

# Conditional Cooperation and Climate Change\*

**Dustin Tingley**  
**Harvard University**

**Michael Tomz**  
**Stanford University**

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## **Abstract**

It is widely believed that international cooperation arises through strategies of reciprocity in which countries restrain their pursuit of self-interest if others do the same. In this paper, we investigate whether citizens in the U.S. and twenty-five other countries support strategies of reciprocity to deal with global warming. We find surprisingly little evidence of reciprocal strategies such as tit-for-tat. Most citizens believe that their own country's energy consumption should not depend on consumption in other countries. We conclude that climate cooperation is unlikely to arise from the mutual fear that shirking by some countries would lead to shirking by others. We do find, however, that citizens are willing to support economic sanctions against polluters and to shame them in international forums, especially when the polluter is violating a treaty. Cooperation could, therefore, emerge from efforts to link climate with other issues and to embed climate commitments in international law.

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## **1. INTRODUCTION**

How can countries cooperate in the absence of a central authority? The seminal work of Axelrod (1984) and Keohane (1984) argued that countries can sustain cooperation by employing strategies of reciprocity, and by establishing international institutions to monitor behavior and authorize punishment. We extend this line of research by investigating whether ordinary citizens support strategies of reciprocity. Will citizens favor cooperative policies only insofar as foreign countries do the same? Do citizens think about policy domains discretely, or do they link domains such that policies on one issue affect cooperation on others?

We answer these general questions with reference to climate change for three reasons. First, concerns about climate change are mounting, and many now regard it as the major challenge confronting the international community. Second, civil society plays an active role in climate policy debates at both the national and the global level. Finally, the consumption decisions of individuals can have a meaningful impact on overall emission levels. It is, therefore, important to study how the behavior of foreign countries affects the views of ordinary citizens.

We provide the first systematic analysis of public support for conditional cooperation on climate change. Data from twenty-six countries reveal remarkably little enthusiasm for reciprocal strategies. Most citizens believe their own country's climate policies should not depend on policies abroad. This fact undermines the credibility of reciprocal strategies such as tit for tat, in which each country restrains its emissions only so long as other countries restrain theirs. If mass preferences do not change in response to foreign behavior, countries may find that they can shirk without triggering shirking by other countries.

We do find, however, that citizens are willing to apply economic sanctions against polluters and to shame them in international forums, especially when the polluter is violating a

treaty. Cooperation could, therefore, emerge from efforts to link climate policy with other issues—for instance, trade—and to embed states’ commitments in international law.

## **2. CLIMATE CHANGE AND PUBLIC OPINION**

*The nature of the problem:* International cooperation on climate change has been difficult because climate change is “the ultimate global commons problem” (Stavins 2011a). To reduce greenhouse gas emissions, countries will need to make substantial sacrifices. Their residents will need to drive smaller cars, adjust their thermostats, take shorter showers, and carpool or rely on public transportation. Countries will also need to make large investments in alternative energy technologies such as solar panels, wind farms, and nuclear plants. Each of these actions entails high costs, yet the benefits of acting would be non-excludable. Countries that refuse to make sacrifices will nonetheless benefit from the efforts of others. Robert Stavins (2011b, pg. 49) estimates that, “For virtually any jurisdiction, the benefits it reaps from its climate-policy actions will be less than the costs it incurs.” Hence, each country will have strong incentives to free-ride on the sacrifices of others.

Given the temptation to free ride, how can cooperation be achieved without a centralized enforcement authority? Many analysts argue that countries can enforce cooperation by using conditional strategies that reward good behavior and penalizing bad. If the rewards and punishments are substantial enough, conditional strategies could incentivize all countries to contribute to the common good. Charles Lipson (1981) usefully distinguished between two types of conditional strategies: intrinsic strategies, in which actions and reactions occur within a single policy realm; and extrinsic strategies, in which behavior on one issue prompts responses on others. Both types could promote cooperation, but it is not obvious citizens would support them.

***Intrinsic strategies and the mass public:*** Many authors have argued that intrinsic strategies can sustain international cooperation (Axelrod 1984; Barrett 1990; Grundig 2006; Jørgensen et al. 2010; Keohane 1984). In the most familiar intrinsic strategy, tit-for-tat, each player imitates opponents by matching cooperation with equivalent cooperation and punishing defection with equivalent defection. Applying this idea to climate policy, countries could agree to implement costly climate control measures if and only if other countries do the same. As Hugh Ward (1993, pg. 229) explains, “Transboundary pollution politics is actually a repeated game in which national politicians have to make a sequence of decisions through time about policy in relation to the same problem. This suggests that solutions enhancing the environmental quality of all nations concerned may be attained through conditional cooperation in which each nation cooperates by reducing its emissions as long as the other nation has also done so in the past” (see also Barrett 1990; 2003, pg. 53; Jørgensen et al. 2010). Provided that players have sufficiently long time horizons, cooperation could be sustained by the fear that defection by some countries would trigger defection by others, leading to the destruction of the global commons.

Would citizens actually support conditional strategies such as tit-for-tat? If not, how might they respond to the climate policies of foreign countries? We argue that there are three potential responses—emulation, counterbalancing, and non-reaction.

The first possibility is *emulation*, i.e., controlling emissions if other countries control emissions, but abandoning restraint if other countries abandon restraint. Emulation could occur as a result of strategic thinking, such as a conscious effort to enforce cooperation by employing trigger strategies like tit-for-tat. Emulation could also stem from the ethical belief that it would be unfair for some countries to free-ride on the efforts of others, but morally acceptable to shirk

if other countries shirk. Either of these logics could cause public support for climate policies to rise and fall in response to the actions of other countries.

Second, citizens might choose to *counterbalance* other countries, rather than emulating them. After learning about major foreign efforts to stop global warming, citizens might conclude that their own country's contributions were no longer necessary, and that their country could pollute freely without jeopardizing the global commons. Conversely, after hearing that other countries were increasing greenhouse gas emissions, citizens might redouble their own country's efforts to limit emissions, in order to offset the destructive activities of foreign nations. By this logic, foreign pollution could mobilize citizens to support environmental policies, whereas foreign environmentalism could demobilize them. To the extent that citizens counterbalance rather than emulate foreign countries, the prospects for international cooperation on climate change will be poor.

