

# The Democratic Peace and the Wisdom of Crowds

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This article proposes a new theory for the democratic peace that highlights a previously unexplored advantage enjoyed by democracies in crises. We argue that because democracies typically include a larger number of decision-makers in the foreign policy process, they will produce fewer decision-making errors in situations of crisis bargaining. Thus, bargaining among larger groups of diverse decision-makers will fail less often. In order to test our hypothesis, we use data from experiments in which subjects engage in ultimatum bargaining games. We compare the performance of individuals, small groups and foreign policy experts against the performance of larger groups of decision-makers. We find strong support for the idea that collective decision-making among larger groups of decision-makers decreases the likelihood of bargaining failure.

## Introduction

Few phenomena in the field of international relations receive the same level of academic attention as the finding that democracies tend to resolve their conflicts with one another through means short of war. This well-established pattern—the democratic peace—has two parts: first, and most famously, the existence of few, if any, clear cases of war between established democracies (Chan 1984; Kant [1795] 1969; Maoz and Abdolali 1989; Weede 1984, 1992); second, and somewhat more controversially, evidence that democracies are no less war-prone *overall* than other kinds of states (Bremer 1992, 1993; Dixon 1993, 1994; Lake 1992; Small and Singer 1976). In other words, democracies rarely—if ever—fight each other, but because they fight as many war—on average—as other states, it follows that they frequently find themselves in wars against nondemocratic states.

These findings are of such potential importance to policymakers that scholars have, over the last several decades, subjected them to numerous empirical checks. Overall, these tests support the existence of a democratic peace (Gartzke 1998, 2000; Kacowicz 1995; Lemke and Reed 1996; Maoz and Abdolali 1989; Maoz and Russett 1993;

Oneal and Russett 1999, 2001; Rousseau et al. 1996; Russett 1993; Russett, Oneal, and Davis 1998; Small and Singer 1976; Thompson and Tucker 1997; Dafoe 2011).<sup>1</sup> As Levy notes, “the absence of war between democratic states comes as close as anything we have to an empirical law in international relations” (1989, 270).

Perhaps not surprisingly, theories of the democratic peace continue to proliferate alongside empirical tests, in part because of the difficulty in accounting for the apparent dyadic nature of the observation. What is it about their institutions that facilitate peaceful relations among democratic states? Drawing on a now well-established literature on the advantages of group decision-making, we propose a new theory for the democratic peace. We highlight a previously underexplored advantage that democracies may have in crisis bargaining. Specifically, we argue that democratic states have diverse collections of independently deciding individuals. This will likely lead democracies to produce fewer decision-making errors than states that place more foreign policy decision processes in the hands of smaller and more homogenous groups of individuals—whether individual leaders or even foreign policy experts.

We test these expectations via a simple experimental design that isolates one key difference between democratic and autocratic decision-making: democracies typically have a larger group of decision-makers involved in the foreign policy process. Closely matching our experimental conditions with both the assumptions of the bargaining model of war and the “wisdom of the crowds” literature, we find strong support for the idea that collective decision-making decreases the likelihood of bargaining failure. Across experimental conditions, larger groups of decision-makers consistently outperform individuals in situations of ultimatum bargaining, whether they are

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<sup>1</sup>There may be thousands of books and articles on the democratic peace—too many to review here. See Rosato (2003) and Dafoe (2011) for more thorough reviews of the theoretical and empirical challenges to the democratic peace finding.

matched against a smaller group of individuals (i.e., in a mixed dyad) or other, similarly large groups. The findings imply that existing theories of the democratic peace that appeal to shared normative values, accountability, or transparency may be correct, but also incomplete, as simply aggregating decision-makers' bargaining choices through a voting institution replicates two key features of the democratic peace finding in a controlled experimental setup; democratic dyads avoid costly bargaining failure more than autocratic or mixed dyads, and democracies do no worse than other regime types in terms of bargaining outcomes.

## Theory

### *The Wisdom of Crowds*

In the opening anecdote of his popular book *The Wisdom of the Crowds*, Surowiecki (2005) illustrates a classic example of how crowds may be wise. At a 1906 county fair in Plymouth, England, British scientist Francis Galton came across a weight-judging competition in which members of a gathering crowd lined up to place wagers on the weight of a fat ox. The best guess won the prize. Seven hundred and eighty-seven diverse individuals (including expert butchers and farmers and nonexpert clerks) tried their luck at guessing the ox's weight in an attempt to win prizes. When the contest was over, Galton borrowed the tickets from the organization and analyzed the guesses, hoping to show that the average voter was capable of very little. Adding the contestants' estimates together and calculating the mean, Galton used this number to represent the collective wisdom of the Plymouth crowd, acting as if the crowd voted as a single person. Given the mixture of the crowd, which included relatively "smart" guesses from experts with relatively "dumb" guesses from nonexperts, Galton undoubtedly expected the guesses would be way off. The crowd guessed the ox would weigh 1,197 pounds. The actual weight of the ox was 1,198 pounds. In Surowiecki's words, "the crowd's judgment was essentially perfect" (2005, xiii).

What Galton discovered in averaging the guesses of the Plymouth crowd was a phenomenon now reproduced in multiple real-world and experimental settings—that under certain conditions, groups of independent decision-makers can be remarkably smart, even smarter than the smartest members within that group. While it was certainly true that the "dumbest" members of the Plymouth crowd performed considerably worse than the so-called "experts" as Galton predicted (each individual in the group was off by an average of nearly fifty-five pounds, with a standard deviation of roughly sixty-two pounds), their guesses appeared wrong in very different ways. Some individuals dramatically overestimated the weight of the ox and others dramatically underestimated its weight. In averaging a diverse set of individual guesses, the errors canceled out and thus produced a collectively wise decision. In other words, even if most people within a group are not particularly well informed or rational (lacking the ability and desire to make sophisticated cost-benefit calculations), when those imperfect judgments are aggregated together, our collective intelligence is oftentimes superior to the smartest of decision-makers (Tetlock 2005).

The importance of this finding for studying the behavior of political and social groups was not lost on Galton. In particular, the analogy to a democracy where people of radically different abilities and interests each get one vote suggested itself immediately. In Galton's words, "[t]he average competitor was probably as well fitted for making a just estimate of the dressed weight of the ox, as an average voter is of judging the merits of most political issues on which he votes" (Surowiecki 2005, xii).

Despite his own belief that power in society should belong to a select few with the best qualities for breeding, Galton later conceded that, "the result seems more creditable to the trustworthiness of a democratic judgment than might be expected" (Surowiecki 2005, xiii).

Not all crowds are wise, however. And, over time—as researchers examined the implications of Galton's findings across various social contexts—they gradually refined a theory of collective intelligence to include certain key criteria. Contemporary theorists emphasize that collective accuracy depends on a combination of both individual accuracy and diversity. Specifically, collective accuracy can be characterized by the simple mathematical identity below (Page 2008; Hong and Page 2004, 2009, 2012).

$$\text{Collective accuracy} = \text{average accuracy} + \text{diversity}$$

*Average accuracy* in this equation refers to the average magnitude of each individual's error. *Diversity* refers to how different individual guesses are on average. What the first term in this simple equation makes clear is that crowds must know something about the issue at hand. If individuals know nothing about an issue and are wildly wrong, then the crowd will still tend toward incorrect decisions as well. After all, rockets are designed by groups of engineers, not laypeople. On the other hand, if a number of individuals do know something about the problem at hand, but are prone to making different types of errors, then aggregating their views can help make an accurate decision because different errors will cancel one another out. As we discuss below, it is plausible that democratic decision-makers are both accurate and diverse enough to give democracies an advantage in foreign policy decision-making.

