Culture, Identity, and Structure in Social Exchange:

A Web-based Trust Experiment in the U.S. and Japan*

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ABSTRACT

Cross-cultural trust and cooperation are important concerns for international markets, political cooperation, and cultural exchange. Until recently, this problem was difficult to study under controlled conditions due to the inability to conduct experiments involving interaction between participants located in physically distant locations. We report results of an experiment using a Web-based "virtual lab" to study trust and trustworthiness between Japanese and Americans in real-time interaction. Participants played a variation of the Trust Game in two different experimental conditions: a "flags-on" condition in which everyone's nationality was publicly identified during the session, and a "flags-off" condition in which participants did not know who was Japanese or American. The findings most strongly support Yamagishi's structural theory of trust, which predicts that Japanese will form more durable exchange relations compared to Americans. We found less support for explanations that focus on cultural differences in trust and trustworthiness associated with the nationality of the participants, and for cognitive explanations that point to the effects of a shared social identity between participants and partners with common nationality.

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There is a growing body of research on cross-national trust and cooperation, spurred by the surprising observation that trust is generally lower in collectivist societies, characterized by extensive relational obligations and high levels of conformity, than in individualist countries like the U.S. (Yamagishi and Yamagishi 1994; Yamagishi et al. 2005a; Buchan, Croson, and Dawes 2002; Croson and Buchan 1999; Miller and Mitamura 2003). These studies have focused on the U.S. and Japan, two societies with similarly modern economic and political systems but with key cultural differences that are believed to influence the willingness to trust strangers. Cross-cultural differences are inferred by comparing levels of behavioral trust[1]—typically using a variant of the Trust Game, in which participants decide whether to give resources to one or more partners who may or may not return them—in different countries. In such comparative designs, interactions occur within each culture and the results are compared between cultures.

The problem with this approach is that we cannot tell whether cross-cultural differences in the behavior of the participant are due to the nationality of the participant or the nationality of the partners, or both. The next step in cross-cultural experimental research is to go beyond the comparative framework by conducting experiments involving actual interaction under controlled conditions between participants from different cultures. Until recently, this was impractical for

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1 "Trust" can be a noun (like "confidence," "faith," or "assurance") or a verb (the act of entrusting). Controversy abounds over the definition of "trust" as a noun, which refers to a state of mind and to motivations—e.g., "encapsulated interest" as proposed by Hardin vs. "social intelligence" as suggested by Yamagishi (Cook et. al 2005, pp. 4, 23). "Behavioral trust," which is our usage, is more straightforward since it refers to actions that can be observed in an experiment, such as giving resources to someone who may not return them.

studies involving participants from geographically distant locations. The present study addresses this limitation by using a Web-based "virtual lab" to study social exchanges between participants located half way around the world. To our knowledge, this is the first experimental study of trust and trustworthiness between Japanese and Americans in real-time interaction.

The article is organized as follows. We first discuss three theories that predict differences in the levels of trust and trustworthiness between the U.S. and Japan. Collectivism is important in all three theories, but for different reasons. The cultural theory predicts higher trust and trustworthiness in collectivist Japan compared to the more individualistic U.S., due to independent versus interdependent self-construals that value group obligations and expectations differently. An alternative explanation points to collectivism as the cognitive basis of a salient social identity. This in turn leads to higher trust and trustworthiness in collectivist Japan, particularly when Japanese are interacting with Japanese partners in a salient in-group. Finally, we consider Yamagishi's (Yamagishi, Cook, and Watabe 1998) structural theory of trust which focuses on the effects of close monitoring and enforcement within durable relations and stable institutions. According to this view, Americans resolve uncertainties of market exchanges by placing greater trust in strangers, and Japanese by forming durable relations with parochial partners that preclude strangers. A novel implication of this theory is that trust and trustworthiness may be greater among Japanese, but only in durable relations that are mutually beneficial. If so, then what are commonly assumed to be cultural differences should disappear once the durability of the relations is controlled for.

These three explanations are not mutually exclusive, and our results provide some support for all three. Most notably, we find support for the novel predictions of the structural theory. We find that Japanese are more likely to form durable relations and are more trustworthy

towards long-term partners, while Americans are more inclined to trust strangers. More broadly, we find suggestive evidence for Yamagishi's claim that relational factors account for cross-cultural differences in the dynamics of trust and commitment in the two societies. We conclude by discussing implications of these results, the promise and the limitations of our design, and possible directions for future research.

TRUST AND THE CULTURE OF COLLECTIVISM

The U.S. is widely regarded as "individualist" while Japan is generally considered "collectivist" (Casson 1991; Ouchi 1981; Hofstede 1980). For example, Markus and Kitayama have characterized the American self-concept as independent and ego-centric in the sense that the view of the self derives from "a faith in the inherent separateness of distinct persons" (1991: 226). In contrast, "Japan is a collectivist culture in the sense that people's self-identification tends to be deeply rooted in group membership" (Hagen and Choe 1998: 591). The Japanese self-concept emphasizes the normative importance of seeing oneself as a member of larger social units and defining one's goals and needs in relation to those of others. Japanese are expected "to find a way to fit in with relevant others, to fulfill and create obligation, and in general to become part of various interpersonal relationships." Indeed, in some cases, collective needs "become so focal in consciousness that the goals of others may be experienced as personal goals" (Markus and Kitayama 1991: 227-229).

Collectivist self-identification is believed to promote greater compliance with extensive relational obligations in a culture of conformity that curtails malfeasance (Miller and Kanazawa 2000; Fukuyama 1995). Decades of research have repeatedly shown how prosocial value orientations and in-group harmony lead to high levels of trustworthiness within close-knit groups

(Messick and McClintock 1968; McClintock and Liebrand 1988; Wagner III 1995). Higher trustworthiness in turn reinforces the belief that most people can be trusted, thus propelling what Putnam (2000) calls a "virtuous cycle of increasing trust."

This cultural theory of trust in collectivist Japan became prominent during the 1980s with the emergence of Japanese firms as global leaders. Japanese business relationships – both inter-firm (Hagen and Choe 1998; Fukuyama 1995) and managerial (Hofstede 1980; Ouchi 1981) – came to be regarded by Westerners as more cooperative and marked by higher levels of trust. In contrast, social critics warned of a gradual erosion of interpersonal trust and social capital in the U.S. (Putnam 2000; Fukuyama 1999), attributable in part to the cultural legacy of individualism that tolerates self-interest in the name of economic rationality and personal freedom. This cultural approach leads us to predict higher trust and trustworthiness in collectivist Japan, a society in which self-concept is defined in relation to the needs and goals of others:

Hypothesis 1a. Japanese are more trusting than are Americans.

Hypothesis 1b. Japanese are more trustworthy than are Americans.

