that might distinguish the typical ideologue from the true philosopher. Wide reflective equilibrium requires thinkers to step back from their own experience and consider candidate philosophies they never would have arrived at on their own. *Real* political theorists attempt to engage in wide reflective equilibrium. And such an approach might allow them to overcome their myopic interest-based and psychological limitations.

This paper, however, considers the work of those who, at least in the short term, are still working through narrow reflective equilibrium. Part of what limits popular ideologues like Limbaugh and Olbermann is that they have not made the rather difficult jump to consider so many divergent

[4]Of course, that southerners did not see the issue that way calls into question the use of the issue as a reference, a point to which we will return below. Lincoln's own views of slavery are also more complex than Rawls depicts them.

philosophies. Even if we believe that Rawls has a good recipe for deriving a proper theory, it is empirically the case that most thinkers are not following it. Even many sophisticated thinkers are at best only just moving from narrow to wide, and many are still working on the narrow. And reasonable people attempting to arrive at theories of justice will, in the short run, differ on those theories. It is exactly this limitation that I think explains different ideologies.

4.3 Competing "Considered Judgments"

The key is in the need to decide which judgments are "considered" and which are merely strongly held. In a political system, such disagreement is common. Worse, most of the time, thinkers will not agree on when we do not have a considered judgment. For Rawls, you should only use those judgments that are widely shared. But who decides when reasonable people agree?

Consider the application of the same model in the physical sciences. As a model of science, reflective equilibrium is on solid ground. Historically, scientists debated a heliocentric versus geocenteric model of the universe. Both are based on a theory that says the earth, the sun, and other planets are heavenly bodies moving through space. And both understand that the earth and the sun revolve around each other. But which is the real center? Which do other bodies like the moon and planets revolve around? Enter retrograde motion, the observed short-term reversal in the paths of planets through the sky.

The heliocentric model is consistent with retrograde motion, while the geocentric model is not. So we reject the geocentric model and are forced to develop the heliocentric. That is, we keep it until we observe that other objects do not seem to be revolving around the sun. And we discover that while the sun is the center of the Solar System, it is not the center of the galaxy, or the universe. And the scientific refinement of theory continues.

This is exactly the role Rawls argues considered judgements should play. Knowing slavery is wrong is like knowing about retrograde motion. Both are observations that are consistent with some theories and not with others, and we can rule out the inconsistent theories by knowing them.

But consider a parallel case in philosophy. Americans embrace "freedom" as a principle. But freedom might have different forms. Negative freedom (or freedom as self-ownership) says that

we want to minimize the demands the state makes on individuals. Positive freedom (or freedom as optionality) says we want to maximize the opportunities that individuals have to achieve their goals. Since these models are often in conflict, which is right? Enter labor laws. Labor regulations are not consistent with negative freedom but are with positive freedom. However, labor laws are not like retrograde motion. While we all must agree with what we see through the telescope, judgments about the value of labor regulations are not universal.

For Rawls, this need not be a problem. Labor is just not a case on which we have our "best considered judgments," so we will not use it to guide our choice. But for many, labor is a solid judgment. A small business owner, for instance, knows all too well the consequences of giving too much power to workers, and if anything is wrong, it is denying a business owner the ability to run her own business her own way. Workers are always free to leave. Likewise, a factory worker may have few judgments he considers more settled than that he should never be put in a position where he has little option but to take a job that does not treat him safely and compensate him adequately. For him, if anything is wrong, allowing any employer to even offer him an unsafe job at low pay is wrong.

"What gets us into trouble is not what we don't know," observes Mark Twain. "It's what we know for sure that just ain't so." Most political issues are like this. Indeed, Lincoln's slavery may have been a considered judgment to him, but it was not to half the country. It is not simply that the issues are unsettled. It is that many people think they are settled, and different people think they are settled on different sides. This is because different people have different interests and psychological predispositions. Even something as simple as different experiences can lead to different judgments. This is true even for the most sophisticated thinkers, who are trying, contentiously, to find the right philosophy.

In fact, Rawls himself argues that we should expect people to have competing values and beliefs because of the "burdens of judgment." Specifically, the evidence we weigh is complex, we can disagree about the weight placed upon different considerations, political concepts can be vague and subject to hard cases, our reasoning is shaped by our experiences, and different kinds of considerations are hard to compare. Rawls does not link the concept of the burdens of judgment

to the concept of reflective equilibrium in the way that I have, but the relationship is there. For this reason, it may be that we do not all agree. Rawls wants to focus on how we might eventually come to agree. This manuscript focuses on what happens in the meantime, when we do disagree.

There is some evidence that political thinkers do follow this process, and that they can be especially attached to judgments, even as the principles that justify them change. Consider a few examples.

In his own telling, G.A. Cohen, a Marxist social philosopher, had long agreed with many Marxists that the cornerstone of capitalist exploitation was that the capitalist extracted something from the worker that the worker himself owned, his labor, and a person cannot be coerced into giving up something that they own. Freedom was thus about self-ownership. However, in arguing with those who supported free market capitalism (notably Robert Nozick), Cohen came to believe that the principle of self-ownership did support a minimal state and not interventions on behalf of equality. Cohen thus rejected self-ownership (the principle), since it doesn't justify the egalitarian policies Cohen has firmly judged to be right. (Cohen, 1995).

Rawls himself is tied to some very specific judgments. In 1958, in "Justice as Fairness," Rawls used a variation on game theory with rationally expectant actors to justify his two principles[5] of justice. In 1971, in *A Theory of Justice*, Rawls had decided that the two principles were not implied by standard rational-actor game theory, and instead developed his well-known idea of the "original position" behind the "veil of ignorance." In 1992, Rawls took a more intensely pluralistic approach to political theory, but again arrived at the same two principles in *Political Liberalism*. The same principles survived with minimal revisions into *Justice as Fairness: A Restatement* in 2001.

In both of these cases, it is not that the theorists are being insincere. They are genuinely attempting to reach a conception of what is right. The judgments they hold fast to are not blind spots, but the things they believe most strongly to be right. But reasonable people can disagree about what those things are. Or at the very least, empirically, actual people who claim to be reasonable do disagree. This phenomenon is captured by the model's refusal to identify which

[5]Briefly stated: 1. All persons have a claim to equal liberty, and 2. Any social and economic inequalities are justified only if all offices and positions are open to all and only if inequalities are to the advantage of the least advantaged members of society.

outcomes are "true" in an moral sense.

Thus the model of reflective equilibrium may not work to reach the correct answer, at least in the near future. The problem is, psychological predispositions and interests color our judgment on which issues are settled. Nevertheless, reflective equilibrium may well describe the process they believe they are using. Flawed humans using a reasonable method may come to different conclusions. To understand those consequences, we need a model that puts structure on the limitations from interests and psychology.