In addition to these general rules, scholars in the psychology literature have also identified a number of specific conditions under which groups are unlikely to perform better (Cason and Mui 1997; Bone Hey and Suckling 1999; Rockenbach Sadrieh and Barbara 2001; Cox and Hayne 2006; Puncochar and Fox 2004; Kerr, MacCoun, and Kramer 1996).<sup>2</sup> For example, worse decision-making may emerge when designated leaders promote conformity and self-censorship, which can lead to *group-think* (Sniezek 1992; Kleindorfer Kunreuther and Schoemaker 1993; Mullen et al. 1994). Similarly, problems can arise when groups polarize the attitudinal judgments of their members (Davis 1992; Kerr, MacCoun, and Kramer 1996; Cason and Mui 1997). Importantly, however, many of these conditions do not apply in our experimental setup, and there are also good reasons to believe that democratic decision-making is less vulnerable to many of these harmful conditions. We describe these reasons in detail below.

## The Wisdom of Crowds in Democracies Versus Autocracies

If a diverse group of independently deciding individuals can be collectively wise—and this may be behind some of democracies' ability to formulate superior policy decisions—it is surprising that more attention has not been paid to this particular democratic advantage in foreign policy decision-making.<sup>3</sup> Perhaps democracies, by

<sup>2</sup>In the interest of space, we review the results of these papers in the supplementary appendix.

<sup>3</sup>One exception is an important study by Reiter and Stam (2002), who apply a similar logic to a different empirical puzzle: why democracies win the

aggregating predictions from a diverse population of intelligent agents, may outperform a team comprised of even the best-performing agents. That is, it might be the case that democracies have an advantage in foreign policy decision-making when compared against alternative institutional forms like autocracies that aggregate information from a smaller, less diverse set of “expert” individuals.

Even though foreign policy decision-making in democracies is oftentimes dominated by a relatively small group of educated elites (Saunders 2011; Hafner-Burton, Hughes, and Victor 2013; Hafner-Burton, LeVeck, and Victor 2017), there are still compelling reasons to believe that democracies draw on a larger, more diverse set of views *on average* when making decisions about war bargaining. First, by holding periodic elections, citizens can express their views on which leader or mix of representatives is best suited to conduct international affairs. Indeed, existing evidence suggests that citizens, while hardly experts in foreign policy, do hold broadly informed opinions on such matters, see clear differences between the candidates on issues of foreign policy, and vote partially on the basis of these factors (Aldrich 1999). Citizens may therefore elect representatives who take a particular approach to foreign policy, such as whether a state should take a more hawkish or dovish approach to matters of interstate conflict (DeNardo 1995). At the same time, they may leave the details of how to best implement a given approach to elected representatives and the bureaucrats they oversee (Lupia and McCubbins 1994, 2003). The diverse approaches of different elected officials (many of whom have some input into the foreign policy decision-making process) may act like the diverse heuristics and interpretations found in recent models of collective wisdom (Hong and Page 2004, 2009). Second, citizens in democracies can more efficiently express approval or disapproval for their leader’s policies through public polls. Again, these polls may aggregate citizens’ diverse views on the wisdom of a particular approach to foreign policy. Third, democracies tend to have freer markets with exchanges that can react almost instantly to inform leaders about the expected outcome of a particular policy choice (Gartzke 2007; Wolfers and Zitzewitz 2009). These market signals can act like weighted votes from market investors. Finally, democracies tend to establish different domestic institutions with diverse approaches or perspectives on foreign policy. For instance, in the United States, the Departments of State and Defense have different intelligence sources, decision-making structures, and personnel.<sup>4</sup> Yet, both institutions may have input on how to deal with a particular adversary.

Together, these information aggregation mechanisms allow for more diverse groups of independently deciding

wars they initiate. Reiter and Stam argue that democracies “are better at forecasting war outcomes and associated costs” because they “benefit from more and higher quality information” (2002, 23) and thus only initiate winnable wars. They argue, “the unitary nature of dictatorships . . . forgoes democratic advantages from the market-place of ideas that provide broad checks on a single leader” (2002, 25). Reiter and Stam build from Schultz (1999), who also raises the prospect that democracies are more strategic about what conflicts they enter. Here, we explore whether this advantage helps democracies forecast the reservation price of opponents in crisis bargaining and whether it offers a partial explanation for the democratic peace (i.e., bargaining success, rather than war outcomes).

<sup>4</sup>In other words, even though cabinet members’ views may be correlated by a shared ideology or by a desire to gain favor with an ideological leader (Saunders 2011), in many contexts, ideology will not induce perfect correlation.

individuals to process information separately and express their own independent assessment on foreign policy matters. Thus, existing studies support the comparative-static claim that democratic decision-making is—on average—relatively more pluralistic than autocratic decision-making due to these mechanisms of accountability. This is true even though the decision to go to war in a democracy like the United States may ultimately rest with only a small group of leaders gathered in a “situation room.” Furthermore—even when aggregating similar beliefs across similar numbers of individuals—participants in autocracies often lack the incentive to tell leaders the truth (Reiter and Stam 2002). And although elites may often influence or manipulate the preferences of citizens in democracies (challenging the assumption of independence) (Zaller 1992; Lenz 2012), existing studies suggest that democratic decision-making is influenced by a more diverse set of opinions on average relative to autocratic states.<sup>5</sup>

Even at the level of elite decision-making—outside the direct influence of everyday citizens—there is little controversy in the academic literature that democracies tend to have a larger group of decision-makers involved in the foreign policy process. At the broadest level, the Polity IV index measure—on which the democratic peace phenomenon is based—is primarily driven by the variable *XCONST* (Gleditsch and Ward 1997), which, in a large part, codes the number of actors across institutions that constrain policy-making by the executive. The variable therefore reflects the fact that democratic policy-making is typically influenced by a larger number of independent actors. Similarly, the The Political Constraint Index (POLCONIII) (Henisz 2000) used in some robustness checks of the democratic peace (Tsebelis and Choi 2009) measures the raw number of institutional veto players and their relative independence in terms of preferences and ideological viewpoints.<sup>6</sup> As we review further in the supplementary appendix, there is also evidence that these veto players have some influence over foreign policy, not just domestic policy.

There is also plenty of qualitative evidence to support the assumption that democracies contain a larger, more diverse group of individual decision-makers on average. For example, in categorizing foreign policy decision-making across states over time, Hermann and Hermann (1989) show that autocratic regimes are almost perfectly correlated with “Predominant Leader” or “Single Group” decision units that “will be relatively insensitive to discrepant advice and data” (365), while foreign policy-making in democratic regimes is correlated with “Multiple Autonomous Actors.”<sup>7</sup>

Even in the United States, where the executive branch is thought to enjoy a great deal of autonomy—particularly over decisions to go to war—there nevertheless exists a robust and well-documented interagency process as a

<sup>5</sup>For example, consider that even when partisan media, like Fox News or MSNBC, heavily influences citizens’ views, (1) even these opposing views are likely to create diversity in opinion with errors that cancel out, and (2) some component of citizens’ opinions still remains statistically independent (i.e., unexplained) by these “elite” opinions (Levendusky 2009). The experiment below can be understood to capture this independent component.

<sup>6</sup>In Supplementary Appendix Table A6, we compare democracies and autocracies along both variables quantitatively and show that democracies are systematically characterized by a larger, more diverse group of independently deciding individuals on average.

