A BEHAVIORAL APPROACH TO INTERNATIONAL LEGAL COOPERATION

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(ILAR)

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A Behavioral Approach to International Legal Cooperation

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Abstract: International relations theories on treaty design and participation have relied heavily on the structure of bargaining problems, the allocation of power in the international system, and interest group politics to explain states’ preferences for cooperation. Using experiments drawn from behavioral economics and cognitive psychology—along with a substantive survey focused on international trade treaties—we suggest that the personality traits of the individual people asked to play key roles in negotiating and ratifying international treaties also shape their preferences for how treaties are designed and put into practice. Players whose personality traits include patience were more likely to seek treaties with larger numbers of countries (and thus larger long-term benefits). And players with the skill to anticipate how others will respond over multiple iterations of strategic games also were likely to imagine that the complex strategic challenges of large N cooperation are manageable. We find that the presence of an enforcement mechanism increased the willingness of players to join treaties. However, personality traits were even more important. More strategic players also were more likely to favor joining the agreement and this effect is about twice the effect of adding enforcement. Our study, based on a sample of 509 university students, provides a baseline for future experimental and survey research on actual policy elites who design and implement treaties.
Why do states create and participate in international legal institutions? What explains how those institutions are designed? For decades, scholars have pointed to a persuasive set of answers to these questions: states aspire to create international institutions to solve problems that require cooperation. For some scholars the design of these institutions reflects the tasks of contracting—such as reducing transaction costs, increasing the flow and credibility of information, or creating mechanisms for the reliable enforcement of international obligations.\(^1\) For others, the design and operation of international institutions helps states seek legitimacy and acceptance by their peers.\(^2\) Some scholars suggest that the designs of institutions vary with the different types of problems that governments seek to manage through collective action;\(^3\) others point to domestic politics,\(^4\) culture\(^5\) or the structure\(^6\) of inter-state bargaining to explain why some areas of international relations are vastly more legalized than others.\(^7\) Some also have sought to explain why states join some institutions while eschewing others—pointing, often, to the costs of entry and accountability.\(^8\)

These stories, though informative and diverse, are missing a central role for the people who actually make decisions about international cooperation. For years the scholarship on international institutions—whether focused on transaction costs, domestic politics or forces such as structure and culture—has largely assumed that individual decision makers didn’t much matter because the larger interests and ethos of states and the international structures within which state governments attempted to cooperate largely determined preferences for cooperation.

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5. See Meyer et al. 1997; and Boli and Thomas 1999.
That scholarship assumed, often implicitly, that individual decision makers in the same situation tend to think alike about cooperation, and specifically, about the design and appeal of international legal institutions.

Here we suggest that personality also shapes how people approach the tasks that are central to international cooperation. Variation in the behavioral traits of individual decision makers and the contexts in which decisions are made shapes their preferences for the design and appeal of international legal institutions. Their preferences, in turn, may have consequences for cooperation. Indeed, people of similar backgrounds, political affiliations and training often espouse radically different strategies when faced with similar challenges in international cooperation. Carla Hills, the US Trade Representative under President George H.W. Bush, said that the failure of the Doha round was due, in part, to lack of awareness by the US public of what is at stake for the country. 9 Susan Schwab, working in the same job for a president of the same party (the elder Bush’s son, George W. Bush) suggested that Doha’s troubles lay chiefly with the challenge of negotiating with 152 countries (at the time) across so many issues. 10 For Hills, a strategy for crafting more effective trade agreements required a more active public relations effort at home; for Schwab, it required reducing the complexity in the structure and content of international bargaining. Two elites—each able to have substantial influence over what their government did in international relations—espoused radically different policy designs when faced with the same challenge. Perhaps their behavioral traits shaped their policy strategies.

This paper is about individual’s preferences, not the ultimate outcomes of international cooperation such as the level of international trade. Nonetheless, individual’s preferences and their determinants matter for at least two reasons. First, scholars long ago noted that the people

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9 Hills 2005.
10 USTR 2008.
sitting at the negotiation table and those that make decisions to join agreements have substantial autonomy on their own—they are not merely perfect agents for underlying interests and structures.\(^{11}\) They have personal styles, opinions, and predilections, as well as formal and informal permissions and job flexibility, which give them degrees of independence from their principals.\(^{12}\) Second, while it is likely that the path between individual preferences and international cooperation outcomes are strongly mediated by the institutions and interactions inherent in collective decision-making, it is also desirable to scrutinize the factors that shape individuals’ preferences apart from these processes. To understand how international and domestic institutions ultimately mute or magnify the impact of behavioral traits it is necessary to know what individuals with these traits would prefer in the first place.

This article is hardly the first to suggest that personalities are important. It is well understood that people’s attitudes, preferences, emotions, and even biology shape decisions that are typical of foreign policy.\(^{13}\) People are the originators and conduits for ideas, which figure prominently in some international relations scholarship.\(^{14}\) Indeed, for years scholars of foreign policy focused on individual elites, but they tended to treat each elite in an idiosyncratic manner—for example, President John F. Kennedy’s and Barak Obama’s inexperience was thought to make each of them initially unable to form opinions independent of military advisers.\(^{15}\) Other studies have explored how Kennedy’s medication for Addison’s disease may have also influenced his policy decision-making.\(^{16}\) The list of studies focused on idiosyncratic,

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12 Hawkins et al. 2006.
13 See Tomz 2004 and 2008; Fowler and Schreiber 2008; Putnam and Shapiro 2009; and Hafner-Burton, Hughes, and Victor 2011.
14 For example see Goldstein and Keohane 1993.
individual decision-making is long and includes the whole broad field of political biography.\textsuperscript{17} Certain personality traits may make elite decision makers prone to error, leading to misperceptions, accidental wars and other foreign policy outcomes.\textsuperscript{18} Yet, the suggestion that decision makers’ personal behavioral traits shape their policy preferences has not made much headway into the accepted cannon of research on international legal institutions, which remains largely focused on the interests of core state institutions as well as the interest groups, structures and political and cultural forces that shape them.