Trust and social identity

Cultural explanations for differences in trust and trustworthiness are complemented and extended by a long-standing line of research in social psychology that calls attention to the importance of shared membership in a salient social category (Tajfel 1970; Tajfel and Turner 1986). Social identity theory offers a cognitive explanation for differences in trust and trustworthiness between the U.S. and Japan, based on two behavioral assumptions. First, actors have a cognitive need to reduce the complexity of the perceived environment by classifying together objects that are sufficiently similar, including self and others. Hence, we tend to overlook in-group differences while exaggerating out-group differences (Quattrone and Jones 1980). Second, social identity

theory posits a need to affirm self-esteem by attributing positive qualities to the members of the group with which one identifies (Brewer and Miller 1996; Stets and Burke 2000). Moreover, a performance that is evaluated positively in relation to group values will be attributed to individual attributes such as talent or effort when associated with an in-group member, while an identical performance by an out-group member is more likely to be attributed to luck or to contextual factors (Allison and Messick 1985). Conversely, a negative performance by an in-group member will be excused, while an identical performance by an out-group member is likely to be attributed to an innate attribute, such as a lack of character or ability.

Following Tajfel's (1970; Tajfel and Turner 1986) classic "minimal group" experiments, laboratory studies have repeatedly demonstrated that participants treat in-group members more favorably than out-group members, even when the group is arbitrarily defined, e.g., a preference for paintings by Klee or Kandinsky. Social identity theory predicts in-group bias in prosocial behavior towards partners who share a salient group membership (see Abrams and Hogg 2001 for a recent review). Social identity has been consistently found to bias exchange decisions, including resource allocation, cooperation, and reciprocity (e.g., Brewer and Kramer 1986; Anthony 2005; Simpson and Macy 2004).

Taken together, the identity-theoretic explanation differs from the cultural explanation in focusing on the *shared nationality of the partner* rather than the nationality of the actor itself. Although this distinction between the actor and the partner is crucial for understanding the basis of regional variations in trust and cooperation, it has been conflated in previous laboratory studies of trust and trustworthiness in the U.S. and Japan. The reason is that these studies were conducted separately in Japan and the U.S., with no interaction between American and Japanese participants. These designs test for the effects of the nationality of participants, but a critical

limitation is the inability to isolate and measure the effects of the nationality of the partner. Partners and participants were always the same nationality and were assigned randomly, with no opportunity for participants to express partner preferences. Under these conditions, neither nationality nor any other shared attribute was available to activate an in-group bias. However, we can extrapolate from social identity theory a set of predictions about what we might expect to observe if Japanese and Americans were able to interact both within and across nationalities, under conditions in which nationality was a salient identity.

To begin with, social identity theory suggests the following predictions, based on the premise that social identification promotes in-group favoritism:

> **Hypothesis 2a.** Participants trust members of a salient in-group more than members of an out-group.
>
> **Hypothesis 2b.** Participants are more trustworthy with members of a salient in-group than they are with out-group partners.

Note that Hypotheses 2a and 2b parallel Hypotheses 1a and 1b, except the mechanism is not the nationality of the actor but his or her identification with the nationality of the partner. The culturalist hypotheses (1a and 1b) predict that collectivist Japanese place greater value on trust and trustworthiness than do Americans, which suggests that it is the nationality of the participant that matters. Social identity theory suggests an alternative hypothesis, that Japanese collectivism entails greater willingness to cooperate only with other Japanese.

Despite this important difference in the focus of analysis (i.e. the nationality of the actor vs. partner), social identity theory complements and extends the cultural explanations for cross-national differences in trust and trustworthiness. While social identity theory posits a

fundamental psychological mechanism, it makes no prediction by itself about cross-cultural variations in the level of social identification. The cognitive and cultural mechanisms converge under the assumption, however, that social identities are more important in collectivist cultures like Japan's that emphasize in-group harmony (Triandis 1995). The interdependent view of the self means that collectivists derive their self-concept from relevant relationships as the "functional unit of conscious reflection," subordinating personal goals to collective needs (Markus and Kitayama 1991: 226). Under this assumption, social identity theory predicts greater trust and trustworthiness among Japanese when interacting with a Japanese partner:

> **Hypothesis 3a.** Compared to Americans, Japanese are more trusting with same-group partners than with out-group partners.
>
> **Hypothesis 3b.** Compared to Americans, Japanese are more trustworthy with same-group partners than with out-group partners.

Yamagishi's Structural Theory of Trust

What appears to be a gradual but steady erosion of trust in individualist societies in recent years has received wide attention by scholarly commentators, journalists, and business and political leaders. This position is supported by theories of collectivist culture that point to the importance of a sense of membership in and obligation to a larger group. It is also consistent with social identity theory under the additional assumption that collectivism increases the salience of a shared cultural or national identity. However, when the level of trust in strangers in the U.S. and Japan is tested empirically, the results are surprising. The findings from several studies, using both survey data and controlled experiments, provide converging evidence that Americans have higher levels of trust in strangers than do Japanese (e.g. Yamagishi and Yamagishi 1994; Yamagishi et al. 1998; Buchan et al. 2002; Miller and Mitamura 2003).

This puzzling result led Yamagishi (2003; Yamagishi et al. 1998) to challenge both the cultural and cognitive explanations. Instead of assuming cross-cultural differences in identity as given, Yamagishi pointed to structural differences in the two societies as the primary mechanism underlying the differences in trust and trustworthiness in the U.S. and Japan, noting in particular that collectivist societies are characterized by more densely embedded relations.A dyad is embedded to the extent that it is part of a relatively small and densely connected cluster. As a consequence, actors tend to have a small number of long-term relationships among network neighbors who are likely to know one another. In Japan, embedded relations are evident in lower levels of social and geographic mobility (Miller and Kanazawa 2000) and, until the recently, the pervasive system of lifetime employment. Embedded relations allow close monitoring of behavior and third-party reputational effects that that regulate extensive relational obligations and promote trustworthy behavior within close-knit groups (Macy and Sato 2002; Uzzi 1997; Kollock 1994). Embedded relations also enable greater opportunities for future interactions. This "shadow of the future" (Axelrod 1984) creates incentives for trustworthy behavior that reduce the risk of being cheated. In short, embedded relations motivate trustworthy behavior and constrain opportunism by sustaining norms of informal social control and promoting more durable relations within small, tight-knit network clusters.

Yamagishi contends that commitment and trust are alternative solutions to the problem of uncertainty in social and economic exchanges. While commitment minimizes transaction costs associated with misplaced trust, trust minimizes the opportunity costs of commitment. The opportunity cost of commitment is a potentially lucrative but risky transaction outside the safety of parochial exchange relations with familiar partners. The willingness to trust strangers minimizes this opportunity cost. However, when trust is misplaced, the trustor suffers the

transaction cost of being cheated. Commitment reduces this transaction cost by limiting transactions to durable relations in which the risk of being cheated is relatively low. Durable relations discourage cheating by providing greater ability to monitor and sanction behavior and greater possibilities for reciprocity in future interactions.

