

# Trust and embedded markets: A multi-method investigation of consumer transactions<sup>☆</sup>

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## Abstract

Previous work shows that, as the buyer's uncertainty about the quality of some good or service increases, so does the tendency to purchase that good or service via embedded transactions, rather than from strangers. While this previous work explains variation in embedded exchange across different types of purchases, it does not address variation in embedded exchange across persons. Our research integrates the embeddedness and trust literatures to explain variation in within-network exchanges based on an interaction of the purchaser's generalized trust and the level of uncertainty entailed in the purchase (i.e., whether there exists an incentive for the seller to misrepresent the quality of some good or service). For purchases involving uncertainty, low-trusters will tend to forgo risky transactions with strangers, opting instead for the increased certainty of embedded markets. High-trusters, on the other hand, will be more likely to transact with strangers (despite the increased risk), from whom they can often find better deals. We should not expect any differences between high- and low-trusters for products that do not entail uncertainty. Results from two data sources, responses from a nationally representative survey of the U.S. population and behavioral responses in new laboratory experiments, provide support for the arguments.

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In the model of perfect markets proffered by classical and neo-classical economics, self-interest motivates action through the acquisition of benefits provided by goods and services. The perfect market is comprised of a large number of anonymous buyers and sellers who exchange goods under conditions of perfect information and certain outcomes. As a result, as explained below, social relations have no bearing on transactions in models of perfect markets (Granovetter, 1985; Williamson, 1975). But, as has often been noted (e.g., Granovetter, 1985; Podolny, 1993; Uzzi, 1996), highly stylized or perfect markets occur rarely, if ever, in the real world. Instead most economic decisions happen in imperfect markets, where outcomes are uncertain and actors make use of social relations, either as exchange partners, sources of information about exchanges, or both. Thus, a key agenda for research in economic- and rational choice-sociologies has been to understand the conditions under which actors use existing

social relations for economic exchanges (Lie, 1997; Smelser and Swedberg, 1994).

As just mentioned, one condition that creates imperfect markets is the presence of *uncertainty*. A long line of research views the reliance on social relations as a solution to various forms of uncertainty (see Buskens, 2002; Kollock, 1994; Raub and Weesie, 1990; Yamagishi et al., 1998). The basic message is that as the uncertainty inherent in the purchase of some good or service increases, so does the tendency for actors – whether individual consumers or corporate actors – to rely on social relations.

While few, if any, doubt the promise of an embeddedness approach to economic life, a number of researchers have called for further specification in this area of investigation. Portes and Sensenbrenner (1993), for instance, note that most embeddedness research illustrates important limitations of models that assume perfect markets, but does not offer much in the way of specific predictions. We agree with Portes and Sensenbrenner (1993), as well as more recent critics such as Mizruchi et al. (2006: p. 310), who note that studies of embeddedness “have gone far in demonstrating that networks matter, but they have contained the seeds of something more: that the extent to which networks matter varies across actors and situations.”

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The argument outlined in this paper offers specific predictions about who relies on social networks for consumer transactions. To do so, it builds on two distinct lines of research in economic and rational choice sociology: the literatures on embeddedness and generalized trust. We show that, together, these two approaches can generate specific predictions about when (and for whom) networks matter.

To anticipate, the present work predicts *person*  $\times$  *situation* interaction effects on tendencies to engage in embedded versus non-embedded transactions. The argument explains variation in within-network exchanges based on an interaction of the purchaser's generalized trust and the level of uncertainty that the purchase of a product or service entails. As discussed more fully below, a buyer may face a number of different types of uncertainty (see Barrera, 2005: pp. 17–19). Our research only addresses those cases in which a buyer is uncertain about whether a prospective seller will exploit an information asymmetry to abuse the buyer's trust (e.g., by advertising a "peach" but delivering a "lemon"). We argue that, in markets in which sellers have incentives to misrepresent the quality of goods or services, buyers low in general trust will tend to forgo attractive transaction opportunities available from strangers, opting instead for the increased certainty of embedded transactions. High-trusters, on the other hand, will be more likely to transact with strangers from whom better deals may be found (due to market forces), despite the higher level of uncertainty involved (Kollock, 1994; Yamagishi et al., 1998).

Importantly, uncertainty about whether sellers will misrepresent quality, rather than a general preference for embedded transactions, is predicted to generate differences in embedded transactions between high- and low-trusters. As explained below, we should not observe a difference in high versus low-trusters' tendencies to make purchases from ties versus non-ties when the quality of products and services are known at the point of purchase.

Summing up, this paper builds on previous work to predict who buys what types of products through embedded versus non-embedded transactions. While low-trusters are predicted to rely heavily on networks for purchases involving uncertainty, we predict that the economic activities of high-trusters will more closely resemble those predicted by models of perfectly competitive markets. To test our arguments, we draw on data from nationally representative surveys and controlled laboratory experiments. Following others (Barrera, 2005; Buskens, 2002), we show the value of such a multi-method approach for addressing problems of trust and embeddedness.

The sections to follow outline research on embeddedness and generalized trust, respectively. We then integrate these strands of theorizing to derive predictions linking embeddedness to generalized trust, and present an initial test of the arguments using data from the General Social Survey. Thereafter we address some limitations of the General Social Survey data and measures, and outline an experiment designed to overcome these limitations. The experimental results, as explained below, strongly support the argument but raise questions about one of our measures of trust. We report results from an auxiliary experiment designed to address these questions. The auxiliary study provides fur-

ther confidence in the measure of trust and, indirectly, for our conclusions linking trust, uncertainty, and embeddedness. The paper concludes with a discussion of limitations, implications, and suggestions for future work.

## 1. Embeddedness and uncertainty

The bulk of research on the role of social relations in economic activity has built on the concept of embeddedness. Inspired by Granovetter's (1985) seminal piece, the "bedrock assumption of the embeddedness approach is that social networks – built on kinship or friendship, trust or goodwill – sustain economic relations and institutions" (Lie, 1997: p. 349; for a review, see Powell and Smith-Doerr, 1994).<sup>1</sup> This basic assumption has generated a number of formal models (e.g., Montgomery, 1998; Raub and Weesie, 1990) and an explosion of empirical work on everything from interfirm networks to immigrant enterprise (see chapters in Smelser and Swedberg, 1994).

If there is a unifying theme in the theoretical and empirical literatures on embeddedness, it is that reliance on social relations helps solve problems created by *uncertainty* (Buskens, 2002). Following Knight (1921), we define an uncertain situation as one in which the objective probabilities associated with relevant outcomes are unknown to the actors involved. Uncertainty may arise from a number of different sources, both exogenous (caused by the natural world) and endogenous (caused by the actions and decisions of other actors). For example, the purchaser of a new home may face the possibility that it will be destroyed by a storm, catch fire because the electrician was unqualified, or leak because a roofer (acting opportunistically) used cheap and inferior building materials. (For a detailed discussion of types of uncertainty, see Barrera, 2005: p. 17ff.)

We are interested in how embeddedness solves a particular type of endogenous uncertainty: when sellers have an incentive to exploit information asymmetries and abuse buyers' trust. Comparisons of rubber and rice markets show particularly clearly the importance of this type of uncertainty in shaping economic markets (Kollock, 1994). A buyer can determine the quality of rubber only after extensive processing. The quality of rice, on the other hand, can easily be discerned at the point of purchase. This difference in uncertainty, Kollock notes, underlies the different forms Thailand's rubber and rice markets take on: while rice is usually traded impersonally in auctions resembling the perfect markets model, rubber markets tend to be characterized by more personal long-term relations.

Importantly, the impact of uncertainty on embeddedness has been replicated in controlled experimental investigations of exchange. These studies show that, as uncertainty increases, actors become increasingly willing to forgo potentially profitable deals from unknown exchange partners for the safety and relative certainty of ongoing exchange relationships (Kollock, 1994; Yamagishi et al., 1998).

<sup>1</sup> As explained below, the concept of trust has been invoked in a number of studies of embeddedness. But these studies refer to dyadic trust, rather than generalized trust. We discuss this distinction below.