Our central claim is that certain behavioral traits of the people tasked with making international cooperation decisions help to explain their preferences when negotiating and joining international legal agreements such as treaties. We do not dismiss the importance of other factors—such as structure, interest groups, function or culture—which can all generate the demand for a legal institution and constrain and inform choices such as design. We simply draw attention to the roles that individual personalities, skills, and responsibilities also may play in shaping decision makers’ preferences for international cooperation. One implication of our claim is that different types of people in the same situation may prefer to approach professional policy tasks in materially different ways.

Our starting point is the burgeoning research in experimental psychology and behavioral economics, which shows that people have many distinct behavioral traits, some of which can drive their social and strategic performance.\textsuperscript{19} We focus on two personality traits—patience and strategic skill—that are particularly likely to be important in the bargaining situations that

\textsuperscript{17} See Halberstam 1972; and Isaacson and Thomas 1986.
\textsuperscript{18} See Jervis 1968 and 1976; and Johnson 2004.
\textsuperscript{19} For a review see Hafner-Burton, Hughes, and Victor, 2011. In particular, see Neale and Bazerman 1985; Knetsch 1989; Chen and Chaiken 1999, 73–96; Costa-Gomes and Zauner 2001; Camerer, Ho, and Chong 2003; Fehr and List 2004; and Fowler and Schreiber 2008.
pervade international cooperation.\textsuperscript{20} First, international relations theorists have long known that one of the key functions international legal institutions perform is to lengthen the shadow of the future\textsuperscript{21}—that is, to convince participants that the promises they make inside an institution will be ongoing for some period of time to come. Longer shadows are thought to facilitate more cooperation.\textsuperscript{22} Indeed, while international relationship theorists disagree about a lot, this cooperation-enhancing role of the shadow of the future is one theory that commands widespread acceptance. A behavioral trait that shapes a person’s shadow is \textit{patience}. Patient people have lower discount rates; they are more willing to wait for larger benefits that accrue in the distant future rather than seize smaller but more immediate gains. Patience, thus, may affect a decision maker’s willingness to support international cooperation through legal institutions, especially when participation within these institutions entails proximate costs but yields the possibility of large yet more remote benefits.\textsuperscript{23}

Second, the design and implementation of international legal institutions also reflects the strategic situation.\textsuperscript{24} How a state behaves depends on what it expects other countries to do and on the vulnerability that each state has to others defecting—in other words, cooperation depends on the game type.\textsuperscript{25} Just as strategic situations vary, people also vary in what we will call \textit{strategic skills}—the ability to anticipate how their counterparts will respond in a bargaining situation and

\textsuperscript{20} We are mindful that scholars in American politics have looked at a somewhat different battery of personality traits—the “big 5,” which decompose personality into five main traits: openness, conscientiousness, extraversion, agreeableness, and neuroticism. For a review see Gerber et al. 2010. See also Mondak and Halperin 2008; Vecchione and Caprara 2009; and Mondak et al. 2010. The two traits we examine map partially on to the “big 5,” but for international relations scholarship, where the tasks of decision makers are a bit different, the traits we study are a reasonable place to begin exploring whether and how personality actually matters.\textsuperscript{21} See Koremenos, Lipson, and Snidal 2001; and Koremenos 2001.\textsuperscript{22} Axelrod 1984.\textsuperscript{23} See Koremenos, Lipson, and Snidal 2001; and Fowler and Kam 2006.\textsuperscript{24} Stein 1982.\textsuperscript{25} For a recent review of political science research on international legal institutions, including empirical work drawn from game theory, see Hafner-Burton, Victor, and Lupu 2012.
adjust their own response accordingly. Some people are like good chess players, able to anticipate many moves in advance. Others behave as if they are islands—unaware of or uninterested in what other people know or how they are likely to behave strategically. When confronted with the same problem of international cooperation, decision makers with varied strategic skills may very well respond differently—they may favor different types of agreements and perform differently when tasked with varied strategic challenges.

We explore how these two behavioral traits might affect preferences for different types of policy choices with a series of experiments and surveys on a convenience sample of 509 people. In doing so, we thus join a promising literature that uses survey experiments to probe how people make decisions related to international relations. Using standard “games” drawn from behavioral economics, we measure these traits for each individual. We also pose more real-world scenarios in which subjects face tasks that are typical of major decisions that arise during the formation of international economic institutions. Those decisions correspond to two different phases of international cooperation—namely, the negotiation of a treaty to liberalize trade and the decision whether to join a treaty through ratification. Through experimental treatment we explore how people with different measured behavioral traits respond to standard challenges at each phase, such as whether broad participation in and enforcement of the treaty is attractive from their vantage point.

As with nearly all experimental research that explores behavioral traits, our study sample consists of college undergraduate and master’s students. While there have been some studies comparing the personal attributes of non-elite populations such as college undergraduates with

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26 See Tomz 2004 and 2008; Putnam and Shapiro 2009; Hainmuller and Hiscox 2010; Gartner 2011; Grieco et al. 2011; McDermott 2011; Mintz, Yang, and McDermott 2011; Tingley and Walter 2011a, 2011b, and 2011c; and Trager and Vavreck 2011.
highly trained and experienced elites, essentially none of them has looked at the two behavioral traits we examine here. Our work thus offers a benchmark for explaining how individual behavioral traits might influence preferences for treaty design and participation, and it also offers a frame for comparing how real policy elites might differ from non-elites. (The research presented here is part of a larger program that is utilizing those benchmarks for research on actual policy elites.)

