

TRUST, CULTURE, AND COOPERATION: A Social Dilemma Analysis of Pro-Environmental Behaviors

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Social dilemmas require a choice between cooperation, or sacrificing for the greater good, and self-interest. One commonly studied social dilemma is environmental conservation. Previous work suggests that trust predicts cooperation in the form of environmental protection. We contend that this view ignores cultural factors. Building on prior cross-cultural research, we predict an interaction between strength of social ties and trust on cooperation. Findings from General Social Survey data indicate that low trust levels found in the U.S. South (a collectivist culture) renders trust ineffective at promoting environmental protection. However, trust predicts cooperation in nonsouthern regions (which are more individualist), where trust levels are higher.

INTRODUCTION

Social dilemmas are situations in which individual and collective interests conflict (Komorita and Parks 1995). Solutions to these dilemmas require *cooperation*, which entails that individuals forgo individual gain for the good of the group. Common real-world social dilemmas include protecting the environment, supporting public television/radio, and voting. These situations are problematic because pursuit of self-interest (i.e., littering, refusing to support public programming, and not voting) is often tempting, but if such behavior is widespread, the collective suffers and all are worse off than if each had cooperated. Given the ubiquity of social dilemmas, researchers from across the social sciences have devoted considerable effort to understanding how to generate cooperative behavior (Kollock 1998; see Kramer, Tenbrunsel, and Bazerman 2010 for an overview).

Two streams of research in the social dilemmas literature suggest that *generalized trust*, or a belief in others' benign intent, affects cooperation.¹ One stream focuses on the main effect of trust on cooperation, and indicates a direct and positive relationship (Yamagishi and Cook 1993; Orbell, Dawes, and Schwartz-Shea 1994; Parks and Hulbert 1995; Hayashi et al. 1999; Hwang and Burgers 1999; Buchan, Croson, and Dawes 2002; De Cremer and Stouten 2003). According to this perspective, trust motivates cooperation by reducing individuals' fear of exploitation from others, making cooperation less risky (Yamagishi and Sato 1986).

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The second stream of work suggests that the trust–cooperation relationship may be less direct. Here, researchers contend that trust varies across groups, with cultural factors such as the strength of group ties accounting for much of this variation (Yamagishi and Yamagishi 1994).² As we explain below, collectivist cultures are characterized by its members having strong in-group ties, which facilitate monitoring and sanctioning systems. These systems promote trust among in-group members, but distrust of outsiders (Yamagishi, Cook, and Watabe 1998). Individualist cultures, on the other hand, are characterized by its members having relatively weak in-group ties, and interactions are less frequently governed by strict monitoring and sanctioning systems. Those in individualist cultures are therefore more trusting of strangers (Yamagishi et al. 1998). This argument has garnered consistent empirical support (see Yamagishi 1988; Yamagishi et al. 1998; Kuwabara et al. 2007; Gheorghiu, Vignoles, and Smith 2009).

Most empirical studies on social dilemmas utilize experimental designs (Sønderskov 2011), but a growing body of work addresses solutions to real-world social dilemmas using representative surveys. The latter often centers on the social dilemma of environmental sustainability and finds that generalized trust generates cooperative behavior: High trusters are more likely than low trusters to buy green products (Gupta and Ogden 2009), recycle (Sønderskov 2011), use public transportation (Van Lange et al. 1998), and conserve water (Van Vugt and Samuelson 1999). These findings thus suggest a direct and positive relationship between trust and cooperation. Accordingly, these scholars may prescribe that we resolve real-world social dilemmas (like protecting the environment) by increasing trust (see Van Vugt 2009).

While these recent studies on environmental protection yield valuable and timely findings, they omit important considerations stemming from the second stream of trust research. Specifically, they ignore factors that influence the trust–cooperation relationship, such as the strength of ties that characterize various cultural groups. *The purpose of the present work is to address how cultural differences influence the relationship between trust and willingness to engage in pro-environmental behaviors.* Building on Yamagishi and associates' work (Yamagishi and Yamagishi 1994; Yamagishi et al. 1998), we suggest that trust may be an inefficient solution to the problem of environmental protection in certain cultures. More specifically, we contend that the trust–cooperation link may be relatively weak or nonexistent in collectivist cultures because of low levels of generalized trust. Conversely, we expect that trust will be a strong predictor of cooperative behaviors aimed at protecting the environment in individualist cultures, where trust is higher.

We test our arguments using data from the 2010 wave of the General Social Survey (GSS), focusing on questions about respondents' willingness to protect the environment. Following prior work (Vandello and Cohen 1999; Simpson 2006), we consider the southern United States to be a collectivist region, while the non-South is considered to be individualist. We predict an interaction between trust and region where high and low trusters cooperate at similar levels in the South. In the non-South, however, we expect that high trusters will be more willing to protect the environment than low trusters.

The current work produces two important contributions to the social dilemmas literature. First, we present an empirical investigation of the trust–cooperation link in a real-world social dilemma using representative data. Second, we emphasize cultural factors to better explain the relationship between trust and cooperative decisions about protecting the environment.

PROTECTING THE ENVIRONMENT AS A SOCIAL DILEMMA

Previous theorists pointed to several types of social dilemmas, each of which has the following two properties: a “rational” strategy for each person (i.e., the one yielding the highest individual payoff), which is a noncooperative choice; and if all individuals pursue this individually rational strategy then the collective suffers (Liebrand 1983; Kollock 1998). These situations are dilemmas because individuals “may completely understand the situation, may appreciate how each of their actions contributes to a disastrous outcome, and still be unable to do anything about it” (Kollock 1998:185).

Theorists often divide social dilemmas according to the properties of the resource at stake (see Komorita and Parks 1996). In this article, we limit the scope of our analysis to collective resources considered to be *public goods*. According to Hardin (1982:17), a collective resource qualifies as a public good if it meets two criteria: nonrivalness and nonexcludability. A collective resource is *nonrival* if all actors benefit equally from the resource; it is *nonexcludable* if any single actor’s benefit from the resource does not prevent any other actor from doing so.

The natural environment satisfies both of Hardin’s criteria for a public good. All individuals benefit from a clean environment regardless of how much or how little they contributed. That is, the private benefits of engaging in pro-environmental behaviors are relatively minimal (Sønderskov 2011). A clean environment is nonexcludable because a single person’s enjoyment of a healthy environment does not prevent others from doing the same. Previous work has used a social dilemmas framework to study environmentally conscious efforts such as water management (Hodge and McNally 2000), policing deforestation (Agrawal and Goyal 2001), and use of carpool lanes (Van Vugt et al. 1996).