According to Yamagishi, Americans tend to focus on opportunity costs and Japanese on transaction costs. The reason is structural, not cultural or cognitive. Individualist societies are characterized by lower levels of embeddedness – people have larger numbers of weaker and less durable relationships, with fewer relational obligations and less normative social control. Hence, people must learn to trust strangers and take calculated risks in the absence of effective monitoring and sanctioning mechanisms. In this sense, trust is both a strategy for pursuing opportunities outside the safety of local neighborhoods and a consequence of learning to negotiate the risks of short-term relationships. In comparison, collectivist societies tend to be characterized by higher levels of commitment to regular exchange partners in more durable relationships, facilitating mutual monitoring against opportunism. In turn, such social arrangements promote reliance on social control and relational obligations in dense, stable networks to reduce transaction costs while mitigating the need to develop trust.

For Yamagishi, reliance on sanctioning and close mutual monitoring indicates distrust, not trust.[2] Trust in strangers is less likely to develop in Japan where institutional and relational constraints provide assurance against opportunism. Yamagishi concludes that Japanese society has found a low-risk equilibrium in which reliance on durable relations makes learning to trust

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2 Recent studies illustrate Yamagishi's argument. Hagen and Choe (1998), Molm, Takahashi, and Peterson (2000), Malhotra and Murnighan (2002), and Mulder et al. (2006) have demonstrated that high levels of social control, such as contracts or binding agreements and sanctioning systems, increase trustworthiness while undermining trust.

strangers both unnecessary and difficult. In contrast, Americans maintain a high-risk equilibrium in which those with the skill and the inclination to trust strangers are rewarded with better exchange opportunities. The low-risk equilibrium reinforces commitment to dense local relations with close monitoring and sanctioning, while the high-risk equilibrium reinforces the ability to judge the reliability of strangers.[3] In short, Yamagishi,'s structural theory of trust predicts different relational patterns underlying cross-national differences in trust.[4]

Hypothesis 4. Compared to Japanese, Americans are more likely to initiate exchanges with strangers.

Hypothesis 5. Compared to Americans, Japanese build more durable relations.

These relational patterns are crucial, because the central premise of Yamagishi's comparative research is that cross-cultural differences reflect the proximate effects of relational differences that shape cognition and behavior (Yamagishi 2003: 355; Yamagishi et al. 1998).[5] Instead of assuming "cross-cultural" differences as given, Yamagishi's approach is to explain them in terms of relational and institutional structures that characterize different societies. In this view,

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3 A recent study by Yamagishi, Kikuchi, and Kosugi (1999; also see Yamagishi 2001) illustrates this point. They demonstrate that high trustors outperform low trustors in detecting cheaters.

4 Although our study focuses on dyadic relations, Yamagishi's theory also applies to organizational and institutional systems for monitoring and sanctioning that sustain and organize durable relations and facilitate trust (see also Kramer & Tyler 1996; Fine & Holyfield 1996).

5 In Yamagishi's words: "The goal of cross-cultural experiments in psychology is to discern the universal from the culturally specific in the working of the human mind through comparisons of responses of people from various cultures. The goal of what I call 'cross-societal' experimentation … is quite different: to extract the effects of sociorelational factors from the so-called cultural differences. This is done by systematically controlling the theoretically specified sociorelational factors and observing whether the cross-cultural differences in participants' responses disappear…." (Yamagishi 2003: 355).

Japanese who are outside the constraints of densely clustered commitment relations , are no more trustworthy than Americans. Accordingly, Japanese and Americans should show similar levels of trust and trustworthiness when we controll for relational differences.[6]

Hypothesis 6a. Relational differences account for different levels of trust among Japanese compared to Americans.

Hypothesis 6b. Relational differerncesaccount for different levels of trustworthiness among Japanese compared to Americans.

CROSS-NATIONAL TRUST EXPERIMENTS

We tested our hypotheses in a novel Web-based laboratory experiment in which American and Japanese participants played a variant of the Trust Game over the Internet with partners from both countries. The standard Trust Game (Figure 1) models sequential exchange between two players, the "trustor" and the "trustee". The trustor receives an initial endowment and decides whether to make an entrustment to the trustee ("send") or not. If the trustor makes an entrustment, the trustee receives some multiple of the entrustment and decides whether to "return" the entrustment with the trustor for a mutual profit or to "keep" the entire entrustment. In a continuous version of the Trust Game (often called the Investment Game after Berg, Dickhaut, and McCabe [1995]), the trustor can send any amount not exceeding the available endowment, and the trustee can return any amount not exceeding the amount received.

[Figure 1 about here]

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6 This study focuses on the durability of embedded relationships. We leave for future research the effects of network structure, specifically, the clustering of relations.

Under the assumption of rational action, the standard game-theoretic solution is to not return entrustments, and knowing this, the trustor should not make any entrustments. Distrust is therefore the unique Pareto deficient subgame perfect equilibrium of the game. The dilemma is that the dominant choice for each player leads to a suboptimal collective outcome.

Similar games were used in previous studies on cross-national trust (Yamagishi et al. 1998; Croson and Buchan 1999; Buchan et al. 2002). However, these studies were conducted separately in Japan and the U.S., with no interaction between American and Japanese participants. These designs test for the effects of the nationality of participants, but a critical limitation is the inability to measure the effects of the nationality of the partner. In order to tease apart the effects of subject and partner nationality, we need to vary both the nationality of the subject *and* the nationality of the partner. An easy way to do that is to simply tell the participants that their partner is American or Japanese (regardless of their actual nationality). However, this only measures the effect of the *knowledge* of the partner's nationality, and not the *actual* effect of partner nationality as manifested in behavioral differences between Americans and Japanese. Participant's beliefs about the partner's nationality are sufficient for a test of the identity-theoretic predictions, but the structural theory is about behavioral dynamics in repeated interactions and therefore requires that we actually pair Japanese and Americans in repeated interactions where participants know the partner's nationality in one condition but not in another.

Methods

We conducted a laboratory experiment in which participants from the U.S. and Japan played a variant of the Trust Game ("Entrustment Game") with each other over the Internet. A total of eighty-two participants, 44 natural-born American undergraduates (22 males, 22 females) from a university in New York and 42 natural-born Japanese undergraduates (27 males, 15 females)

from a Japanese university were recruited by fliers to participate in a "Social Exchange Study." All sessions were run at 6 p.m. Eastern Standard Time in the U.S., which is 9 a.m. in Japan. Participants were promised a cash payment of $12 to $18 (1200 to 1800 Yen)[7], depending on their performance in the study.

Design

Each experimental session lasted 30 minutes and consisted of four American undergraduates and three or four Japanese undergraduates playing repeated Entrustment Game over the Internet in real-time. At regular intervals throughout the experiment, participants were given endowments of $.50. Participants could keep their entire $.50 endowment, or they could entrust some part of their endowment (up to $.50) to other participant(s). Participants could make entrustments only from their $.50 endowments; they could not entrust cumulative profits earned from past exchanges. Each entrustment was doubled by the experimental program and sent to a trustee, who could decide whether to return the entire amount as the trustor's payoff or to keep the entire amount as his or her own payoff. In each exchange, then, the payoff for the trustor was either zero (if trust was betrayed) or an amount $2x$, where x was the amount that was entrusted to the trustee ($0 \leq x \leq \$0.50$). The payoff for the trustee was either $2x$ (if trust was betrayed) or 0 (if the entrustment was returned). This means that trustees could earn profits only by betraying trust. Trustees who honored trust earned nothing, since splitting a profit was not an option. Instead, the incentive to honor trust was relational – the interest in building a mutually beneficial long-term relationship with a partner who can also be trusted.