<sup>7</sup>Geddes (1999, 2003) and Weeks (2012, 2014) have also detailed intricate decision-making processes across different types of autocratic regimes.

mechanism for collective decision-making. At multiple levels, the US interagency process draws together a diverse collection of independently deciding actors from across multiple agencies with distinct—sometimes parochial, often times conflicting—interests and beliefs based on independent characterizations of the international system (Raach and Kass 1995; Marcella 2004; Gorman and Krongard 2005).<sup>8</sup>

Detailed historical accounts illustrate how this interagency process can aggregate a large and diverse number of views. In his seminal article “Conceptual Models and the Cuban Missile Crisis,” Allison (1969, 63) provides what is perhaps the most well-known example of how US foreign policy outputs are “the consequences of innumerable and oftentimes conflicting smaller actions by individuals at various levels of bureaucratic organizations in service of a variety of only partially compatible conceptions of national goals, organizational goals, and political objectives.” Specifically, Allison shows that Kennedy struggled to weigh different, and sometimes conflicting, recommendations from his closest advisors drawn from different agencies with different perspectives. The moves appeared “resultant of collegial bargaining” (Allison 1969, 691) from a “conglomerate of semifeudal, loosely allied organizations, each with a substantial life of its own” (Allison 1969, 698). As Allison notes, “the nature of problems of foreign policy permits fundamental disagreement among reasonable men concerning what ought to be done. Analyses yield conflicting recommendations. Separate responsibilities laid on the shoulder of individual personalities encourage differences in perceptions and priorities . . . More often, however, different groups pulling in different directions yield a resultant distinct from what anyone intended” (Allison 1969, 707). In the US government, these actors include “chiefs”: the president; secretaries of state, defense, and treasury; director of the CIA; joint chiefs of staff; and, since 1991, the special assistant for national security affairs” (709).

Allison’s account of the decision to implement a blockade of Cuba during the crisis provides an excellent illustration of how inputs from numerous, diverse viewpoints—even from within the executive branch, where members often have a shared ideology (Saunders 2011)—can have a significant impact on crisis bargaining. As described by Allison, Senators Keating, Goldwater, Capehart, Thurmon, and others initially attacked Kennedy for his “do nothing approach,” while McGeorge Bundy, the president’s assistant for National Security Affairs, asserted that there was no present evidence that the Cuban and Soviet Government would attempt to install a major offensive capability (Allison 1969, 712). Meanwhile, Colonel Wright and others at DIA believed that the Soviet Union was placing missiles in Cuba. This information fell on the diverse crowd of advisers differently (Allison 1969, 713). Kennedy’s principal advisers, including Secretary of Defense McNamara, McGeorge Bundy, Theodore Sorenson, and the president’s brother Robert Kennedy, considered two tracks: do nothing and taking diplomatic action (Allison 1969, 714). However, the joint chiefs of

staff advocated for a military invasion of Cuba (Allison 1969, 714). According to Allison, “the process by which the blockade emerged is a story of the most subtle and intricate probing, pulling, and hauling [and] leading, guiding, and spurring.” Initially, Allison notes, “the President and most of his advisers wanted the clean, surgical air strike” (Allison 1969, 714). Remarkably, however, despite the presence of a sizeable minority preferring an air strike, the president ultimately opted for a blockade after considering the advice of McNamara and Robert Kennedy (Allison 1969, 714). Reflecting on the influence of the diverse opinions of his advisers, the president’s brother claimed that “the fourteen people involved were very significant” (Allison 1969, 714).

In stark contrast to the Kennedy administration’s handling of the Cuban Missile Crisis, the overwhelming consensus among diplomatic historians on the Cuban Missile Crisis is that Kennedy’s counterpart in the Cuban Missile Crisis, the Soviet leader Nikita Khrushchev, drew from a much smaller group of advisors than Kennedy. Furthermore, Khrushchev systematically ignored the advisers that he did consult with during the crisis, if they even felt safe to express their true beliefs at all (Fursenko and Naftali 1998, 2007; Taubman 2003; Dobbs 2008). Beyond the case of the Cuban Missile Crisis, Hermann and Hermann (1989) use four case studies to demonstrate how autocratic regimes made the decision to initiate or escalate war after periods of failed negotiations due to their relative insensitivity to discrepant advice and data. In a more recent example, Saddam Hussein repeatedly ignored the advice of his military advisers and scientists (many of whom appeared afraid to express dissent in the first place), many of whom correctly estimated that the rate of Iraq’s nuclear program ran a high risk of triggering war (Horowitz and Narang 2014; Braut-Hegghammer 2016). This further illustrates how autocracies may be worse at incorporating knowledge dispersed among multiple actors, even when those actors hold key advisory roles in government.

#### *The Wisdom of Crowds and the Democratic Peace*

The possibility that a more diverse collection of independently deciding individuals characteristic of democratic states might be superior to nondemocracies in predictive tasks has important implications for the democratic peace finding. Existing theories of the democratic peace tend to argue that democratic institutions facilitate peaceful relations among states in two ways: first, democratic institutions can help align the interests of leaders with their citizens, and, second, democratic institutions may improve the quality of information conveyed by states during crisis bargaining.<sup>9</sup>

The first of these explanations begins with the idea that democratic institutions tend to hold leaders accountable for the costs of war.<sup>10</sup> War can be an extremely costly and risky process for citizens. They pay the psychological and material costs of fighting in the form of lives lost and higher taxes. However, political leaders—who ultimately make the decision to wage war—rarely suffer these costs themselves. If leaders expect to enjoy the benefits of

<sup>8</sup>Indeed, despite the presence of a dedicated intelligence community, organizations in the US federal government maintain their own intelligence agencies. They do this precisely to arrive at independent assessments and avoid group-think; for example, the Department of Defense operates the Defense Intelligence Agency (DIA), the State Department operates the Bureau of Intelligence Research, and the Treasury Department operates the Office of Intelligence Analysis, etc.

<sup>9</sup>For a survey of behavioral and normative theories of the democratic peace dating to Kant’s Liberal Peace, see Rosato (2003) and Dafoe (2011). See Stevenson (2016) for a review of normative theories.

<sup>10</sup>See Rosato 2003 for a general review of the literature in support of this mechanism.

victory with little to no exposure to the costs of waging war, they will prove more inclined to fight a risky war rather than negotiate a compromise.

According to this view, representative forms of governments better align the interests of the ruler with the ruled by periodically holding leaders accountable to their citizenry (Doyle 1997, 24–25; Russett 1993, 38–39). Because democratic institutions make leaders more sensitive to the costs of war, they thereby decrease the probability that leaders will fight for personal gain (Maoz and Russett 1993; Russett 1996). If war is costlier for democratic leaders, they should be less willing to risk war on average compared to leaders of nondemocratic states—who can afford to gamble with others' lives and resources. This heightened sensitivity to the costs of war may also explain why democracies fight with nondemocracies more often. If democratic leaders are less willing to pay the cost of war, autocratic states should challenge democracies more frequently and demand greater concessions during diplomatic negotiations, thereby increasing the risk of war.

A second popular explanation focuses on how democratic institutions may influence crisis bargaining between states. Building off the bargaining model of war (Fearon 1995), this argument rests on the idea that war results from bargaining failure due to credible commitment problems or the effects of private information on negotiations. It wagers that something about democratic institutions must solve these problems. Thus, democracies are more likely to find mutually beneficial bargains that avoid the costs of war. In particular, proponents of this argument suggest that democracies may be better able to resolve the informational problem that arises when sides have private information about their costs of war relative to the issues at stake. For example, democratic decision-making processes are often more open and transparent, especially in cases where different representatives argue or negotiate over foreign policy in public forums (Schultz 1998, 2001). This greater transparency of democratic decision-making allows opposing states to better assess the true capabilities and resolve of democratic states (Schultz 1998).<sup>11</sup>

While both of these arguments suggest plausible mechanisms that might account for the democratic peace, neither one addresses the possibility that democracy may produce superior foreign policy decision-making processes. The first argument simply suggests that leaders representing democracies are pacific because democratic institutions more directly expose them to the costs of war. This should bias democracies toward peace in general, but does little to explain why—if democratic institutions heighten leaders' sensitivity to the costs of war, which, in turn, causes nondemocracies to exploit their pacific tendency to make greater demands—democracies do not perform worse, on average, than other kinds of states in crisis bargaining situations (Bueno de Mesquita et al. 1999). That is, no evidence implies that nondemocratic states generally extract greater concessions from democratic states over time because the latter are more inclined to back down.