DiMaggio and Louch (1998) advanced an uncertainty argument like the one just outlined to explain the conditions under which individual consumers rely on social ties for their purchases. They show that, as the uncertainty involved in the quality of goods (or services) increases, so does the tendency for actors to obtain these goods via embedded transactions. This simple embedded transactions framework is effective at explaining why certain types of purchases (i.e., those that entail more uncertainty) are more likely than others to occur within networks (those that entail less uncertainty). But, as mentioned earlier, there is much room for increased explanatory power.

Consider, for instance, the purchase of a used car without a written warranty. DiMaggio and Louch (1998) show that roughly half of used automobile purchases are from social ties and the other half from strangers. We know from an uncertainty and embeddedness framework that, *ceteris paribus*, we should expect more embedded purchases of used cars than new cars. But how do we explain the tendency for half of the respondents to purchase used cars from social ties while the remaining half make similar purchases from strangers? Part of the explanation is obvious, but theoretically uninteresting (at least to us): the person may or may not be tied to a seller who has the type car she wants to purchase. Thus, *availability* of the desired product undoubtedly explains some variance in embedded transactions.

The more interesting question is: holding constant the availability of an item or service from a tie versus non-tie, how do we explain differences in the tendency for individuals to acquire that item or service through embedded transactions? This is the question we want to address. In concluding their analysis of embedded transactions, DiMaggio and Louch (1998) point explicitly to the problem, noting:

an important limitation of [our] analysis is that it explains variation across transactions and does not address variation across persons—which, we argue, requires a different theoretical framework. . . (1998:635).

The section to follow introduces research on generalized trust, which we integrate with the arguments on embeddedness and uncertainty just reviewed. We show that the resultant framework can explain variation across transactions and persons.

## 2. Social networks and trust

The literature on trust has arguably grown even more quickly – and across more disciplines – than research on embeddedness. In addition to sociology and economics, social psychology, political science, and other disciplines have all experienced an upsurge of interest in trust and related components of social capital (see Rousseau et al., 1998). Part of this growing interest can be attributed to the wide-ranging consequences of trust (Putnam, 2000).

While there is some variation in what researchers mean by trust, as Rousseau et al. conclude from their interdisciplinary review: “Across disciplines, there is agreement on the conditions that must exist for trust to arise. Risk is one condition considered essential . . . risk creates an opportunity for trust” (1998: p. 395). Stated differently, risk creates an opportunity for a test of trust

(Dasgupta, 1988; Kollock, 1994). “The second necessary condition of trust,” Rousseau et al. continue, “is interdependence, where the interests of one party cannot be achieved without reliance upon another.” Thus, following Gambetta (1988: p. 217; see also Barrera, 2005: p. 6), an actor’s trust may be expressed as “the subjective probability with which [he or she] assesses that another agent . . . will perform a particular action, both *before* he can monitor such action, . . . and in a context in which it affects his own action” (*emphasis in original*).

Trust researchers differ in whether they refer to *specific* or *dyadic trust* (trust in a specific person or relation) versus *generalized trust* (trust in strangers or those with whom one has had no prior experience). The bulk of references to trust in the existing literature on embeddedness refer to some form of specific or dyadic trust (Buskens et al., 2003; Granovetter, 1985). These works generally view trust as the basis for social relations and as necessary for economic exchanges across those relations. Importantly, most existing work does not explicitly invoke variation in trust to explain embedded exchanges (see Dore, 1983; Ingram and Roberts, 2000; Uzzi, 1996). Rather, to predict whether two actors will exchange at any given point, these studies ask whether the actors have exchanged successfully in the past: information about whether the actors trust each other is relatively superfluous.

Our work, with its focus on generalized trust, complements, but goes beyond, these previous studies. Because it grants trust a more central explanatory role, our work extends the somewhat nascent literature on trust and embeddedness. That is, in contrast to most previous work on embeddedness and trust, we explicitly use trust to predict who relies on social relations for economic transactions and who does not.

### 2.1. Why generalized trust?

Generalized trust, or trust in strangers, entails an expectation that others in general will act in benign ways when there is an incentive for them to act otherwise (Yamagishi and Yamagishi, 1994). Using Gambetta’s (1988) terminology, high trusters (compared to low trusters) assign lower subjective probabilities to being exploited by a stranger in whom they must decide whether to place trust. Thus, as detailed more fully below, it is high-generalized trust that leads actors out of personal networks to seek more profitable deals in the open market (Yamagishi and Yamagishi, 1994). Those low in generalized trust, on the other hand, are more likely to prefer embedded exchanges for products or services entailing uncertainty.

Generalized trust has been linked to a variety of positive social outcomes including more fluid and efficient social and economic institutions (Alesina and La Ferrara, 2002), greater political participation and other forms of civic engagement (Putnam, 2000), and greater cooperation in social dilemmas and social exchange situations (Orbell and Dawes, 1993).

Importantly, the positive effects of generalized trust are not limited to others in whom trust is placed or the social institutions within which high-trusters act. Generalized trust is also individually beneficial to trusters themselves. For example, Orbell and Dawes (1993) report that high-trusters tend to do better

than low-trusters in social dilemmas when there is an “exit option.” Similarly, Rotter (1980) and Yamagishi (2001) show that high-trusters more closely scrutinize social cues about whether potential exchange partners are trustworthy. This growing line of research on trust as a form of “social intelligence” (Rotter, 1980) gives us an image of high-trusters not as blindly optimistic dupes, but conditional optimists highly attuned to relevant social cues about others’ trustworthiness.

Given these wide-ranging benefits of generalized trust, several new lines of research have emerged to explain its origins (for a review, see Delhey and Newton, 2003). The program of research on which this paper builds links variation in generalized trust to the types of networks in which actors are embedded. The basic argument is that the high level of informal monitoring and sanctioning that occurs in densely connected networks limits expectations of benign behavior to relations within those network boundaries (Yamagishi and Yamagishi, 1994). Thus, the monitoring and sanctioning systems in densely connected networks increase an actor’s expectation that others within her network will act benevolently. But when actors go outside their networks to interact with strangers, they leave the security of the sanctioning system. Because the sanctioning system is the cornerstone of their expectations of benign behavior, actors in these networks have relatively low expectations of others’ trustworthiness. These arguments have been used, for example, to explain the lower levels of trust in Japan, compared to the U.S. (Yamagishi and Yamagishi, 1994), as well as the lower levels of trust in the Southern versus non-Southern regions of the U.S. (Simpson, 2006).

Related arguments trace lower levels of trust to strong family ties (Fukuyama, 1995) and to patterns of membership in voluntary associations. For instance, Stolle (1998) shows that spending time in voluntary associations that generate weak ties increases generalized trust. On the other hand, members of voluntary organizations that promote strong, redundant ties (e.g., fundamentalist religious groups) do not show the increase in generalized trust (Miller and Kanazawa, 2000). Instead, these organizations are more likely to generate “assurance-based” networks (densely connected networks with high levels of monitoring and sanctioning) that can inhibit the development of generalized trust.

### 3. Embeddedness and trust

This section links the approach to trust just discussed with the embeddedness framework outlined earlier. We argue that generalized trust differences lead to differences in the tendency for actors to rely on social relations for economic activity. More specifically, we show that the extent to which social relations matter for economic purchases depends on a person (high- versus low-truster)  $\times$  situation (uncertainty versus no uncertainty) interaction. This line of theorizing complements recent studies that argue networks matter but the extent to which they matter varies by persons (Burt, 1997) and situations (Mizruhi et al., 2006).

In the absence of formal contracts, problems of uncertainty in economic transactions have two solutions—generalized trust

and embedded exchange (see Kollock, 1994; Yamagishi and Yamagishi, 1994). Generalized trust allows actors to move beyond their limited social ties to search for lucrative deals from strangers in isolated encounters. While there is a greater likelihood that one’s trust will be exploited in such encounters, this likelihood may be offset by the better deals generated through market processes.