Finally, citizens might *not react* to the policies of other countries. Some citizens might endorse national legislation even if foreigners do not contribute to the global cause. Other citizens might steadfastly refuse to act, even if other countries aggressively control their own carbon emissions. We use the terms "unconditional" and "noncontingent" to describe policy preferences that do not depend on the behavior of other countries.

To summarize, international relations scholars argue that cooperation could arise via intrinsic strategies such as tit-for-tat. By definition, such strategies require countries to emulate each other. If, however, domestic audiences have unconditional or counterbalancing policy preferences, the governments that serve those domestic constituencies may not be willing to engage in emulation. It is, therefore, important to investigate how citizens would respond intrinsically to the climate policies of other countries. We expect that most countries have mixed

populations,<sup>1</sup> in which some people want to emulate foreign behavior, others want to counterbalance foreign behavior, and still others have unconditional policy preferences. Below, we test for all three types and estimate the relative frequency of each.

***Extrinsic strategies and the mass public:*** Countries can sustain cooperation not only via intrinsic strategies, but also via extrinsic ones. Instead of treating issues discretely, countries can make cooperation in one sphere contingent on cooperation in another (Lohmann 1997). For instance, countries can apply trade sanctions against nations that emit high levels of carbon (Barrett 1997; 2003, chapter 12; Esty 2001; Stiglitz 2006). They can also invoke diplomatic sanctions, reduce foreign aid, or shame polluters in international bodies such as the United Nations. The crucial point is that reciprocity can operate across issue areas, as well as within them.

Linkage strategies will succeed only insofar as the linkages are credible. If citizens are unwilling to support extrinsic rewards for countries that restrain their own emissions, or to impose extrinsic punishments on countries that engage in rampant pollution, cooperation may not arise. Consequently, we investigate not only whether citizens react intrinsically—by adjusting their country’s environmental effort in proportion to the effort of others—but also extrinsically, by rewarding or punishing the environmental behavior of countries through action in other policy areas. We expect considerable support for extrinsic reciprocity, but predict that

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<sup>1</sup> “Some countries have sufficiently strong environmental constituencies that they will reduce greenhouse gas emissions regardless of FCCC requirements or the actions of other states. These “unilateral compliers” will be joined by some “contingent compliers”, who will comply once they are assured that enough others will comply....Despite compliance by some actors, many are likely to violate regime rules” (Mitchell 2001, pg. 231).

the public will prefer relatively cheap measures, such as diplomatic pressure, over more expensive measures, such as trade embargoes and military intervention.

Finally, we hypothesize that international institutions will shape public support for conditional strategies. International institutions (defined broadly to include not only formal organizations but also legal agreements and informal norms) can promote cooperation by establishing standards of behavior, monitoring the activities of countries, exposing countries that cheat, and suggesting appropriate punishments or inducements. But institutions can serve an additional function that has not received sufficient attention in the international relations literature. Treaties, we argue, can make conditional strategies more credible by strengthening public support for retaliation against nations that fail to cooperate. Other factors equal, we predict that the public will be more willing to apply intrinsic and extrinsic sanctions against a country when that country's pollution violates a treaty, than when its pollution does not.

### **3. EVIDENCE FROM CROSS-NATIONAL SURVEYS**

*The Prevalence of Unconditional Preferences:* As a first step toward testing our hypotheses, we analyzed a survey of citizens of the United States and of twelve European countries in 2009 (German Marshall Fund 2009).<sup>2</sup> The U.S. survey asked: "Some people say that the U.S. should do as much as it can to fight climate change, even if others do less. Others say that the U.S. should do only as much as other countries do. Which view is closer to your own?" Europeans

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<sup>2</sup> The survey was given to a random sample of around 1,000 adults in each country. It was administered face-to-face in Bulgaria, Poland, Slovakia, Romania, and Turkey, and by telephone elsewhere. The field dates were June–July 2009, and the average response rate was 18%.

received the same question, except the phrase “the U.S.” was replaced with the phrase “the European countries.”

In every country, the vast majority of citizens supported unconditional action to fight climate change; they wanted to do as much as possible, even if other countries were not making comparable efforts (top half of table 1). The percentage of respondents with unconditional preferences ranged from 61% in Turkey to 92% in Portugal, and was 79% across the entire sample. In contrast, the share of conditional cooperators—those who refused to contribute more than other countries—was only 21% on average and did not exceed 39% in any country. These data show that, among citizens in Europe and the U.S., climate change is seen as a serious problem that merits action even if other countries do not reciprocate.

[Table 1 about here]

To test whether the same pattern would hold in developing countries, we analyzed a second poll from the same year by the World Bank (World Bank 2009). The poll explained that “countries from around the world will be meeting in December in Copenhagen to develop a new agreement to take steps against climate change by limiting greenhouse gas emissions.” It then presented two scenarios. First, “If the other countries come to an agreement, do you think [your country] should or should not be willing to commit to limiting its greenhouse gas emissions as part of such an agreement?” Second, respondents were told to “imagine that at the meeting, the other countries do not come to a global agreement on taking steps against climate change. If this happens, do you think our country would have a responsibility to take steps against climate change, or would it not have a responsibility?”

These two questions, taken together, revealed whether and how the policy preferences of citizens depended on the behavior of foreigners. In every country, at least two thirds of



respondents favored unconditional action; they thought their country should take steps against climate change regardless of whether other parties at the Copenhagen conference were willing to do the same (bottom half of table 1). Support for unconditional action was 86% in the sample as a whole, and at least 90% in six of the sixteen countries in the survey. The survey also allowed us to measure support for unconditional *inaction*. This strategy was most popular in Russia and the U.S., where around 13% of people thought their countries should not restrain emissions, regardless of what other countries decided at Copenhagen. Unconditional inaction was less popular in other nations, and was supported by only 4% of respondents in the sample as a whole.

The World Bank study also allowed us to distinguish two types of conditional strategies: emulation and counteraction. On average, 8% of respondents favored emulation; they wanted their country to restrain emissions, but only if other countries took similar steps. Around 3% of respondents took the opposite approach: if other countries could not agree at Copenhagen, their country would have a responsibility to restrain its own emissions, but if other countries vowed to make sacrifices, they were willing to free ride.