This article suggests that decisions regarding treaties depend—in part and possibly a lot—on the personality types of the decision-makers, quite apart from the functional problems they are charged with solving. It also suggests that personality traits may have an effect on preferences that is of the same magnitude as some of the factors that have dominated international relations theory such as formal enforcement mechanisms—an institutional design feature that has been dominant in scholarly debates over the function and effect of international agreements.

//H1// Study Design

Our aim in this study is to link behavioral traits to choices about international legal cooperation in different situations. We thus asked our subjects to participate in a survey experiment in two parts. One part asked them to self-report how they would respond to different

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27 For an extensive review, see Hafner-Burton, Hughes, and Victor 2011. Notably, see List 2003 and List and Mason 2003 regarding loss aversion; Hedinger and Götte 2006 regarding Trust; Cooper et al. 1999 regarding frames of reasoning; and Ackerman and Schneider 1985 regarding systematic vs. automatic cognitive processing.
28 For an exception see Palacios-Huerta and Volij 2009. They compare undergraduates to chess grandmasters in a centipede game, whose equilibrium relies strongly on backwards induction. The ability to reason by backwards induction is strongly related to the type of strategic sophistication we measure in this paper with Beauty-Game contests. Also see Camerer (2003 pg. 217) for previously unpublished data on the beauty contest games played among different sets of individuals (from highly experienced traders to economic Ph.D. students to CEO’s.
scenarios and choices about an international trade agreement.\textsuperscript{29} The other part asked subjects to play a battery of behavioral economic games from which we have elicited information about personality traits. In addition, we also asked a standard set of demographic questions that collect information about, age, sex, and political party identifiers.

Both the survey questions and behavioral games in our study were administered as part of a larger omnibus study where subjects participated in a number of short surveys and experimental tasks contributed by different researchers. The order in which subjects participated in each task was randomized so as to avoid any potential order effects. While we only report the questions and games relevant to the current paper, a full list of the tasks subjects participated in is available upon request.

We conducted our study during the Fall of 2010 and Winter of 2011 at the Rady School of Business’s behavioral computer lab, located on the University of California San Diego’s campus. A total of 509 participants were recruited from undergraduate classes in the Political Science department, as well as two first-year masters courses at UCSD’s school of International Relations and Pacific Studies. Students were compensated for participating in the study by receiving extra-credit in the class from which they were recruited; all participants also had the chance to win monetary rewards from a lottery, whose value depended on how they and other respondents played the experimental games used in the study. Instructions for both the games and the survey were presented to subjects on computers in the lab using Qualtrics survey software. The entire enterprise was approved and overseen by UC San Diego’s Human Research Protections Program.

\textit{Measuring Preferred Choices about Institutional Design}

\textsuperscript{29} We randomized the order in which our subjects took each part of the survey.
Designing and joining an international treaty depends on a large number of choices. In our survey we focus on two that correspond with topics that have attracted special attention by international relations scholars: complexity and enforcement. International relations scholars have explored how different choices in the legal design of agreements depend on the complexity of cooperation.\(^{30}\) And a long-standing, central concern in international relations is whether and how international cooperation requires formal enforcement mechanisms such as dispute resolution procedures.\(^{31}\) These are not the only choices that influence international cooperation, but they are among the most important.

To measure how subjects managed tradeoffs involving complexity, we asked them to choose how many countries should be involved in the negotiation of a trade agreement. The survey included explicit instructions noting that while adding more countries to the negotiations would further their country’s aim of having the agreement cover the largest fraction of world trade, the extra voices would make bargaining more complicated and introduce additional risks that the content of the agreement would be diluted. Responses were in a category from 1 to 4, with each category increasing the number of countries invited to negotiate the treaty.\(^{32}\) We expected that subjects who found strategically complex and lengthier negotiations less burdensome would invite more countries in this scenario, and thus pick a higher category.

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\(^{30}\) Alter and Meunier 2009.

\(^{31}\) See Fearon 1998; Gilligan 2006; and Donno 2010.

\(^{32}\) The question on our survey related to this topic (question 1a) had four response categories (1-4) corresponding with the following options about how many countries to invite to a negotiation:

1. Start with a very small number of countries that account for 1/3rd of world trade and are likely to accept 100% of the treaty obligations, but only for that very small group
2. Start with a couple dozen countries that account for ½ of world trade and are likely to accept 75% of the treaty obligations that you are seeking, but only for those couple dozen countries
3. Start with about 100 countries that account for the majority of world trade and accept 50% of the treaty obligations that you are seeking, but only for those 100 countries
4. Start with all 160 countries that account for essentially all world trade are likely to accept perhaps 25% of the treaty obligations that you are seeking
To measure how the presence of enforcement affected subjects’ willingness to join a trade agreement, we randomly assigned subjects to one of two experimental conditions. In each condition the description of the trade agreement was the same except for one sentence that indicated whether the treaty included a formal enforcement mechanism.33

//H2// Measuring Personality Traits

To measure personality traits we rely on behavioral games rather than traditional survey based measures for two reasons. First, unlike traditional surveys that ask subjects to categorize their own traits—say, by rating their own level of patience—behavioral games are based on a mathematical model of economic behavior, giving researchers a common baseline against which to compare subjects’ behavior.34

Second, unlike traditional surveys, the games used in this survey force subjects to make decisions that are linked to tangible outcomes (real monetary stakes) and thus are probably a more accurate elicitation of underlying traits. This is especially important when studying factors like patience that are perceived to be socially desirable and thus prone to biased self-reporting.35

The average monetary stakes that subjects faced in our experiments were quite small because a lottery (for $100) paid only a small number of subjects. However, other studies have shown that

33 Subjects in the enforcement condition were told:
   “An independent enforcement mechanism promptly and credibly punishes any country that does not comply by taking away some of the benefits of the treaty from the country that breaks the rules.”
   Subjects in the non-enforcement condition were told:
   “The treaty does not provide any formal mechanism to punish countries that fail to comply.”