THEORY AND HYPOTHESES

Collectivism, Individualism, and Trust

Previous research suggests that there is considerable between-group variation in levels of generalized trust (e.g., Bjørnskov 2006; Hooghe et al. 2009). While common explanations for trust differences include sociodemographic factors such as race (Brehm and Rahn 1997; Alesina and La Ferrara 2002), age (Smith 1997; Uslander 2002), and education (Yamagishi 2001), there is growing support for a cultural explanation based on the collectivism/individualism distinction (e.g., Gheorghiu et al. 2009).

According to Triandis (1972), members of *collectivist* groups focus and act on group interests over individual interests. Personal relationships in collectivist cultures

are often *multiplex*, meaning they have “overlapping roles, actions, and affiliations within a relationship” (Kuwabara, Luo, and Sheldon 2010). An example of a multiplex social relationship is coworkers who are also friends outside of work. Additionally, people in collectivist groups commonly have strong, concentrated ties to a small clique of individuals and thus relatively few out-group ties. These ties are often familial (Georgas et al. 1997).

Members of *individualist* cultures often maintain *simplex* social relations (Simpson 2006), which are linked by a single type of relationship (i.e., coworker, friend, or fellow churchgoer). Simplex relationships are typically nonoverlapping. Additionally, people in individualist groups tend to have more nonkin social ties than those in collectivist cultures (Kashima et al. 1995). The number and complexity of social ties tax actors’ ability to maintain them, which results in weaker connections for those in individualist compared with collectivist groups.

Yamagishi and associates (Yamagishi 1988; Yamagishi and Yamagishi 1994; Yamagishi et al. 1998) argued that trust differences between collectivist and individualist cultures stems from the relative prevalence of monitoring and sanctioning opportunities. In collectivist cultures, the cliquish nature of social ties facilitates monitoring and sanctioning of in-group members (see also Miller and Kanazawa 2000). That is, if coworkers are friends who regularly play golf together, the sheer frequency of interaction provides them numerous opportunities to monitor and sanction one another. A consequence is that members of collectivist cultures may expect free riding to be detected and therefore presume that others will cooperate. When interacting with out-group members, those from collectivist groups may be unsure of others’ cooperation because no monitoring or sanctioning system governs these encounters. Interactions with strangers are therefore marked by uncertainty because of a lack of assurance that others’ free riding will be sanctioned. Consequently, collectivist groups promote relatively low trust in strangers.

Unlike collectivist social relations, the network structure of individualist cultures is less stifling of trust (Yamagishi and Yamagishi 1994; Yamagishi et al. 1998; Gheorghiu et al. 2009). The simplex and diffuse nature of actors’ social ties creates opportunities for interactions with strangers. Experimental evidence suggests that individuals who voluntarily interact with strangers often encounter others who are relatively trustworthy and cooperative (Orbell and Dawes 1993). Given that interactions with strangers are only weakly governed by monitoring and sanctioning, people attribute trustworthiness to benign intent as opposed to the presence of a sanctioning system (as is the case in collectivist cultures). People from individualist cultures thus exhibit greater levels of generalized trust than their counterparts in collectivist cultures.³

The above arguments have received consistent empirical support. Several experimental studies have found less trust among members of collectivist compared with individualist cultures (e.g., Yamagishi 1988; Yamagishi et al. 1998). Additionally, research using representative cross-cultural data yielded similar results (e.g., Yamagishi et al. 1998; Gheorghiu et al. 2009). Results from these studies corroborate the argument that cultural factors such as the strength of group ties affect generalized trust.

Following this prior work, we expect trust levels to be lower in collectivist compared with individualist cultures.

Importantly for our purposes, there is strong evidence that Yamagishi's arguments apply to interregional trust differences in the United States. Although the United States is often considered the "prototypical" individualist culture, there is evidence of regional variance along the individualism/collectivism continuum (Vandello and Cohen 1999). Scholars suggest that, compared with the non-South, southern states are characterized by collectivist social relations (Reed 1974, 1983; Cohen et al. 1999; Vandello and Cohen 1999). The South is a relatively "traditionalistic" culture where family ties are paramount, and high levels of poverty, strong regional identification, and fundamentalist religious beliefs further strengthen ties to family and close friends (Vandello and Cohen 1999). Unlike the South, the U.S. West and Great Plains regions are characterized by self-reliance and independence (Shortridge 1993), and because of its commercial and merchant interests, the Northeast is considered a relatively individualist culture marked by loose social relations (Fiske 1992; Vandello and Cohen 1999). Researchers also consider the Midwest to be more individualist than the South (Vandello and Cohen 1999). Consistent with these assertions, Vandello and Cohen (1999) found that collectivism indicators used in cross-cultural research (e.g., poverty, residential stability, and racial inequality) were more prevalent in the South compared with the non-South, suggesting that the South is more collectivist than nonsouthern regions of the United States.

Simpson (2006) combined the above mentioned work on regional differences in the United States with Yamagishi's arguments about the relationship between individualism/collectivism and trust. He predicted that, as a collectivist culture, those from the South would be less trusting than nonsoutherners (i.e., those living in regions with individualistic characteristics). Using representative data from the United States, he found that southerners reported lower generalized trust compared with their non-southern counterparts. Following others (Vandello and Cohen 1999; Simpson 2006), we also consider the South to be collectivist and the non-South to be individualist, and predict lower trust in the South versus the non-South.

Hypothesis 1: Southerners will report lower levels of generalized trust than nonsoutherners.

Trust and Cooperation

Previous research suggests that trust promotes cooperation (Yamagishi and Cook 1993; Orbell et al. 1994; Parks and Hulbert 1995; Hayashi et al. 1999; Hwang and Burgers 1999; Buchan et al. 2002; De Cremer and Stouten 2003). Common explanations for the trust-cooperation relationship are that trusting individuals expect most others to have benign intentions and are therefore likely to cooperate. Based on this expectation, high trusters reciprocate others' anticipated cooperation (Granovetter 1992; De Cremer and Stouten 2003). A second explanation is that a belief in others' benign intent reduces one's fear of exploitation (Yamagishi and Sato 1986). That is, if an individual expects

others to cooperate, she can be confident that a generous contribution is not a bad investment, in other words, that she will not be cheated.