The Marshall Fund and World Bank surveys are highly informative, but they are not immune to criticism. Participants in the World Bank study were asked if their country “would have a responsibility” to act, even if other countries did not. If respondents thought the interviewer was fishing for a positive answer and felt social pressure to comply, they might have expressed unconditional preferences, even though they actually harbored contingent ones. Fortunately, this concern does not apply to the Marshall Fund Survey, which presented the options in an evenhanded manner by acknowledging that “some people” have one view and “other people” have the opposite view. As table 1 shows, unconditional preferences were nearly

as common in the Marshall Fund study as in the World Bank study. Thus, our findings are not an artifact of the way the World Bank survey was phrased.

One might also wonder whether respondents appeared environmentalist because they presumed that action would be costless. To check this possibility, we split the World Bank sample into two groups: those who predicted that it would be “necessary to increase the cost of energy, to encourage individuals and businesses to conserve more or to use alternative forms of energy” (60%), and those who did not expect that action would require higher energy prices (40%). In every country, support for unconditional action was at least as high among people who anticipated higher energy prices as among people who did not. Future surveys could present respondents with details about the costs of environmental action, and measure how that information affects the prevalence of unconditional preferences.

***Cross-National Variation in Unconditional Activism:*** Table 1 showed that support for unconditional action is higher in some countries than in others. What explains this variation? Previous studies have found that individuals are more likely to support prevention and mitigation policies if they think global warming would be harmful (Brody et al. 2008; Cameron 2005; Inglehart 1995, pg. 57; Layton and Brown 2000; Lee and Cameron 2008; Viscusi and Zeckhauser 2006), if they think action would not involve significant costs, (O'Connor et al. 2002; Scruggs and Benegal 2012), or if they hold post-material values (Inglehart 1995). These same factors should govern aggregate preferences: other factors equal, support for unconditional action should be strongest in countries where vulnerability to climate change is high, the costs of action are low, and post-modern values are prevalent.

To test these hypotheses we constructed a cross-national dataset in which the dependent variable, *Unconditional Action* (taken from table 1), was the percentage of respondents in each

country who wanted their country to act regardless of other countries. Our dataset combined estimates from both the Marshall Fund and the World Bank surveys. Three countries appeared in both the Marshall Fund and the World Bank studies (France, Turkey, and the U.S.). In those cases, we averaged the values from the two surveys, although our results did not change when we adopted the value from one survey and discarded the other.

We constructed four explanatory variables. The first, *Extreme Weather*, was the annual average percent of population affected by extreme weather events, including droughts, floods, and extreme temperatures, in 2009. Exposure was highest in Bangladesh, China, India, and Kenya, where more than 4% of citizens typically experience extreme weather. The second variable, *CO<sub>2</sub> Per Capita*, represented average emissions per person in metric tons in 2009. We included this variable to measure the potential costs of taking action, although it is debatable whether the marginal costs of action would be higher in carbon-intensive economies than in other kinds of economies. The top four per-capita emitters in our sample were the U.S., Russia, the Netherlands, Germany; the bottom four were Kenya, Bangladesh, Senegal, and Vietnam. A related variable, *GDP Per Capita*, quantified domestic product per person in 2009, expressed in thousands of dollars and adjusted for purchasing power parity. The U.S. topped the list, whereas Bangladesh was at the bottom. We obtained all three variables from the *World Development Indicators* (World Bank 2011).

Our fourth variable, *Post-Materialism*, measured average support for post-material values. For each country, we obtained the most recent World Values Survey and noted how respondents ranked four national goals: maintaining order in the nation, fighting rising prices, free speech, and giving people more say. Respondents received a score of 0 if they assigned highest priority to the materialist goals of order and low prices, a score of 1 if they thought the

post-materialist objectives of free speech and popular voice were most urgent, and a score of 0.5 if they had mixed priorities. We then averaged across individuals to obtain a mean score for each country (Gelissen 2007). Measures of *Post-Materialism* were missing for Kenya, Portugal, and Senegal, which did not participate in the World Values Survey.<sup>3</sup> Among the remaining countries, post-materialism was highest in the U.K. and Italy, and lowest in Russia and Bulgaria.

Table 2 reports the estimates from several linear regressions. The first model is a bivariate regression of *Unconditional Action on Extreme Weather*. The estimated coefficient is positive, meaning that countries with greater exposure to extreme weather are more willing to engage in unconditional action. The second model adds our proxies for the costs of mitigation and the level of income. The estimated coefficient on *CO<sub>2</sub> per capita* is negative and significant, indicating that carbon-intensive economies are less willing to reduce emissions unconditionally. Controlling for *CO<sub>2</sub> per capita*, though, richer countries are more willing to act without demanding sacrifices by foreigners. Our final model, which explains two-thirds of the cross-national variation in our sample, includes *Post-materialism*, which has a positive and significant effect on preferences for unconditional action. *Extreme weather* and *CO<sub>2</sub> per capita* continue to be influential, but *GDP per capita* ceases to exert an independent, statistically significant effect. Overall, our analyses suggest that national preferences about climate policy reflect the differences in vulnerability, transition costs, and cultural values.

[Table 2 about here]

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<sup>3</sup> For other countries, the sample years were Bangladesh 2002, Bulgaria 2006, Brazil 2006, China 2007, Germany 2006, Egypt 2008, Spain 2007, France 2006, UK 2006, Indonesia 2006, India 2006, Iran 2005, Italy 2005, Japan 2005, Mexico 2005, Netherlands 2006, Poland 2005, Romania 2005, Russia 2006, Slovakia 1999, Turkey 2007, U.S. 2006, and Vietnam 2006.

To recap, data from two international surveys show that unconditional strategies are far more popular than conditional ones. Opinions vary across countries in predictable ways, but majorities everywhere stand ready to fight climate change, even if other countries do not. Given the widespread enthusiasm for action, it seems likely that many countries will take at least some steps to control emissions. However, it also seems clear that citizens in both developed and developing countries oppose the kinds of conditional strategies that have received so much attention in the international relations literature.

#### **4. DETAILED EVIDENCE FROM THE UNITED STATES**

We now deepen the analysis by examining four additional questions. Would our conclusions differ if the surveys named specific countries that were taking action, instead of asking generically about other countries in the world? How would citizens respond if foreigners substantially *increased* their emissions, instead of simply failing to decrease them? Would citizens support the idea of linking climate policy to other issues, thereby engaging in extrinsic reciprocity? And finally, would formal international commitments such as treaties make citizens more willing to support intrinsic and extrinsic strategies of reciprocity? We answer these questions by analyzing detailed data from the U.S.