34 See Camerer 2003. Deviations from the baseline predictions can often be characterized by a relatively clear and simple parameter. For example, the “beauty contest” game used in this paper makes a stark equilibrium prediction that players will all play a single strategy. However, it is also very clear that this prediction will only hold if subjects are fully strategic in a very particular manner (recursively eliminating dominated strategies without bound). Deviations from the equilibrium prediction can be simply and clearly parameterized in terms of how many steps of iterated strategic reasoning subjects actually perform, giving researchers a clear measure of how subjects vary along an important dimension of strategic reasoning.

similarly small incentives are adequate for eliciting accurate responses,\textsuperscript{36} even when decisions were elicited with a single prize.\textsuperscript{37} Furthermore, a number of studies have reliably found a link between behavior in lottery-incentivized games and real world political behavior.\textsuperscript{38}

//H3// Patience

One behavioral trait that we expect to influence a person’s preferences for cooperation is their level of \textit{patience}. International cooperation frequently involves sacrificing pay-offs that are immediate for benefits that are delayed. Patience should affect a person’s preferences related to international cooperation in at least two ways in our study.

First, when tasked with negotiating a treaty, patience should affect how a decision maker decides to pursue treaty negotiations. Different bargaining strategies can substantially influence the length of negotiations and their prospects for success. For instance, including more countries in negotiations could potentially bring greater benefits in the long run because agreements would engage a larger share of the world economy but risk that negotiations might drag on, delaying the benefits of cooperation.\textsuperscript{39} Thus, our first hypothesis is that patient people in our study will be more willing to pursue complex negotiations, involving more countries, even though doing so may delay the completion of negotiations.

Second, when tasked with the decision whether to join an international treaty, patience should affect whether a decision maker views the legal commitment favorably. We thus also anticipate that the type of person who is generally willing to wait for higher payoffs – a patient person – will be more willing to engage in international cooperation, and join the treaty, than the impatient type who seeks more immediate gratification.

\textsuperscript{36} See Camerer and Hogarth 1999; and Palfrey and Wang 2009.
\textsuperscript{37} Coller and Williams 1999.
\textsuperscript{38} See Fowler 2006; Fowler and Kam 2006 and 2007; and Dawes, Loewen, and Fowler 2011.
\textsuperscript{39} Martin 1995.
Our arguments about patience, applied here for the first time (to our knowledge) to international legal cooperation, have a strong counterpart in formal models of international bargaining. Powell (1999) noted that many bargaining models are sensitive to assumptions about how much states value future payments. More patient states are more willing to bargain for longer periods of time in order to secure peace rather than immediately secure a less valuable outside option. Levontoglu and Tarar (2008) formalized this argument, showing that whether or not a negotiated settlement is attainable in many models of bargaining under incomplete information depends on the patience of bargainers. These insights could also inform decision makers’ preferences for cooperation where the rewards are more favorable trade agreements instead of the peaceful division of a prize.

To measure how much subjects value the future – that is, their level of patience – we adapted a “choice game” introduced by Coller and Williams (1999). Here we refer to this game as a time-discounting task in order to more intuitively evoke the game’s purpose. Past studies have linked behavior in this task to real world behavior, such as savings rates. The game has also been used in political science to explain why some individuals are willing to vote when the benefits from voting almost always occur in the distant future.

In our study (and in others using this task), our subjects were asked to make 20 different choices between a prize that would be paid to them within 30 days after taking the study and a larger prize that would be paid within 60 days. Following Fowler and Kam (2006), in each choice, the 30-day prize was $100, while the 60-day prize varied from $100.17 to $123.07.

40 Powell 1999.
41 Leventoglu and Tarar 2008.
42 Coller and Williams 1999.
43 Harrison, Lau, and Williams 2002.
44 Fowler and Kam 2006.
45 Ibid.
Subjects were told that at the end of each academic quarter we would randomly draw one winner, and then randomly select one of the 20 choices and pay the winner according to their choice. (Full instructions can be found in the SI). This promise was credible, as all sessions of our study were held within 30 days of the quarter ending, and the subjects in our study knew this.

For each subject, the point at which they switched from taking the 30-day prize to the 60-day prize is a measure of the subject’s discount rate. If subjects made no mistakes, and discounted future payments at a constant rate, then this implied an equality $p > df$ over the time period in question, where $p$ is the value of a prize in the present time period, $f$ is the value of the prize in the future time period and $d$ is the factor by which a subject discounts future payments. In practice it has proved difficult to interpret discount rates measured this way.\textsuperscript{46} Thus we adopt a simpler approach of measuring a subject’s patience as the total number of 60-day choices they made rather than calculating a falsely precise discount factor.\textsuperscript{47}

Figure 1 shows the distribution of time discounting choices made by subjects in our study, which is similar to choices found in many other studies.\textsuperscript{48} The modes at the extremes indicate that many subjects either always choose one option or always chose the other. Heuristics also generated some modes—for instance, the large spike at 5 corresponds to subjects switching when the 60-day choice moves above $110$—a result similar to that in other studies.\textsuperscript{49}

\textsuperscript{46} Many studies have found evidence for hyperbolic discounting, meaning that subjects value the near future much more than the distant future (Laibson 1997; Frederick, Loewenstein, and O’Donoghue 2002). This means that their discount factor $d$ may vary with time. Furthermore, a small percentage of subjects act irregularly -- they do not simply switch at one point in the sequence of choices from 30-day to 60-day choices but instead have multiple switch points (Coller and Williams 1999; Harrison, Lau, and Williams 2002). This could be because they have nonstandard time preferences, or because they simply made an error when marking 20 separate choices.