Recent work indicates that trust promotes cooperation in the form of pro-environmental behaviors (Van Lange et al. 1998; Van Vugt 2001, 2009; Gupta and Ogden 2009). For example, Sønderskov (2011) showed that, compared with low trusters, high trusters were more likely to recycle paper, batteries, and electronics. In a study of commuting preferences, Van Lange et al. (1998) found that high trusters reported a stronger preference for public transportation compared with low trusters. Similarly, Gupta and Ogden (2009) showed that individuals buying green products were more likely to trust others compared with nongreen buyers. From these and similar previous findings, Van Vugt (2009) concluded that trust is crucial for facilitating pro-environmental behavior.

Following prior experimental work, and social dilemmas research on environmental protection, we expect a positive relationship between trust and cooperation.

Hypothesis 2: High trusters will be more willing to protect the environment than low trusters.

The Interaction between Culture and Trust

While previous research indicates that trust promotes pro-environmental behaviors, we contend that cultural influences have thus far been ignored. Following recent work (Irwin 2009; Berigan and Irwin 2011), we argue that trust will have relatively weak effects on cooperation in collectivist groups. Conversely, in individualist groups trust will strongly predict cooperative behaviors. Said differently, we expect an interaction between culture and trust on cooperative decisions about environmental protection.

As previously stated, generalized trust is relatively prevalent in cultures characterized by individualist social relations. Given the positive relationship found in prior studies, we anticipate that trust serves as a catalyst for cooperation. This is especially likely in large-scale social dilemmas such as protecting the environment. Generalized trust is particularly relevant because many of the participants are strangers. That is, cooperation is predicated on a belief that others are cooperative. Thus, if generalized trust fosters cooperation in the form of pro-environmental behaviors, then high trusters ought to cooperate more than low trusters in individualist cultures.

In collectivist cultures, members are commonly distrustful of strangers. Accordingly, we expect that cooperation is unlikely predicated on trust. That is, cooperation in collectivist cultures will stem from mechanisms other than trust. Therefore, trust can only be a weak predictor of cooperation, at best. Instead, cooperation may be determined by factors such as the presence of monitoring and sanctioning (Hechter 1987); cultural pressure to conform to normative standards (Miller and Kanazawa 2000); or values related to stability, harmony, and safety (Oishi et al. 1998). Accordingly, we predict that high and low trusters will cooperate at similar levels in collectivist groups. This prediction is counter to prior research on cooperative resolutions to environmental social dilemmas, which ignored cultural differences. We argue that the significant

effect of trust on cooperation found in prior work stems from the strong link in individualist but not collectivist cultures.

Recent research supports the above arguments. For example, Irwin (2009) used *World Values Survey* data to address cooperation in several social dilemmas, including claiming improper government benefits, avoiding fare on public transportation, accepting bribes, and cheating on taxes. Findings suggested that trust did not predict cooperation in collectivist countries, but in individualist societies trust was a significant predictor of cooperation. Using the same data set, Berigan and Irwin (2011) focused on the social dilemma of supporting the general welfare. They found that trust promoted cooperation in the form of voluntary charitable contributions in individualist societies. In collectivist countries, a relative lack of trust engendered support for government wealth redistribution programs.

Earlier in this section, we argued that, in the United States, southern states fit the characteristics of collectivist groups while nonsouthern regions are more individualist. When we apply this individualism/collectivism demarcation to the arguments given above, it generates the following prediction:

Hypothesis 3: In the non-South, high trusters will be more willing to protect the environment than low trusters, but in the South high and low trusters will cooperate at similar levels.

Taken together, we suggest that high trusters are more willing to engage in pro-environmental behaviors compared with low trusters. This prediction is consistent with recent social dilemmas research on environmental protection. However, our arguments differ from previous work in that we suggest that the main effect of trust on cooperation is qualified by an interaction between trust and culture. In the following section we detail our methods and results.

DATA AND MEASURES

We used data from the GSS to test our hypotheses. The survey has been conducted by the National Opinion Research Center annually from 1972 through 1994, and biennially thereafter. Each survey includes a sample of noninstitutionalized, English-speaking adults in the United States. The analyses reported below used data from interviews conducted in 2010, when the survey asked a subset of the sample about environmental issues. Of the 2,044 respondents included in the 2010 wave, 1,368 received questions about the environment while 1,214 received the trust measure. In total, 650 respondents answered all of the questions included in our analyses.

Dependent Variables

Previous research suggests that cooperation can take one of two forms: first-order cooperation and second-order cooperation (Oliver 1980; Heckathorn 1989, 1993). Individuals cooperate at the *first order* when they contribute directly to a collective

effort. This may entail sacrificing to help protect the environment by altering one's standard of living via buying green products, cutting water and energy use, driving less frequently, etc. *Second-order* cooperation refers to enforcing first-order cooperation, either directly (e.g., publicly embarrassing a polluter) or indirectly (e.g., paying higher taxes to support programs aimed to help protect the environment). Our analyses included measures of both first- and second-order cooperation. We included measures of each to determine whether our arguments are robust to both forms of cooperation. Our measure of first-order cooperation asked respondents, "How willing would you be to accept cuts in your living standards in order to protect the environment?" This question addresses respondents' willingness to take personal responsibility to help solve the social dilemma and is therefore a valid proxy for first-order cooperation.

Our measure of second-order cooperation asked respondents how willing they would be to pay much higher taxes in order to protect the environment. This question measures second-order cooperation in that it gauges respondents' willingness to support institutions tasked with protecting the environment, rather than making a direct contribution to the cause.⁴ Both measures of cooperation are coded such that 1 = very unwilling to 4 = very willing.

Previous work suggests that individualists should cooperate more than those from collectivist cultures (see Yamagishi 1988). Comparison of means tests indicate that cooperation levels are equivalent in the non-South versus the South for both willingness to accept cuts in living standards (mean [M] = 2.69; standard deviation [SD] = 1.17 versus M = 2.66; SD = 1.19; t = .46; p = not significant [ns]), and willingness to pay higher taxes (M = 2.65; SD = 1.18 versus M = 2.58; SD = 1.18; t = .94; p = ns). The discrepancy between our findings and past research is most likely explained by previous comparative work having considerable difference on the individualism/collectivism continuum (i.e., United States versus Japanese participants). Interregional differences within the United States may represent less ideal typical comparisons, and therefore cooperation differences may be subtle. Our primary interest, however, is whether trust predicts cooperation similarly in the South and non-South, and not necessarily with comparing cooperation levels across regions.