***Reciprocity with Respect to Specific Countries:*** The Marshall Fund and World Bank surveys asked how citizens would respond to the climate policies of other countries, without naming the countries or indicating their level of development. The identities of foreign countries could make a difference, however. In 1997 the U.S. Senate passed the Byrd-Hagel Resolution, which said the U.S. should not sign any international agreements to control greenhouse gas emissions unless they mandated “new specific scheduled commitments to limit or reduce greenhouse gas

emissions for Developing Country Parties within the same compliance period.” And when President George W. Bush took office, he famously criticized the Kyoto Protocol not only because it would straightjacket the U.S. economy, but also because it did not demand enough from the developing world. It is, therefore, important to know how Americans would react to the climate policies of major developing-country emitters, such as China and India.

Since 2002, Anthony Leiserowitz and his colleagues (Leiserowitz et al. 2011; Leiserowitz 2003) have been asking Americans whether their country should reduce its greenhouse gas emissions “regardless of what other countries do, only if other industrialized countries (such as England, Germany, and Japan) reduce their emissions, only if other industrialized and developing countries (such as China, India and Brazil) reduce their missions,” or if instead the U.S. “should not reduce its emissions.” The vast majority of people who expressed opinions had unconditional preferences. Across all six surveys in table 3, around 80% wanted the U.S. to reduce emissions unilaterally, and an additional 6% felt the U.S. should not act at all. The remainder demanded sacrifices from other industrial countries (4%), or from both the industrial and the developing world (9%). Thus, unconditional preferences predominated, even when the questions mentioned specific countries at different stages of development.

[Table 3 about here]

***Responses to Various Levels of Foreign Contribution:*** In previous sections we compared public reactions to two situations: a scenario in which foreign countries acted, and a scenario in which they did not. For additional insight, we designed a survey with a wider range of scenarios and administered it to a sample of 708 U.S. adults, who we recruited through an online service called Amazon Mechanical Turk. Berinsky, Huber, and Lenz (forthcoming) show that experiments on

Mechanical Turk produce roughly the same effects as experiments on nationally representative samples.

Nevertheless, Mechanical Turk subscribers are substantially more liberal than the national population. We found the same pattern in our sample: 53% of our respondents were Democrats, whereas only 25% were Republicans and 22% did not identify with either major party. This skew in the political views of respondents could be consequential, since Democrats and Republicans are known to have different opinions towards climate change (Dunlap and McCright 2008; Krosnick et al. 2000; McCright and Dunlap 2011). For robustness, we present our findings not only for the sample as a whole, but also separately for each political party.<sup>4</sup>

Each participant read about five situations. The first one read: “If most of the other countries in the world increase their use of fossil fuels by a large amount, what should the United States do?” In a similar way, we asked what the U.S. should do if foreign countries increased their use by a small amount, kept their use at current levels, decreased their use by a small amount, and decreased their use by a large amount.<sup>5</sup> After each scenario, respondents chose from a list of five policy options. We assigned each answer a score of -100 if the respondent wanted the U.S. to increase its consumption of fossil fuels by a large amount, -50 if she wanted the U.S. to boost consumption by small amount, 0 if she wanted to keep U.S. consumption at current

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<sup>4</sup> Mechanical Turk respondents are also younger and more likely to be female than the population at large. We do not have a strong prior reason to expect a differential age and gender effects. Previous work on gender differences in public goods games is inconclusive (Brown-Kruse and Hummels 1993), though (Kurzban and Houser 2001) find that women are more likely to be conditional cooperators than men and men are more likely to be unilateral cooperators than women. One implication is that our sample underestimates the extent of unilateralism.

<sup>5</sup> The scenarios were presented in the following order: increase large, keep the same, decrease large, increase small, decrease small.

levels, 50 if she wanted the U.S. to decrease consumption by a small amount, and 100 if she wanted the U.S. decrease consumption by a large amount. This scale is easy to interpret: positive numbers represent improvements over the status quo, whereas negative numbers represent shirking relative to the status quo.

Figure 1 displays the average score (with a 95% confidence interval) for each scenario. The figure reveals two patterns for the population as a whole. First, Americans were willing to support reciprocal reductions in the use of fossil fuels. When most countries in the world were maintaining the status quo, the average environmental score was 53, suggesting that Americans wanted the U.S. to trim consumption by a small amount. When other countries undertook small reductions, U.S. environmentalism jumped to 64, and when foreigners scaled back their consumption by a large amount, the index climbed above 70. These changes in environmentalism are substantively large, and almost certainly did not arise by chance alone.

[Figure 1 about here]

Second, American reactions were asymmetric. Although Americans supported reciprocal cuts, they did not shirk in response to foreign shirking. The average environmental score was 54 when other countries increased consumption by a small amount and 55 when they increased consumption by a large amount. These two values were no different from baseline score we observed when other countries were keeping emissions at current levels.

This asymmetry is surprising. To limit emissions of greenhouse gases, the U.S. would need to accept significant lifestyle changes and make costly investments in alternative energy. We expected that Americans would accept the costs if other countries reciprocated. If, however, other countries abandoned restraint, we thought that Americans would emulate them, either because the “mutual restraint” equilibrium had collapsed, or because it would seem unfair to let



foreigners free ride on American efforts. These predictions were not borne out; American environmentalism did not waver even when other countries substantially increased emissions.

Our findings are also surprising, given recent studies about how citizens respond to energy consumption by their neighbors. In one study, Schultz et al. (2007) provided homeowners with data about the average energy use of other homes in the neighborhood. High-consuming households responded by conserving energy, but low-consuming households started using *more* energy, a phenomenon psychologists call the “boomerang” effect.<sup>6</sup> Fischer (2008) reviewed twelve additional experiments, and found that informing people about the actions of neighbors had no net effect on consumption. The reason, Fisher speculated, is that social information “stimulates high users to conserve” but encourages low users to “upgrade a little.” We found no boomerang response to the behavior of foreign countries. After hearing that most countries were increasing emissions, Americans did not retreat from their environmental stances.

There are several potential explanations, which could be topics for future research. Some Americans might think they are consuming at economically optimal levels, such that the financial costs of burning more fuel would outweigh the benefits. Others might feel that consuming more energy would be immoral because of the harmful effects on future generations. Still others might be economically and morally willing to increase consumption, yet conclude that other responses to foreign emissions (such as issue linkage, discussed below) would be more effective and generate less collateral damage than relaxing U.S. emissions standards.