The second argument incorporates our understanding of crisis bargaining. It acknowledges that all parties—regardless of regime type—have an incentive to avoid war. But it also wagers that democracies are better able to

convey their own capabilities and resolve to opponents. It therefore implies that democracies are less likely to be challenged in the first place when possible adversaries perceive them to have high levels of resolve. But this argument may be incomplete. It treats the role of the democratic decision-making process as strictly passive—as allowing an opponent to better assess a democratic state's reservation price. But it ascribes no distinct advantages to democratic foreign policy decision-making itself.

Our argument is substantially different. In contrast to previous theories of the democratic peace, we propose an alternative mechanism through which democracies may be able to resolve the informational problems that lead to bargaining failure. For the reasons outlined above, we posit that democracies are better able to aggregate and interpret noisy signals gathered during a crisis in a way that cancels out decision-making errors.

Consider the simplest model of crisis bargaining as outlined by Fearon (1995). In this setup, two states ( $S_1$  and  $S_2$ ) have divergent preferences over the division of some issue space represented by the interval  $X = [0,1]$ , where each state's utility is normalized to a zero to one utility space.  $S_1$  prefers issue resolutions closer to one, while  $S_2$  prefers resolutions closer to zero. Supposing states fight a war,  $S_1$  prevails with probability  $p \in [0,1]$  and gets to choose its favorite outcome closer to 1.  $S_1$ 's expected utility is  $pu_1(1) + (1-p)u_1(0) - c_1$ , or  $p - c_1$ .  $S_2$ 's expected utility for war is  $1 + p - c_2$ . The parameters  $c_1$  and  $c_2$  represent the costs for fighting a war to each side along with the value of winning and losing on the issues at stake. Importantly, the costs of fighting open up a range of bargained solutions between each state's reservation price,  $p - c_1$  and  $p + c_2$ , that both sides should strictly prefer to paying the costs of war (Narang 2017, Narang and Mehta 2017, Mehta and Narang 2017). Structured this way, the puzzle becomes about why sides ever fail to identify a negotiated settlement within this range ex ante, knowing that war is always inefficient ex post.

Fearon suggests that coherent rationalist explanations for war will fall into one of two categories; sides can fail to reach a bargain because (1) they have private information with incentives to misrepresent or (2) because sides are unable to credibly commit themselves to follow through on the terms of the agreement. According to the first explanation, sides have asymmetric information about their own capabilities,  $p$ , and resolve,  $c$ , and they have an incentive to overrepresent (or underrepresent) their ability on these dimensions to their opponent in order to secure a better settlement. As a result, while the costs of fighting open up a range of negotiated settlements both sides prefer to war, the incentive to bluff may lead sides to delay settlement in favor of fighting in order to accrue enough information to formulate reliable beliefs about their opponent's strength (Slantchev 2003; Narang 2014, 2015).

In situations of incomplete information, war (bargaining failure) can occur in Fearon's model if State 1 overestimates State 2's cost of going to war, and therefore makes an offer that is too small for State 2 to accept. On the other side of the decision, war can also occur if State 2 underestimates its own costs of war and chooses to only accept offers that State 1 would not reasonably propose. In each of these cases, decision errors can happen because decision-makers have uncertainty about key parameters, and they can only estimate these parameters with some error. However, it is possible that the error made by one decision-maker within a state may be different from

<sup>11</sup>A related informational mechanism, domestic audience costs, has also received significant attention in the crisis bargaining literature. See Fearon (1994); Tomz (2007); Weeks (2008).

that of another. For example, while one decision-maker might overestimate the other state's cost of going to war, another decision-maker could err in the opposite direction. If such views are aggregated, the errors could cancel out.

In the next section, we describe a version of the classic ultimatum game, and we use this model as the basis for an experimental research design in which we test the proposition that regimes with more decision-makers experience fewer instances of costly bargaining failure (analogous to war) and achieve outcomes that are at least as good as the outcomes achieved by regimes with fewer decision-makers.

### Methodology and Results

Using observational data to identify the effect of information aggregation mechanisms on war bargaining outcomes is difficult for a number of reasons. First, asymmetric information presents the same problem for the analyst that it does for states in the international system: a state's reservation price for war is private information that is rarely revealed. This makes it difficult to know how close one state's offers are to another state's reservation price for costly conflict. This is especially true for the majority of crisis bargaining scenarios, because offers rarely trigger war. Even in the rare cases where crisis bargaining devolves into war, it is impossible to know with any certainty just how much one state's offer fell short of another state's threshold for avoiding conflict.

Second, in an uncontrolled environment, it is difficult to ascertain what information individual decision-makers had access to and exactly how that information was filtered through executive decision-making processes. Future work needs to trace the precise process by which signals about opponents are aggregated and how these aggregated signals influence state decision-makers. But this approach is not ideal for clearly answering the more primary question of whether aggregation *can* influence bargaining in the manner predicted by existing theories. Such questions are better answered in an environment where the researcher can carefully control what information actors have access to, and how that information is aggregated.

#### An Experiment

To examine the question of whether information aggregation can improve bargaining outcomes, we look at data from laboratory bargaining games. Specifically, we look at a variant of the ultimatum game (Güth et al. 1982), which (as we further explain below) mimics key features of war bargaining.<sup>12</sup> The game is played between two players, a *proposer* and a *responder*, who bargain over a fixed pie of one hundred monetary units ( $\mu$ ). The proposer makes an integer offer,  $S_p \in [0, 100]$ , which is the portion of the pie she proposes keeping for herself. The responder simultaneously makes a demand,  $S_r \in [0, 100]$ , which is the minimum portion of the pie they will accept without

rejecting the proposer's offer. The monetary payoffs for the proposer and responder are the following:

$$\begin{aligned} (S_p, 100 - S_p) & \quad \text{if } 100 - S_p \geq S_r \\ (0, 0) & \quad \text{if } 100 - S_p < S_r \end{aligned}$$

In other words, if the proposer's offer exceeds or equals the responder's demand, then the pie is split according to the proposer's offer. If the offer falls short of the demand then the offer is rejected and both parties receive zero  $\mu$ .

If proposers' and responders' utility is strictly increasing in the amount of money they personally receive—and they both have mutual knowledge of this fact—then the unique subgame perfect Nash equilibrium for the ultimatum game is for proposers to offer zero and for responders to accept zero because they are indifferent between accepting and rejecting. If this theoretical expectation holds, this might make the ultimatum game a poor analogy to the bargaining model of war because only the proposer is strictly worse off when an offer of zero is made and rejected. However, the existence of this strategy profile does not present a major problem for testing our theory. This is because, as a practical matter, individuals in the ultimatum game almost never propose zero or set zero as their minimum acceptable offer across real world settings (Camerer 2003). Thus, empirically, these potential offers—while theoretically possible—have no practical effect on our results below.<sup>13</sup>

The infrequency of proposals that offer zero in the ultimatum game is likely due to the fact that responders exhibit aspects of real world bargaining that are crucial for our particular question: they have positive but variable minimum acceptable offers (Camerer 2003; Henrich et al. 2001). This is because subjects derive utility from other things besides monetary payoffs—like satisfying norms of fairness or feelings of spite. So while the responder cannot possibly gain a higher payoff by demanding more, this is only true in terms of *monetary* payoffs. In terms of players' *utility* for monetary splits, things are often different. This means that responders can rationally demand more than zero, and proposers can anticipate this by offering some positive amount to avoid bargaining failure. Numerous experiments have shown that responders' varied thresholds for rejecting an offer do not purely reflect a mistake, but rather some actual differences in players' utility for different monetary splits (Camerer 2003; Andreoni and Blanchard 2006).