5 The Game of Reflective Equilibrium

This section lays out the basic game play. Details and proofs are in the appendix.

The game involves a group of players called the **intelligentsia**, with preferences and beliefs as described in section 1. The players are all engaged in the process of working out positions on all of the issues of the day. As noted above, this is a model of the "miniscule proportion of the population" that engages in creative synthesis. These actors are interested in arriving at positions on issues that they regard as "just," "right" or "true." They have their own beliefs on the issues, but they may communicate with others and therefore update those beliefs.

Before we get to the game, consider a possibly ideal scenario, in which all actors get together and discuss their beliefs, perhaps voting on every issue. We know from the Condorcet Jury Theorem (1785 that, *if the actors' beliefs are reflective of the truth, and if the sources of their uncertainty are independent*, such a procedure would be very effective. That is, if the probability that each actor's position on the issue is "correct" is greater than 0.5, then the probability that their aggregate decision from majority rule is also "correct" goes to 1 as the number of actors grows large. The resulting vote would prescribe a β that was sure to be the correct belief system.

If considered judgments were broadly agreed upon, then such a vote would also satisfy Rawls' reflective equilibrium. A majority would vote in favor of those judgements, and thus the winning β would by definition fit the considered judgements.

However, there are two problems with such an approach. The first is simply that it ignores the difficulty of finding a set of principles that actually do fit the majority position on many issues, or

even just that subset of issues on which there are considered judgements. Maybe what the majority wants is philosophically untenable. This model will largely bracket that concern, however. We will assume that political thinkers are imaginative enough to apply principles in sufficiently creative ways that they can articulate a set of principles that would justify any set of policy positions.

The second problem is that there may be disagreement over what constitutes considered judgements, as noted above. We have allowed this possibility by abandoning the idea that we can even identify whether the the private information on any of the issues is probabilistically "correct." This is not to say that there is no right and wrong, only that the actors have no way of knowing. The fundamental goal of this model is to identify what they will learn if they have no one to turn to but themselves.

An intelligentsia in which actors face other actors who "know" contradictory facts would not be able to come to an easy collective choice. A simple vote would no longer be guaranteed to satisfy all considered judgements. There are two approaches to such a situation. One would be to model the dynamics, decision rules or deliberative processes that might lead to an answer. A considerable literature has dealt with deliberation, as noted in section 3. But deliberation is not the common answer in the real world. We rarely have the opportunity to lock the intelligentsia in a room and tell them they are not allowed to leave until they have worked their disagreements.

Instead, the actors might disband their caucus and try to work things out on their own. It is this disaggregated process that is modeled here.

This process also mirrors the real-world development of ideas, which is both interactive, in that thinkers seek out approval from other thinkers, but also atomistic, in that creative work is done by thinkers alone (or in small groups) and then offered up for such approval. The model is meant to capture the way in which ideas are published. The actors write down their theories, then attempt to share them with the world. To do so, they face a gatekeeper, drawn from the rest of the intelligentsia. The process repeats.

5.1 The Stage Game

The stage game is modeled on the peer review process. A political thinker, called the **Theorist**, proposes a theory, which has the form of an ideology. That is, it is a vector of positions on all issues. Another thinker, the **Reviewer**, considers and then either accepts or rejects it.[6] The "peer review" process a useful metaphor, but only a metaphor. In broad strokes, it captures the way in which political discourse is conducted. For example, in the case of political journalists (writing in say *The New Republic* or the *Weekly Standard*), we would use the terms "Contributor" and "Editor." Sometimes in political journalism, the decision to accept or reject comes at the hiring stage, with the decision to give someone a column. Even among bloggers on the Internet, where there is little formal gatekeeping, someone needs to link to a blog to drive traffic. Such links amount to a vote of approval along the lines of what an editor is doing. The main idea remains that the speaker and the gatekeeper are from the same class, often working on both sides of the fence, and serving as both actor and (part of the) audience.

The game has two steps. First, a Theorist is chosen from among the polity to propose a β. This is a complete ideology, with prescriptions for all issues. It is thus a vector of 0's and 1's. Second, a Reviewer is chosen from among the polity. That Reviewer gets to "accept" or "reject" the piece. After its acceptance or rejection, both actors update their beliefs about all issues.

Initially, we will consider the case where the Theorist and Reviewer are chosen randomly and independently. I will then consider the more realistic case in which the Reviewer's preferences are likely to be correlated with the Theorist's, on the grounds that the Theorist would choose an outlet that is more receptive to her own preferences.

The model also does not consider what happens after acceptance or rejection, except as concerns the Theorist and the Reviewer. Other thinkers do not read what is published except when they are acting as gatekeepers. This is a reasonable simplification, but still a simplification. In reality there are no doubt other thinkers who read, but they are similarly skeptical, in the same way as a reviewer, and only believe what they would themselves accept.[7] Any further audience for political

[6]For the sake of clarity and consistency, I will adopt the convention of referring to the Theorist with feminine pronouns and to the Reviewer with masculine pronouns.

[7]Consider by way of another metaphor the RAS model of Zaller 1992, but as conducted by highly informed actors

journalism occurs at a separate stage, involving readers who are consumers but not participants.

I assume the actors play the stage game strategically, but without regard to its long-term considerations. Utility is assigned at the end of the stage, and previous rounds' outcomes do not affect the utility at future rounds (except as earlier rounds affect players' beliefs). Actors are not strategic about the long-term evolution of beliefs.

5.2 Prior Beliefs and Preferences

Actors have lexical preferences over issue areas: They care first about issues which they regard as considered judgments, and only then about other issues. This captures the core notion of the role of considered judgments in Reflective Equilibrium: that we should view our best considered judgments as "fixed points,"[8] which we expect never to withdraw.

We define a **considered judgment** as any issue on which an actor has reached some level of certainty. Using the conventional level of confidence in hypothesis testing, that would be any issue on which an actor was 95 percent certain. The model here uses that level. When beliefs cross that threshold, the actors do not reconsider their beliefs. It is as if they are 0 or 1, and the model treats them that way.

Details about the microfoundations of the actors are in Appendix A.3. The appendix builds a more complete model of the stage game. However, many of the details in the appendix are not necessary for the findings presented here. Simulations using a model with less detailed microfoundations give similar results. What is important is that the players play the given strategies in the stage game. These can be derived from these preferences, or simply asserted as intuitive and reasonable.

The preferences as outlined in appendix A.3 involve two important features:

First, the actors care about both the *substance* of what is accepted or rejected, and also *whether or not* something is accepted or rejected. That is, there is a premium for publication, but the actors also care about what they say (or what they allow to be said). This creates a tradeoff, in which a

who are thus resistant to inconsistent messages.