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7 Approximately $1 = 100 Yen in 2001. Although we refer to all amounts in dollars, in all cases, Japanese participants received and exchanged equivalent values in Yen.

The amount entrusted (x) is used as the primary measure of trust, while the dichotomous decision to return an entrustment measures trustworthiness. In dyadic exchange, this operationalization of trust measures the willingness to transfer a valued resource to another person and make oneself vulnerable to exploitation, under conditions in which there is no incentive to be trustworthy other than as a way to signal commitment to an ongoing relation.

Our "Entrustment Game" differs from the standard Trust Game (e.g. Berg et al. 1995; Buchan et al. 2002;) in two important ways. First, trustors in our study made continuous (rather than binary) decisions, while trustees made binary (rather than continuous) decisions. The problem with the binary trust decision is that it conflates cooperation and trust in repeated interactions because trustors cannot calibrate the level of risk they are willing to accept (Yamagishi et al. 2005a). The problem with the continuous trustee decision is that it can invite fairness considerations (Pillutla and Murnighan 1995; Malhotra 2004), which in turn can constrain or bias the degree of reciprocation. In contrast, our Entrustment Game is designed to 1) unambiguously identify partners as trustworthy or not (depending on the decision to either return the entrustment or not), and 2) allow trustors to calibrate their willingness to trust more precisely than if they were restricted to a binary trust decision

Our second modification of the standard Trust Game is to remove the direct incentive for honoring trust, which yields a null payoff for the trustee instead of a positive payoff.[8] This design makes it possible to isolate an indirect incentive for honoring trust, namely, to induce the partner to reciprocate in a future exchange in which the roles are reversed. Including both direct and

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8 In the continuous Trust Game, the trustor decides how much of an initial endowment X to send to the trustee, where $X \geq x \geq 0$. The trustee receives triple the entrustment ($3x$) and decides how much to keep and how much to return to the trustor, $3x \geq y \geq 0$. The payoff for the trustor is $X - x + y$, and the payoff for the trustee is $3x - y$. In this design, it is possible for both to earn positive profits if $3x > y > 0$.

indirect incentives conflates their effects on trustworthiness, precluding the ability to unambiguously measure differences between Japanese and Americans in their responsiveness to durable relations as a pre-condition for trustworthy behavior.

During the experiment, the computer screen displayed information to each participant regarding who is currently entrusting how much to the participant and to whom and how much the participant is currently entrusting to others. Participants could not see other participants' activities, however. Participants were identified on the screen by random ID numbers. All instructions were reverse-translated by native speakers and given in English in the U.S. and Japanese in Japan. To minimize experimenter effects, instructions were delivered in writing through a custom computer program. Each experimental session was assigned randomly to either the flags-on condition (5 sessions) or the flags-off condition (6 sessions). In the flags-on condition, the computer screen displayed pictures of the American national flag or the Japanese national flag below each participant's ID. In the flags-off condition, no information regarding the nationality of each participant was given. Until debriefed after the experiment, participants in this condition were unaware that they were interacting with participants from another country.

Procedure

Upon entering the laboratory, participants were seated alone at a computer in separate rooms and completed a computerized tutorial with review questions to ensure full understanding of the experiment. The experiment began after all participants finished the instructions. After each experimental session, participants were debriefed one by one, paid according to their final earnings, and thanked for their participation.

Data and Measures

The computer at each terminal was connected over the Internet to a central server, which recorded the experimental condition (flags on or flags off) and participant information (nationality and gender) at the beginning of each session and data from each event within a transaction. A transaction was initiated each time a participant made an entrustment (the trustor event) and concluded with the partner's decision to return or not return an entrustment (the trustee event). In a given transaction, we refer to those who make the entrustment as the "trustor" and to those who receive the entrustment as the "trustee," although participants played both roles during the course of a session.

We used three variables, *nationality*, *in-group*, and *flag*, to test for the hypothesized effects of culture and social identity. *Nationality* was coded 1 for Japanese and 0 for Americans. *In-group* indicates whether the partner in the transaction was the same (1) or a different (0) nationality. *Flag* was coded 1 for the flags-on condition and 0 for the flags-off condition.

We tested the cultural hypotheses (that Japanese are more trusting and trustworthy) by measuring the main effect of *nationality* on the amount entrusted and the probability of return. We tested the social identity hypotheses (that participants, especially Japanese, are more trusting and trustworthy when the partner is known to be an in-group member) by measuring the interactions between *nationality, in-group* and *flag.*

Finally, we tested Yamagishi's structural theory by controlling for *durability*, *mutuality*, *risk*, and *provocation* as relational measures. We define "mutual relations" as long-term, mutually beneficial exchange relations characterized by reciprocity. Theoretically, we focus on reciprocity in ongoing, mutually beneficial relations as the primary mechanism for building durable relations in our experimental design. Operationally, we measure mutuality as the frequency of exchanges between two partners, where an exchange is defined as any entrustment

between the partners, one in each direction. An exchange occurs when A entrusts resources to B and B entrusts resources to A. No matter how many times A entrusts resources to B, the relationship has zero mutuality if B never entrusts to A. Operationally, this is simply *the lesser of the total number of previous entrustments from A to B and B to A*. If exchange frequencies are perfectly balanced between A and B, mutuality will be half the total number of entrustments (since two entrustments are required to complete an exchange). If two-thirds of all entrustments are from A to B, mutuality will be one-third of the total number of entrustments between the partners. If exchanges are perfectly imbalanced, mutuality will be zero. Mutuality thus captures both the total number of entrustments and the extent to which this number is evenly divided between the partners. The theoretical motivation for this measure is that the willingness of A to trust and continue exchanging with B depends not only on the extent to which B has returned A's past entrustments but also the extent to which B has entrusted A. This is important because we designed our Entrustment Game to eliminate direct returns to the trustee for returning entrustments, such that the only incentive to return an entrustment is to build an ongoing, bi-directional, mutually beneficial relationship.[9]

We also constructed a measure of *risk* as the proportion of past entrustments to the partner that were not returned. *Risk* thus measures the probability that an entrustment will be betrayed by the trustee. Finally, we included a measure of *provocation* to capture the recency

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9 Alternatively, *mutualility* could be decomposed into its two components, the total number of entrustments to and from the partner and the "balance of accounts" between giving and receiving entrustments. However, imbalanced exchange relations tend to limit the total number of entrustments, making the separate measures highly collinear.

effect of having just been betrayed in the last entrustment to the partner.[10] Taken together, these three relational measures capture the extent to which A has built a mutually beneficial—long-term relationship with B characterized by mutual (bi-directional) trust and trustworthiness.