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<sup>6</sup> Researchers have also studied ways to counteract the boomerang effect, e.g., by suggesting that low consumption is morally desirable, or by providing all households with energy conservation tips. See Schultz et al. (2007) and Alcott (2011).

Were our findings driven by the high percentage of Democrats in our sample, who are typically more environmental than Republicans? To find out, we split our sample into three political subgroups: Democrats, Independents, and Republicans. Surprisingly, all three political groups responded to foreign action in similar ways (bottom panels of Figure 1). When other countries cut emissions below current levels, Democrats, Independents, and Republicans all became significantly more environmental. Moreover, the effects were of similar magnitudes. Among Democrats, environmentalism was 16 points higher when other countries decreased consumption by a small amount than when other countries maintained consumption at current levels. The analogous estimates for Independents and Republicans were 17 points and 20 points, respectively. If anything, Independents and Republicans were slightly *more* responsive than Democrats. Consequently, if our sample had contained a more representative distribution of political groups, the reaction to foreign activity would have been stronger, not weaker.

Figure 1 also confirms that members of all three parties refused to match shirking with shirking. The average environmentalism score of Democrats hovered between 66 and 68, regardless of whether foreign countries kept emissions at current levels or increased them to a small or a large degree. Likewise, the average score among Republicans remained consistently between 31 and 32, no matter whether foreigners maintained the status quo or backslid substantially from it. Independents showed a fairly similar pattern, but responded *positively* to large levels of pollution by foreign countries. Their average environmental score was 6 points higher when other countries increased emissions by a large amount, than when other countries maintained the status quo. Overall, all three groups reacted to foreign behavior in similar ways, despite political cleavages in the U.S. about global warming.

*Few Americans, or Many?* Figure 1 showed evidence of conditional cooperation at the national level. Next, we monitored how each individual reacted to changes abroad, to infer whether the effects in Figure 1 were driven by the attitudes of a few Americans, or by the preferences of many. Having witnessed a change in foreign behavior, each person could increase, maintain, or decrease their support for environmental policies in the U.S. We calculated the percentage of people who exhibited each type of reaction and report them in table 4.

[Table 4 about here]

Table 4 reveals three key patterns. First, a sizable minority thought the U.S. should follow the lead of foreign countries. Approximately 22% responded positively when other countries decreased their emissions by a small amount instead of maintaining the status quo. Only 3% responded negatively, and the remainder were unfazed. Positive responses were seven times more prevalent than negative ones, and the net effect, measured as the frequency of positive responders (emulators) minus negative responders (counterbalancers), was 19 points.

When foreign countries climbed the next rung of the environmental ladder, by making large cuts instead of small ones, Americans again responded positively. 18% of the sample became more environmental, whereas only 5% moved in the opposite direction, for a net effect of 13 points. Here, emulators outnumbered counterbalancers by more than 3 to 1. Thus, when foreign countries abandoned the status quo in favor of more environmental practices, some Americans wanted the U.S. to follow. We obtained similar results for each partisan affiliation.

Table 4 also reveals a second key pattern: when foreign countries retreated from the status quo, they did not depress environmentalism in the U.S. Given a scenario in which foreign countries were increasing consumption by a small amount, 7% of Americans responded negatively, but 9% responded positively. Likewise, when most countries switched from

increasing consumption by a small amount to increasing consumption by a large amount, positive responders in the U.S. almost exactly counterbalanced the negative ones. In both scenarios, the net effect was slightly positive but statistically indistinguishable from zero. Again, effects were similar when we split the sample along partisan lines.

Third, most Americans had unconditional preferences. In the sample as a whole and for each political subgroup, between 70 and 86% of Americans did not adjust their policy preferences to the actions of other countries. This pattern is consistent with our earlier findings, which were based on representative samples of citizens in the U.S. and in other countries.

Overall, these findings suggest that foreign environmentalism can galvanize domestic environmentalism by mobilizing the minority of citizens who have conditional preferences. If foreign countries acted more aggressively to reduce their use of fossil fuels, and/or U.S. citizens became more aware of environmental initiatives by foreign countries, American opinion would shift in a pro-environmental direction. To achieve this effect, though, Americans would need to believe that foreigners were making real reductions, not simply slowing an upward trend. Moreover, the effect on American opinion would be limited, given that most Americans favor action or inaction, regardless of what other countries do.

Our data also show that that American environmentalism will not wane in response to rising foreign emissions. This finding carries positive and negative implications. The good news is that Americans do not want U.S. consumption to soar in tandem with other countries. This fact reduces the likelihood of a pollution cycle, in which emissions by foreign countries cause the U.S. to relax its own emissions controls. The bad news is that, if Americans are not willing to play tit for tat, other countries will have less of an incentive to protect the environment.

***The Consistency of American Responses:*** To deepen the analysis, we next examined the consistency of each individual's responses to foreign activity. We coded people as *always unconditional* if their policy preferences never varied with the behavior of other countries. We classified them as *consistent emulators* if their environmentalism increased monotonically with the environmentalism of foreign countries. One example is the pattern (0, 0, 0, 50, 100), implying that if other countries increased or maintained consumption, the U.S. should not respond, but if other countries decreased their consumption, the U.S. should match them. We coded people as *consistent counterbalancers* if their environmentalism decreased monotonically with the environmentalism of other countries, as in the pattern (100, 50, 50, 0, 0). All other patterns fell into a category called *other*.

[Table 5 about here]

Table 5 shows the percentage of people who exhibited each pattern. More than half had reliably unconditional preferences. Approximately 23% were consistent emulators, whereas 5% were consistent counterbalancers. We were particularly intrigued by counterbalancers and asked them to explain their preferences in a few sentences. Most cited the need to compensate for bad behavior by other countries, and/or the opportunity to free ride without destroying the environment. As one respondent explained:

If other countries increase their use of fuels by a large amount, the U.S.A. should decrease by a large amount to offset the increase in other countries. But if other countries decrease by a large amount ... it would take the burden off citizens of the U.S.A. to decrease by a lot.

A few people provided a different rationale, which invoked the laws of supply and demand.

According to one sophisticated respondent:

In the situation wherein most countries increase their use of fossil fuels, the equilibrium price of fossil fuels in general would go up. Therefore the U.S. should

use less, being as what the U.S. should use is dependent upon the laws of supply and demand. Conversely, if most countries decrease their use of fossil fuels, the equilibrium price of fossil fuels would go down. Therefore the U.S. should use more, in accordance with those same laws.