Independent Variables

We measured trust with the following question: "Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?" This question has been used in numerous studies and is considered the standard trust measure (see Brehm and Rahn 1997; Alesina and La Ferrara 2002; Putnam 2000; Paxton 2007). In the non-South, 38.72 percent of respondents trust others, while in the South 24.91 percent trust others ($p \leq .001$). Table 1 includes descriptive statistics for all independent variables broken down by high and low trust levels.⁵

To determine the effects of culture on trust and cooperation, we included a measure that asked respondents to indicate the region in which they currently live. Southern regions included the South Atlantic, East South Central, and West South Central.⁶ All other regions were considered non-South.

Control Variables

Previous research has linked the following variables to trust and/or cooperation: gender (Simpson 2003), age (Smith 1997), and race (Simpson, McGrimmon, and Irwin 2007). We control for each of these factors in our models. Findings in Table 1 show that men, older individuals, and whites are more likely to trust than women, younger people, and nonwhites ($p \leq .01$ for each). Prior work suggests that religiosity influences cooperation (Batson and Ventis 1982). We control for religiosity with a religious traditions scale where the various traditions are treated as a series of dummy variables. Because it is the largest group, Protestants are treated as the suppressed category in multivariate analysis. Bivariate analyses in Table 1 indicate that Jewish individuals are more likely trust than non-Jews ($p \leq .001$). Also, compared with those claiming religious beliefs, individuals with no religion are more likely to trust others ($p \leq .01$). In addition to religious tradition, we controlled for respondents' level of fundamentalism in terms of religious beliefs and strength of affiliation. High trusters are less likely to

TABLE 1. Descriptive Statistics for Those Reporting High Trust versus Low Trust

Variable	Range	High trust	Low trust
<i>Proportions^a</i>			
South		24.91	75.09
Non-South***		38.72	61.28
White***		38.50	61.50
Nonwhite		16.93	83.07
Female		30.48	69.52
Male***		37.23	62.77
<i>Religion</i>			
Protestant		31.81	68.19
Catholic		31.41	68.59
Jewish***		69.24	30.76
No religion**		41.53	58.47
Married***		39.10	60.90
Not married		29.00	71.00
<i>Means^b</i>			
Age***	18–89	52.54 (16.91)	45.58 (17.99)
Republican	0–6	2.63 (2.05)	2.59 (1.87)
Education***	0–20	14.74 (2.87)	12.75 (3.05)
Fundamentalist***	1–3	1.73 (.73)	2.06 (.74)
Strength of religious affiliation*	1–4	2.83 (1.13)	2.97 (1.03)
Confidence in government	1–3	1.74 (.54)	1.71 (.60)
Community size***	1–10	6.12 (2.58)	5.60 (2.92)

^aRow percentages reported.

^bStandard deviations in parentheses.

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$ (chi-square for crosstabs, one-way analysis of variance for means; two-tailed tests).

be fundamentalist and hold strong religious affiliation compared with low trusters ($p \leq .01$ for each).

Political party affiliation influences views about the environment, with Democrats supporting environmental efforts more so than Republicans (Van Liere and Dunlap 1980).⁷ We included a measure of political party affiliation to control for this possible effect. Table 1 indicates no relationship between party affiliation and trust. We also controlled for the potential effects of marital status (Irwin 2009) and education (Uslander 2002). Education was measured as the highest year of schooling completed. Married individuals and those with more education are more likely to trust than unmarried and less educated individuals ($p \leq .001$ for each). Respondents' confidence in the government may influence both generalized trust and cooperation (Cook, Hardin, and Levi 2005). We measured confidence by combining responses to two items: one focusing on confidence in the executive branch, and the other on confidence in congress. Findings in Table 1 show no relationship between confidence and trust.

There is evidence that population density is associated with trust (Pew Research Center 2007). To control for this potential effect, we included a measure that captures the size of community the respondent currently lives in. As Table 1 shows, high trusters are more likely to live in more densely populated areas than low trusters ($p \leq .001$).

None of the control variables listed above directly pertains to our argument. We thus limit our discussion of them in the results section.

RESULTS

Analytic Strategy

We used two types of statistical tests to analyze our results. First, the variable for our mechanism, trust, was binary—that is, respondents either reported that “most people can be trusted” or that “one must be careful when dealing with others.” To test whether region affects trust levels, we used a binary logistic model, which reports increases or decreases in the likelihood of one binary choice occurring versus the other (Hosmer and Lemeshow 2000). Second, we use ordered logistic regression models to test hypotheses related to cooperation. The cooperation items are measured with ordinal scales; thus, distances between response categories are not necessarily uniform. Using ordinary least squares regression with ordinal dependent measures may overestimate the regression coefficients (Long 1997). Ordered logistic models are more appropriate for ordinal dependent measures (Fullerton 2009).

Region and Trust

Earlier we argued that southern states are relatively collectivist compared with non-southern states. Accordingly, we predicted that southerners would report lower levels of trust than nonsoutherners. Results from binary logistic regressions are presented in Table 2.

Model 1 excludes the South variable, while model 2 includes the measure. Both models contain several significant controls. Race strongly affects trust, with whites

TABLE 2. Binary Logistic Regressions for Region on Generalized Trust (Odds Ratios)

Variable	Model 1	Model 2
South	—	.67**
White	2.64***	2.62***
Female	.71**	.72*
Age	1.02***	1.02***
Republican	.96	.96
Education	1.24***	1.24***
Fundamentalist	.80†	.84
Strength of religious affiliation	.96	.81
<i>Religious tradition</i> ^a		
Catholic	1.05	.98
Jewish	2.45†	2.57†
No religion	1.15	1.19
Married	1.36*	1.38*
Confidence in government	1.30*	1.37***
Community size	1.05*	1.05†
N	1,214	1,214
<i>Pseudo R</i> ²	.18	.19
<i>Wald x</i> ²	124.34***	124.34***
<i>Hosmer and Lemeshow x</i> ²	4.61	11.02

^aReference category is Protestant.