[8] Here "fixed point" is used in the way Rawls used it, as a guiding reference point, and not in the way mathematicians usually use it, to refer to a point that maps to itself by a function.

Theorist may say something she does not necessarily believe in order to get it accepted.

Second, this tradeoff does not apply to considered judgments. That follows from the lexical preferences, which put considered judgments first, as they should be given the reflective equilibrium model.

Appendix A.3 outlines the microfoundations consistent with these preferences, but if the reader is skeptical that actors might be able to work through the tradeoffs as described, all that is important is that these features give the following equilibrium strategies:

The Theorist presents a theory that matches the Theorist's preferences on all considered judgments. The theorist may bend to popular will on other issues, depending on the tradeoff.

The Reviewer accepts any theory that matches the Reviewer's preferences on all considered judgments. He rejects any theory that fails to match the Reviewers preferences on at least one considered judgment.

5.3 Updating beliefs

After acceptance or rejection, both the Reviewer and the Theorist have learned something.

For the Theorist, if the Reviewer accepts, the Theorist has learned that at least one outsider has no strong objection to the proposed β. This should make the Theorist more confident. The Theorist knows that the Reviewer doesn't necessarily agree with everything presented, but on balance, everything is more likely. If the Reviewer rejects, the Theorist becomes less confident (except for those issues which the Theorist believes are settled —her own considered judgments).

For the Reviewer, something similar happens. If the Theorist offers something that agrees with him on all considered judgements, then the theory is persuasive in general. Thus the Reviewer's beliefs move toward the theory on all issues. However, if the Theorist offers something that is disagreeable, then the Theorist has proven herself untrustworthy, and the Reviewer's beliefs move away from the theory.

Just how fast the beliefs move in these directions is another matter. It would be nice to work out a result following Bayes Rule. However, there is no objective moral reality in this model. To

compute the posterior probability for an issue position given that it was proposed by the Theorist, for example, we would need to know the objective probability that the Theorist would propose it given that it is true. If no one knows the true moral world, however, then no one can know the relationship between the Truth and anyone's beliefs. Appendix A.6 spells out a solution, in which beliefs move in the suggested direction, but not too quickly.

5.4 Variations

In addition to the simple model presented above, we can make two important modifications. Both of these modifications make the model more realistic. They also cast light on whether these features are important for the evolution of ideologies.

The first variant modifies the initial beliefs to have some structure. As noted in section 2, initial beliefs are meant to reflect actors' predispositions or interests. In either case, initial political opinions will thus probably not be random.

If beliefs reflect psychological predispositions, then those predispositions might affect similar policies in similar ways. Some actors might have an initial bias toward policies that punish wrongdoing. An actor who has a predisposition to favor for example gay marriage might also have a predisposition to favor abortion rights. If so, two different actors with the same psychological backgrounds might have similar tendencies.

Meanwhile, if interests shape initial beliefs, similar patterns might emerge. Two similarly situated actors —say two wealthy property owners —might have similar beliefs about police powers and labor laws, derived from their social status.

Both of these kinds of patterns might lead to stronger structure in the emergent ideology. In the model, actors have some tendency toward one of three preference profiles. These tendencies are not strong, but initial conditions are set so that there is some pattern in the beliefs of actors on the policies, and a subset of the actors are thus predetermined to have similar beliefs, due to their psychological traits.

The second variant leaves beliefs as they are in the base model and instead modifies the selection process for Reviewers. Political writers' work is not likely to be evaluated by anyone at

random. Writers seek out favorable outlets and are hired by agreeable editors. Thus Reviewers are disproportionately likely to agree with the Theorist.

In the model, the probability of a Reviewer being selected for a given Theorist is thus proportional to the potential reviewer's similarity to the Theorist's preferences.

6 Simulation Results

Each version of the model has been simulated 50 times for 500 iterations of the stage game. In the simulations, there are 20 actors and 20 issues. Code for implementing the stage game of the model in R is provided at www.XXXXX [AND IS PROVIDED AS SUPPLEMENTAL MATERIAL FOR REVIEWERS]. Code for generating and storing many iterations of the model and generating the figures here is available from the author.

There are several features of the simulation that we would like to consider.

6.1 Certainty

Reflective Equilibrium is meant to form principles that will give confidence to our convictions. The way this model is laid out, certainty is an absorbing property.

Figure 1 traces the number of issues held with certainty over the course of 500 iterations. The mean number is plotted, along with a 95 percent frequency interval. The upper left panel shows the base model. To the right of the base model is Variant 1, in which the initial preferences were given some structure. Below the base model is Variant 2, in which Reviewers are likely to have similar preferences to the Theorist. The remaining figures are also laid out in this way.

[FIGURE 1 ABOUT HERE]

Across all three models, the percentage of positions held with certainty grows. It grows the fastest when Theorists get agreeable Reviewers. Such a system is self-confirming. Clusters of like-minded thinkers talk to one another and reaffirm their beliefs, never having to question themselves.

6.2 Disagreement

The process of Reflective Equilibrium should bring about agreement across actors. But, as I have argued, different considered judgements should keep actors from reaching agreement. Still, they should come to agree with *some* others. Empirically, we observe political conflict among a small number of positions with many adherents. It is not a disagreement of each against each, but disagreements between us and perhaps several groups of them.

Figure 2 shows the distribution of unique preference profiles held by actors at the end of 500 iterations. That is, the 0's and 1's held at the end of the simulation. What we find is that, for the base model and Variant 2, the total number of unique profiles has fallen. And even for Variant 1, there are many runs with very few unique profiles. At the same time, it is not that common to have only one profile at the end of the system. There are thus a smaller number of unique profiles after the process than before, suggesting convergence, but not convergence to a single, consensus position.

[FIGURE 2 ABOUT HERE]

6.3 Dimensionality

Figure 2 suggested that there are a small number of unique preference profiles. But every unique profile is counted in Figure 2. As noted above, two actors with very similar preferences may be thought of as having similar ideologies. Different varieties of "conservative" are still thought of as conservative, for example. In the simulation, there may still be two dominant preferences —or at least two poles. In modern politics, we generally observe two ideologies in conflict, defining a single-dimensional ideological space. This in spite of the fact that many issues need not be connected.

There are many ways to measure dimensionality. I apply three here, all using the eigenvalues from the matrix of preferences. Figure 3 traces the mean value of the first eigenvalue. Large first eigenvalues suggest that one dimension significantly organizes the preferences. And Figure 4 plots the average ratio of the first and second eigenvalues. As this number gets large, one dimension is dominating over the others.

[FIGURE 3 ABOUT HERE]

[FIGURE 4 ABOUT HERE]

Again, across the variants, the dimensionality collapses over time. In the case of the agreeable reviewers, the ratio of the first to second eigenvalue explodes after a handful of iterations. (Note the scale on the lower left figure.)