Finally, around 17% of sample had non-monotonic preferences. Some may have arisen from respondent error; others were probably intentional. For example, more than half of the non-monotonic patterns were U-shaped, such as (100, 50, 50, 50, 100). Perhaps people with U-shaped preferences had mixed motives: they wanted to reciprocate when other countries improved upon the status quo, but sought to compensate when other nations fell short. Future analysis could reveal why a small but significant share of respondents expressed non-monotonic preferences.

When we subdivided the sample by political party (rightmost columns of table 5), the patterns were similar. Two additional findings deserve mention. First, contrary to the conventional stereotype, Republicans were not more likely to go it alone. Emulation was most common among Republicans, and unconditional preferences were as prevalent among Democrats and Independents as among Republicans. Second, although all three groups had similar rates of unilateralism, Democrats were generally more environmental. About five-sixths of the Democrats with unconditional preferences wanted to decrease consumption by a large amount. Republicans exhibited a wider range of unconditional positions, with a plurality wanting to keep U.S. consumption at present levels.

***Public Support for Issue Linkage:*** If Americans will not shirk in response to foreign shirking, will they use other strategies to encourage other countries to behave environmentally? It has long been argued that, in an anarchical world, countries can enforce cooperation by linking issues, that is, by threatening to retaliate in one area of world affairs if foreigners behave selfishly in other. Would U.S. citizens support economic sanctions or military action against polluters?

To explore this possibility, we presented the following scenario to half of our Mechanical Turk subjects: “Five years ago, a country said that it would reduce its use of fossil fuels and work with the U.S. and other nations on the problem of global warming. In the past five years, the country has increased its use of fossil fuels by a large amount and it is refusing all efforts to reduce the use of fossil fuels. The country is now encouraging businesses to drill for more fossil fuels. Experts think that the country’s use of fossil fuels will double over the next twenty years. The country has high levels of trade with the US.”<sup>7</sup> The other half of our respondents received the same scenario, but we replaced the phrase “the country said that it would reduce its use of fossil fuels” with the phrase “the country signed a treaty, in which it promised under international law that it would reduce its use of fossil fuels.”

After presenting the scenario, we listed several ways the U.S. could respond and asked respondents to “check all actions that you think the U.S. should take in this situation.” The options were: not take any action in this situation; increase U.S. use of fossil fuels; criticize the other country publicly; cut off trade with the country; take military action against the country; or take some other action. If participants selected some other action, we invited them to describe it.

Table 6 shows how Americans responded. When the country had not signed a treaty, only 3% thought the U.S. should respond by using more fossil fuels, and 7% volunteered that the U.S. should start using less, not only to compensate for the other country’s emissions but also to set an example. This pattern once again casts doubt on the political viability of intrinsic reciprocity.

[Table 6 about here]

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<sup>7</sup> We also informed half of the respondents that the country was a democracy, and told the other half that the country was an autocracy. That random variation is not the focus of our analysis.

Although Americans were not willing to match shirking with shirking, many favored alternative methods of enforcement. Roughly half thought the U.S. should criticize the country publicly, and 37% advocated trade sanctions. These options were at least ten times more popular than the intrinsic sanction of increasing U.S. emissions. As expected, very few respondents—only 2%—favored the costliest action, military action. Finally, some respondents called for non-punitive measures. They argued that hostile measures were disproportionate to the crime and could backfire by hurting the U.S. As an alternative, 22% proposed private diplomatic talks, and 8% recommended economic and technical aid to help the country consume less fossil fuels. Only 19% said that the U.S. should do nothing at all.

In sum, the vast majority of people wanted to offer carrots such as foreign aid, use sticks such as public humiliation and trade sanctions, or engage in quiet diplomacy. They regarded these methods as more appropriate and effective than in-kind retaliation. The fact that 81% were willing to act has significant implications for international cooperation. Americans may not support intrinsic strategies, but most are willing to use extrinsic ones.

Finally, table 6 confirms our hypothesis shows that treaties boost public support for several types of punishments. For instance, 51% of respondents wanted to sever trade with a polluter who was violating a treaty, but only 37% endorsed that response when an otherwise equivalent country had not signed a treaty. Likewise, 59% of respondents wanted to criticize the polluter publicly when it had previously signed a treaty, whereas only 48% favored the strategy of public criticism when the country had made a purely verbal commitment. Thus, the treaty caused a 14-point surge in public support for trade sanctions, and an 11-point jump in public support for naming and shaming. Interestingly, the treaty did not affect support for intrinsic responses, military intervention, foreign aid, or quiet diplomacy.



## 5. CONCLUSION

In this paper we investigated support for conditional cooperation on the issue of climate change. Using surveys from 26 countries, we found that most people have unconditional policy preferences: they insist that the climate policies of their own country should not depend on the behavior of foreigners. A smaller percentage of citizens are emulators, who think their country should emulate others. Their penchant for emulation is asymmetric, however: they will make new sacrifices if foreign countries do, but will not shirk if other countries abandon restraint. Finally, a small percentage of citizens have counterbalancing preferences. They will compensate for rising pollution by foreign countries, but slack if others start protecting the global commons.

Public support for intrinsic trigger strategies is, therefore, extremely low, a finding with important implications for international cooperation. Many theorists have argued that countries can sustain cooperation by employing conditional strategies such as tit for tat. On the topic of climate change, each country could offer to protect the commons if others reciprocate, but threaten to resume pollution if other countries shirk. Respondents did not endorse such strategies, however. We conclude that climate cooperation is unlikely to arise from the kinds of trigger strategies that have received so much attention in the international relations literature.

Our findings reinforce with the work of Elinor Ostrom and colleagues, who reached a similar conclusion after studying the management of common pool resources (CPR's) within countries. In a creative series of experiments about CPRs, Ostrom et al. (1992, pg. 414) tested how effectively participants would protect CPRs in different institutional settings. They concluded, "For those who predict cooperation in repeated settings based on trigger strategies, our findings are not supportive. In no experiment where one or more subjects deviated from an agreed-upon joint strategy did the subjects then follow a trigger strategy of substantially

increasing their investments in the CPR. In fact, in some experiments where one or more subjects deviated from an agreed-upon joint strategy, some subjects subsequently reduced their investments in the CPR. When subjects discussed the problem of how to respond to one or more free-riders, they overtly rejected the idea of dumping all of their tokens into the CPR.”<sup>8</sup> Subjects in our surveys were similarly unwilling to use trigger strategies; they responded to news of international shirking not by shirking themselves, but by calling on their country to maintain or increase its own efforts to combat global warming.