More specifically, consider a buyer who may purchase a desired item via an isolated or embedded exchange. Unlike embedded exchanges, isolated encounters entail “no information or incentive connection to other encounters in which the two actors are involved” (Buskens, 2002: p. 9). Whether the purchase is made through an isolated or embedded exchange, we assume that the primary goal of the buyer is to minimize costs and maximize benefits. Further, we assume that embedded exchange is a means through which this end (buying an item with the lowest expected cost) is realized, rather than an end in itself: that is, for current purposes, we assume that actors do not derive additional value from dealing with a friend.

We further assume buyers are aware that sellers have an incentive to deliver a product of lesser quality than what is advertised, i.e., to abuse trust. To simplify, we assume that no other forms of uncertainty (either exogenous or endogenous) are present, and that no communication takes place between buyers or between buyers and sellers (other than declaration of prices by sellers).

Based on previous work and the above assumptions, we expect the problem of information asymmetries in economic exchange to be solved differently by high- and low-trusters. While embedded transactions may be characterized by higher prices relative to those in the open market, they generally entail less uncertainty, due to the decreased chances of being cheated by a social relation. As a result, there is less need for trust in embedded transactions.

Following our conception of generalized trust, we expect that actors low in generalized trust (compared to those high in generalized trust) will assign higher subjective probabilities to being exploited by a seller in an isolated encounter. As a result, given some unknown level of objective uncertainty arising from information asymmetries, low trusters will be more likely than high trusters to rely on embedded exchanges. Importantly, as noted earlier, a test of trust requires the presence of uncertainty. Thus, differences between high- and low-trusters should not emerge for transactions that do not entail uncertainty.

We now state the forgoing arguments as a series of hypotheses to be tested below.

**Hypothesis 1 (No uncertainty).** For products or services that *do not* entail uncertainty, there will be no difference in low- and high-trusters’ (a) preferences for, or (b) tendencies to engage in, embedded versus non-embedded transactions.

**Hypothesis 2 (Uncertainty).** For products or services that entail *uncertainty*, low-trusters will be more likely than high-trusters to (a) express preferences for, and (b) engage in, embedded (versus non-embedded) transactions.

The section to follow outlines our initial test of these hypotheses, based on data from the General Social Survey. As detailed

below, these data do not allow us to control for a number of important network- or normative-constraints on *behavior*, but still afford us the opportunity to address the link between trust and *preferences* for embedded transactions. Thus, even though we are primarily interested in behavior, following previous work (DiMaggio and Louch, 1998), we also capitalize on supplementary data related to preferences. Moreover, because the experimental design outlined later was motivated by problems with the survey results, it is instructive to consider the full range of survey data. We therefore report tests of our hypotheses using data from the General Social Survey on behaviors (whether respondents purchase items from social ties or strangers) and on preferences (whether they claim to prefer purchasing items from social ties or strangers).

#### 4. Study 1: survey data and methods

The General Social Survey (GSS) is a full probability survey of non-institutionalized English speaking adults living in the U.S. The National Opinion Research Center (NORC) has conducted the survey annually from 1972 to 1994 and, since then, biennially. Each year, NORC administers special topic modules to a subset of respondents. The data used in this paper come from a module on transactions administered in 1996.

Appendix A details the dependent variables used in the analyses, broken down by stated preferences for embedded versus non-embedded purchases, and actual purchases. For the preferences data, respondents indicated on a five-point scale whether they preferred to purchase each of five goods or services from someone with whom they had no prior contact or from a contact (with 1 = strong preference for no contact and 5 = strong preference for contact). For actual purchases data, respondents were asked if they had purchased each of a number of items or services in the past. Respondents who had made a given purchase were asked about their relationship to the seller. As discussed in Appendix A, responses were coded 1 if the good or service was purchased from a person with whom the buyer had a tie and 0 if they had no prior (direct or indirect) relationship with the person (or person within the company) from whom the item or service was purchased.

##### 4.1. Independent and control variables in the General Social Survey

The GSS contains three questions designed to tap into generalized trust: trust, helpful, and fair (Appendix A). These

measures have been used in a wide range of studies but, as discussed below, have been criticized on a number of grounds. As shown in Appendix A, for all three measures, trusting responses (e.g., “Most people can be trusted”) were coded 1, distrusting responses (e.g., “Can’t be too careful in dealing with people”) were coded 0, and intermediary responses (“it depends”) were coded .5. Then, following previous work (e.g., Simpson, 2006), responses to the three measures were summed to create a new variable (sumtrust), which ranges from 0 to 3. (See Appendix A for a discussion of factor loadings and the alpha loading for the *sumtrust* measure. We conducted analyses with other codings [e.g., that eliminated the “middle” category, such as “it depends”]. These analyses generated results similar to those reported below, and are available upon request.) Finally, the analyses included several control variables that may affect trust and/or network ties: gender, family income, age, race, and whether or not the respondent has a college degree.

#### 5. Survey results

The following analyses test the hypotheses outlined earlier. We begin with analyses relevant to the preferences data, and then turn to actual network purchases.

##### 5.1. Trust and preferences for embedded purchases in the General Social Survey

In an initial analysis, we regressed each of the measures of preferences for embedded purchases (see Appendix A) on the generalized trust measure (sumtrust) and the control variables (age, gender, race, family income, and college degree). As shown in Table 1, net of the control variables, generalized trust has no effect on preferences for purchasing bedroom furniture, the single item that does not entail significant uncertainty (see Appendix A for a discussion of the levels of uncertainty involved in purchasing these items. For a more detailed discussion, see DiMaggio and Louch, 1998). On the other hand, trust was a significant predictor of preferences for embedded purchases for all uncertain goods and services, with low-trusters consistently expressing a stronger preference for embedded transactions.

On average, the items in Table 1 that entail uncertainty are generally more expensive than the item that entails little or no uncertainty (bedroom furniture). This is problematic for the following reason. Definitions of risk often entail a combination of two factors, the likelihood of one’s trust being exploited by another, and the cost at stake in the interaction (see Buskens,

Table 1  
General Social Survey results: preferences for within network exchanges by trust, net of control variables

Item or service ( <i>N</i> )	Entail uncertainty?	High-truster–low-truster ( <i>p</i> -value)	Support for hypothesis?
Bedroom furniture (694)	No	.517 <sup>a</sup>	Yes (Hypothesis 1a)
Automobile (694)	Yes	.005 <sup>b</sup>	Yes (Hypothesis 2a)
Lawyer (693)	Yes	.025 <sup>b</sup>	Yes (Hypothesis 2a)
House repair (700)	Yes	.005 <sup>b</sup>	Yes (Hypothesis 2a)
Home (366)	Yes	.003 <sup>b</sup>	Yes (Hypothesis 2a)

Note—<sup>a</sup>: two-tailed; <sup>b</sup>: one-tailed.

2002: p. 10). Thus, an alternative explanation for the findings is that differences in high versus low-trusters' preferences for embedded transactions result from greater risks (including costs and uncertainty), rather than uncertainty alone. Unfortunately, the GSS data do not allow us to tease apart these two explanations. However, we control for the alternative explanation in the experiment outlined later. With that caveat, the results suggest strong support for the argument that low-trusters (as measured by the GSS measure) express stronger preferences for embedded transactions for items involving uncertainty, but not for items that do not entail uncertainty.

Summing up, following [Hypothesis 1a](#), there is no difference in high- and low-trusters' preferences for embedded transactions for the one item where no difference was predicted, and significant differences between high- and low-trusters' preferences for embedded transactions for the two items and two services for which differences were predicted ([Hypothesis 2a](#)). Thus, with the above caveat in mind, data on preferences provide support for the hypotheses.

### 5.2. Comparisons of actual network purchases decisions in the General Social Survey

Next we consider data relevant to respondents' actual purchases (see [Appendix A](#)). The analyses included the sumtrust measure and the controls used in the preference analyses just presented. As discussed in [Appendix A](#), the GSS contains actual decisions for a number of purchases, including *homes*, *automobiles* (from private individuals and dealers), *home maintenance services*, and *legal services*. For the results reported here, the dependent measure was coded 1 if the respondent purchased the good or service through an *embedded* transaction (see response categories 1–4 in [Appendix A](#)). If the respondent and seller had “no prior relationship,” the dependent measure was coded 0, indicating a *non-embedded* transaction.