The average is somewhat misleading, however, because it smooths out variation over time. The process is actually more volatile, as we can see from Figure 5, which plots the ratio of the first two eigenvalues for a single run of 500 iterations. Here, we see that dimensionality waxes and wanes, presumably as different issues become associated with each other and then not.

[FIGURE 5 ABOUT HERE]

Why does this occur? It's difficult to tease out the exact contribution of every facet of the model, but it is reasonable to see that subsets of the intelligentsia move toward each other and away from other subsets. As more of their positions become fixed, they are unable to move back toward others. If we imagine them having different ideal points in a multi-dimensional space, to the extent that this smaller number of subsets are aligned, they will fit on a single line. If two poles are frequent, we should expect a strong single dimension.

This general pattern matches what we observe in history, in which new issues are often initially orthogonal to political conflict, but are absorbed into the primary dimension of conflict over time.

6.4 Polarization

Finally, not only do we observe two dimensions, we also observe polarization. We can measure polarization by estimating ideal points using a scaling technique, such as NOMINATE, at each iteration. We can then take the ratio of the interquartile range to the total range of the first dimension NOMINATE score. Where this is high or close to 1, we have polarization. Figure 6 plots this over time, and Figure 7 plots it for a single iteration. We do not see a general tendency toward more polarization, but there is considerable variation in polarization, at least as measured by this metric.

[FIGURE 6 ABOUT HERE]

[FIGURE 7 ABOUT HERE]

7 Discussion

The results from simulations of this model seem to match the stylized facts of the real world. Reflective Equilibrium under these conditions tends toward a small number of ideologies, often on one dimension. This is not a test of the model so much as a reality check that what is being modeled is captured. Further comparative statics would be useful.

7.1 Extensions

The number of potential extensions to this model is large. Here are a few that would be worth exploring.

7.1.1 Awareness of the total coalition

Part of the incentive to form a long coalition comes from the awareness of its members that there is some threshold for victory. Nothing like that is included in the current model. But it could be. Alternative decision rules for the theorist, for instance, might account for how many people might be persuaded by the proposal. Theorists could condition on the preferences of those who agree on considered judgments, for instance. One way to move in this direction might be to have proposed theories be voted on by the entire intelligentsia, or a subset of them, rather than just one gatekeeper.

It would be useful to derive decision rules assuming utility functions over the number of people who agree with the proposal. Theorists presumably prefer to propose their own beliefs, but they might also derive utility from advancing popular theories. In that case, when their own beliefs are not strong, taking cues from the others makes sense, and proposing theories that are more likely to lead to long coalitions.

7.1.2 Broad conversation

Relatedly, all players should be more aware of the other ideologies that are being offered. One natural extension is to let everyone update on the basis of any β that passes peer review. Likewise, peer review could be based on more than one peer. The more peers required, the more likely a proposal will be rejected, and thus the greater the updating if it is not rejected.

7.1.3 Salience

Under the current model, all issues are equally salient. But one reason long coalitions can form is that different actors care about different issues. Degrees of belief captures this idea in the current model, but it might be possible to allow members to reach a considered judgment on an issue that they nevertheless feel is less important than some other considered judgment.

7.2 Implications

The model here provides evidence that sincere thinkers, who are not trying to engage in ideological combat, may nevertheless find themselves at opposite ends of an ideological spectrum.

This is not the only way that ideology may evolve. It is apparent that at least some actors are engaged in ideological combat. And there are surely many who take issue positions solely because of that combat. Republicans seem to oppose some of President Obama's policies only because Obama is associated with them, and Democrats behaved similarly with President Bush. But the model in this paper suggests that even when we move to a more principled population of serious thinkers, something similar may happen.

A Appendix

A.1 Players

The players are an **intelligentsia**, as described in section 1:

- X is a set of k binary issues.

- P is a set of n intellectual actors.
- $y_{ij} \in \{0, 1\}$ is the i^{th} actor's "position" on the j^{th} issue.
- β is a **belief system**, or a set of issue positions that are meant to be internally consistent.
- $\mathbf{Y}$ is an n by k matrix of issue positions.
- $b_{ij} \in (0, 1)$ is the i^{th} actor's beliefs about the j^{th} issue.

A.2 Game Sequence

The game proceeds as follows:

1. Nature chooses the beliefs of all of the actors.
    - In the base model, this choice is random from the uniform distribution.
    - In the variant 1 model, this choice is random from a normal distribution centered on 0.6 or 0.4, to create one of three profiles. This models structure in psychological predispositions or interests.
2. Nature chooses which issues are considered judgments for all actors.
    - In the current models, the i^{th} actor treats the i^{th} issue as a considered judgement.
    - In future variants, patterns in the considered judgments could be explored.
3. Nature chooses one actor to be the **Theorist** and one to be the **Reviewer**
    - In the base model, each actor has equal probability of being chosen at each stage.
    - In the variant 2 model, the actor is chosen at random, and the probability of being chosen as a reviewer is a function of how much each potential reviewer agrees with the chosen theorist.
4. The Theorist presents the theory
5. The Reviewer accepts or rejects

6. Both the Theorist and the Reviewer update their beliefs.

7. Both the Theorist and the Reviewer form new considered judgments for any beliefs that have just crossed the threshold.

8. The game repeats steps 3 through 7 indefinitely.

A.3 Preferences

A.3.1 The Theorist

Begin with the preferences for the Theorist. On the first question, considered judgments, the Theorist prefers to say what she believes strongly to be true over saying what she believes strongly to be false. This implies the following:[9]

$$U_T(\beta_i = b_{T,i}) = 1 \tag{1}$$

$$U_T(\beta_i \neq b_{T,i}) = 0 \tag{2}$$

Because the Theorist's preferences are lexical and with this form, we can pause here to note that no Theorist will ever propose a β that contradicts their own considered judgments. This is an assumption with some bite. It rules out two possibilities. First, it rules out the purely opportunistic theorist who will write what he "knows" to be false just for attention. If publication itself is highly valued, such a tradeoff might make sense. Second, it rules out the slightly less opportunistic theorist who might trade off saying one thing she "knows" to be false for the opportunity to say many other things she "knows" to be true.

While there are surely such opportunistic actors (some might say evidenced by most political best-sellers), in the domain of serious theorists, whose work is likely to be taken most seriously, it is plausible to make this claim. The goal of this paper is to take political thinkers at their word, and that means assuming they are at least sincere when they have strong beliefs. Note that the

[9]Since the beliefs of an actor on those issues she considers a considered judgment are a 0 or 1, and since the β is always a 0 or 1, most loss functions based on distance (e.g. quadratic or linear) would reduce to these expressions.

claim applies only to those issues which the actor views as a considered judgment. She may well sell out on any other.