† $p \leq .10$, * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$ (two-tailed).

reporting greater likelihood of trust than nonwhites ($p \leq .001$). This finding mirrors prior work showing that minority groups commonly report lower trust than whites (Alesina and La Ferrara 2002; Glaeser et al. 2000; Uslander 2002; see Smith 2010 for a review). In our models, the odds of whites reporting trust is about 2.6 times greater than the odds of nonwhites trusting others. Results also indicated that women were less likely to trust than men ($p \leq .01$ in model 1; $p \leq .05$ in model 2). In addition, age (Smith 1997) and education (Yamagishi 2001) had significant effects, which supports prior trust research. Those reporting fundamentalist religious beliefs were less likely to trust others. Jewish individuals were slightly more trusting than Protestants. This difference approached statistical significance ($p \leq .10$). Our models also show significant positive effects of confidence in the government ($p \leq .05$ in model 1 and $p \leq .001$ in model 2) being married ($p \leq .05$), and community size ($p \leq .05$ in model 1 and $p \leq .10$ in model 2).

Consistent with Hypothesis 1, model 2 indicated that southerners reported lower generalized trust than nonsoutherners ($p \leq .01$). More specifically, being a southerner is associated with a 33 percent decrease in the odds of reporting trust in strangers (1-.67). Consistent with prior work (Simpson 2006), this finding indicates that the

collectivist nature of the U.S. South hinders trust. We next turn to tests of our second and third hypotheses.

Trust, Region, and Accepting Cuts in Living Standards

To determine whether trust impacts pro-environmental behaviors, we first addressed our measure of first-order cooperation—which asks respondents how willing they are to make cuts in their living standards in order to protect the environment. Hypothesis 2 predicted that trust would increase individuals’ willingness to make cuts in living standards. In addition to a main effect of trust, Hypothesis 3 predicted an interaction between trust and culture (i.e., South versus non-South) on cooperation. Specifically, we argued that collectivist social relations would attenuate the trust–cooperation relationship in the South, but not in the non-South, where trust would significantly predict willingness to cut living standards. Table 3 presents the results from multivariate analyses.

Model 1 of Table 3 excludes trust, being from the South, and the interaction between the two. Model 2 excludes the interaction while model 3 presents the full model. Four of

TABLE 3. Ordered Logistic Regressions of Region and Trust on Willingness to Accept Cuts in Living Standards (Odds Ratios)^a

Variable	Model 1	Model 2	Model 3
Trust	—	1.77***	5.36***
South	—	1.12	3.28**
Trust × South	—	—	.41**
White	1.17	1.09	1.11
Female	1.18	1.21	1.20
Age	.99*	.99**	.99**
Republican	.86***	.86***	.86***
Education	1.08***	1.06*	1.06*
Fundamentalist	.78†	.78†	.77†
Strength of religious affiliation	1.13	1.14	1.13
<i>Religious tradition^b</i>			
Catholic	1.16	1.17	1.17
Jewish	.73	.65	.64
No religion	1.84	1.92	1.85
Married	1.11	1.07	1.08
Confidence in government	1.21	1.20	1.18
Community size	1.02	1.02	1.03
N	650	649	649
<i>Pseudo R²</i>	.09	.11	.12
<i>Wald x²</i>	64.07***	74.82***	80.47***
<i>Pearson x²</i>	1,898.27	1,901.38	1,889.21

^a(1 = not at all willing; 5 = very willing).

^bReference category is Protestant.

† $p \leq .10$, * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$ (two-tailed).

the controls reached statistical significance. In each of the three models, there was a significant negative relationship between age and willingness to accept cuts in living standards ($p \leq .05$ in model 1 and $p \leq .01$ in model 2). Political party preference was also a significant predictor. In each model, self-identification as a Republican was associated with less willingness to make cuts ($p \leq .001$). Education had a positive relationship with accepting cuts to living standards ($p \leq .05$). Findings also indicated that, compared with liberal religious beliefs, fundamentalist beliefs had a negative impact on the dependent measure. This finding approached statistical significance ($p \leq .10$).

With the addition of our two primary independent variables, model 2 demonstrated a strong effect of trust on willingness to make cuts in standard of living (odds ratio [OR] = 1.77; $p \leq .01$). This finding supports prior work and corroborates the argument that trust promotes environmental protection. Yet, as we report below, this effect is primarily due to the trust–cooperation relationship in individualist, but not collectivist groups.

Model 3 included the region \times trust interaction along with main effects. The interaction effect was significant ($OR = .41$; $p \leq .05$). The OR indicates that trust was attenuated in the South, but not in the non-South (see Figure 1). Thus, the effect of trust on willingness to make cuts to living standards was considerably stronger in the non-South compared with the South. This finding supports Hypothesis 3. The main

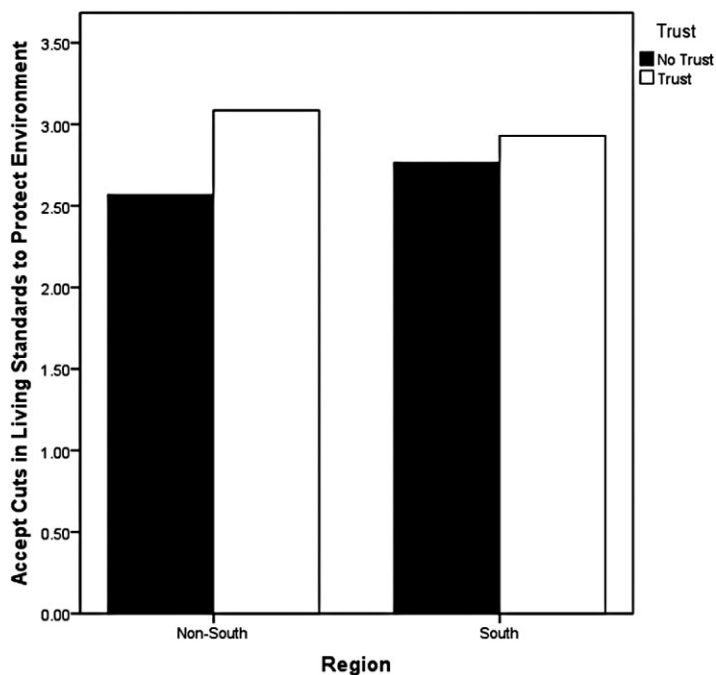


FIGURE 1. Interaction between Region and Trust on Willingness to Accept Cuts in Living Standards.

effects for trust and South were also significant. The trust *OR* ($OR = 5.36; p \leq .001$) indicates that the odds of being very willing to make cuts is significantly greater for high trusters versus low trusters in the non-South. The *OR* for the South variable ($OR = 3.28; p \leq .01$) demonstrates that the odds of being very willing to make cuts is significantly higher for southerners than nonsoutherners that report low trust. Figure 1 graphically displays these findings.⁸

To further test Hypothesis 3, we disaggregated the data to determine the effects of trust on willingness to cut living standards in the South versus non-South. Consistent with our argument, Table 4 shows that trust was a nonsignificant predictor of cooperation in the South ($OR = .77; p = ns$). Only three variables approached statistical significance. Being Republican was associated with lower odds of cooperation, while confidence in government and community size had a positive relationship with the dependent measure ($p \leq .10$ for each).