Crucially, heterogeneity in demands creates uncertainty for proposers regarding what offers will and will not trigger costly bargaining failure. In this regard, the experiment is analogous to many models of war bargaining under asymmetric information, such as Fearon (1995) or Powell (1999), where the proposer makes a single take-it-or-leave-it offer under uncertainty about an opponent's costs of war (i.e., opponent type). Such decision-making errors are analogous to a leader underestimating its opponent's willingness to fight. Rejection in our game is analogous to a costly outside option, such as war, which both

<sup>12</sup>We use the ultimatum game instead of the games used by Tingley and Wang (2010) and Tingley and Walter (2011), which allow the experimenter to manipulate responders' cost of bargaining failure. We did this for two practical reasons. First, compared to the laboratory, it is more difficult to ensure that subjects in online experiments fully understand complex instructions (Rand 2012, 176). We therefore chose the ultimatum game, in part, because it was the simplest game that met our requirements. Second, there now exist hundreds of experiments conducted using the ultimatum game, including international policy elites. We could therefore examine how well crowds performed relative to individual experts.

<sup>13</sup>Indeed, individuals in our experiment vote to propose zero just more than 4 percent of the time, but, in most cases, these votes do not manifest in observing a proposal of zero because the votes occurred as part of a group in which votes for larger proposals bring the actual observed frequency of proposals that offer zero to substantially less than 1 percent.

players wish to avoid in favor of some mutually acceptable bargain.

While the ultimatum game is a workhorse of laboratory studies on bargaining, our innovation is to systematically manipulate the number of decision-makers on each side and see how this affects the rate of costly bargaining failure. Other articles have looked at what happens when subjects' views on how to play the ultimatum game are aggregated by deliberation (Bornstein and Yaniv 1998) and voting (Elbittar, Gomberg, and Sour 2011). However, no study to date has examined what happens to the rate of bargaining success when the number of decision-makers on each side is systematically varied. Our experiment does this with respect to voting, which is a common way for aggregating decisions.

Even though previous studies of individual bargaining in the ultimatum game suggest that decision-makers avoid bargaining failure a large fraction of the time (Camerer 2003), it is far from guaranteed that aggregating subjects' views will further increase the proportion of successful bargains in a population. For one, subjects may have informed views about how to bargain with other individuals, but may be relatively uninformed when it comes to bargaining with groups of different sizes. Second, the size of a group itself may diminish individual decision-makers' incentives to make wise decisions (Downs 1957). Making a wise vote takes mental effort, but that effort can be potentially rendered moot by other voters' decisions (Downs 1957; Popkin 1991). Furthermore, simply knowing that you are part of a group may make one more aggressive toward other out groups, such as the group you are bargaining with (Tajfel and Turner 1979); this aggression might plausibly lead to increased bargaining failure. Whether these potential pitfalls of collective decision-making can be overcome by its advantages is an empirical question, which we test.

**H1:** Our hypothesis is that decisions aggregated from larger groups of proposers and responders will lead to fewer instances of bargaining failure and higher earnings compared to smaller groups and individuals.

To test this, we modified an experiment by Rand et al. (2013), where we asked proposers and responders to play a single round of the ultimatum game described above.<sup>14</sup> In the original experiment, each proposer submitted a single offer while each responder submitted a single demand simultaneously. Experimenters then paired demands and offers at random and paid subjects accordingly. Thus, each proposer had an incentive to make a proposal that would yield the highest expected earnings when played against a random (anonymous) responder. The expected success of each proposer's offer in the experiment can be calculated based on how often the population of responders would reject it and how many monetary units each proposal would have earned on average.

In our modification to this experiment, we compare the success of offers and demands made by small groups of three individuals to the success of offers and demands made by much larger groups of nine individuals. These smaller groups of size three in the experiment are analogous to autocracies, which tend to have a smaller number

of decision-makers included in the policy-making process. Larger groups of size nine are taken as analogous to more democratic polities, where more individuals are typically involved in the policy-making process. We use a group size of three for autocracies because it is the smallest size that has a well-defined majority. Henceforth, we refer to small groups as *autocracy* and large groups as *democracy*. Of course, all the caveats with this stylized operationalization still apply (see External Validity section below). We use a group size of nine because it represents one of the largest treatment "dosages" we could implement while still having enough observations to test our directional hypothesis (that larger groups of decision-makers decrease the rate of bargaining failure). However, in Supplementary Appendix Figure 1, we test whether our results are particularly sensitive to using nine players (as opposed to smaller groups of five or seven). We find evidence that our results are robust to these differences.

We determined a group's proposal to the other side in the following manner: each individual in a group simultaneously and anonymously submitted a vote for what their group should offer to the other side. We then took the median offer submitted in the group to represent the group's actual proposal. For example, say that in a group of three, individuals voted to offer seventeen, eighteen, and twenty-four. The group's actual offer would be eighteen. While this procedure certainly does not capture the intricacies of foreign policy decision-making in a democracy or any other state, it is akin to a decision rule where the median voter's preference is decisive, and thus it approximates a number of real-world collective decision-making bodies, such as voting in elections (Downs 1957) or Congress (Krehbiel 1998). Specifically, aggregation processes like this one can be understood as similar to citizens voting for politicians with a particular level of hawkishness or dovishness, representation across bureaucracies in interagency meetings (Allison 1969; Janis 1972), or congressional votes over war authorization/war funding during crisis bargaining. While there are many significant differences across each of these aggregation mechanisms, they all collect a large number of diverse viewpoints and aggregate them into a single number or outcome that can influence or determine foreign policy.

Of course, the downside of our stylized procedure is that it abstracts away from the intricacies of any one of these mechanisms. However, the upside is that it captures our key independent variable in a way that is tractable and relatively easy to interpret. We further discuss concerns over the external validity of this mechanism in a subsequent section below.

It is also worth noting that, in the absence of deliberation, *groupness* in our experiment emerges from informing individuals about whether or not they played in a group before making their votes. Thus, individuals cast their vote in expectation of it becoming aggregated. Therefore, our treatment induced any behavioral changes that would arise from subjects *knowingly* voting as part of a group to influence the final proposal. And despite the presence of deliberation in the real world (and the attendant risk of attenuating the wisdom of the crowds), our discussion above illustrates that the risk of group-think from deliberation is much more severe in autocracies, where "predominant leader" or "single group" decision units are "relatively insensitive to discrepant advice and data" (Hermann and Hermann 1989, 366). Therefore, while our voting mechanism does not fully capture some of the dynamics that might emerge from deliberation, it does

<sup>14</sup>It is possible that crowds might have additional advantages that would emerge in a more dynamic setting. Future experiments might explore group advantages in learning.

preserve the fact that democratic deliberation typically involves a larger number of more independent inputs.

We posted this experiment online and recruited 1,409 subjects through the internet labor market Amazon Mechanical Turk.<sup>15</sup> We paid subjects \$0.50 as a show-up fee simply for participating in the experiment. We randomly assigned subjects as players on *Side A* or *Side B*. We told players that *Side A*'s task was to propose to *Side B* how much of \$0.40 should go to each member of *Side B* and how much should go to each member of *Side A*. For example, each member of *Side B* might get \$0.10, implying that each member of *Side A* would get \$0.30.<sup>16</sup> *Side B* would decide what minimum amount satisfied an acceptable offer. If *Side A*'s offer to *Side B* met or exceeded *Side B*'s minimum acceptable offer, then we paid both players the bonuses according to the proposed division. Otherwise, no member of either side earned a bonus.

We defined the total size of the pie in terms of what each member received, so that the individual stakes of the decision remained constant across conditions. In other words, changing the group size across conditions did not change the absolute amount of a fixed prize that each individual in a group could receive. While we made this decision primarily to improve the experiment's internal validity (by isolating the effect of aggregation rather than an individual's stake in the decision), it does have a real world analogue. Whereas the benefits of any bargain are typically more diffuse in large populations when the stakes are strictly material, there are many conflicts where one polity might impose a different way of life on citizens in another country (Lake 1992). In these situations, citizens and other decision-makers might place the same value on their own way of life regardless of how many other citizens exist in the country.