After weighing considered judgments (and so not violating her deepest held convictions), the Theorist's preferences are over what she says and whether it gets published (whether it is Accepted $= A$):

$$U_T(\beta|A) = -||\beta - b_T|| - \theta(||\beta - b_T||) + \gamma \quad (3)$$

$$U_T(\beta|\neg A) = -||\beta - b_T|| \quad (4)$$

where θ is a scalar that captures the value of having a given opinion (β) published, and γ is a scalar that captures the pure value of publication regardless of the content. One might imagine θ varying by outlet and γ varying by actor, although those possibilities are not explored here.

A.3.2 The Reviewer

The Reviewer's job is much easier. The Reviewer also has lexical preferences that weigh his considered judgments first. He thus also first prefers to accept those arguments that match his considered judgments and reject those that do not.

This is the only consideration of the reviewer. He otherwise prefers to accept all articles. He thus accepts anything that does not violate a considered judgment. This makes the reviewer especially open-minded, perhaps best modeling a typical audience member for the piece. If the piece passes muster on the issues on which the Reviewer is passionate, the Reviewer is highly receptive to the rest of the argument.

This open-mindedness is also in keeping with the notion of Reflective Equilibrium. Actors should expose themselves to a wide range of ideas.

A.4 Knowledge

The players do not know each other's preferences, but they do know aggregate preferences on each issue. (We might imagine regular polling of elites, or an unbiased sense of issue preferences from interaction at cocktail parties.) That is, they know the percentage of all pundits whose beliefs are greater than 0.5 for each issue. Call this vector a. The Theorist does not know how correlated the preferences on these issues are. That is, she does not know probability of support for an issue conditional on support for another issue. But she does know the marginal probabilities.

A.5 Stage game equilibrium strategies

I solve by backwards induction. At the second stage, the Reviewer accepts any β that does not violate his considered judgments. The Theorist prefers the be published than not (conditional on what is being published) and would thus prefer to offer a β with no contradictions,. The Theorist does not know the preferences of the Reviewer, but she can compute the probability that any given β will be objected to. Since that probability is just a function of β, the Theorist's problem is to choose β to maximize the following expression.

$$U_T(\beta) = U_T(\beta|A)p + U_T(\beta|\neg A)(1-p) \tag{5}$$

where the probability that the Reviewer agrees to publish is the probability that there is no disagreement with a considered judgment, which is given in equation 6, where q is the base probability that any issue is a considered judgment, which the Theorist can infer from her own rate of certainty across many issues.

$$p = \prod_{i}^{n} 1 - q\Big(1 - \sqrt{(\beta_i - a_i)^2}\Big) \tag{6}$$

Equation 6 could be maximized by matching β to the population's beliefs a. That is, the Theorist maximizes publication by saying what she thinks most people want to hear. Of course, the Theorist does not merely want to maximize publication. She also cares about what she says, which is captured by Eqations 3 and 4 above.

Combining equations 3,4 and 6 via 5 yields 7:

$$\theta\gamma\left[\prod_{i}^{n} 1 - q\left(1 - \sqrt{(\beta_i - a_i)^2}\right)\right] + \theta\left[\prod_{i}^{n} 1 - q\left(1 - \sqrt{(\beta_i - a_i)^2}\right)\right]\left(-||\beta - b||\right) + \left(-||\beta - b||\right) \quad (7)$$

which the Theorist then maximizes, subject to the constraint that β does not disagree with any of the Theorist's considered judgments.

Equation 7 cannot be easily solved analytically, but it can be solved computationally. Even without analytic comparative statics, we can say something about the properties of this solution.

As γ gets large, the relative importance of improving the probability of acceptance grows. So the more the Theorist values publication, the more she will compromise her own beliefs. However, θ affects both the first and second term, so the importance of publication affects both the importance of compromise but also the importance of what the Theorist says. Both of these conform to the phenomena being modeled.

A.6 Updating beliefs

After the game, both actors update their beliefs, based on the information revealed in the game. For the Theorist, if the piece is accepted, that should confirm her beliefs in the things she has said, whereas if it is rejected, it should reduce her beliefs. For the Reviewer, if the piece is accepted, he updates on the new things that were not the basis of the acceptance (were not considered judgments). If he rejects the piece, the Reviewer's beliefs move away from the proposed β.

Ideally, updating would follow Bayes Rule. However, because there is no objective moral reality in this model, Bayes Rule cannot be applied. To compute the posterior probability for an issue position given that it was proposed by the Theorist, for example, we would need to know the objective probability that the Theorist would propose it given that it is true. But we have assumed no relationship between the Truth and beliefs on these thorny moral issues.[10] So we can't define the objective probability in equation 8. That is the nature of the political philosophy problem.

[10]One reasonable solution here would be to have the actors condition on something other than absolute truth, such as the expected behavior of the other actors, given current beliefs. However, this moves the model away from a model of beliefs about morality, which is the underlying goal.

That is, there is no way to define $p(\beta_i = 1|y_i = 1)$ and similar terms in the following expression of Bayes Rule. The actors are not conditioning on the truth, since they do not know it.

$$p(y_i = 1|\beta_i = 1) = \frac{p(\beta_i = 1|y_i = 1)p(y_i = 1)}{p(\beta_i = 1|y_i = 1)p(y_i = 1) + p(\beta_i = 1|y_i \neq 1)p(y_i \neq 1)} \tag{8}$$

However, we do know something about the plausible relative size of those objective probabilities. In the model, actors are more likely to choose a β and to accept a β if they strongly believe its elements to be true than if they strongly believe them to be false. It is a plausible step for the actors to assume β's are more likely to be proposed or accepted if they are true than if they are not. This assumes a certain minimal belief in the discipline, but one that it is reasonable to assume most theorists do have. The magnitude of the difference cannot be determined, but that merely affects how fast beliefs will change. We can thus argue that actors assume

$$p(\beta_i = 1|y_i = 1) > p(\beta_i = 1|y_i \neq 1) \tag{9}$$

In other words, after the outcome of the game, beliefs move toward the β if it is accepted and away from it if it is rejected. In the model, I assume that the difference is small, so the movement is small (The results reported here assume .45 and .55). It otherwise follows the general form of Bayesian updating.