As in the preferences analysis, the analysis of actual purchases (reported in [Table 2](#)) includes controls for race, gender, income and education (whether the respondent has a college degree). (Including other control variables yielded effectively the same results. More detailed analyses are available from the authors upon request.)

[Table 2](#) shows that trust (as measured by the GSS items) does not affect actual embedded transactions. Results are very similar whether we look at only those cases that do or do not include warranties (e.g., for homes and automobiles). Suffice to say, these

results offer no support for the behavioral predictions. Net of the control variables, regardless of which item (home or car purchase) or service (home repair or legal services) we consider, we do not observe a difference between low- and high-trusters' tendencies to report having engaged in embedded transactions. The section to follow discusses some possible reasons for our failure to observe differences between high- and low-trusters. We use the ideas outlined in that discussion to motivate an experiment designed to better test the predictions.

## 6. Discussion of survey results

The results from the GSS data yield only mixed support for the argument linking trust with embedded purchases. On the one hand, the preferences data provide strong and consistent support for the argument, while the results of the more important test – actual purchasing behavior – do not. Why do we observe support for preferences, but not actual decisions?

### 6.1. Statistical power

One possibility is simply a matter of differences in statistical power for the preferences and behavior data. That is, the  $N$  for the preferences data is, on average, about twice as large as the  $N$  corresponding behavioral data. The question thus becomes whether we would still observe support using the preferences data if the sample sizes were similar to those for behaviors.

To address this, we reanalyzed the data on preferences, after selecting only those cases for which we have the corresponding behavioral data (e.g., legal services). We were able to do this for three of the preferences measures (homes, home repairs, and legal services), but not for bedroom furniture or automobile purchases because the latter measures did not include corresponding cases in the behavioral data. (Respondents who answered the preferences item on automobiles did not answer the corresponding behavioral question, and vice versa.) Importantly, for all three cases we were able to analyze, we find exactly the same pattern of support as that reported above. Once again, compared to high-trusters, low-trusters expressed a stronger preference for embedded purchases for homes ( $p = .008$ , one-tailed), home repair services ( $p = .002$ , one-tailed), and legal services ( $p = .02$ , one-tailed). Thus, the support for the preferences component of the argument cannot be attributed to greater statistical power.

Table 2  
General Social Survey results: actual within network exchanges by trust, net of control variables

Item or service ( $N$ )	Entail uncertainty?	High-truster–low-truster ( $p$ -value, two-tailed)	Support for hypothesis?
New car from dealer (105)	No	.172	Yes ( <a href="#">Hypothesis 1b</a> )
Used car from dealer (100)	Yes	.888	No ( <a href="#">Hypothesis 2b</a> )
Used car from individual (138)	Yes	.655	No ( <a href="#">Hypothesis 2b</a> )
Home (175)	Yes	–.832	No ( <a href="#">Hypothesis 2b</a> )
Home repairs (302)	Yes	.315	No ( <a href="#">Hypothesis 2b</a> )
Legal services (357)	Yes	.373	No ( <a href="#">Hypothesis 2b</a> )

### 6.2. Availability and preferences within constraints

Another possible explanation for the discrepancy between the findings for preferences and behavior rests on the issue of availability discussed earlier. Purchasing any item (e.g., a used car) from a network tie requires knowing a person who possesses and is willing to sell that item at the time one wishes to purchase it. Thus, we might not observe differences between high- and low-trusters' tendencies to engage in embedded transactions due to network constraints. In fact, research suggests that high-trusters have more varied networks (Wollebaek and Selle, 2002). Thus, there are reasons to expect that most items will be more readily available through high-trusters' networks than through low-trusters' networks. This difference may then negate a greater tendency for low-trusters to engage in embedded transactions. That is, low-trusters' network constraints may not allow them to act on their greater preferences for embedded transactions.

### 6.3. Normative constraints on economic exchanges between friends

Yet another possible explanation is suggested by the literature on preferences and behavior. Previous work shows that preferences do not always accurately predict behavior (Schuman and Johnson, 1976). There have been a number of accounts for this disparity; one of the most explicit is the theory of reasoned action (Fishbein and Ajzen, 1975). In that theory, behavior is a product of *attitudes or preferences, subjective norms*, and the relative importance the actor places on each. Thus, in our case, a person may hold a particular preference for embedded versus non-embedded transactions (depending, e.g., on her level of generalized trust), but act against this preference if there exists strong normative pressure to do so. This may be particularly true in the case of purchases from friends. For instance, a high-truster in the market for a used automobile may feel compelled to purchase a car from a friend even if better deals are available elsewhere.

Alternatively, a person may prefer to buy a car from a friend but worry about the potential effects of bargaining over the terms of exchange on the friendship. Furthermore, as noted by an anonymous reviewer, while embedded exchanges may serve to reduce the type uncertainty we focus on in this paper, other types of uncertainty may generate a reluctance to engage in economic transactions with friends. For example, the buyer may realize that even the seller *cannot* know for certain whether the car will turn out to be a lemon shortly after the sale. In this case, objective uncertainty is given exogenously (by the state of the vehicle), and cannot be known by the buyer or seller. However, either friend may anticipate tension should something happen to the car and decide the friendship is not worth chancing. This type of uncertainty, while important, does not factor into our arguments linking trust and embedded transactions. However, it may still cloud the relationship between preferences and behaviors in the GSS data.

The experiment outlined in the section to follow was designed to overcome these and other limitations in order to

more explicitly test the argument linking trust, uncertainty, and embedded transactions. To this end, we were careful to hold constant a range of factors associated with purchases. The most important factor the experiment holds constant is the availability of desired products from social ties versus strangers. As explained below, high- and low-trusters in the experiment have equal access to social ties and strangers from whom to purchase desired items. Thus, if we do not observe a difference between low- and high-trusters' tendencies towards embedded transactions, we cannot attribute it to lack of availability.

The experiment also explicitly controls for the level and type of uncertainty entailed in a purchase. This eliminates a wide range of potential error involved in the GSS data on actual purchases. For instance, independent of their level of trust, certain actors have skills or qualities that affect the level of uncertainty involved in the purchase of a particular item. Compared to a high-trusting pharmacist, for example, we might expect an otherwise low-trusting auto mechanic to be more apt to purchase a used automobile from a stranger. Additionally, the level of uncertainty involved in the purchase of a given product may vary widely (e.g., even an automotive neophyte can tell that some used cars have been better cared for than others through outward appearance, maintenance records, etc.). More generally, the GSS data do not allow us to directly control for many nuances that may be present for a given transaction.

The experiment outlined below eliminates these potential sources of error, and thus provides a more direct test of the hypotheses. It is important to stress that the purpose of the experiment is not to determine which, if any, of the above factors led to the discrepancy between preferences and behaviors data in the GSS data. The goal, rather, is to construct the simplest possible test of the argument linking trust and tendencies to engage in embedded transactions, building on what we learned from the GSS results.

But what if, after controlling for all these potential sources of error, we still fail to observe differences between high- and low-trusters as measured by the GSS items? We would not know whether this was because there is no difference between high- and low-trusters, or because the GSS measure simply fails to track behavioral differences. Previous work by Glaeser et al. (2000) is suggestive in this regard. While the vast majority of research uses the GSS trust items as dependent measures, Glaeser et al. (2000) used the items as an independent measure and found that the GSS items did not predict trusting behavior.