To ensure comparability of our study to existing studies, we began by first randomly assigning 232 of the subjects (out of 1,409) to a baseline condition of a single proposer making a take-it-or-leave-it offer to a single responder (the canonical ultimatum game). We then randomly assigned each of the remaining 1,177 subjects to one of our four experimental conditions:

1. A small group of three proposers making a take-it-or-leave-it offer to a small group of three responders (autocracy/autocracy);
2. A small group of three proposers making a take-it-or-leave-it offer to a large group of nine responders (autocracy/democracy);
3. A large group of nine proposers making a take-it-or-leave-it offer to a small group of three responders (democracy/autocracy);
4. A large group of nine proposers making a take-it-or-leave-it offer to another large group of nine responders (democracy/democracy)

We informed subjects that the voting mechanism for group decision-making would simply be the highest offer that gained a majority support, as described above. A summary of the conditions is shown below in Table 1.

**Table 1.** Four ultimatum bargaining experimental conditions

		<i>Side B</i>	
		<i>Autocracy</i> (3 Responders)	<i>Democracy</i> (9 Responders)
<i>Side A</i>	<i>Autocracy</i> (3 Proposers)	<i>Condition 1</i> ( $N=124, 110$ )	<i>Condition 2</i> ( $N=85, 280$ )
	<i>Democracy</i> (9 Proposers)	<i>Condition 3</i> ( $N=286, 98$ )	<i>Condition 4</i> ( $N=92, 102$ )

For each of our experimental conditions, we estimated how well each side would do on average, both in terms of avoiding bargaining failure and in terms of how much individuals earned, by randomly drawing 1,000 samples (with replacement) of  $k$  group members from the  $N$  subjects who participated in that experimental condition. For instance, in the democracy/democracy condition, we randomly drew a set of nine proposers out of all the subjects in the pool assigned to this condition and another set of nine responders assigned to this condition. We would then measure whether bargaining succeeded or failed by whether proposers collectively made an offer greater than or equal to what the responders collectively demanded. To obtain standard errors for this estimator, we used the nonparametric bootstrap, running our procedure over 3,000 samples of the data.

## Results

We began by confirming that we could replicate past studies of one-on-one bargaining between individuals in the ultimatum game using the 232 subjects in our baseline condition. Similar to past studies, our results show that individuals avoid bargaining failure approximately 75 percent of the time (Camerer 2003). Specifically, individuals in this baseline condition of our experiment avoided bargaining failure 76.5 percent of the time (95 percent confidence interval [CI] [0.70 to 0.83]).

Next we examined each of our main experimental conditions. Figure 1 shows the estimated mean outcome in each condition, with bootstrapped standard errors from 3,000 subsamples of the data. Moving from left to right along the X-axis are the four experimental conditions. Condition 1 is labeled autocracy/autocracy, condition 2 is labeled autocracy/democracy, condition 3 is labeled democracy/autocracy, and condition 4 is labeled democracy/democracy.

In Panel A of Figure 1, the Y-axis represents the percentage of times bargaining succeeded, or—in our analogy—the percentage of time subjects avoided the costly reversal outcome of war. In Panel B, the Y-axis represents the average earnings of proposers in each condition. We investigated players' earnings to distinguish our hypothesis that groups in situations of ultimatum bargaining are collectively wise (by making more efficient proposals that more closely predict the reservation price of their opponent) from the alternative possibility that groups exhibit a lower rejection rate simply because they bargain in a more risk-averse and inefficient way (with groups consistently offering more generous proposals in order to secure a peaceful settlement at any cost).

Beginning with the autocracy/autocracy condition at the far left of Panel A, our results show that small groups of three do no better with respect to the percentage of times bargaining succeeds compared to the baseline condition described above, in which individuals faced

<sup>15</sup>See the supplementary appendix for further details on our recruitment procedure.

<sup>16</sup>The size of the pie is always shown as \$0.40. We used numerical examples in the instructions to illustrate how the \$0.40 would be divided as a result of the proposal, but the hypothetical payoffs used were drawn randomly, so as not to systematically bias players' strategies.

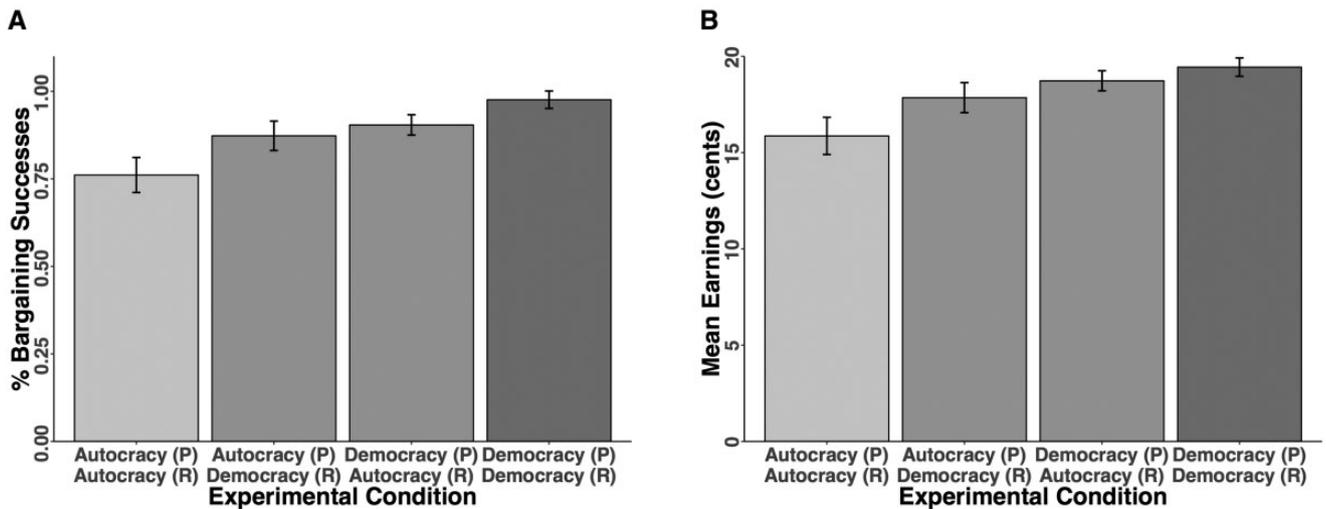


Figure 1. Bargaining failure and earnings across treatments

individuals and bargaining succeeded roughly 75 percent of the time, (76.1, 95 percent CI [0.70 to 0.83]). Consistent with the wisdom-of-the-crowds hypothesis, however, we find that mixed dyads, in which even one side represents a large group of nine, perform significantly better in situations of ultimatum bargaining compared to dyads with two small groups. Autocracy/democracy dyads avoid conflict 87.3 percent of the time (95 percent CI [0.79 to 0.96]), and democracy/autocracy dyads avoid conflict 90.4 percent of the time (95 percent CI [0.85 to 0.96]). Also consistent with our theory, democratic dyads perform the best, avoiding bargaining failure 96.7 percent of the time (95 percent CI [0.93 to 1.00]). In other words, ultimatum bargaining between democracies rarely if ever fails.