A.7 Considered Judgments

At the end of the stage game, the actors may have formed new considered judgments. If their beliefs about any issue crosses some threshold, they become certain and do not revisit the issue. The threshold, α, is set to 0.95 in the simulations here.

$$b_t = \begin{cases} 1 & \text{if} \quad b_t > \alpha \\ b_t & \text{if} \quad 0.05 \leq b_t \leq 0.95 \\ 0 & \text{if} \quad b_t < 1 - \alpha \end{cases} \tag{10}$$

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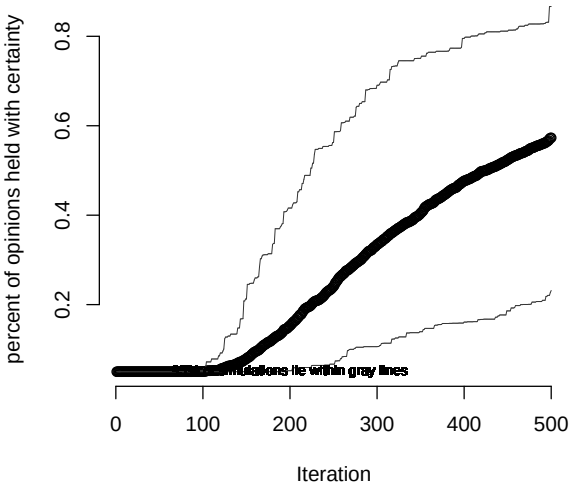
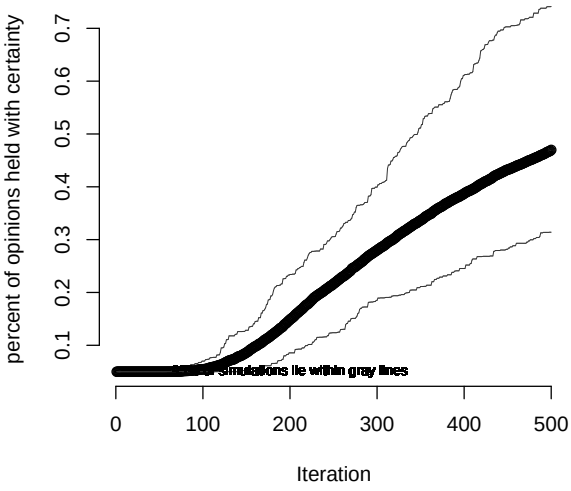
Figure 1: Average Number of Positions Held With Certainty Over Time

(a) Base Model



(b) Variant 1: Structured Priors



(c) Variant 2: Agreeable Reviewers

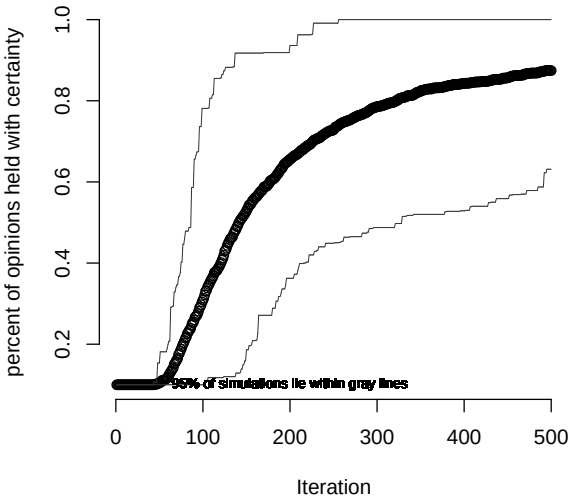
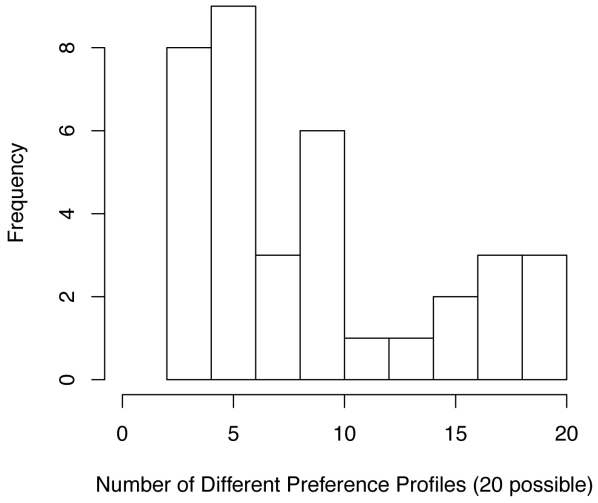


Figure 2: Distribution of Unique Preference Profile at End of 500 Iterations

(a) Base Model



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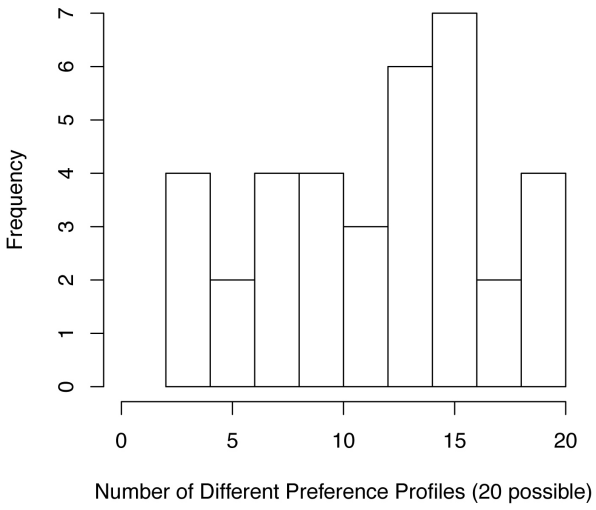

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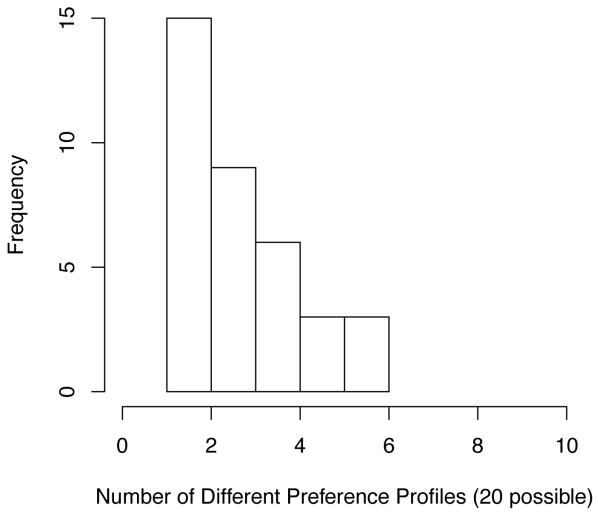

Figure 3: Average First Eigenvalue Over Time

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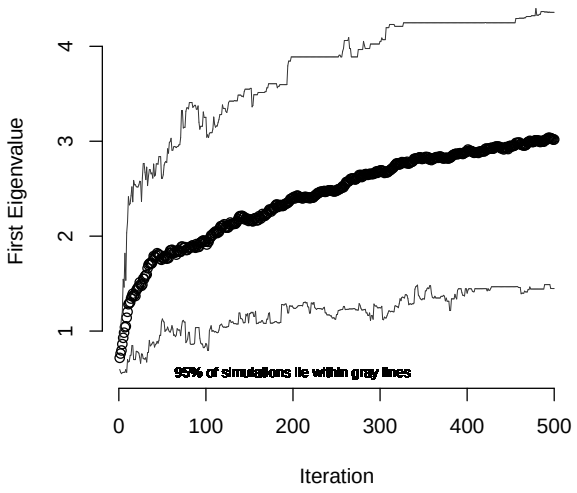