Finally, our control variables include entrustment size (*funds available* or *amount entrusted*), the number with the same nationality as the participant (*in-group size)*, and gender of the participant (*female)*. As a measure of trust, entrustment size was directly constrained by the amount of funds available; as a covariate of trustworthiness, entrustment size determined the degree of temptation to cheat. We also controlled for in-group size, because there was necessarily one (the participant him- or herself) less in the in-group than the out-group for sending entrustments. Finally, it is important to control for gender effects; past studies have found gender differences in cooperation and trust apart from cultural differences (Buchan and Croson 1999), and our Japanese sample contained slightly fewer females.[11]

RESULTS

Entrustment Size: Japanese are not more trusting than Americans.

The cultural theory of trust suggests that Japanese are more trusting than Americans (Hypothesis 1a), while social identity theory implies that Japanese are more likely to trust Japanese partners

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10 An alternative specification is to combine risk and provocation using a single measure that weights recent betrayals more heavily. Our two unweighted measures – one cumulative (risk), one recent (provocation) – impose fewer assumptions about the shape of the decay function and provide a more conservative test of the effects of relational structure. As robustness checks, we tested this alternative specification as well as a two others that use raw measures of the number of entrustments and the number of defections (by both the participant and the partner). We found substantively similar results.

11 None of these covariates interacted with nationality. We therefore report the main effects only.

identified as in-group members (Hypotheses 2a and 3a). The structural theory of trust predicts no differences in trust between American and Japanese participants, net of differences in relational mutuality (Hypothesis 6a). Table 1 reports descriptive statistics. Table 2 reports the results of random-effects regression models predicting the amount entrusted in each transaction. Model 1 reports main effects. The nested models include interaction effects (Model 2) and measures of embeddedness (Model 3).[12]

[Table 2 about here]

The results provide no support for Hypothesis 1a. Unlike in previous studies (Cook et al. 2005; Buchan et al. 2002), no difference obtained between Americans and Japanese in entrustment size.[13] In both Models 1 and 2, neither the main effect of trustor *nationality* nor its interaction with *flag* is significant. However, we found clear support for Hypothesis 2a. As shown in Model 2, the *in-group x flag* interaction is significant and in the predicted direction, indicating that the flags-on condition induced in-group trust, as predicted by social identity theory. In contrast, the *nationality x in-group x flag* interaction is not significant; contrary to Hypothesis 3a, Japanese did not entrust more to in-group partners than did Americans. This suggests that shared nationality with the trustee matters in deciding how much to trust, regardless of the nationality of the trustor.

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12 Because participants are statistically non-independent across time and partners in the repeated-measures structure of our data, ordinary least squares regression is inappropriate. Instead, we estimated fixed effects and time-varying effects using random-effects time-series regression models. Our models used the standard Huber-White robust variance estimator to adjust for within-subject heterogeneity.

13 There are at least two possible explanations for this inconsistency. First, Buchan *et al.* (2002) precluded repeated exchanges. Second, Cook *et al.* (2005) precluded partner selection. These features in our design were to facilitate commitment formation but may also have attenuated the main effects of nationality.

Hypothesis 6a is moot, since there is no effect of nationality on trust to be accounted for by the mutuality of the relation. Nevertheless, suggestive of Yamagishi's structuralist claims, the effects of the three relational measures are highly significant. *Mutuality* has a positive effect on entrustment size while *risk* has a large negative effect. This indicates that participants made larger entrustments to frequent exchange partners and greatly reduced entrustments to those who had cheated them. Furthermore, the *in-group x flag* interaction is no longer significant in the presence of the relational measures. Hence, it appears that the effect of in-group-favoritism on trust was moderated by relational differences associated with in-group exchange partners.

Returning Entrustments: Japanese appear more trustworthy than Americans

Based on the theory of collectivist culture, Hypothesis 1b predicts that Japanese trustees are more likely than Americans to return entrustments, regardless of the nationality of the trustor or whether the nationality is known. Based on social identity theory, Hypothesis 2b predicts that participants in the flags-on condition (but not in the flags-off condition) are more likely to return entrustments to in-group partners than to out-group partners; Hypothesis 3b predicts that this pattern is more pronounced for Japanese. Hypothesis 6b predicts no differences in trustworthiness between American and Japanese participants net of relational differences.

Table 3 reports the coefficients from random-effects logistic regression analyses of trustworthiness. The dependent variable is a binary measure indicating whether the trustee in the transaction returned the entrustment (1) or not (0). As in Table 2, Model 4 reports main effects. The nested models include interaction effects (Model 5) and relational measures (Model 6).

[Table 3 about here]

Model 4 provides support for the cultural explanation (Hypothesis 1b). The positive effect of *nationality* indicates that, whether or not the partner's nationality was known, Japanese participants were more likely than Americans to refrain from exploiting their partners and return entrustments. The main effect of *nationality* persists even when we add interaction effects in Model 5. Indeed, including the interaction effects of *nationality*, *in-group*, and *flag* slightly strengthens the main effect of *nationality*. This indicates that Japanese are more trustworthy regardless of the partner's nationality and whether or not the trustor's nationality was known.

Consistent with social identity theory (Hypothesis 2b), the positive effect of the *in-group x flag* interaction indicates greater trustworthiness towards in-group partners only when the partner's in-group membership was known. Contrary to Hypothesis 3b, however, the three-way interaction *nationality x in-group x flag* was negative and significant, which means that the effect of partner nationality on trustworthiness was evident not among the collectivist Japanese, among whom nationality is usually expected to be more salient, but among the Americans.[14]

Model 6 tests the structural hypothesis that cross-cultural differences in trustworthiness reflect relational differences (Hypothesis 6b). The results show a positive effect of *mutuality* and a negative effect of *risk*, suggesting that cheating is less likely against long-time partners and more likely against dishonest partners. More importantly, *nationality* is no longer statistically significant after controlling for these effects, suggesting that the nationality effect was mediated by relational patterns. In other words, Japanese were more trustworthy than American

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14 Although this result may appear anomalous, exploratory analysis suggests that the three-way interaction actually reflects the positive effect of in-group identity to discipline Americans toward each other, rather than a negative effect of identity salience on Japanese in-group exchanges. Japanese in the flags-on condition were no less trustworthy with each other than they were in the flags-off condition, but Americans in the flags-on condition were significantly more trustworthy with each other than they were in the flags-off condition.

participants, but the mechanism does not appear to be the culture of collectivism. Rather, consistent with Yamagishi's claim, Japanese were more trustworthy, but only to the degree that they presumably formed more long-term, mutual relations than Americans. In this sense, the main effect of *nationality* in Models 4 and 5 was a consequence of the different relational patterns among Japanese and Americans.[15]

Choice of Partner: Americans are more trusting of strangers

While we found no difference between Americans and Japanese in entrustment size, Yamagishi's theory is more specifically about *generalized trust*—trusting strangers in order to navigate the market—than trust in familiar partners. In this sense, a more critical test of the theory is not how much more Americans entrusted *per se* but whether Americans were more likely than Japanese to make entrustments to strangers (Hypothesis 4). Table 4 reports results from a random utility model predicting the likelihood of choosing a particular partner in each transaction.[16] The dependent variable is which partner was chosen by the trustor for an

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15 Two recent studies support this interpretation. In Buchan et al. (2002), Japanese participants reciprocated no more than Americans did in one-shot exchanges. Cook et al. (2005) found no clear difference between Japanese and Americans in trustworthiness, controlling for relational patterns experimentally. Our results in turn show that "cross-cultural" differences in trustworthiness emerge once endogenous exchange relations are allowed.