Citizens in our surveys were, however, willing to apply extrinsic sanctions—to punish polluters by retaliating in other spheres of international affairs (Keohane and Victor 2011, pg. 9). They stood ready to slap economic sanctions on polluters and shame them in international forums. Moreover, citizens were especially willing to take these measures when the polluter was violating a treaty. Cooperation could, therefore, emerge from efforts to link climate policy with other issues and to embed climate commitments in international law. Indeed, Barrett (2007) has called for a climate treaty system in which countries pledge to reduce emissions and subject themselves to periodic reviews. “Such a pledge and review system would not carry binding consequences for non-compliance, but instead rely on moral suasion and naming and shaming in the international arena.”

In addition to identifying enforcement strategies that stand the best chance of garnering public support, our research suggests the potential value of public relations campaigns. Although most citizens have unconditional preferences, substantial minorities in every country would exert more effort if they thought that other countries were making substantial contributions. David

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<sup>8</sup> See also Ostrom et al. (1994, pg. 276) and Sell and Wilson (1991, pg. 119).

Victor (2011) points out that most people are unaware of the major steps China and India are taking to control greenhouse gas emissions. If news of Chinese and Indian efforts spread, it could galvanize environmental action in the U.S. and other developed countries. By the same logic, bold action in the U.S. and other rich countries could spur action in the developing world.<sup>9</sup>

Future research could compare climate change to other policy areas, such as arms control and international trade. On which issues are individuals most likely to support intrinsic strategies of reciprocity, or to prefer intrinsic sanctions over extrinsic ones? Do people have overarching views about unilateralism or reciprocity and apply them in many realms, or do they develop different strategies for different issues? Research could also examine public support for treaties and other institutions. Under what conditions will citizens support treaties in the first place? What kind of institutional features will they demand, and what sacrifices would they make to put treaties and other institutions in place? These themes should be central to future studies about international cooperation.

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<sup>9</sup> For example, unilateral domestic policy changes could lead to increasing environmental standards in other countries through “investing up” dynamics (Perkins and Neumayer 2012).

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**Table 1: Domestic Responses to Foreign Environmentalism****(A) Responses in Europe and the U.S.**

Country	Unconditional	Conditional	<i>N</i>
Bulgaria	73	27	920
France	82	18	987
Germany	87	13	989
Italy	86	14	990
Netherlands	74	26	987
Poland	74	26	912
Portugal	92	8	981
Romania	77	23	949
Slovakia	75	25	964
Spain	84	16	992
Turkey	61	39	790
U.K.	83	17	985
U.S.	76	24	888
Average	79	21	

**(B) Responses in Developed and Developing Countries**

Country	Unconditional		Conditional		<i>N</i>
	Action	Inaction	Emulate	Counterbalance	
Bangladesh	96	0	4	0	984
Brazil	82	8	7	2	819
China	96	0	2	2	960
Egypt	84	3	9	4	693
France	88	2	10	1	586
India	83	3	8	6	1,036
Indonesia	91	2	5	3	633
Iran	81	3	13	3	728
Japan	77	5	12	6	1,000
Kenya	88	2	6	3	956
Mexico	94	1	2	3	781
Russia	67	13	19	2	528
Senegal	90	2	7	2	923
Turkey	87	3	5	5	552
U.S.	73	13	12	3	1,079
Vietnam	97	1	2	1	765
Average	86	4	8	3	

*Note:* Panel A gives the percentage of respondents in each country who offered an unconditional response (do as much as we can, even if other countries do less), versus a conditional response (do only as much as other countries do). Authors' calculations from German Marshall Fund (2009). Panel B gives the percentage who favored unconditional action (act, even if other countries do not), unconditional inaction (abstain, even if others act); conditional mobilization (act only if other countries do), or conditional demobilization (act only if other countries do not). Authors' calculations from World Bank (2010).

**Table 2: Analysis of Cross-national Variation in Unconditional Willingness to Fight Climate Change**

	(1)	(2)	(3)
Extreme Weather	1.67 (0.44)	1.43 (0.70)	1.86 (0.65)
CO2 Per capita		-1.86 (0.41)	-1.02 (0.38)
GDP Per capita		0.34 (0.13)	-0.08 (0.20)
Post-materialism			0.49 (0.16)
Constant	81.27 (1.74)	86.09 (3.03)	69.84 (4.64)
R2	0.20	0.50	0.67
Observations	26	26	23

*Note:* Linear regression coefficients with robust standard errors



**Table 3: U.S. Responses to Industrial and Developing countries**

	Nov 2002	Nov 2008	Jan 2010	June 2010	May 2011	Nov 2011	Average
Unconditional preferences							
Reduce emissions regardless of others	82	84	77	80	78	80	80
Don't reduce emissions, regardless of others	2	5	9	6	8	7	6
Conditional preferences							
Only if other industrial countries do	8	3	4	4	4	4	4
Only if industrial and developing countries do	9	9	9	10	10	9	9

*Note:* Table gives percentages among respondents who offered opinions. Based on authors' calculations from survey reports (Leiserowitz 2003; Leiserowitz et al. 2011). Initial sample sizes were 673 in Nov 2002; 2,164 in Nov 2008; 1,001 in Jan 2010; 1,024 in June 2010; 1,010 in May 2011; and 1,000 in Nov 2011.