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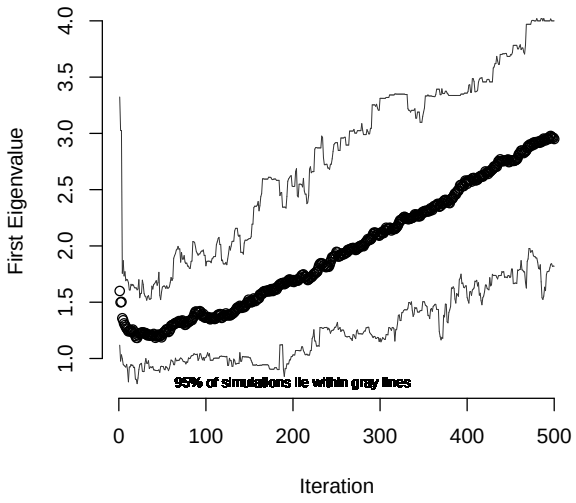

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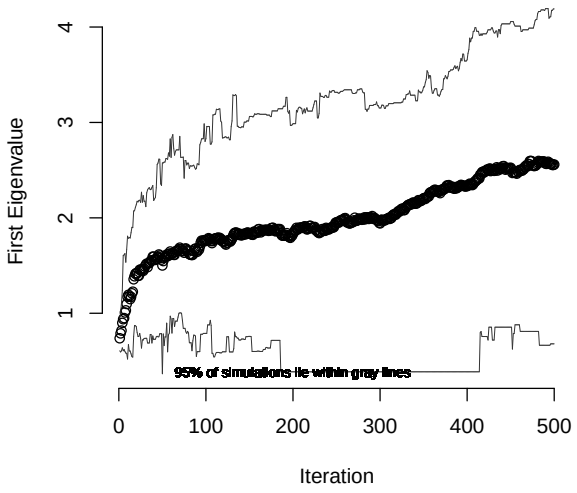
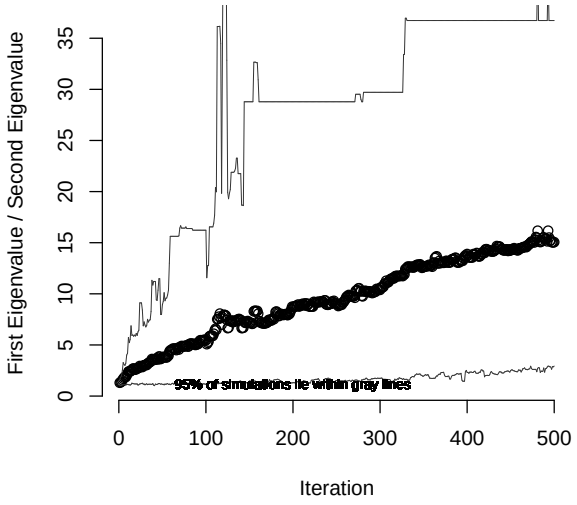


Figure 4: Average Ratio of First Two Eigenvalues Over Time

(a) Base Model



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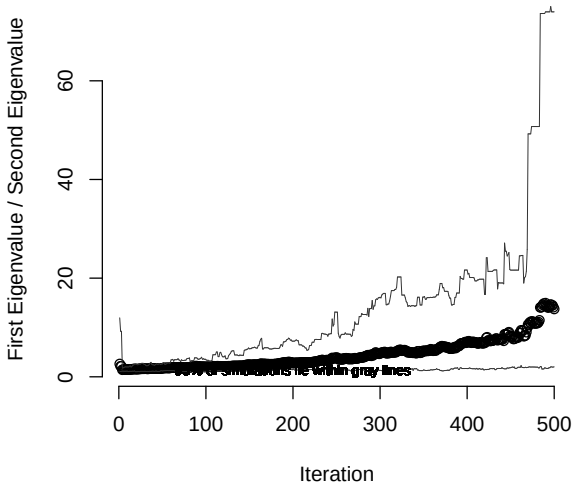

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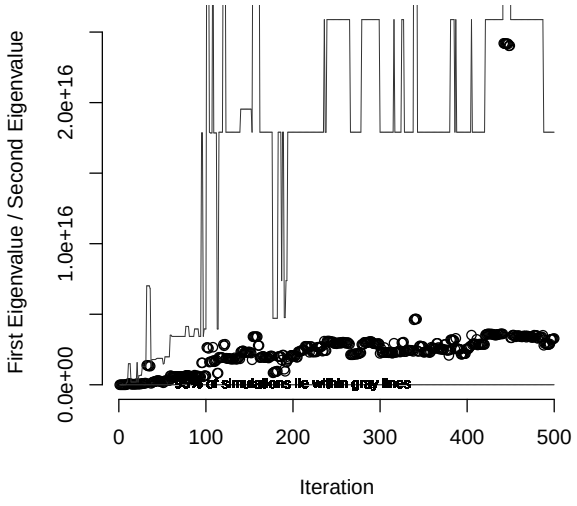
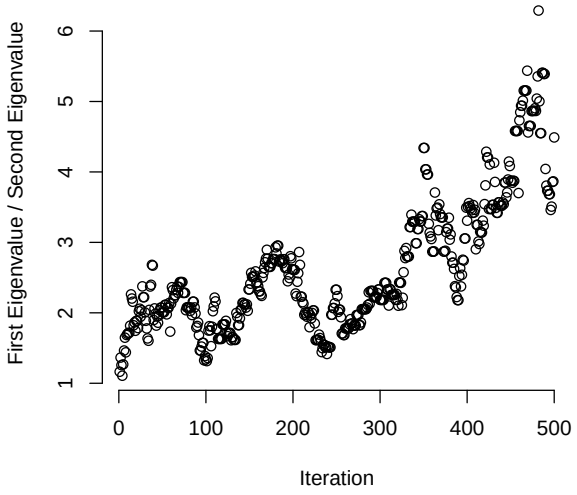
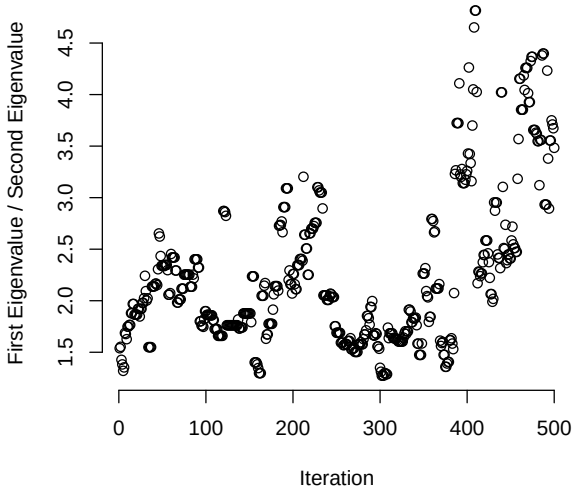