\textsuperscript{47} A similar approach was used by Holt and Laury (2005) to get around the problem of multiple switch points.

\textsuperscript{48} Coller and Williams1999; Fowler and Kam 2006

\textsuperscript{49} Notably see Harrison et al. 2002 as well as Fowler and Kam 2006.
Economic theory distinguishes between choices that are game-theoretic (that is, “strategic”) versus those that are simply decision theoretic. Strategic decisions are characterized by multiple decision makers, each faced with choices whose consequences depend also on the choices made by others. By contrast, decision-theoretic problems may depend on variables that are uncertain but they do not depend on the choices of other decision makers. Obviously, this distinction refers to ideal types, as many decisions combine game-theoretic and decision-theoretic elements. Here we focus on game theoretic choices because they usually require actors to form a clear and accurate picture of other people’s incentives and choices and because many aspects of international cooperation have game theoretic attributes.

Research in behavioral game theory suggests that there is wide variation in how people respond to strategic problems. Some people are unwilling or unable to calculate many moves.

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ahead in a game situation. Others do the opposite—calculating the likely choices by other
decision makers and reasoning, move by move, to the fully iterated equilibrium of the game.
Previous research in experimental games has found that especially when people initially respond
to novel games they do not reason fully to equilibrium.\textsuperscript{51} In such novel situations, individuals
have not had time to form clear expectations for how others will play the game; instead, they
make decisions on their own best move using simple non-equilibrium models of other players.\textsuperscript{52}
In such settings most players do not fully model every response and counter-response until they
find an equilibrium strategy. Usually they stop after one or two iterations.

This heterogeneity in strategic reasoning could have substantial implications for
international cooperation. Many elements thought to be important to the design and operation of
international law—such as reciprocity—rely on high levels of iterated, strategic thinking. The
decision to ratify and thus be bound by an agreement may depend heavily on whether other states
will also join and comply; and whether others will ratify may, in turn, depend on signals they
discern from one’s own decisions. Nonstrategic decision-makers, who treat the decisions of
others as independent, may be less likely to risk joining an agreement because they do not fully
consider the benefits from cooperation due to reciprocity. By contrast, those who realize that
their own decision to join an agreement will amplify the incentives for other countries to do the
same will be more favorable towards joining. Thus, our third hypothesis is that we expect people
whose behavioral traits include higher levels of strategic reasoning will be more favorable
towards joining a treaty.

More strategic actors also may be willing to engage in more complex negotiations
because they are better able to fathom the benefits of agreements that involve large numbers of

\textsuperscript{51} Crawford, Costa-Gomes, and Iriberri 2010.
\textsuperscript{52} Stahl and Wilson 1995.
countries and issues. Thus, we also expect subjects whose personality traits include deeper levels of strategic reasoning will be inclined toward more complex treaty negotiations—willing to negotiate with more countries whose interests must be represented and whose actions must be predicted.

The game most frequently used to study a subject’s depth of reasoning in games is the beauty contest, originally implemented by Nagel (1995). In this game, \( N \) players are asked to pick a whole number between 0 and 100 (0 and 100 included). The winner of the game is the player who picks a number closest to the population average multiplied by a number \( M \). If \( M \) is less than 1, the unique equilibrium strategy is for all players to guess 0; when \( M \) exceeds 1, the unique equilibrium is for all players to guess 100. For example, imagine a version of the game where the multiplier is 2/3. A player starts with a conjecture that other players choose numbers such that the average is 50. The player should then select 33 as his own choice since this is the closest number to 2/3’s the group average. Other rational players know this; they, too, choose 33. But if everyone chooses 33, then the original player’s best pick is 22 (2/3 of 33). At infinite iteration the best choice is zero. To characterizing the number of rounds of strategic reasoning used by subjects we rely on Stahl and Wilson’s “Level-K” model. In this model Level-0 players are non strategic; they play a random strategy. Level-1 players are subjects who best respond to average Level-0 play by picking 50*\( M \)—a choice that reflects one round of iteration. Level-2 players best respond to Level-1 players by picking 50*\( M^2 \)—two rounds of iteration—and so forth. While it is possible for players to iterate to an infinite number of levels, most strategies are found to correspond to 1 or 2 steps of iterated reasoning at most.\(^{53}\) Level-K measurements are not just an assessment of the player’s own skill at iteration but also their expectation of what

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\(^{53}\) See Nagel 1995; Bosch-Domenech et al. 2002; Camerer 2003; and Costa-Gomes and Crawford 2006.
others will do when facing the same choices. If Henry Kissinger faced a level K decision and he thought all other players were mere randomizers then his best choices would be Level-1.

In order to identify the level of reasoning typically employed by a subject in our study, we followed Coricelli and Nagel (2009) by having each subject play multiple beauty-contest games, each with a different multiplier. Unlike single games, this approach creates a fingerprint that better identifies a player’s typical depth of reasoning in the game. That is, players with different depths of reasoning create a qualitatively different pattern of choices across the 6 games. Figure 2 shows the patterns of choices that Levels 0, 1 and 2 would make across each of the 6 games. The x-axis is the multiplier used in a game. The y-axis corresponds to the implied choice for each strategic Level of player. As one can see, Level-0 players should consistently play a random strategy across all games, on average choosing 50. Level 1 players best respond to this by multiplying 50 by the game’s multiplier, creating a linear strategy profile across games. Level-2 and higher players will exhibit a more s-shaped curve.

Subjects were told that we would pick one game at the end of the academic quarter, and pay the winner of that game $100.