In Panel B, we investigate earnings across the four conditions for the reasons outlined above. These findings mirror the result in Panel A, with mixed dyads earning significantly more than autocratic dyads and democratic dyads earning more than even mixed dyads on average. Democratic dyads earned on average 19.4 cents compared to autocratic dyads in which individuals earn 15.9 cents on average. This suggests that proposals of large groups are better calibrated to the demands of responders, which appears consistent with the hypothesis that democracies are “wiser” and also appears consistent with the finding in observational studies that democracies do not perform worse on average in crisis bargaining situations (Bueno de Mesquita et al. 1999). These higher earnings do not emerge because larger groups, on average, make substantially more generous offers. Instead, higher earnings emerge because aggregation averages out overly aggressive offers from individuals that would normally trigger bargaining failure, and also offers that would be far too generous.<sup>17</sup>

#### Why Is the Result Not Strictly Dyadic?

The results above clearly replicate the important dyadic aspect of the democratic peace finding: democracies

almost never fight each other. However, it is not obvious from Figure 1 whether our results replicate the more controversial finding that democracies are no less war prone overall, which implies that mixed dyads should be more war prone than even autocratic dyads (Gleditsch and Hegre 1997).<sup>18</sup> In the supplementary appendix, we discuss two potential reasons why decision aggregation may appear to have a monotonic effect in our experiment, but a dyadic effect in the real world. First, mixed dyads may have an overall higher rate of dispute *initiation* that fully offsets the benefits of aggregation within a crisis. Second, factors not present in our experiment could lead the different types in mixed dyads to have systematically biased views about how to bargain with another type, and this could cause aggregation to actually produce worse bargaining outcomes in mixed dyads.

#### Additional Tests

A second aspect of the wisdom-of-the-crowds hypothesis posits that crowds of individuals can even outperform expert individuals in predictive tasks (Tetlock 2005). Above, we discussed the possibility that democracies, by aggregating predictions from a larger number of decision-makers, may outperform even relatively skilled experts in bargaining scenarios that mimic key aspects of war bargaining. To investigate this, we compared the performance of democratic dyads in our experiment to three types of individuals. The first type is *inexperienced individuals*. These are individuals from our baseline condition who, in a post-experiment survey, reported that they had never played a game similar to our ultimatum game scenario.<sup>19</sup> The second type of individuals that we compared to democratic dyads represented *experienced individuals*, who reported that they had played a similar game in the past (50 percent of the subjects in our baseline condition). The third type of individuals represented *international policy elites*. This sample included 102 international foreign policy elites recruited to play an ultimatum game in a previous study by LeVeck et al.

<sup>17</sup>The median offer from autocracies and democracies was both twenty and the mean was both seventeen. If we condition on bargaining success, democracies and autocracies earn roughly the same amount in our experiment. This replicates other findings in the literature, which suggest that democracies do not do appreciably worse in the bargains they successfully conclude short of war (Bueno de Mesquita et al. 1999).

<sup>18</sup>See Gleditsch and Hegre (1997) for a summary of the controversy over, and mixed results for, a monadic democratic peace.

<sup>19</sup>Specifically, inexperienced individuals did not answer “yes” to the following post-experiment question: have you ever played a similar game, where one player proposes how to split a monetary prize and another player decides whether to accept or reject the offer?

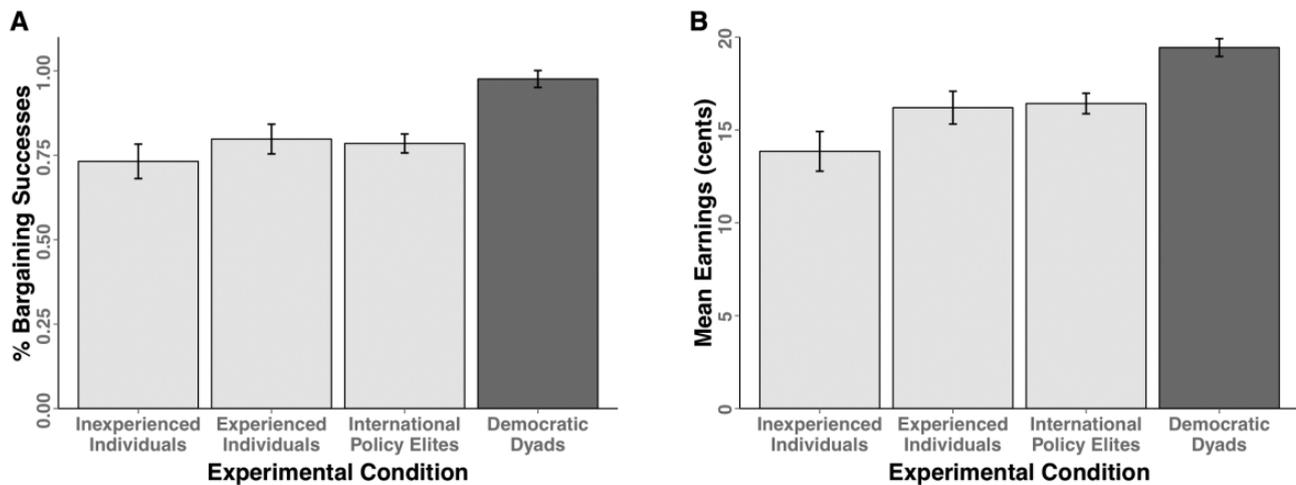


Figure 2. Group vs. expert performance

(2014). These elites had significant real-world experience in actual international bargaining.

Figure 2 compares the results of each type of individual against the performance of democratic dyads along the same two dimensions. Panel A shows the percentage of time bargaining succeeded, and Panel B shows the average earnings of proposers in each condition.<sup>20</sup> Beginning in Panel A, the results show that experienced individuals and international policy elites avoid bargaining failure more than inexperienced individuals. However, this difference failed to reach statistical significance at conventional levels. At the same time, the results in Panel B show that both groups of expert individuals earn significantly more than inexperienced individuals. Meanwhile, the results in both panels strongly confirm the wisdom-of-the-crowds hypothesis. Democratic dyads comprised of both experienced and inexperienced individuals dramatically outperform even experts on both measures. These results are consistent with the findings of Tetlock (2005).

Finally, we investigated a third aspect to determine which factors are actually driving the observed behavior in our experiment. We do this because our aggregation mechanism may actually aggregate two distinct factors: behavioral norms and knowledge about what the other side's minimum acceptable offer will be (Camerer 2003). Because our theory focuses on the second element, beliefs, we isolated that component to see if our main hypothesis holds. Supplementary Appendix Figures A2 and A3 shows an even stronger dyadic effect when we isolate the influence of beliefs—meaning larger groups perform particularly well at guessing the threshold when bargaining with larger groups.

### External Validity

A common concern with the use of laboratory experiments in political science has to do with the use of undergraduates as a convenience sample. The concern is that undergraduates are neither representative of elite decision-makers nor the general population from which they are drawn. As Renshon (2015) notes, such concerns are neither new nor unique to political science, as

<sup>20</sup>The elite sample from LeVeck et al. (2014) played for a larger monetary prize. We have therefore rescaled earnings to match the prize used in our study.

psychologists have long worried about the field's reliance on college students in drawing conclusions that may not be externally valid. Renshon reviews a series of productive responses to these concerns, including attempts to replicate findings across different populations, with mixed results. In some studies, professionals/experts behaved similarly to nonprofessionals/nonexperts (Glaser, Langer and Weber 2005), while in other cases the results substantially differed (Tyszka and Zielonka 2002; Mintz, Redd and Vedlitz 2006). For example, Hafner-Burton et al. (2014) and LeVeck et al. (2014) found interesting differences between elites and student subjects across a variety of strategic games, including the ultimatum game.

In many ways, we address this potential threat better than even the nascent experimental literature on crisis bargaining. In our experiment, we compare the behavior of individuals and groups in situations of ultimatum bargaining drawn from two different samples: subjects drawn from a more general population on Amazon Turk and a sample of political elites. We find important differences and surprising similarities across the different samples discussed above.