16 We considered two approaches to testing trust in new partners. One is to simply compare how much participants entrusted in new partners. We found no cross-national difference in the amount of entrustments to new partners. This approach does not account for partner choice in our experimental design, however (and therefore fails to distinguish, for example, between entrusting a large sum in a single new partner and entrusting smaller sums in many new partners). The other approach is to employ random utility models (McFadden 1973) to estimate the probability of selecting a particular option over other alternatives by assigning a utility distribution over the choice set based on attributes of each alternative. The random utility framework is more appropriate for testing partner choice (whom to trust) than other approaches predicting entrustment in particular partners (how much to trust). We controlled for participant-level heterogeneity by clustering exchanges within participants as in our other analyses.

entrustment. The main predictor of interest was whether the trustor chose a *stranger* (1) with no prior history of exchange with the trustor or not (0). Because random utility models do not allow within-participant effects, *in-group* and *flag* were dropped from the analysis. Instead, the flags-on and the flags-off conditions were analyzed separately, and the effect of trustor nationality was estimated using the *nationality x stranger* interaction.

[Table 4 about here]

In both conditions, the relational measures are associated with significant effects. The choice of a partner is positively correlated with the number of previous exchanges with the partner and negatively correlated with the frequency of defections by the partner. Hence, both Americans and Japanese were more likely to choose a particular partner the more often they had chosen that partner and the more trustworthy that partner had been in the past. Similarly, in both experimental conditions, participants were generally less likely to make entrustments to strangers than to familiar partners, as indicated by the negative effect of *stranger*.

Beyond these effects, neither model yields a significant coefficient for *in-group* or *nationality x in-group*, showing no evidence for in-group favoritism in partner choice.[17] Also inconsistent with the culturalist assumption that Japanese are more trusting, *nationality x stranger* is statistically non-significant in the flags-on condition and negative in the flags-off condition, suggesting that Japanese were no more likely than Americans to initiate exchanges with strangers in the flags-on condition, while Americans were more likely than Japanese to

17 It is not surprising that *in-group* had no significant effect in Model 8 when participants did not know who was whom in the flags-off condition. Since the substantive results remain the same with or without this variable, we omitted it for comparability with Model 7.

choose strangers than in the flags-off condition.[18] This result lends partial support to Hypothesis 4, based on Yamagishi's claim that Americans have higher levels of trust in strangers than do Japanese.

Japanese develop more mutually beneficial relationships

According to Yamagishi, trust and commitment are alternative solutions to the problem of uncertainty. While people in highly mobile societies learn to navigate fleeting relations with unfamiliar partners, those with a small number of long-term partners come to prefer the relative safety of commitment relations based on repeated exchanges. Consistent with this theory, we found that Americans are more likely to trust strangers than Japanese were. The flipside of the argument is that Japanese are more likely than Americans to develop ongoing relationships charactereized by mutual trust (Hypothesis 5). To test this prediction, we first performed discrete-time survival analyses of exchange relations, using a logit model with clustering for within-participant heterogeneity and contolling for group size differences at the level of each exchange. The dependent variable is whether or not a given entrustment was the last entrustment to the partner (=1) or not (=0). The results are reported in Table 5. Model 9 reports the baseline results, and Model 10 includes interaction effects. The crucial test for Hypothesis 5 is the *nationality* x *mutuality* interaction. A negative coefficient for this effect indicates that Japanese exchange relations are more likely to survive the longer they have already survived. As Model 10 shows, that appears to be the case. The *nationality* x *mutuality* interaction is associated with negative coefficients, indicating that Japanese relations grew more durable over time. Note that

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18 Note that participants were much less likely to make entrustments to strangers in the flags-on condition. We speculate that differences in generalized trust between Japanese and Americans may have been washed away by social identity effects.

nationality and its other interactions are not significant. Thus, it is not the case that Japanese were simply more reluctant to leave any exchange relations. Rather, Japanese appear to more greatly value and maintained relations characterized by mutual trust.

[Table 5 about here]

Finally, as an additional test, we calculated a Herfindahl concentration score to compare the extent to which participants favored or committed to particular partners to the exclusion of the others.[19] Table 6 reports the results of an ordinary least squares regression analysis predicting commitment patterns. By far the strongest predictor is the Herfindahl score for entrustments received. To the degree that participants received entrustments from fewer partners, they also made entrustments to fewer partners suggesting norms of reciprocity. Controlling for this and other covariates, *nationality* yielded a small but positive coefficient. This provides further evidence that Japanese participants exchanged more frequently with fewer partners, above and beyond what reciprocity would directly account for.

DISCUSSION

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19 The Herfidahl score is an econometric index for measuring the level of competition among firms as a function of industry size and the market share of each firm and is mathematically equivalent to Kollock's (1994) measure of commitment. In our case, $H_i = \sum_{p}^{P} \frac{e_{ip}^2}{T_i}$ for each participant *i*, where *e* is the number of entrustments to partner *p*, *T* is the total number of entrustments to all partners, and *P* is the total number of partners in the session. A Herfindahl score of 1 indicates commitment to one partner to the complete exclusion of others and 0 indicates exchanges with all partners with equal frequency.

This study tested a set of hypotheses derived from cultural, cognitive, and structural explanations for differences in trust and trustworthiness between collectivist and individualist societies. The results offer support for the novel hypothesis that Japanese favor long-term relations while Americans are more willing to explore new exchange opportunities. Japanese participants exchanged entrustments more frequently and built more durable relationships than did Americans. In contrast, Americans were more likely than Japanese to initiate exchanges with anonymous strangers. These results support Yamagishi's theory that Japanese participants reduce uncertainty by forming durable relationships, while Americans are more likely to navigate the market by exploring new opportunities with new partners.

Our analyses found little support for the theory that a collectivist culture promotes greater trust and trustworthiness among Japanese compared to Americans. Nationality had no effect on entrustment size, and we found that Americans, not Japanese, were more likely to initiate exchanges with strangers. Most notably, while we found that Japanese were more likely to return entrustments than were Americans, this difference disappeared when we controlled for relational patterns (i.e. the mutuality of relations and the trustworthiness of the partner).[20]

The results also provide mixed support for the social identity theory hypotheses predicting greater trust and trustworthiness between members of the same group. Both Americans and Japanese in the flags-on condition were more likely to make and return entrustments to in-group partners than to out-group partners. However, these patterns also disappeared once controlled for the relational measures. Finally, we conjectured that nationality

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20 This is not to suggest that cultural differences can be reduced entirely to structure. The present study shows how relational differences may account for cross-cultural patterns. This in no way precludes the possibility that cultural values, beliefs, and norms also shape observed differences between the U.S. and Japan in the pattern of social relationships.

would be more salient in collectivist cultures than among individualists, but the results did not bear this out. Shared nationality had no effect on willingness to entrust for either Americans or Japanese. Curiously, it was the Americans, not the Japanese, who responded more positively to identity salience by returning entrustments more to in-group partners. Findings from recent social identity theory research provide a plausible explanation. While social identity theory has been widely supported in studies of Western populations, the theory has received surprisingly limited and inconsistent support among East Asians (Yuki 2003). Studies by Smith and Bond (1999) and Triandis (1989), as well as his own research, led Yuki (2003: 168) to conclude that "there is virtually no support for the claim that people in collectivistic cultures tend to show greater in-group favoritism than do people in individualistic cultures" (see also Matsumoto 2002). These studies suggest that East Asians are no more likely than Westerners to engage in intergroup comparisons that motivate in-group favoritism and out-group derogation or discrimination.[21] Rather, it appears that East Asians and Westerners value different forms of social identity. A recent study by Yuki et al. (2005) shows that East Asians trust strangers based on relations, Westerners based on group membership.