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54 Coricelli and Nagel 2009. The multipliers we used were 1/4, 2/3, ½, 3/2, 3/4, 7/4. The unique equilibrium strategy for all multipliers less than or equal to ½ is 0. For all multipliers greater than ½, the equilibrium strategy is 100.
Following Corricelli and Nagel, for every choice in every game we calculated which Level had the lowest squared error. We labeled a player as Level 2 if that player had 4 or more of their 6 choices that were closest to the choice played by an archetypical Level 2 player such as in figure 2. Like Corricelli and Nagel, we do not calculate Levels higher than 2. Thus Level 2 players in our data actually represent “Level 2 or higher”. We labeled a player as a Level 1 if 4 or more of their choices were closest to a Level 1 or greater. We labeled remaining players as a Level-0.

Figure 3 shows the frequency of subjects estimated to be in each category. Most subjects in our study are either categorized as Level-0 players or Level-1 players who engage in one step of iterated reasoning. A small fraction is categorized as being Level 2 or higher. The relative size
of each group is consistent with what Bosch-Domenech et al. (2002) found for experiments in class-rooms and laboratory settings.

Figure 3. Distribution of Level-K Reasoning

While a number of studies have used the Beauty contest game to study strategic reasoning, we believe we are the first to try and connect results in this game to behavior in a separate decision making domain, such as the design and joining of international agreements.

//H1// Results

We have suggested that patience and strategic thinking are likely to correspond to preferences for more complexity during the negotiation of an international treaty as well as support for joining a treaty. In the following section, we test these claims, which are summarized in Table 1.
Table 1. Hypotheses

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<tr>
<td></td>
<td>Complexity in Bargaining</td>
</tr>
<tr>
<td>Patience</td>
<td>More patient decision makers are more willing to endure complex negotiations in order to reap higher gains.</td>
</tr>
<tr>
<td>Strategic Skills (Level-K)</td>
<td>More strategic decision-makers are more confident about their ability to successfully navigate complex negotiations, and thus are more willing to engage in them.</td>
</tr>
</tbody>
</table>

//H2// Negotiation Complexity

In this section we look at how subjects’ patience and strategic thinking are related to their preference for negotiating with more countries.

Table 2 Personality Traits and Tolerance for Complexity in Negotiations

<table>
<thead>
<tr>
<th>Dep. Variable: No. of Countries in Negotiation (4 categories)</th>
<th>Patience</th>
<th>Level-K</th>
<th>Both measures + Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coef</td>
<td>SE</td>
<td>p</td>
</tr>
<tr>
<td>Patience</td>
<td>0.016</td>
<td>0.004</td>
<td>0.00</td>
</tr>
<tr>
<td>Level 1 Reasoner</td>
<td>0.072</td>
<td>0.048</td>
<td>0.13</td>
</tr>
<tr>
<td>Level 2 Reasoner</td>
<td>0.281</td>
<td>0.099</td>
<td>0.00</td>
</tr>
<tr>
<td>Female</td>
<td>0.127</td>
<td>0.048</td>
<td>0.00</td>
</tr>
<tr>
<td>Income</td>
<td>0.006</td>
<td>0.012</td>
<td>0.50</td>
</tr>
<tr>
<td>Year in School</td>
<td>-0.019</td>
<td>0.019</td>
<td>0.33</td>
</tr>
<tr>
<td>Graduate Student</td>
<td>-0.088</td>
<td>0.091</td>
<td>0.33</td>
</tr>
<tr>
<td>Intercept</td>
<td>1.974</td>
<td>0.034</td>
<td>0.00</td>
</tr>
<tr>
<td>N</td>
<td>509</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Standard errors reported are White’s robust standard errors.
†This regression has few observations due to some subjects not reporting their family’s income.
In Table 2 we report three linear models, each regressing subjects’ responses (1-4) onto our measures of decision-making traits. The first set of results regresses subjects’ choices on their measured level of patience. The second set regresses subjects’ choices on their measured level of strategic thinking, with Level-0 thinkers as the omitted category. The third set reports a regression that includes both measures, plus a number of standard demographic controls including the subject’s years of post-secondary education (ranging from 1-7), gender (coded 1 for female), family income in the year before they entered college (coded on a scale from 1-9, with each number representing an interval of income), and a dummy variable indicating subjects who were in graduate school. The third regression includes fewer subjects because some subjects did not report their family’s income.

As expected, both patience and strategic thinking are positively and significantly related to the number of countries a subject decides to invite to the negotiations. Subjects who made more 60-day choices in our time discounting task invited more countries to the negotiations. The most patient subjects chose an average category number that was 0.32 categories higher than the least patient subjects.

---

55 For all regressions reported, we also ran ordered probit models, which relax the assumption that each of the four categories are equally spaced. These models yield substantively similar results and are available from the authors upon request.
56 This is the number of 60-day choices subjects made in our time discounting task. See the Measurement section for further details.
57 The scale is coded as follows, with further details in Section C of the SI:

$0-$24,000 (1)
$25,000-$40,000 (2)
$21,000-$54,000 (3)
$55,000 - $69,000 (4)
$70,000 - $84,000 (5)
$85,000 - $99,000 (6)
$100,000 - $149,000 (7)
$150,000 - $199,000 (8)
$200,000 or more (9)
Level-2 thinkers, who are particularly strategic, were also more likely to invite more countries compared to both Level-0 thinkers (who act randomly in the beauty-contest game) and Level-1 thinkers (who also act unstrategically, essentially treating other players as essentially a random variable). Level 2 thinkers, by contrast, chose an average category number that was .28 categories higher than Level-0 subjects, and .21 categories higher than Level-1 subjects.