A second and related concern is that subjects—both students and elites alike—would behave differently in real-life situations when compared to the lab. This could be because subjects are not fully motivated to engage in the experiment or because the experiment omitted factors in the real world that may cause them to behave differently (similar to omitted variable bias when making inferences in observational studies). The latter is a constant risk with the use of experiments across all fields. For example, in the biological sciences, scientists debate whether effects from “test tube” experiments conducted *in vitro* are likely to generalize to highly complex living organisms *in vivo*. When studying decision-making processes, it is possible that important factors like experience, high stakes, and emotions are relevant in the real world, even if not captured in the setup of the experiment.

In the case of our experiment, there are at least two simplifications that may induce different results in the laboratory when compared to the real world. First, a reasonable case can be made that the voting mechanism in the experiment does not capture the intricacies of foreign policy decision-making in a democracy or any other state. This is true. Our voting rule—which calculates a group's

proposal as the median proposal submitted in the group—purposely abstracts from factors like coalitional bargaining within states, democratic deliberation, and the influence of elite opinion leaders. We do not assert that all decision-makers are completely independent in any real-world decision, but rather that, to the extent individual inputs are at least somewhat independent, our treatment manipulation captures this independent component. A second simplification is that the bargaining scenario that our subjects in the experiment face is much simpler and lower stakes than the real-world bargaining scenarios faced by leaders.<sup>21</sup> This is also true. In closely matching our experiment to the assumptions of the bargaining model of war, we abstract from the multidimensional nature and high stakes of international crisis bargaining.

However, compelling evidence exists to suggest that larger groups may still outperform individuals even if the situation becomes more complex<sup>22</sup> or if the stakes are raised in the domain of foreign policy. On the one hand, average accuracy in the model of collective accuracy outlined is likely low among the general population with respect to designing a rocket. On the other hand, in the domain of foreign policy, Tetlock (2005) has shown that—assuming nonspecialists have some baseline knowledge of foreign affairs—“we reach the point of diminishing marginal predictive returns for knowledge disconcertingly quickly” (Tetlock 2005, 59) in predicting what will happen in a particular region. That is, average accuracy of foreign affairs is typically at a sufficient level among “attentive readers of the *New York Times* in ‘reading’ emerging situations” (Tetlock 2005, 233) to expect that even individual specialists are not significantly more reliable than groups of nonspecialists. We expect that when the wisdom of the crowds is harnessed in the real world that the larger, more diverse group of independently deciding individuals generally has some baseline accuracy. Moreover, laboratory evidence suggests that higher stakes have a fairly minimal effect on behavior in the ultimatum game (Camerer and Hogarth 1999).

A third concern may be that a “fair” or “acceptable” offer is much clearer in the ultimatum game—namely a fifty-fifty split—than in the real world, where a fair or acceptable division can be much more ambiguous and contingent on factors that nonexperts know little about (history, power, regime type, etc.). If true, the structure of the ultimatum game may bias against the importance of expertise, by providing a clearer focal point around which the offers of nonexpert proposers and responders can more easily converge when compared to the real world.

This concern is certainly possible, and it is an interesting area for future research. However, we note that even in our relatively simple and controlled experiment, experienced individuals actually do perform better than inexperienced individuals, suggesting that the ultimatum game is not so simple that expertise is rendered meaningless. Instead, our results confirm that individual expertise helps, but they show that aggregation helps even more. This finding mimics related research showing that larger and more

diverse groups of nonexperts can outperform experts, even on complex issues related to foreign policy (Tetlock 2005). Furthermore, while the norm of fifty-fifty divisions is well-known, there is good reason to suspect that it is not the only widely known norm relevant for crisis bargaining. For example, work by Tomz and Weeks (2013) shows that citizens in different democratic states—the United States and the United Kingdom—share many norms that are relevant to reducing the risk of conflict between democracies. It is possible that processes of aggregation could help distill which of these norms are most relevant to a particular crisis and further reduce the chance of bargaining failure and war between democratic states.

Therefore, despite the fact that each of these three concerns is reasonable, we believe the level of realism in our experiment is appropriate for the specific hypotheses we seek to test. In general, we agree with McDermott that—rather than emerging a property of any individual experiment—“external validity follows, as replications across time and populations seek to delineate the extent to which ... conclusions can generalize” (2011, 28). Future studies can, and should, identify theoretically relevant conditions along which our experiment differs from the real world and test—as part of a broader research program—whether the inclusion of these factors moderates the effects identified here.

## Conclusion

The evidence gathered from our experiments is, of course, preliminary. There remains much more work that can be done to develop and evaluate our core argument. Such work might include further studies that systematically manipulate how information is distributed across individuals, the identity of bargainers, as well as the precise mechanism by which information is aggregated. Other studies may look at observational data to see how aggregated signals (LeVeck and Narang 2016; Narang and LeVeck 2011), such as market movements or polls, actually influence democratic decision-making. Finally, democracies and autocracies vary systematically in the caliber of various aggregation mechanisms—such as the depth of markets or how informed their publics are. Measures of this variation might be linked to measures of war-bargaining outcomes.

However, we believe the findings presented here are significant. In bargaining scenarios that mimic key aspects of war bargaining, aggregated offers from larger groups systematically outperform the offers made by smaller groups and individuals. Furthermore, part of the information aggregated appears to involve individuals’ knowledge of what they themselves would do if placed in their opponents’ shoes. This may help them actually predict the responses of their opponents. Thus, the democratic peace may partially arise because democracies aggregate signals from diverse individuals, which increases the chances of some of those individuals matching the characteristics of decision-makers in the other state—and therefore anticipating the strategies and responses of those decision-makers.

These results notwithstanding, we think it important to emphasize an important limitation to our inferences. To be clear, we do not claim that democracies always make better decisions in every situation. Indeed, we see numerous cases in which democratic decision-makers committed grave errors in crisis bargaining. For instance, it is well documented that the United States made several errors in

<sup>21</sup>For example, in a multidimensional policy space, aggregating diverse preferences across multiple actors may result in a single foreign policy proposal that is ideologically incoherent—with more hawkish measures on some dimensions and more dovish measures on others.

<sup>22</sup>In fact, results from Hong and Page (2004) suggest the opposite. Groups of diverse individuals have a particular advantage in more complex decisions.

estimating the capabilities and resolve of Saddam Hussein in the run-up to the Iraq War in 2003 (Gordon and Trainor 2006; Lake 2010). Such examples suggest that—even if democracies can make collectively wiser decisions compared to nondemocracies on average—they are certainly not immune from making decision errors in particular cases. However, we note that, in many famous cases of miscalculation by democracies, the actual reason for the miscalculation appears to stem from restricted decision-making, where a narrow group of similar-minded leaders engaged in an echo chamber (Janis 1972) and effectively excluded the diverse views of numerous individuals (Packer 2005, 50–60; Daalder and Lindsay 2003, 46–47; Mann 2004, 351–53).

More broadly, our results may suggest policy implications beyond the domain of crisis bargaining, including situations of international cooperation on issues like health, development, or the global environment. Although there is generally broad support for greater economic development, global health, global peace, and a cleaner environment, uncertainty over the costs and benefits of cooperation can often lead citizens to hold diverse views on whether and how to cooperate. For example, Romano (2011) shows that most Americans assume that developmental aid accounts for 27 percent of the national budget when it is actually less than 1 percent (Narang 2013; Narang 2016; Narang and Stanton 2017). Similarly, individuals appear to hold diverse opinions about the risk of global health epidemics (Leach et al. 2010), the process of collective security (Dellmuth 2016), and global climate change (Keohane and Ostrom 1995; Ostrom 2009; Stevenson 2013; Stevenson and Dryzek 2014). However, as we show with bargaining, it may be possible that, in situations of international cooperation, the errors made by one decision-maker may cancel out the error made by another and produce a collectively wise policy decision across domains (Landemore 2012a, 2012b, 2013).

### Supplementary Information

Supplementary Information is available at <https://data.verse.harvard.edu/> and the *International Studies Quarterly* data archive.

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