Our findings are consistent with this pattern. Whereas Americans were more likely than Japanese to initiate exchanges with strangers in the absence of salient social identity and value in-group partners otherwise, Japanese built more durable relations. These divergent relational

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21 We thank an anonymous SPQ reviewer for suggesting the alternative possibility that, in the flags-off condition, Japanese participants identified with other participants more strongly than American participants did, under the presumption that people perceive each other to be more similar to them in a culturally homogenous society like Japan than in the U.S. We speculate that this is unlikely to have induced greater social identification among Japanese participants, since they had no awareness of an out-group in the flags-off condition, which social identity theory typically assumes to be necessary (e.g. Turner et al. 1987). Nevertheless, more research is needed to explore the nature of social identity in collectivist cultures in general.

patterns in turn led Japanese to be more trustworthy than Americans, but this difference in trustworthiness also disappeared when we controlled for the mutuality of interaction. From this perspective, Japanese may appear more trustworthy, but only to the extent that they participate in ongoing commitment relations. Put differently, Japanese collectivism encourages trustworthiness indirectly, via the preference for more durable relations.

This interpretation is also consistent with previous research on commitment formation. Yamagishi contends that collectivist societies are more likely to have a low-risk equilibrium in which the risk of being cheated is reduced by long-term commitment relations that preclude the skills required to navigate uncharted social terrain. In contrast, individualist societies are more likely to have a high-risk equilibrium in which these navigational skills are rewarded and reinforced by the greater opportunities to be found outside the safety of densely clustered network neighborhoods. In an initial test of this theory, Yamagishi et al. (1998) presented Japanese and American participants with a series of forced-choice options to stay in the current relationship or leave for a new exchange partner. All partners were anonymous (and simulated, unbeknownst to participants). The researchers found that Americans were more likely than Japanese to explore new exchange relations. Our study extends their results to cross-cultural interactions in an open-choice environment where participants can choose from among multiple partners and decide whether and with whom to build long-term relationships.

It is worth noting, however, that, while Americans were less likely to develop durable relations, we found no cross-national difference in the level of trust or trustworthiness within durable relations. Neither *nationality* X *durability* nor *nationality* X *risk* obtained a significant effect on the size of entrustments or the propensity to return entrustments. Thus, the effect of

durabililty was the same for Americans and Japanese while the degree to which they entered durable relations differed.

Methodologically, our contributions to the literature on trust experiments are three-fold. First, our study is among the first cross-cultural laboratory studies to allow between-group interaction. This is necessary to test the effects of the nationality of both the actor and the partner on trust and commitment. Although Buchan et al. (2003) crossed the nationality of participants with in-group and out-group partners, participants and partners were from the same culture, and their interactions were limited to one-shot interactions. Second, our "open market" design goes beyond previous studies to examine the evolution of behavioral commitment in market exchanges with multiple alternative partners in real-time. Yamagishi et al. (1998) allowed repeated interactions, but only in forced-choices between staying with and leaving a particular partner for a random new partner. By combining an "open market" design with possibilities for partner selection and relational formation, our design helps capture cultural, cognitive, and structural influences on trust and trustworthiness in a more dynamic context. Third, we introduced a new game to better isolate the incentives for building reciprocal relations in repeated exchanges. Whereas the standard Trust Game is sufficient for studying trust in one-shot exchanges, we believe our Entrustment Game helps clarify the structural conditions underlying the emergence of reciprocity in durable relations.[22]

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22 These innovations are not without limitations. The experimental design did not allow us to manipulate relational dynamics to test the effect of durable relations on trust and trustworthiness. We also did not manipulate social identity (as a member of an in-group) independently of national identity (as American or Japanese). By turning the flags on, we may have activated national identity as well as social identity. Nor did we directly compare our Entrustment Game with results using the standard Trust Game..Our experimental design extends previous research on cross-cultural trust (e.g. Yamagishi et al. 1999; Buchan et al. 2003), but follow-up studies are needed that go beyond the small step we have taken here to study cross-cultural differences in the laboratory.

CONCLUSION

This study was designed to address a specific cross-cultural comparison of the levels of trust in the U.S. and Japan. However, the similarities and differences we observed in this experiment may generalize to cross-cultural patterns in other countries as well. In particular, our results point to the need for more research on the structural underpinnings of differences between collectivist and individualist cultures both within and outside Asia and the West. Rather than simply assuming that these cultural differences have cultural explanations, our hope is to draw more scholarly attention to the need to unpack the cultural "blackbox" and to better specify the ways in which culture and structure interact.

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Table 1. Summary results by experimental condition and participant nationality

Condition	Flags On				Flags Off			
Participant nationality	American		Japanese		American		Japanese	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Total Earnings (cents/Yen)	1199.96	350.09	1073.40	401.01	1012.50	451.06	953.69	484.68
Average entrustment to US, per event	11.37	6.16	14.26	10.23	10.18	4.37	14.37	9.35
Average entrustment to JP, per event	15.26	12.26	9.57	5.73	13.37	7.99	10.02	4.27
Average amount of cheating US, per event	10.40	3.17	11.60	5.12	9.23	5.50	11.75	5.83
Average amount of cheating JP, per event	12.53	7.40	9.97	4.66	12.84	8.79	8.87	3.00
Frequency of entrustments to US, per partner	11.37	8.22	10.63	8.13	9.55	8.68	10.29	8.17
Frequency of entrustments to JP, per partner	10.35	6.41	13.93	13.64	11.42	8.61	14.41	12.34
Frequency of cheating US, per partner	1.55	1.93	3.30	3.31	5.25	3.69	5.54	4.35
Frequency of cheating JP, per partner	2.56	3.10	1.56	2.61	5.50	4.94	3.00	3.42

Notes: US = American participant, *JP* = Japanese participant

Table 2. Random-effects logistic regression analyses predicting trust (entrustment size)