A number of recent studies suggest a possible explanation for the lack of predictive power of the GSS trust items (Miller and Mitamura, 2003; Yamagishi et al., 1999). These researchers argue – and empirically demonstrate – that the standard GSS items conflate trust and caution. Consider, for instance, the two main response categories of the trust item (see Appendix A): *most people can be trusted* and *you cannot be too careful*. Miller and Mitamura (2003; see also Yamagishi et al., 1999) argue that, rather than representing two points on a continuum, these two response categories correspond to two conceptually distinct factors: trust and caution. They write:

The question . . . does not ask respondents to choose between trust and distrust. . . . Rather, respondents choose between trust and caution. Yet there is reason to believe that trust and caution are not opposites: certainly it is possible for a person to believe most people can be trusted, and at the same time believe it is prudent to be cautious (63).

Consistent with this reasoning, Yamagishi and Yamagishi (1994) found that measures of trust and caution loaded onto distinct factors. Miller and Mitamura (2003) provide further empirical support for the distinction between the two concepts.

The above reasoning may explain why the GSS items fail to predict embedded purchases. Prudent high-trusters, for example, may *prefer* to look for good deals from strangers, but instead exercise caution. To overcome these potential problems, the experiment outlined below introduces items from an alternative trust scale. We chose these items because they have been used in previous research to predict an array of trusting behaviors (Rotter, 1980; Yamagishi, 1986). These items avoid the trust/caution confound by measuring the extent to which respondents agree or disagree with a one-dimensional item, whether people (in general) can be trusted (Yamagishi et al., 1999). (Furthermore, an auxiliary experiment outlined later confirms the greater relative predictive power of these items, compared to the GSS trust measure.)

## 7. Study 2: experimental design and procedures

Potential participants were initially contacted in classrooms at a large university in the southeastern U.S. using the opportunity to earn money as an incentive. Those who filled out forms indicating an interest in participating were later contacted via telephone. The telephone scheduler told the potential participant that the study required that they bring a “friend or acquaintance” (hereafter friend) who would also be paid for their participation.

Those who agreed to participate and to bring a friend were scheduled. A follow-up call insured that the participant had chosen a friend who was also willing to show up at the designated time. If so, the scheduler recorded the name of the friend. If not, they were cancelled or rescheduled. The “focal” participants were scheduled in groups of five to six, and each focal participant brought one friend, thus giving an average of 10–12 participants per experimental session. A total of 110 students participated, including 58 males and 52 females.

### 7.1. Experiment procedures

Upon entering the laboratory, each participant was escorted to a private subject room equipped with a computer. (Thus, each focal participant and his or her friend were separated from each other, and from all other participants, immediately upon arrival.) After filling out consent and participant information forms, participants completed a questionnaire containing a number of trust items, along with filler items.

As noted earlier, a possible explanation for the discrepancy between the GSS data on preferences and behavior is that the GSS trust items do not predict differences in trusting behaviors

(including embedded versus non-embedded transactions) very well. Thus, in addition to the GSS measure, the questionnaire included four items from a trust scale that have been shown in much previous work to be strong predictors of various trusting behaviors. These questions are given in Appendix A.

### 7.2. Purchases from friends versus strangers in the laboratory

After completing the pre-experimental questionnaire, participants began reading instructions for the experimental procedures. The instructions started as follows:

There are many different types of purchases people need to make in day-to-day life. For some purchases, you know the quality of the item at the time of the purchase. For example, imagine that you buy a piece of used furniture. You can usually determine the quality of the furniture simply by looking at it. Thus, sellers cannot easily “misrepresent” the quality of furniture. But for other types of purchases, it is difficult to know the quality of the item at the time of purchase. Instead, its quality may not become known until later. For example, when purchasing a used car, you may not know whether you got a “good deal” or a “lemon” until several months after the purchase.

We’re interested in how buyers and sellers make decisions when purchasing these different types of products. Thus, in the first part of this study, some participants will sell items, while others will buy items . . . *You have been randomly assigned to the role of buyer.*

Thus, *all* participants were told that they would occupy the buyer role while some others would be sellers and some others would be buyers.

Participants were then told that they would be given a bank account with which to purchase two items, a “widget,” and a “gadget.” The instructions explained that the participant would be paid any amount remaining in her bank account if she purchased a widget and a gadget (i.e., she was required to purchase both to get the remainder of her account). This created an incentive for participants to get good deals on the two items.

The instructions then explained that gadgets differed from widgets by whether the quality of the item would be known by the buyer at the time of purchase. Specifically, participants were told that sellers could not misrepresent the quality of widgets, but could sell either good or bad gadgets. Participants were told that, if they bought bad gadgets, they would need to pay the “repair cost,” which was set at 50% of the original cost of the gadget. Repair costs would be deducted from their bank account. Meanwhile, the repair costs paid by the buyer of a bad gadget would be added to the bank account of the gadget’s seller (thus ostensibly creating an incentive for sellers to misrepresent the value of a gadget).

While the participant (always a buyer) was reading the instructions, sellers were ostensibly deciding how much to charge a given buyer for a widget or gadget and, in the case of the gadget, whether to misrepresent its quality (i.e., to sell a

Table 3  
Experiment: price set for widget and gadgets

Seller	Price (\$)
Price Set A	
Stranger 1	10.00
Stranger 2	11.00
Friend	12.50
Stranger 3	13.50
Price Set B	
Stranger 1	8.00
Stranger 2	8.75
Friend	10.00
Stranger 3	11.25

Note: In the experiment, prices were not arranged lowest to highest. They were placed in random order.

“good” or “bad” one). The instructions noted that sellers would know the names of the buyers for each item prior to making these decisions, but sellers would not know the amounts other sellers were proposing for a given item (or, for gadgets, whether they were proposing to sell a good or bad gadget).

The instructions explained that, once all potential sellers quoted a price for the item, the research assistant would bring the participant a form listing all sellers and their prices. The participant (buyer) would then pick a seller from that list. Participants were told that they would not know whether a seller misrepresented the value of a gadget until the very end of the study.

After a brief waiting period, the research assistant brought the participant the list of sellers and prices. In reality, the sellers' names and prices were predetermined. For each item, the form listed four sellers. One seller was the participant's friend or acquaintance, and the remaining three were fictitious names. (That the participant recognized the friend's name, but not the other three names was verified in a post-experiment questionnaire.) To control for potential gender effects, the three unknown sellers were the same gender as the friend, as indicated by gender-typical names.

In all cases (for both widgets and gadgets), each seller listed a different selling price, and the participant's friend's price was always the third lowest. To avoid suspicion, as shown in Table 3, there were two different price sets. In half the cases, Price Set A was assigned to the widget purchase, and Price Set B to the gadget purchase. For the remaining half, Price Sets A and B corresponded to the gadget and widget, respectively. (Each price in Set B is roughly 80% of the similarly ranked price in Set A.)

As noted earlier, participants made both a widget and gadget purchase. The ordering of purchases was randomly determined, with half the participants making the widget purchase first and the remaining half first making the gadget purchase. The same sellers' names appeared on the widget and gadget forms.

After participants decided which of the sellers they wished to purchase the item from, they indicated this on a form, which the research assistant subsequently collected. Thereafter they made their second decision in similar fashion. Finally, participants completed a post-experiment questionnaire, and then participated in an unrelated procedure. After completion of

Table 4  
Experiment: percent of widgets and gadgets purchased from friends and strangers ( $N = 106$ )

Item	Lowest price (stranger)	Second lowest price (stranger)	Friend	Highest price (stranger)
Widget	73.6	12.3	13.2	.9
Gadget	19.8	26.4	53.8	0

the second procedure, participants were paid, debriefed and dismissed.

## 8. Results of experiment

Of the original 110 participants, two did not understand the instructions and two reported that they “knew” their friend would misrepresent the quality of the gadget. (These latter two participants chose to purchase their gadgets from strangers.) Thus, these four participants were dropped. The analyses to follow are based on the responses of the remaining 106 participants.

Table 4 displays the number of participants who bought each item from a friend versus a stranger. Several patterns in these descriptive results deserve brief comment. First, consistent with the fact that sellers could not misrepresent the quality of widgets, the majority of participants (73.6%) purchased the lowest priced widget. Note also that relatively few participants (13.2%) bought widgets from their friend, whose name was listed with the third lowest price. This suggests that most participants were pursuing the best deal, and not willing to pay a premium to deal with a friend when product quality was known at the point of purchase.