**Table 4: U.S. Responses to Changes in Foreign Energy Consumption****All Respondents**

Change in foreign consumption	Effect on U.S. Conservation			
	Positive	None	Negative	Net positive
Keep the same → small decrease	22	75	3	19 (16 to 23)
Small decrease → large decrease	18	77	5	13 (10 to 16)
Keep the same → small increase	9	83	7	2 (-1 to 5)
Small increase → large increase	10	83	8	2 (-1 to 5)

**Democrats**

Change in foreign consumption	Effect on U.S. Conservation			
	Positive	None	Negative	Net positive
Keep the same → small decrease	19	78	3	16 (11 to 20)
Small decrease → large decrease	19	77	4	15 (10 to 20)
Keep the same → small increase	10	82	8	2 (-2 to 6)
Small increase → large increase	9	82	9	1 (-3 to 5)

**Independents**

Change in foreign consumption	Effect on U.S. Conservation			
	Positive	None	Negative	Net positive
Keep the same → small decrease	25	73	1	24 (17 to 31)
Small decrease → large decrease	14	79	7	7 (0 to 14)
Keep the same → small increase	8	86	6	3 (-3 to 8)
Small increase → large increase	13	81	6	8 (1 to 14)

**Republicans**

Change in foreign consumption	Effect on U.S. Conservation			
	Positive	None	Negative	Net positive
Keep the same → small decrease	26	70	3	23 (15 to 30)
Small decrease → large decrease	19	76	5	15 (8 to 22)
Keep the same → small increase	9	84	7	1 (-5 to 7)
Small increase → large increase	7	86	7	-1 (-6 to 5)

*Note:* Table shows the percentage of respondents who responded positively, neutrally, or negatively to changes in foreign energy consumption. 95% confidence intervals appear in parentheses. Sample sizes were 708 for the All Respondents, 374 for Democrats, 158 for Independents, and 176 for Republicans.

**Table 5: Consistency of U.S. Responses to Changes in Foreign Energy Consumption**

Pattern	All	Democrats	Independents	Republicans
Always unconditional	55	56	55	53
Large increase	0	0	0	0
Small increase	0	0	1	1
Keep the same	11	3	17	24
Small decrease	8	6	10	10
Large decrease	35	47	27	19
Consistent emulator	23	21	21	28
Consistent counterbalancer	5	6	5	4
Other	17	17	19	14

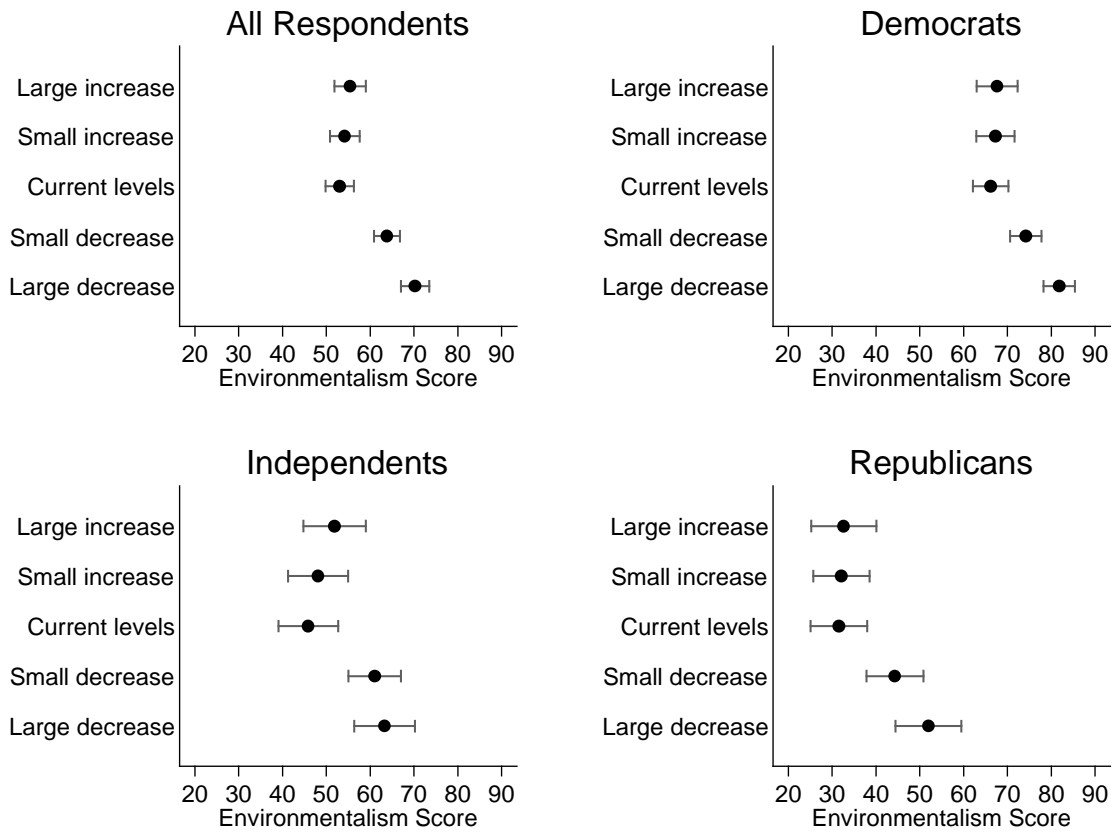
*Note:* Table gives the percentage of respondents who exhibited each pattern consistently. Sample sizes were 708 for the All, 374 for Democrats, 158 for independents, and 176 for Republicans.

**Table 6: Preferred Methods of Responding to a Country that Increases Consumption**

<b>U.S. should</b>	<b>Other country signed treaty</b>		<b>Difference</b>
	<b>Yes</b>	<b>No</b>	
Selected options:			
Criticize the country publicly	59	48	11 (4 to 19)
Cut off trade with the country	51	37	14 (7 to 21)
Take military action against the country	3	2	1 (-2 to 3)
Increase its own use of fossil fuels	2	3	0 (-3 to 2)
Not take any action in this situation	11	19	-7 (-12 to -2)
Volunteered options:			
Decrease its own use of fossil fuels	6	7	-1 (-5 to 3)
Help the country decrease its use	7	8	-1 (-5 to 3)
Engage in private diplomatic talks	19	22	-3 (-9 to 3)
Refer the problem to the U.N.	2	3	-1 (-3 to 1)

Note: Table gives the percentage of respondents who chose or volunteered each option. Analysis is based on 375 cases in which the country signed a treaty, and 333 cases in which the country did not sign a treaty. The last column, labeled difference, gives the effect of the treaty; 95% confidence intervals appear in parentheses.

**Figure 1: Effect of Changes in Foreign Energy Consumption on U.S. Environmentalism**



*Note:* The figure shows the average environmental score among U.S. respondents, conditional on whether other countries increased, maintained, or decreased their use of fossil fuels. The dots represent the means, and the horizontal lines are 95% confidence intervals. Each estimate is based on a sample of 708 respondents, consisting of 374 for Democrats, 158 independents, and 176 for Republicans.