		Model 1		Model 2		Model 3	
VARIABLES	Effect[a]	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Main effects							
Nationality	F	-0.22	1.77	-.07	2.28	.07	2.20
In-group	R	-0.98	1.42	.76	2.09	1.68	2.05
Flags	F	1.62	1.76	1.06	2.30	.93	2.22
Interaction effects							
Nationality x In-group	R			-.65	.59	-1.50	.58
Nationality x Flags	F			.07	3.38	.09	3.25
In-group x Flags	R			1.28**	.51	.89	.51
Nationality x In-group x Flags	R			-.25	.75	.53	.74
Embeddedness							
Mutuality	R					>.01**	>.01
Risk	R					-9.92**	.90
Provocation	R					.49	.30
Control							
Funds available	R	.07**	>.01	.07**	>.01	.07**	>.01
Trustor is female	F	-0.66	1.79	-0.67	1.71	-.46	1.65
Partner's group size	R	-0.58	3.29	-5.13	4.47	-6.54	4.39
Intercept		11.48	1.73	11.64	1.81	11.51	1.74
R-sq: within		0.06		.06		.10	
R-sq: between		0.01		.01		.02	
R-sq: overall		0.01		.01		.02	
X^2		355.25**		367.06**		586.52**	
Number of observations	5582						
Number of groups	82						
Observations per group: minimum	9						
Observations per group: average	68.1						
Observations per group: maximum	188						

Notes: [a]F denotes a fixed effect. R denotes a random effect.
*p<.05, **p<.01. All tests are two-tailed.
Nationality denotes Japanese = 1.

Table 3. Random-effects logistic regression analyses predicting trustworthiness (returning entrustment)

		Model 4		Model 5		Model 6	
VARIABLES	Effect[a]	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Main effects							
Nationality	F	.53**	.24	.60**	.20	.36	.21
In-group	R	.30	.15	.02	.18	-.08	.18
Flags	F	.92**	.32	1.09**	.26	.55**	.23
Interaction effects							
Nationality x In-group	R			.36	.28	.04	.30
Nationality x Flags	F			-.19	.34	.40	.35
In-group x Flags	R			.84**	.29	.55	.29
Nationality x In-group x Flags	R			-1.35**	.44	-1.22**	.45
Embeddedness							
Mutuality	R					.21**	.02
Risk	R					-1.34**	.28
Provocation	R					-1.42**	.18
Control							
Size of entrustment	R	.03**	>.01	.03**	>.01	>.01**	>.01
Trustee is female	F	.36	.26	.58**	.15	.32**	.15
Partner's group size	R	.34	.92	.08	1.18	-.67	1.22
Intercept		.85**	.37	.87**	.35	2.03**	.68
Log likelihood		-1684.47		-1677.34		-1516.50	
X^2		38.77**		92.77**		342.14**	
Number of obs		5582		5582		5582	
Number of groups		82		82		82	
Observations per group: minimum		9		9		9	
Observations per group: average		68.1		68.1		68.1	
Observations per group: maximum		188		188		188	

Notes: [a]F denotes a fixed effect. R denotes a random effect.
*p<.05, **p<.01. All tests are two-tailed.
Nationality denotes Japanese = 1.

Table 4. Random utility models predicting partner choice

VARIABLES	Effect[a]	Model 7 (Flags On) Coef.	S.E.	Model 8 (Flags Off) Coef.	S.E.
Main effects					
In-group	R	-.02	.06	-.09	.06
Stranger	R	-.47**	.10	-.03*	.01
Interaction effects					
Nationality x In-group	R	-.05	.12	.03	.10
Nationality x Stranger	R	.21	.14	-.41**	.13
Embeddedness					
Mutuality	R	.04**	>.01	.09**	>.01
Risk	R	-.75**	.05	-.25**	.02
Provocation	R	-.34**	.03	-1.84**	.02
Control					
In-group size of partner	R	-.28*	.11	-.18*	0.08
Log likelihood		-4430.93		-5391.15	
X^2		53.73**		74.14**	
Number of observations		20475		16107	

Notes: [a]F denotes a fixed effect. R denotes a random effect.
*p<.05, **p<.01. All tests are two-tailed.
Nationality denotes Japanese = 1.

Table 5. Discrete-time survival analyses predicting end of exchange relations

		Model 9		Model 10	
VARIABLES	Effect[a]	Coef.	S.E.	Coef.	S.E.
Main effects					
Nationality	F	-.10	.15	.32	.26
In-group	R	-.19	.17	-.14	.21
Flags	F	.40*	.15	.50*	.24
Embeddedness					
Mutuality	R	>.01**	>.01	>.01**	>.01
Risk	R	2.42**	.42	2.39**	.42
Provocation	R	1.74**	.13	1.76**	.13
Interaction effects					
Nationality x In-group	R			-.42	.34
Nationality x Flags	F			-.25	.35
In-group x Flags	R			-.08	.28
Nationality x In-group x Flags	R			.29	.42
Nationality x Mutuality	R			>-.01**	>.01
Control					
Funds available	R	-.01**	>.01	-.01**	>.01
Trustee is female	F	-.07	.15	-.03	.15
In-group size of partner	R	-.33	.92	-1.26	1.26
Intercept		-2.60**	.55	-2.32**	.71
Log likelihood		-1585.77		-1497.66	
X^2		268.81		279.16	
Number of observations	5582				
Number of groups	82				
Observations per group: minimum	15				
Observations per group: average	68.1				
Observations per group: maximum	149				

Notes: [a]F denotes a fixed effect. R denotes a random effect.
*p<.05, **p<.01. All tests are two-tailed.
Nationality denotes Japanese = 1.

Table 6. OLS regression analysis predicting commitment (Herfindahl index of partner choice)

	Model 11	
VARIABLES	Coef.	S.E.
Nationality	.11*	.05
In-group	.34	.40
Flags	.00	.05
Nationality x flags	-.03	.07
Participant is female	-.05	.04
Number of partners	-.01	.04
Herfindahl of entrustments received	.65**	.26
Total number of entrustments given by participant	>-.01**	>.01
Total number of entrustments received by participant	>.01	>.01
Intercept	.24	.33
R-squared	.34	
Number of observations	82	

Notes: *p<.05, **p<.01. All tests are two-tailed.
Nationality denotes Japanese = 1.

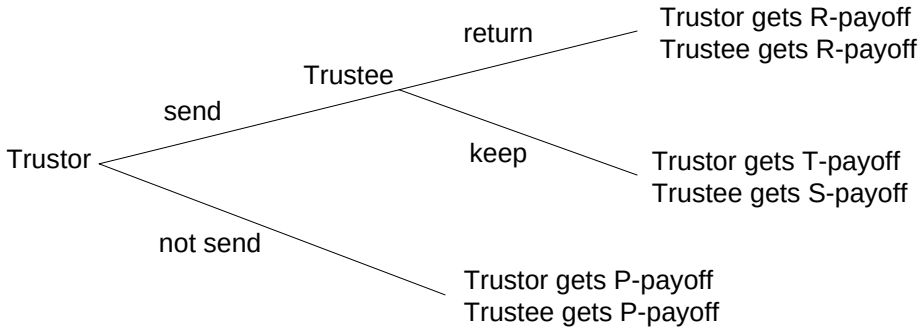

Figure 1. Trust Game