//H2// The Decision to Join a Treaty

In this section we report how subjects’ willingness to join a negotiated trade agreement depended on an enforcement mechanism as well as subjects’ patience and strategic reasoning. The first model in Table 3 reports the effect of enforcement by itself. Subjects randomly assigned to the treatment in which the treaty included an enforcement mechanism were about 5% more likely to prefer to join the treaty.58

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58 Technically subjects picked 1 of 5 categories for how likely they were to sign the treaty. Each category was stated to represent a 20 point probability interval (0-20%, 21-30% etc). Our regression assumes that movement across the 5 categories is linear. So .244 represents 20*.244 ≈ 5%
The second model reports that patience had no appreciable effect on subject’s propensity to join. This result, contrary to our hypothesis, may reflect that joining decisions arise at a single moment in time for which the attributes of the treaty (its costs and benefits as well as its design, such as enforcement) play a much larger role in determining whether individuals favor membership. It may also be, that though the question specified that some benefits would only be
realized later in time, it did not specify it for all of the treaties benefits. Thus, while we would expect patience to play a role, the effect may have been diluted by other considerations.

The third model reports that more strategic subjects (those measured to be Level-2 reasoners) were, on average, 11% more likely to join the trade agreement. This is about 2-times the effect of adding enforcement to a trade agreement, and thus suggests that personality traits such as strategic thinking can exert a substantial influence on decision-makers’ preferences for cooperation relative to the presence of enforcement deemed important by much of the literature.

The fourth model in Table 3 shows that these findings are robust to the addition of demographic controls (discussed above). It also shows that personality traits do not reliably interact with the presence or absence of an enforcement mechanism. That is, the decision-making traits that we measure have an effect on the decision to join that is largely independent of whether the agreement includes a credible enforcement mechanism.

In addition to collecting quantitative evidence, we also asked subjects to comment on their decisions and reasoning processes. These comments tended to show that strategic reasoners approached the problem differently than others. Subjects who were classified as nonstrategic (measured as a Level-1 reasoner) typically focused on how their country individually benefited from the treaty’s provisions, or acted as though other country’s decisions were exogenous—a decision process revealed by these excerpts of the open-ended response fields in our survey:

“By lowering tariffs and other barriers against trade with other countries my country's economic output could increase. Although not everyone will benefit, there is a 50/50 chance of benefiting depending on the amount of countries joining the treaty, therefore I could go either way.”

“The long-term effects do not seem promising - the success of your country is based on others' decisions.”

Meanwhile, strategic (Level-2) reasoners were more likely to comment on how their own decision might influence the decisions of other countries:
“The long term gain outweighs the short term pain. The assumption is that I'm making a decision for the US government. Because we will benefit more by more people joining and the US is looked to as an example in many regards.”

“The more countries that join the better it is for all of them. So by joining, you encourage others to do the same, presumably.”

//H1// EXTERNAL VALIDITY

Because laboratory experiments in political science, psychology, and economics almost always use a convenience sample of university students, there is always a question of external validity. This is especially true when we want to make inferences about elite decision makers what are hard to engage in survey and experimental research.59 We are thus presented with the question whether we can generalize findings from college students to the individuals who lead nations or who negotiate treaties for a living.60

To our knowledge, there are no experimental studies of elite political decision makers that measure the personality traits of patience; moreover, the literature on elite strategic behavior is only suggestive.61 Thus, there is currently little evidence to adjudicate the question of whether or not elites and university students translate these behavioral traits into preferences for cooperation in the same way. Nonetheless, it is possible that there will be some differences, and here we explore two.

59 Hafner-Burton, Hughes, and Victor 2011.
60 For examples of studies that rely on undergraduate populations and seek to make inferences about the behavior of elites, see: Ensley, Marchi, and Munger 2007; and Tingley and Walter 2011a, 2011b, and 2011c.
61 To our knowledge, only three studies have looked at this—none directly focused on elite decision makers relevant for international relations. Camerer 2003, pg. 217, citing an unpublished 1998 Camerer manuscript looks at how undergraduates, trustees at a leading university and CEOs score on level-K studies. In a different study Plott 1996 noted that undergraduate students were better attuned to how other members of the same sample would play the game—a larger proportion of the undergraduate sample believed (correctly) the others would behave at random. See also a third study by Bosch-Domènech et al. 2002, pg. 1694.
First, elites may fundamentally differ from the masses in what we’ve been calling their behavioral traits. For instance, it is plausible that the institutions selecting individuals to become negotiators or political leaders select for a different distribution of traits than do colleges (even though college education is almost always a precursor to these jobs). For example, careers in international law and business typically have long trajectories, and patient people who highly value future success may be disproportionately represented in these careers. And, we might hope, elites that have become leaders charged with the responsibility of brokering and managing international cooperation should be more advanced strategic thinkers.62

However, while these types of differences in the distribution of these two populations may be important, those differences have not been explored in any detail. Research such as ours involving convenience samples may still be useful. If each decision-making trait measured by our games has stable tendencies in our survey scenarios, and these traits exist in both student and elite populations, we will have learned something important about the mapping from behavioral traits to policy preferences for decisions on topics germane to international relations. Indeed, there is research suggesting that there is a substantial overlap between college students and international elites in other elicited traits. For example, one study has surveyed the existing literature comparing college students to people in the general population across a number of laboratory games.63 That study finds that differences tend to be minor and quantitative, not qualitative. That is, the same player traits exist in each population, and are simply distributed

62 A few studies have looked at this selection process, though usually in comparison with other countries rather than comparisons between elites and masses. There is some suggestive evidence that political systems with high levels of accountability—democracies—tend to select leaders with more advanced training (and thus presumably higher levels of patience and possibly greater strategic skills). See Besley and Reynal-Querol 2011; but see also Galasso and Nannicini 2011; and Besley 2005.
63 Belot, Duch, and Miller 2010.
differently. The few studies that have looked at personality traits in depth find similar results. Cross-cultural studies have found cultures that play games in a qualitatively different fashion. However, these are the exception. Results from within a culture—such as western-educated U.S.-based university students—probably apply to the same culture (elite decision-makers drawn from the same population). Most cultures differ primarily in the central tendency of their distributions across most games.