In contrast to the South, trust was a strong predictor of cooperation in the non-South ($OR = 2.541; p \leq .001$). This finding further supports Hypothesis 3. Results also indicated that age ($p \leq .01$) and being Republican ($p \leq .001$) were negatively

TABLE 4. Ordered Logistic Regressions of Southerners' versus Nonsoutherners' Willingness to Accept Cuts in Living Standards (Odds Ratios)^a

Variable	South	Non-South
Trust	.77	2.54***
White	1.61	.83
Female	1.20	1.18
Age	1.002	.98**
Republican	.89†	.85***
Education	1.07	1.06*
Fundamentalist	.87	.79
Strength of religious affiliation	.98	1.21
<i>Religious tradition</i> ^b		
Catholic	1.73	1.05
Jewish	—	.36
No religion	1.47	2.17
Married	.95	1.06
Confidence in government	1.47†	1.06
Community size	1.08†	.99
N	237	412
<i>Pseudo R</i> ²	.11	.16
<i>Wald x</i> ²	27.19*	71.27***
<i>Pearson x</i> ²	697.17	1,223.94

^a(1 = not at all willing; 5 = very willing).

^bReference category is Protestant.

† $p \leq .10$, * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$ (two-tailed).

associated with willingness to accept cuts in living standards. Education had a positive impact on the dependent variable ($p \leq .05$).⁹

Trust, Region, and Paying Higher Taxes

In addition to the analyses on first-order cooperation, we addressed respondents' willingness to pay higher taxes to protect the environment. This measure of second-order cooperation represents individuals' desire to support institutions that oversee the provision of public goods. As with willingness to cut living standards, we predicted a main effect of trust on willingness to pay higher taxes (Hypothesis 2). We also predicted an interaction between trust and region on cooperation (Hypothesis 3). We expect that trust will significantly predict willingness to pay higher taxes in the non-South, but not in the South. Results from multivariate analyses are presented in Table 5.

Model 1 excluded trust, being from the South, and the interaction between the two. Model 2 excluded only the interaction while model 3 presents results from the full model. In each model, being Republican was negatively associated with cooperation

TABLE 5. Ordered Logistic Regressions of Region and Trust on Willingness to Pay Higher Taxes (Odds Ratios)^a

Variable	Model 1	Model 2	Model 3
Trust	—	1.74***	2.66*
South	—	.99	1.49
Trust × South	—	—	.72
White	1.29	1.24	1.25
Female	.96	1.02	1.01
Age	.99	.99	.99
Republican	.86***	.85***	.86***
Education	1.11***	1.08***	1.08***
Fundamentalist	.82	.85	.85
Strength of religious affiliation	.99	1.01	1.01
<i>Religious tradition^b</i>			
Catholic	.91	.89	.89
Jewish	.77	.73	.73
No religion	1.25	1.28	1.27
Married	1.03	.99	.99
Confidence in government	1.73***	1.68***	1.67***
Community size	1.03	1.03	1.03
N	648	647	647
<i>Pseudo R²</i>	.11	.13	.13
<i>Wald χ^2</i>	77.33***	88.72***	89.57***
<i>Pearson χ^2</i>	1,953.76	1,947.68	1,946.13

^a(1 = not at all willing; 5 = very willing).

^bReference category is Protestant.

* $p \leq .05$, *** $p \leq .001$ (two-tailed).

($p \leq .001$). Higher levels of education ($p \leq .001$) and confidence in the government ($p \leq .001$) were associated with greater willingness to pay higher taxes.

Consistent with Hypothesis 2, trust was significantly associated with protecting the environment via paying higher taxes (see model 2). The odds of high trusters being very willing to pay higher taxes was 1.74 times greater than the odds of low trusters being very willing to pay higher taxes ($p \leq .001$). This finding suggests that generalized trust influenced responses about sacrificial choices to protect the environment.

As with our measure of first-order cooperation, we suggested that the main effect of trust on second-order cooperation is primarily due to the trust–cooperation relationship in individualist, but not collectivist, groups. Findings from model 3 show that the odds ratio for the interaction between trust and region was less than one ($OR = .72$), indicating that trust was attenuated in the South, but not the non-South. The interaction, however, was nonsignificant (see discussion below for an explanation). The main effect of trust was significant ($p \leq .05$), demonstrating a significant difference between high and low trusters in the non-South. The main effect for the South was nonsignificant, indicating no difference between southern and nonsouthern low trusters. To further test Hypothesis 3, we focused on the effects of trust using disaggregated data.

Consistent with our argument, results with disaggregated data indicated that trust did not predict cooperation in the South ($OR = 1.07$; $p = .82$). For southerners, cooperation was positively influenced by education ($p \leq .001$) and confidence in the government ($p \leq .05$). No other variables reached statistical significance.

Consistent with Hypothesis 3, trust strongly predicted cooperation in the non-South ($OR = 2.06$; $p \leq .001$). Results also indicated that Republican self-identification ($p \leq .001$) was negatively associated with nonsoutherners' willingness to pay higher taxes. Confidence in the government ($p \leq .01$) and education ($p \leq .10$) had positive effects.