The patterns are reversed when we consider gadget purchases, which entail uncertainty. In this case, the majority of participants (53.8%) engaged in embedded transactions, while the remaining participants purchased from a stranger at either the lowest (19.8%) or second lowest (26.4%) price. We did not anticipate a greater number of non-embedded gadget purchases would be from the stranger who offered the second (rather than first) lowest price. However, many participants invoked a heuristic to avoid the lowest price. In their responses to post-experiment questionnaires, several participants suggested that the lowest price was too good to be true. Interestingly, these participants drew this conclusion without having any information about the ostensible costs of gadgets to sellers.

The analyses to follow test our argument linking trust to embedded transactions, specifically the *product uncertainty*  $\times$  *buyer trust* interaction. As discussed earlier, we expect that low-trusters will be more likely than high-trusters to purchase gadgets, but not widgets, from a friend. We first assess our argument using the trust measure taken from the General Social Survey and then turn to the alternative trust scale taken from previous behavioral studies of trust. Following previous research (see Simpson, 2006; Yamagishi and Yamagishi, 1994), we aggregated each scale.<sup>2</sup> We then divided participants into

<sup>2</sup> The alpha loading for the alternative trust scale (.403) was lower than the loading for the GSS items (.540). However, as shown below, the alternative trust scale is not only a more powerful predictor of embedded versus non-embedded

Table 5

Experiment: percent of widgets and gadgets purchased from friends by each trust measure ( $N=106$ )

	Widget	Gadget
GSS trust measure results		
Hi	12.00	54.00
Lo	14.55	53.57
Alternative trust measure results		
Hi	14.58	43.75
Lo	12.28	62.07

high- and low-trusters, based on a median split of each summed measure.

Table 5 gives descriptive statistics for the predicted interaction effect for both the GSS trust measure and the alternative trust measure. As shown in the table, consistent with the survey results reported earlier, the GSS measure does not track predicted differences between high- and low-trusters' gadget purchases. The proportions of high- and low-trusters (according to the GSS measure) who purchased gadgets from friends versus strangers are virtually identical: 54% versus 53.57%,  $\chi^2 = .004$ ,  $p = .95$ . The absence of an effect of trust on embedded transactions of gadgets may point to fundamental problems with our argument, or to the inability of the GSS items to predict real differences in trusting behavior (see Glaeser et al., 2000). The results to follow strongly suggest the latter.

Table 5 shows a clear difference between high- and low-trusters as measured by the alternative trust scale. These descriptive statistics show that low-trusters are nearly 40% more likely than high-trusters to engage in embedded transactions given product uncertainty,  $\chi^2 = 7.091$ ,  $p = .008$ . On the other hand, when no uncertainty exists, the proportion of high- and low-trusters who engaged in embedded transactions is much more similar (14.58% versus 12.28%,  $\chi^2 = .239$ ,  $p = .63$ ). These results support the predicted interaction between trust and uncertainty. The question is whether these differences remain after controlling for other factors that may be related to embedded exchanges and/or trust. We now turn to this question.<sup>3</sup>

Our dependent measure is whether the participant engaged in embedded (i.e., purchased the item from a friend) or non-embedded transactions (purchased the item from one of the three strangers). We regressed this decision on the trust measure, the order in which the purchases were made (whether the widget or gadget was purchased first), whether Price Set A or B was assigned to the widget (see Table 3), the participant's gender, and the gender of the sellers. (As noted earlier, for simplicity, all sellers were the same gender as the buyer's friend.)

transactions. It is also a much better predictor of the standard behavioral measure of trust.

<sup>3</sup> We also repeated the analyses to follow with the GSS trust measure. Consistent with the results of Table 4, the GSS measure did not track the predicted trust differences after controlling for other variables ( $p = .96$ ). Thus, we drop consideration of the item for now in order to focus on the alternative trust measure. Later we introduce an auxiliary experiment to assess the comparative predictive power of the GSS and alternative trust scales.

Table 6

Experiment: unstandardized coefficients from the regression of embedded exchange on predicted interaction ( $trust \times product\ uncertainty$ ) and control variables ( $N=106$ )

Independent variable	Coef. (S.E.)
Low trust $\times$ product uncertainty	1.237 (.728)*
Male $\times$ product uncertainty	1.975 (.803)*
Low trust	-.453 (.603)
Product uncertainty	.563 (.615)
Male buyer	-1.662 (.696)*
Product order	-.129 (.332)
Product price	.248 (.339)
Male sellers	.180 (.340)

Note: \* $<.05$ . All control variables are two-tailed (given that no specific predictions are made for control variables), while the predicted interaction ( $trust \times uncertainty$ ) is one-tailed (given directional prediction).

In addition to these main effects, our analysis included two interaction terms. The first was an interaction between the participant's gender and item (widget versus gadget). We included this term because preliminary analyses showed that gender most strongly affected embedded exchanges for the *certainty* (widget) purchase, with females being significantly more likely than males to purchase widgets from a friend. We know of no theoretical or empirical precedent for this finding but the effect was robust across analyses. Thus, we control for it. Our main predictor variable was the interaction between trust and whether the purchased item is a widget or gadget. Again, as given in Table 5, we should expect the strongest relationship between uncertainty and embedded exchanges for low-trusters. (Thus, low-trust and uncertainty are each coded 1.)

Table 6 shows that the interaction term was significant, net of the main effects terms (low trust and product uncertainty) and control variables. We therefore turn to the simple effects of product uncertainty on embedded transactions for high- and low-trusters. These analyses will tell us whether the interaction between trust and uncertainty reflects a difference between high- and low-trusters' tendencies to engage in embedded transactions when those transactions involve uncertainty (Hypothesis 2) and whether no such differences exist between high- and low-trusters when transactions do not involve uncertainty (Hypothesis 1).

Because the above analyses revealed gender differences in the tendency to purchase widgets versus gadgets through embedded exchange, our simple effects analyses include a gender term. The results of these analyses are given in Table 7. Beginning with the gender effects, females are more likely to buy widgets from

Table 7

Experiment: impact of trust on embedded exchange, net of buyer's gender ( $N=106$ )

Item	Entail uncertainty?	High-truster–low-truster (alternative measure, $p$ -value)	Support for hypothesis?
Widget	No	.477	Yes (Hypothesis 1b)
Gadget	Yes	.027	Yes (Hypothesis 2b)

Note: The reported significance levels for widgets are two-tailed (given that no difference is predicted for widgets), while those reported for gadgets are one-tailed (given that we make specific directional predictions for gadgets).

friends ( $p = .015$ ), but there is no gender difference for gadgets ( $p = .534$ ).

Consistent with the prediction, we find that there is no effect of trust on the tendency to purchase widgets (certainty) from friends versus strangers,  $p = .48$ . However, as predicted, low-trusters are significantly more likely than high-trusters to make embedded exchanges when the purchase entails uncertainty ( $p = .03$ ). Thus, these simple effects echo the findings presented in Table 5, showing differences between high- and low-trusters for purchases involving uncertainty (consistent with Hypothesis 2) but no differences for purchases that do not entail uncertainty (consistent with Hypothesis 1).

## 9. Discussion of experiment

Consistent with the survey results reported earlier, the GSS trust scale did not predict embedded transactions in the experiment. As noted above, the lack of predictive power of the GSS items for trusting behavior is consistent with previous findings (Glaeser et al., 2000) and may reflect the conflation of trust and caution. The alternative trust scale, which overcomes these problems (Miller and Mitamura, 2003; Yamagishi et al., 1999), accurately predicts variation in embedded transactions by generalized trust. Consistent with our argument linking trust and embedded markets, low-trusters engaged in more embedded transactions than high-trusters, but only when transactions entailed uncertainty. Under conditions of no uncertainty, as predicted, low and high-trusters did not differ in their tendencies to favor embedded over non-embedded transactions.