Another way elites might be different from college students, even if they had the same trait-distribution as undergraduates, is due to learning. Put simply, experience shapes the way people make choices. Indeed, most of the research on elites has come to the conclusion that the largest differences between elite and non-elite decision making relate to experience. For example, a study of athletes finds that experienced professional soccer players come close to playing mixed strategy equilibria when making goal kicks, while inexperienced players have more heterogeneous strategies. This difference aligns with the expectation that differences between elites and masses reflects the former’s experience; professional soccer players constantly face pressure to randomize their strategies correctly since goal kicks play such a central role in the game. It is similarly plausible that the strategic pressures exerted on diplomats, leaders, and international executives lead them to adapt their decision making, and

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64 For example, Camerer, Ho, and Chong’s (2003) data on the beauty contest game played among different sets of individuals (from highly experienced traders to economic Ph.D. students to CEO’s) and finds some differences as well as stable patterns. For example, even though economic Ph.D. students play strategies that are closer to the equilibrium strategy than general student populations, they also play non-equilibrium strategies, and the pattern of non-equilibrium strategies played is similar to undergrads.

65 Henrich et al. 2010.

66 Much of this role for experience relates to how elites choose and update heuristics. (see for example Feltovich, Prietula, and Ericsson 2006). Indeed, physiological research shows that different areas of the brain are used for routine and new tasks and that experienced subjects can more readily rely on portions of the brain that are wired for routine decision-making and also more efficient (Oxley et al. 2008). One conclusion from this work is that all people are generally equipped with the hardware needed for politically sophisticated tasks that are typical of elite political decision making, such as awareness of coalitions and sorting people into groups (Schreiber 2005).

67 Chiappori, Levitt and Groseclose 2002.
choose differently than novices in relevant domains, including the scenarios presented by our
survey vignettes.

Learning poses a more fundamental challenge for our study because it may alter the
mapping from the traits in our study to scenario responses. Therefore the relationships we find
between behavioral traits and scenario responses in college students may not map perfectly onto
elite decision makers. However, it is important to recognize that the effects of learning on
decision-making are most significant where the decision domain is consistent and decision tasks
are often repeated. This is why expertise may have a profound impact on something like the
strategy for penalty kicks in soccer, for which choices are constrained and repeatedly practiced
under similar conditions. By contrast, treaty making is a comparatively rare event, and the actors,
options, and preferences present in one situation may be quite different from those in another.
(More than 15 years have passed since governments concluded the last large trade agreement.)
Unlike soccer players, who have converged to single equilibrium behavior in a very restricted
game scenario, it is unlikely that treaty-makers have done exactly the same for the scenarios we
use in our survey.68 Instead elite decision makers are likely to apply a mixture of learned
heuristics along with the decision-making predispositions rooted in the behavioral traits we study.
While learning and expertise probably do play a role in international treaty making, the raw
impact of personality traits is likely to remain relevant. With that in mind, our study offers a first
baseline for further work in this area.

68 Moreover, other studies find that experience is highly specific—experts in one domain do not
automatically make better choices in another. Thus even if decisions about trade agreements are made by
elites, many of the learning effects on decision heuristics may not be so pronounced. For example, see the
study comparing specificity of expert knowledge in two similar board games (Eisenstadt and Kareev
1975). See generally the discussion of specificity of elite skills in Hafner-Burton, Hughes, and Victor
2011.
IMPLICATIONS

Facing the same situation and placed in the same decision making role, people’s behavioral traits reliably correspond to differences in their views on international cooperation, including their willingness to take on complex bargaining and seek participation in treaties. If these characteristics hold in actual policy decision-making forums then one implication of our study is that personality traits of the people involved may affect treaty design and other decisions that lie at the center of international cooperation. In particular, the scope of international law may have a lot to do with the people involved – who negotiates a treaty, for example, could have an impact on which countries are included, and who votes on membership could affect participation. These effects are distinct from the situations decision makers face, their professional roles and the structure of the bargaining situation.

Already, studies in international relations reflect on what happens if states are more or less patient. Our study builds on this literature by suggesting that whether or not a state acts patiently might depend on the patience of the person or people making the key decisions about cooperation. On the other hand, no studies that we are aware of allow decision makers in international relations to be heterogeneous in their ability to reason strategically. We’ve shown that this ability does in fact vary among undergraduates and that these variations correlate to different preferences for cooperation.

If this holds then the core theories in international relations—which have focused on international structure and institutional attributes such as enforcement—are indeed missing a key part of the explanation for preferences for international cooperation, which may be especially

69 This interest in patience is anchored in the insight that the length of future shadows matters and that one key function of international institutions is to lengthen that shadow. See, for example, Axelrod and Keohane 1985; and Martin 1995.
valuable in identifying why cooperation processes are, in reality, often far from rationally optimal or functional to the strategic problem at hand.


About the Laboratory on International Law and Regulation  
(ILAR)

The Laboratory on International Law and Regulation (ILAR) is an international, interdisciplinary laboratory that explores when and why international laws actually work. Among scholars, this question has triggered a lively debate that ILAR is engaging with better theories and evidence. ILAR research examines a wide array of issues from environment and energy to human rights, trade and security issues. The ILAR team looks at these issues from the international perspective and also through comparisons across countries.

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