Findings reported in Table 6 support our argument that trust is a predictor of cooperation in the non-South, but not in the South. However, a significant interaction effect did not emerge with the aggregated data (see Table 5). Instead, there was only a main effect of trust. We suggest that the lack of a significant interaction is most likely due to low statistical power. After all, there were only 238 southerners included in our sample. To address this issue, we conducted additional analyses with the combined 2000 and 2010 GSS datasets. Both waves included the same environmental questions, trust item, and controls. Findings are reported in the Table A1 (see Appendix). For these analyses, we also included a control for year of interview. With the increased sample size ($N = 468$ for the South and $N = 806$ for the non-South), results indicated a significant trust \times region interaction ($OR = .62$; $p \leq .05$), showing that the trust–cooperation relationship was attenuated in the South, but not the non-South. These additional analyses provide further support for our argument, and corroborate Hypothesis 3.¹⁰

TABLE 6. Ordered Logistic Regressions of Southerners' versus Nonsoutherners' Willingness to Pay Higher Taxes (Odds Ratios)^a

Variable	South	Non-South
Trust	1.07	2.06***
White	1.59	1.03
Female	.87	1.09
Age	1.01	.99
Republican	.89	.83***
Education	1.16***	1.05†
Fundamentalist	1.14	.75
Strength of religious affiliation	1.03	.99
<i>Religious tradition</i> ^b		
Catholic	1.63	.76
Jewish	—	.36
No religion	2.74	.93
Married	.81	1.08
Confidence in government	1.60*	1.73**
Community size	1.05	1.02
N	238	409
<i>Pseudo R</i> ²	.13	.16
<i>Wald x</i> ²	32.71**	71.32***
<i>Pearson x</i> ²	714.77	1,227.25

^a(1 = not at all willing; 5 = very willing).

^bReference category is Protestant.

† $p \leq .10$, * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$ (two-tailed).

Together, the results with both cooperation measures suggested that trust was a predictor of willingness to sacrifice in order to protect the environment. This effect, however, was due to the strong relationship between trust and cooperation found in individualist groups. Such a relationship was not found in collectivist groups. These findings indicate that the influence of trust on cooperation depended on region of the United States. In the South, where trust levels are relatively low, trust had no effect on cooperation. But in the non-South, trust levels are higher, and trust strongly predicted pro-environmental behaviors.

DISCUSSION

The goal of the current work was to test an argument about how culture influences the relationship between trust and cooperation on pro-environmental behaviors. Prior research indicated that trust was a primary predictor of recycling (Sønderskov 2011), conserving water and energy (Van Vugt and Samuelson 1999), and buying green products (Gupta and Ogden 2009). While results from these studies are important and timely, they ignore cultural factors that may influence the relative impact of trust

for promoting sustained cooperation. We drew upon Yamagishi and associates' (e.g., Yamagishi and Yamagishi 1994) arguments to address this omission. Specifically, we predicted a main effect of trust on pro-environmental behaviors but argued that this effect would be present in the non-South, but not in the South. Findings from multivariate analyses supported our predictions.

Our results have theoretical and practical implications. First, they provide support for Yamagishi's theoretical arguments. Prior work focused on the relationship between individualist/collectivist social relations and trust cross-culturally (Gheorghiu et al. 2009) and in the United States (Simpson 2006). More recently, scholars have applied the theory to explain cooperation in real-world social dilemmas such as cheating on taxes (Irwin 2009), and supporting the general welfare (Berigan and Irwin 2011). The current research indicates that the theory applies to the dilemma of protecting the environment, suggesting that cultural factors like the strength of group ties influences individuals' willingness to cooperate via pro-environmental behaviors.

An important practical implication of our findings is that increasing trust may be a relatively inefficient strategy for motivating southerners to protect the environment. Our models indicated that culture moderates the influence of trust. Thus, in southern locales, policies aimed at increasing trust may do little to foster environmental protection.

Encouraging Pro-Environmental Behavior in the South versus Non-South

If trust is ineffective at promoting cooperation in the South, what can be done to motivate southerners to increase environmental protection efforts? Our models indicate that, in the South, confidence in the government was associated with willingness to cut living standards and pay higher taxes to protect the environment. This suggests that southerners' cooperation may depend on institutional rather than interpersonal trust. Thus, expectations about the government's trustworthiness may be more important than the perceived trustworthiness of community members. This finding is consistent with prior trust research, which showed that cooperation in social dilemmas stems from institutional, but not interpersonal, trust in collectivist cultures (Irwin 2009).¹¹ Thus, individual-level pro-environmental behaviors and support for programs aimed at environmental protection may have little backing in the South unless individuals trust government officials.

Political views and education were also associated with cooperation in the South. Compared with Democrats, those self-identifying as Republican were less likely to report willingness to make cuts in living standards. Pro-environmental efforts may therefore target Republicans and assure them that the long-term benefits of conservation may outweigh any short-term costs. Further, those with Republican beliefs may modify their stance on environmental issues if they consider pro-environmental behavior to be consistent with their own values, rather than mandated by those with liberal political views (Lloyd 2007; Pepper, Jackson, and Uzzell 2011). As for education, greater levels of education were positively associated with southerners' willingness to pay higher taxes. Thus, it appears that, in addition to whatever direct benefits stem from increased average

education in the South, an indirect benefit may be greater willingness to engage in environmental cooperation. Future work is needed to draw firm conclusions.

In the non-South, cooperation was strongly predicated on trust, suggesting that efforts to increase environmental cooperation should include trust-enhancing policies. Trust researchers suggest that one strategy for doing so is promoting voluntary organization membership (Putnam 1995; Stolle 1998). Stolle (2001:205) argued that “membership in voluntary associations should increase face-to-face interactions between people and create a setting for the development of trust . . . the development of interpersonal trust and cooperative experiences between members tends to be generalized to the society as a whole.” A second approach suggests that people trust in-group compared with out-group members (Foddy and Yamagishi 2009). Thus, increasing identification among community members by calling attention to their similarities and shared responsibility may cultivate trust and cooperation.

Limitations

Although the results from our empirical analyses supported the arguments presented earlier in the article, there are several limitations. First, results from bivariate and multivariate analyses were inconsistent with prior work showing more first-order cooperation in individualist (non-South) versus collectivist (South) cultures. A possible explanation is that prior work compared ideal typical individualist with collectivist groups (i.e., United States and Japan). Interregional differences within the United States may represent less ideal typical comparisons, and therefore cooperation differences may be subtle. Nevertheless, our primary goal was not to compare cooperation levels across regions, but to determine whether trust predicts cooperation similarly in the South and non-South. Our results clearly show that trust has disparate effects in individualist versus collectivist cultures.

A second limitation is that our findings are inconsistent with some prior work on second-order cooperation. Previous research shows that those from collectivist cultures are more likely than individualists to engage in second-order cooperation (see Yamagishi 1988). Bivariate and multivariate analyses showed no effect of region on willingness to pay higher taxes. Previous research on second-order cooperation often focused on support for institutions that sanction deviant group members (Yamagishi 1988). Thus, to pick up on the effects found in prior work, the measure of second-order cooperation may need to ask directly about sanctions, or the government’s ability to control and punish its citizens (rather than willingness to pay higher taxes to protect the environment). Unfortunately, no such measure existed in the GSS related to environmental protection.