Summing up, our argument proposes trust as a mediator between uncertainty and embedded transactions, and the alternative trust scale (but not the GSS scale) accurately tracked that effect. But given that there have been no head-to-head comparisons of various trust scales (to our knowledge), we wanted to increase our confidence that the alternative trust scale is actually tracking trust differences (and the GSS trust scale is not), rather than some non-theorized link between uncertainty and embedded transactions. To do so, we conducted an auxiliary experiment that assesses the relative predictive power of each trust scale with the standard behavioral measure of trust.

### 9.1. Results from an auxiliary experiment

Appendix B reports the results of an auxiliary experiment, which serves as a head-to-head comparison of the GSS and alternative trust scales. The experiment uses the standard behavioral measure of trust developed by Berg et al. (1995). As shown in Appendix B (see particularly Table B.1), the alternative trust scale is a strong predictor of trusting behavior, while the GSS scale is not. These findings increase our confidence that differences in generalized trust are driving the differences in tendencies to engage in embedded transactions found in the main experiment reported earlier.

## 10. Discussion and conclusion

The research reported here integrates two burgeoning streams of sociological research. The first shows that social relations strongly influence economic activity. The second stream shows that economic actions are conditioned in predictable ways by generalized trust. At the intersection of these two lines of research is the argument that the extent to which social relations matter for economic activity depends on actors' generalized trust. More specifically, we have argued that, given uncertainty about some product or service, low-trusters will be more likely than high-trusters to purchase items or services within their social networks. Central to our argument is the claim that product uncertainty – and not a general preference for trade via social relations – generates differences in high- and low-trusters' tendencies to engage in embedded transactions.

We tested our arguments using data from the General Social Survey and a controlled laboratory experiment. As predicted, data from the GSS showed that, compared to high-trusters (as measured by the GSS trust scale), low-trusters expressed stronger preferences for engaging in embedded transactions under conditions of uncertainty. As expected, this difference in preferences did not exist for purchases that do not entail uncertainty. This latter finding is important because it supports the argument that risk or uncertainty, rather than a general preference for embedded markets, leads to preference differences between high- and low-trusters.

Although the GSS results showed support for the preference hypotheses, they did not support the predicted behavioral patterns. Earlier, we outlined a number of reasons the survey data on actual purchases may have failed to provide an appropriate test of the behavioral hypotheses. One possible explanation rests on *availability*. Purchasing any item (e.g., a used car) from a network tie requires knowing a person who possesses and is willing to sell that item. Thus, the lack of behavioral differences between high- and low-trusters may have reflected constraints on the potential for low-trusters to *act* on their preferences for embedded exchange. Another likely explanation is suggested by recent criticisms of the GSS trust measure (the measure of trust used in the survey items). Previous work has used the GSS items to predict various types of preferences (Cook and Gronke, 2005; Green and Broch, 1998) but more recent studies have shown that the GSS measures do not predict trusting *behavior* (Glaeser et al., 2000).

Some researchers have explained the lack of predictive power of the GSS items for behaviors by noting that the items conflate trust and caution (Miller and Mitamura, 2003). Thus, a high-truster may believe (by definition) that others tend to have benign intentions. But, at the same time, she may act prudently by purchasing a used car from a friend (or a friend of a friend), rather than a stranger (see Yamagishi et al., 1999). It is therefore possible that GSS items accurately track preferences for embedded exchange, but fail to track behaviors because they conflate trust with caution or prudence.

There are still other possible explanations for our failure to find a link between trust and embedded transactions for the GSS items. For instance, many household purchases (e.g., automo-

bile and home purchases) involve multiple decision makers. But we only have data on respondents' generalized trust (not, for example, their spouse's). This, when coupled with the fact that purchasing decisions are often made jointly, may explain why we did not find the expected relationship between trust, uncertainty, and embedded transactions in the GSS analyses. For these and related reasons, we designed an experimental market where purchases could be made either via embedded or non-embedded transactions.

The experiment was designed to more carefully test our arguments linking trust and uncertainty to embedded transactions. Besides controlling for a range of factors associated with transactions (e.g., the level of uncertainty entailed in purchasing an item, item price, availability from social ties versus non-tie, etc.), the experiment also used an alternative trust measure that avoids conflating trust and caution (e.g., Miller and Mitamura, 2003; Yamagishi et al., 1999). Previous research has shown this measure to be a reliable predictor of a range of trusting behaviors (Rotter, 1980; Yamagishi, 1986).

Using this alternative trust measure, data from the first experiment provided strong confirmation for the behavioral component of the theory. For the purchase involving uncertainty, low-trusters showed a greater tendency than high-trusters to engage in embedded transactions. However, as predicted, there was no difference between high- and low-trusters when the quality of the product was evident at the point of purchase. Thus, the results are in line with the interaction effect predicted by our argument.

We also conducted an auxiliary experiment (reported in Appendix B) to further assess the predictive power of the alternative trust scale introduced in the main experiment. That is, as just discussed, the GSS items did not predict embedded transactions in either the GSS data or the data from the first experiment, while the alternative trust scale predicted behavior in the experiment. Thus, we wanted to be sure that the alternative trust scale was not picking up some particularistic feature of our experiment, and that the alternative scale is a better predictor than the GSS scale of trusting behaviors in general. The head-to-head comparison assessed the relative predictive power of the two trust scales for the standard measure of trusting behavior (Berg et al., 1995). These results yielded additional confidence in the measure and, by extension, for our conclusions from the main experiment linking trust and uncertainty to embedded transactions.

Despite the empirical support for the arguments, this research raises as many questions as it answers. For instance, this paper only addressed one type of uncertainty. As discussed earlier, economic exchanges may involve a number of different types of uncertainty and these different types may have different effects on tendencies to engage in embedded exchanges. Future research should address the impact of various forms of uncertainty on the use of social relations for economic transactions.

More generally, we only addressed how buyers' behaviors varied with trust and uncertainty. But transactions – whether embedded or between strangers – require the mutual consent of at least two parties. Thus, a theory of trust and embedded transactions should explain the preferences and behaviors of all parties. Future work thus needs to address questions such as: How do sellers' preferences for embedded versus non-

embedded transactions depend on product uncertainty? Under what conditions do sellers charge social ties a “premium” for the certainty involved in embedded transactions? Can existing measures of *trustworthiness* be used to predict sellers' prices and decisions to misrepresent the quality of goods in embedded and non-embedded transactions? By generating answers about the conditions under which sellers misrepresent the quality of products, such studies would shed light on the conditions under which trust versus embedded transactions “pays.”

We believe the experimental procedures introduced in this paper (the main experiment) offer a promising methodology for addressing these and a host of other questions on embeddedness. To our knowledge, all previous experiments have required that participants interact with strangers or fictitious others (e.g., computer simulated actors). But the experiment reported in this paper introduces a new approach to studying the conditions under which actors rely on existing social ties versus non-ties for economic activity. At the same time, the procedure allows researchers a high degree of control over a wide range of factors that can vary, often to an unknown extent, in real-world markets. As our understanding of embeddedness deepens and our predictions become more refined, this control can be relaxed: factors that were controlled in the study presented here can become manipulations for testing more nuanced predictions in future work. Of course, we view such experimental studies as only part of the ideal approach to embedded markets. The best approach would include a range of methodologies. In fact, we believe the multi-method approach to embedded markets is an important contribution of the research reported here.

Summing up, the theory and results presented in this paper echoes recent calls for further specification in embeddedness research. For instance, Portes and Sensenbrenner (1993) note that too few embeddedness studies offer precise predictions about when actors use embedded ties, while Mizruchi et al. (2006) call for more work on how the use of social relations for economic action varies across persons and situations. We found support for predictions linking embeddedness to trust and uncertainty. In so doing, our research suggests that markets are neither the impersonal venues envisioned by some models, nor are they as saturated by social relations as strict embeddedness researchers would have us believe. Instead our research gives a view of markets as existing between these under- and over-socialized extremes.

## Appendix A. Independent and dependent measures for survey and main experiment

This appendix lists the dependent variables and trust measures from the General Social Survey, as well as an alternative trust scale used in the main experiment.