Figure 5: Ratio of First Two Eigenvalues for One Simulation

(a) Base Model



(b) Variant 1: Structured Priors



(c) Variant 2: Agreeable Reviewers

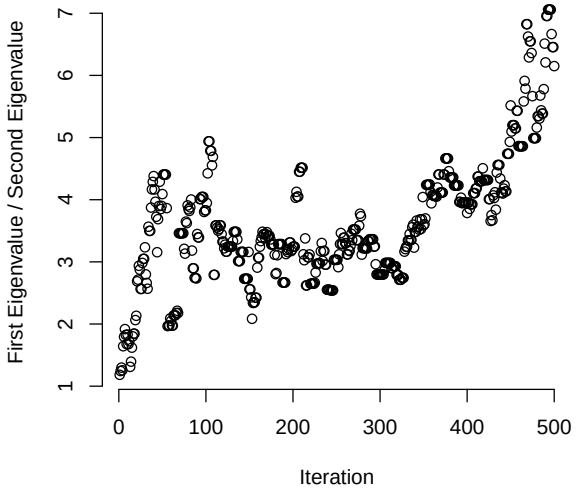
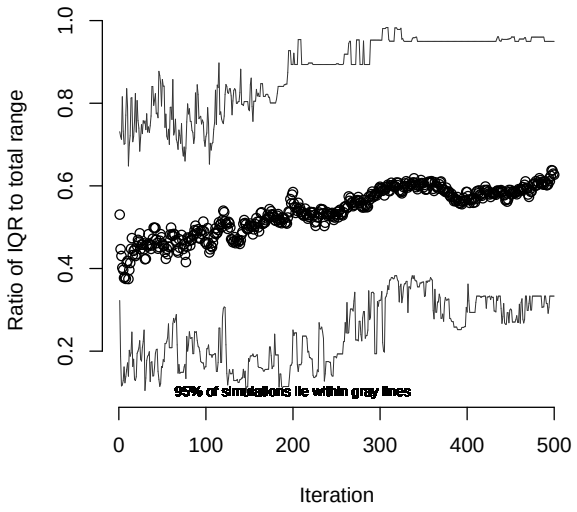
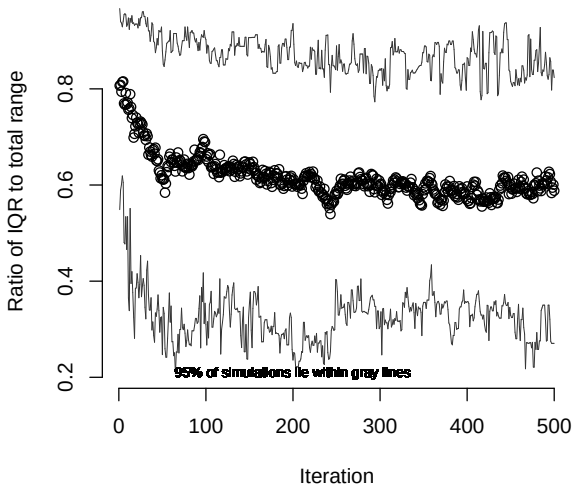


Figure 6: Average Ratio of IQR to Range of Ideal Points Over Time

(a) Base Model



(b) Variant 1: Structured Priors



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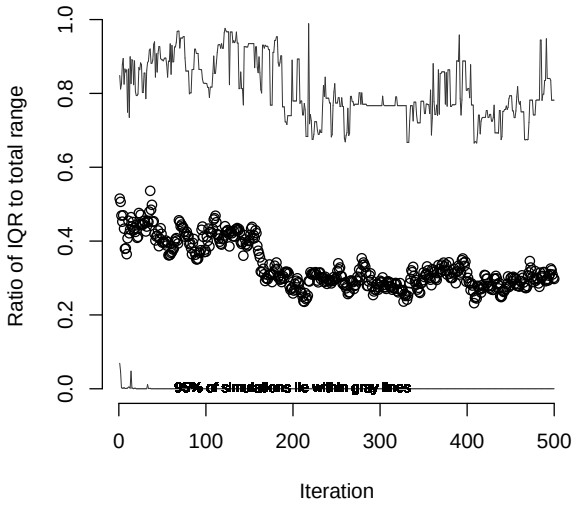
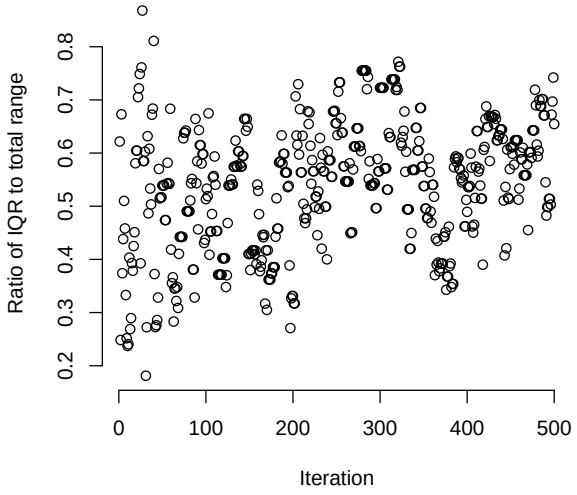
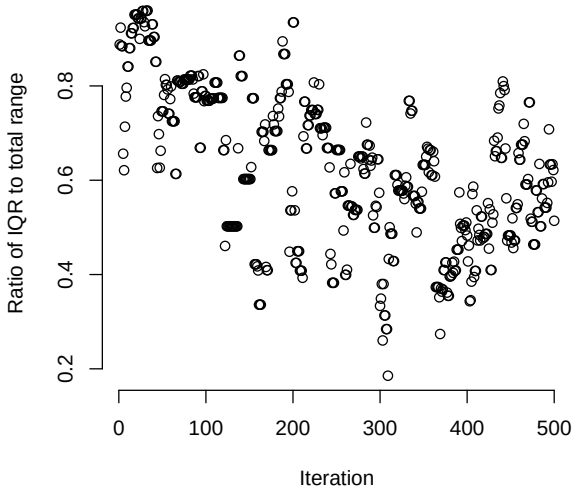


Figure 7: Ratio of of IQR to Range of Ideal Points for One Simulation

(a) Base Model



(b) Variant 1: Structured Priors



(c) Variant 2: Agreeable Reviewers