An additional potential limitation is our assumption that the South is more collectivist compared with the non-South. There are, no doubt, other dissimilarities between these groups (e.g., economic, religious, and levels of inequality) that could potentially predict differences in how trust influences willingness to protect the environment. As we detailed above, however, considerable prior work (see Reed 1974, 1983; Cohen et al. 1999; Vandello and Cohen 1999; Simpson 2006) suggests that the strength of ties

that characterize the South versus non-South (i.e., their levels of collectivism/individualism) are critical considerations that have measurable effects on social outcomes. Thus, although the South and non-South differ on many factors, the individualism/collectivism distinction is an important one to consider.

Finally, it has been noted that the trust measure used in the present research has limitations (see Yamagishi 2011). For example, Miller and Mitamura (2003) argue that it may conflate trust and caution. This conflation, however, is potentially more serious in cross-cultural studies where those from different language groups might attribute different meanings to the concepts (Miller and Mitamura 2003:62). Although the measure is imperfect, it is widely used in trust research (see Brehm and Rahn 1997; Alesina and La Ferrara 2002; Putnam 2000; Paxton 2007) and is considered the “standard” trust measure.

CONCLUSION

The research presented here is a step toward explaining how trust and culture interact to influence environmental initiatives. Building on Yamagishi’s theory of trust, we suggested that the strength of group ties and concomitant trust affect individuals’ choices regarding contributions to public goods. Our results demonstrated that southerners’ willingness to engage in environmental protection was not predicated on generalized trust. Thus, initiatives aimed at increasing pro-environmental behavior in the South may be ineffective if they center on people’s trust in others. Instead, such initiatives may achieve greater success if they are able to increase institutional trust or emphasize the ways in which environmental protection is consistent with Republican political beliefs. In the non-South, on the other hand, trust strongly predicted environmental cooperation, indicating that policies and initiatives centering on generalized trust may have their intended effects. While our research helps to address the impact of culture on trust and cooperation, more work is needed to more fully uncover the cultural bases for cooperative resolutions to social dilemmas and successful collective actions.

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NOTES

¹Other types of trust include trust directed toward specific others one has reason to trust (through previous interaction or reputation), and trust in others with whom one shares a common group membership (e.g., race and gender). Here, we focus on generalized trust, which is considered to be one’s default expectations about most others’ trustworthiness (Yamagishi 2001).

²We define *culture* as systems of ideas, meanings, and practices common to the members of a particular group or society (Hall, Grindstaff, and Lo 2010). For the purposes of the present work, we focus on cultural beliefs (and practices) regarding the strength and intensity of social relationships, which include the permeability of group membership, and the importance of familial and nonfamilial interactions (see Triandis 1995). When we refer to culture, we are therefore referring to the kinds of relationships that characterize a specific social group.

³We do not claim that members of individualist cultures have especially high levels of generalized trust. In fact, research indicates that less than half of all people in the United States (the prototypical individualist country) report trusting strangers (Yamagishi et al. 1998). Our assertion is that generalized trust is higher in individualist compared with collectivist cultures, and these trust differences influence the relationship between trust and cooperation.

⁴There were several other items that focused on environmental protection but were not well-suited to our research question. These were problematic in that they asked if respondents engaged in certain behaviors in the past and may not reflect respondents' ability to perform these actions. For example, one item asked about frequency of recycling. Recycling is affected by availability of recycling centers and curbside programs. Thus, there may be individuals who want to recycle but do not have the means to do so. In asking about willingness to engage in pro-environmental behaviors, the questions we chose gauged respondents' feelings about environmental protection rather than their past behavior.

⁵For dichotomous variables, we used crosstabs to compare the proportion of individuals reporting high versus low trust. For nondichotomous variables, differences in means were assessed using one-way analysis of variance.

⁶States included in the South (which are consistent with the Census delineation of southern states) are Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

⁷Political party affiliation is often confused with political ideology (i.e., liberal/conservative). Here, we refer only to the party with which the participant most closely identifies.

⁸We found no multicollinearity in any of the models that exclude interaction effects. The same is true for analyses focusing on willingness to pay higher taxes (found in Tables 5, 6, and A1).

⁹The pseudo R-square values in our models are modest (around .10 in Table 3 and .11 for South and .16 for non-South in Table 4), but consistent with findings from prior trust research (see, e.g., Rahn and Transue 1998; Alesina and La Ferrara 2002). The change across models is relatively small but not meaningless. For example, in Table 3 the change from model 1 to model 3 is 25 percent $((.12-.09)/.12)$.

¹⁰It is important to point out that our control for year of interview yielded a nonsignificant effect in each of the models. Nevertheless, because of the 10-year span between 2000 and 2010 waves of the GSS, history may be a confounding factor in the way people respond to environmental questions. Indeed, much happened during this time period in terms of policy and public information on the environment. Thus, these results should be interpreted cautiously.

¹¹Institutional trust was also a significant predictor of willingness to pay higher taxes in the non-South, but generalized trust had a stronger effect. This shows that both forms of trust predict cooperation in individualist groups, but trust in others may be a more important consideration compared with trust in the government.

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APPENDIX

TABLE A1. Ordered Logistic Regressions of Region and Trust on Willingness to Pay Higher Taxes Using 2000 and 2010 Combined Data (Odds Ratios)^a

Variable	Model 1	Model 2	Model 3
Trust	—	1.72***	3.15***
South	—	.97	1.77†
Trust × South	—	—	.62*
White	1.23	1.15	1.15
Female	.95	.98	.98
Age	.99†	.99**	.99**
Republican	.88***	.87***	.87***
Education	1.10***	1.08***	1.09***
Fundamentalist	.86†	.88	.87
Strength of religious affiliation	.96	.96	.96
<i>Religious tradition^b</i>			
Catholic	1.01	.97	.97
Jewish	1.47	1.48	1.48
No religion	1.30	1.27	1.24
Married	.99	.96	.96
Confidence in government	1.55***	1.48***	1.48***
Community size	1.03	1.02	1.02
Year	1.01	1.01	1.01
N	1,282	1,276	1,276
<i>Pseudo R²</i>	.09	.11	.12
<i>Wald x²</i>	126.57***	149.89***	153.71***
<i>Pearson x²</i>	3,850.39	3,816.54	3,806.96

^a(1 = not at all willing; 4 = very willing).

^bReference category is Protestant.

† $p \leq .10$, * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$ (two-tailed).