### A.1. General Social Survey items relevant to preference hypotheses

GSS respondents were asked: “I'd like you to imagine that you want to buy each of the following items or services. Would you rather buy them from a business or service provider with

whom you had some family or social relationship, or from a seller or provider with whom you had no prior personal contact? Please tell me the number that best represents your feeling with respect to each of the purchases listed.” Possible responses ranged from 1 (“strong preference for no contact”) to 5 (“strong preference for contact”). Respondents answered this question for the following five items: *bedroom furniture*, an *automobile*, *legal services*, *home maintenance services*, and a *house or condominium*. Responses to these items provide a test of the hypotheses using *preferences*.

As mentioned in the text, items for which quality is unknown or unobservable at the point of purchase (such as rubber) entail high uncertainty for a potential buyer. On the other hand, items for which quality is easily discernable (rice) entail low or no uncertainty. Thus, following DiMaggio and Louch (1998), bedroom furniture entails a low level of uncertainty. The remaining goods (automobile and home) and services (lawyer and house repair) entail higher levels of uncertainty.

#### A.2. General Social Survey items relevant to actual decisions

First, respondents were asked if they had purchased a given item or service at all (in the case of a *home purchase*), in the past 10 years (for *home maintenance services* and *legal services*), or 5 years (for an *automobile from a private individual* or an *automobile from a dealer*). Those who responded yes were then asked, among other things, their relationship to the seller of each item at the time of purchase. Possible responses included (1) relative (including in-laws), (2) friend or acquaintance, (3) friend of a friend or relative, or a relative of a friend, (4) not a friend, but someone with whom the respondent had previous business dealings, and (5) no prior relationship. For the analyses of actual decisions from this survey data, responses 1–4 were coded as “embedded transactions,” while response 5 was coded as a “non-embedded” transaction.

#### A.3. General Social Survey trust measures (used in survey and experiments)

The following items were taken from the GSS, and the composite variable (*sumtrust*, see below) was used as the trust measure for all analyses of the GSS data. These questions were also included in the experiment. *Trust*: Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people? Possible responses included (a) most people can be trusted (coded 1), (b) you cannot be too careful (coded 0), and (c) it depends (coded .5). *Helpful*: Would you say that most of the time people try to be helpful, or that they are mostly just looking out for themselves? (a) most people try to be helpful (coded 1), (b) they are mostly just looking out for themselves (coded 0), and (c) it depends (coded .5). *Fair*: Do you think most people would try to take advantage of you if they got a chance, or would they try to be fair? (a) would try to take advantage of you (coded 0), (b) would try to be fair (coded 1), and (c) it depends (coded .5). The three items load onto one factor and are moderately correlated ( $\alpha = .655$ ).

Thus, following previous work (Simpson, 2006), the three variables were summed to create a composite variable, here called *sumtrust* (range = 0–3).

#### A.4. Alternative trust measure for main experiment and auxiliary experiment

An alternative trust scale (taken from a much larger scale developed by Yamagishi et al.) was also administered in the experiment. This scale consisted of four items, each measured on a seven-point Likert scale (1 = strongly agree and 7 = strongly disagree): (1) *one should not trust others until one knows them well*; (2) *those devoted to unselfish causes are often exploited by others*; (3) *most people will respond in kind when others trust them* (reverse scored); (4) *most people are basically honest* (reverse scored). After summing the responses of these items, we divided participants into high- and low-trusters using a median split of the composite measure.

### Appendix B. Auxiliary experiment design and results

The auxiliary experiment was conducted about 1 year after the main experiment. The auxiliary study was conducted in the same physical location and subjects were drawn from the same population as the main experiment. As in the main experiment, potential participants were contacted in large classrooms using the opportunity to earn money as an incentive. Those who indicated an interest in participating were later contacted via telephone. Unlike the main experiment, participants for the auxiliary experiment were not asked to bring a friend or acquaintance. Those who agreed to participate were scheduled. Participants were scheduled in groups of 8–10. A total of 179 students participated in the auxiliary experiment.

#### B.1. Procedure

Upon arrival at the laboratory, each participant was escorted to a private subject room. After filling out consent and participant information forms, participants completed a questionnaire containing both trust scales, along with some filler items. Thereafter they received instructions for our behavioral measure of trust, the investment game developed by Berg et al. (1995).

Importantly, as noted earlier, previous research has suggested the GSS trust scale does not predict trusting behavior in the trust game very well (Glaeser et al., 2000). However, although previous work shows that the alternative trust scale predicts a number of behaviors related to trust, no study to our knowledge has assessed its predictive power for the investment game. This is important because, since Berg et al. introduced it, the investment game has become the standard behavioral measure of trust.

The investment game involves two players, a truster and a trustee. The truster is given some number of resources, which translate into money. In the auxiliary experiment, trusters were given six resource points, each worth one dollar. The truster is told that he or she can send any amount ( $0 \leq S \leq 6$ ) of those points to the trustee. Any amount,  $S$ , the truster sends is tripled before it reaches the trustee. For instance, if the truster sends

Table B.1  
Unstandardized coefficients for trusting behavior in auxiliary experiment  
( $N = 179$ )

Independent variable	GSS measure	Alternative measure trust
Trust measure	.330 (.241)	.662 (.244)**
Gender	.409 (.246)	.517 (.249)*

Note: Standard errors are in parentheses. \*\*.004, one-tailed; \*.04, two-tailed.

three of the original six dollars to the trustee, the trustee will receive nine dollars. In turn, the trustee may return any portion ( $0 \leq R \leq 3S$ ) of the tripled amount to the truster. But unlike  $S$ ,  $R$  is not subject to a multiplier. Keeping with the above example: trustee receives nine after the tripling of  $S = 3$ . Assume that the trustee decides to send four of those nine back to the truster. In this case, the truster receives four dollars (in addition to the three that he or she kept from the initial endowment) and the trustee receives five dollars. Following previous work (Berg et al., 1995; Buchan et al., 2002; Glaeser et al., 2000),  $S$  is our behavioral measure of trust.

All participants in the auxiliary experiment were informed that they would be trusters. (The results reported here are from of a larger study. We do not introduce the non-relevant experimental conditions in this paper.) Thereafter, they were given a form and indicated how many points they wished to send to a trustee (whom they did not know). Importantly, they were told that they would not interact with the trustee at any other point during the study. Thus, the interaction was “one-shot.” Following their decision to trust (or how much to trust), participants moved on to a different part of the procedure that is not relevant to our current purposes. Thereafter they were paid, debriefed and dismissed.

## B.2. Results of auxiliary experiment

Of the original 179 students, two did not understand the instructions and one reported that she had discussed the study in detail with another participant prior to coming to the laboratory. Thus, the analyses to follow are based on 176 students (69 males and 106 females).

The alpha loadings for the GSS and alternative trust scales were somewhat higher for this experimental group ( $\alpha = .614$  and  $.511$  for the GSS and alternative trust scales, respectively). Despite the lower alpha loadings for the alternative trust scale, the results reported below confirm its greater predictive power. We now turn to these results.

As in the analyses of our main experiment, we compare low to high-trusters using a median split of each scale. Consistent with some previous work (Buchan et al., 2007; Snijders and Keren, 1999), preliminary analyses showed that gender had a small effect on trusting behavior, with males being slightly more trusting than females,  $p = .06$ , two-tailed. Thus, in addition to our predictor variable, we also include a dummy variable for gender.

The results for each measure of trust are given in Table B.1. The results strongly echo the findings of our main experiment. The alternative trust scale is a strong predictor of trusting behavior ( $p = .004$ , one-tailed), while the GSS scale is not ( $p = .09$ , one-tailed). These results further increase our confidence in the

alternative trust scale, particularly when coupled with findings from previous studies on the predictive power of the alternative trust scale and on the lack of predictive power of the GSS trust measures. Most importantly, these findings increase our confidence that differences in generalized trust are driving the differences in tendencies to engage in embedded transactions found in the main experiment.

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