TITLE: How Do Reputation Systems Affect Commitment and Social Cohesion in Economic Exchange?

Lenard Strahringer*

Department of Sociology, Utrecht University/ Stanford Graduate School of Business, Stanford University

Rense Corten

Department of Sociology, Utrecht University/Interuniversity Center for Social Science Theory and Methodology (ICS)

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* Address of correspondence: PhD Office, 655 Knight Way, Stanford, CA 94305, United States

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Abstract

With the rise of the platform economy, economic interaction increasingly takes place under the regime of online reputation systems, which reduce uncertainty by publicizing others' past behavior. However, uncertainty is central to the development of stable and cohesive relationships. The fundamental concerns are that reputation systems render personal, stable relationships obsolete and erode social cohesion. Grounded in social exchange theory, we propose two mechanisms through which reputation systems reduce commitment and inhibit social cohesion. These hypotheses are tested in a lab experiment simulating economic exchange with and without reputation systems. Contrary to our theoretical expectations, we find that reputation systems slightly reduce interactions between strangers and do not inhibit the development of cohesive ties. Although reputation systems reduce the expressive value of cooperation, they offset this undesired effect by increasing cooperation. Alleviating concerns about the social ramifications of the platform economy, the relationship structure appears largely unaffected by the reputation system. We conclude that actors interpret acts of cooperation differently in the presence of a reputation system, and market participants develop relationships not for purely functional reasons but as emotion-based byproducts of economic exchange.
Keywords: *Social Cohesion, Social Exchange, Reputation Systems, Commitment, Expressive Value.*

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1 Introduction

Today, the platform economy is pervasive in economic interactions (Kenney et al., 2021; Tadelis, 2016). Unlike in the offline world, interactions on online platforms often take place under the regime of institutionalized reputation systems (e.g., the rating systems on eBay or Airbnb) (Cheshire, 2011; Resnick & Zeckhauser, 2002). Research shows that reputation systems reduce uncertainty about others' behavior, promoting cooperation between strangers (Diekmann et al., 2014; Raub & Weesie, 1990; Bolton et al., 2005; Tadelis, 2016). Thus, some platforms claim to enable meaningful social interaction and to create beneficial, personal relationships (Frenken et al., 2020). Yet, uncertainty is a central motive to form stable relationships instead of relying on a market logic of exchange (Kollock, 1994; Podolny, 1994; Eccles, 1981; Geertz, 1978; Petersen & Rajan, 1994; Buskens & Raub, 2002). Uncertainty also facilitates social cohesion at the actor-to-actor level by enabling risk-taking acts that signal trust and affection (Kuwabara, 2011; Molm et al., 2007b; Parigi & State, 2014). The fundamental concerns are that reputation systems (1) render stable, personal relationships obsolete and (2) potentially inhibit social cohesion (Tadelis, 2016; Wood et al., 2019; Parigi & State, 2014).

While there has been discussion on how the platform economy affects commitment and social cohesion at a societal level (Frenken et al., 2020; Schor, 2014), we know little about how interactions under reputation systems – a governing feature of online platforms – differ from offline interactions and how this affects relationship formation at the actor-to-actor level. Addressing this question, our interest in this research lies in *commitment* – the stability of exchange patterns – and *social cohesion* – the strength of the affective, relational bonds between actors (Kuwabara, 2011). Commitment reflects the conscious decision to interact with the same actor repeatedly instead of exchanging with changing or arbitrary actors. Commitment is interesting because it indicates that actors rely on stable exchange relationships rather than on a market logic of exchange to achieve favorable exchange outcomes (Kollock, 1994). Unlike in a perfect market, where actors are indifferent to exchange partners, commitment fosters repeated positive interactions between the same exchange partners, through which cohesive relationships can emerge (Lawler & Yoon, 1996).

Social cohesion is a broad term that has been used to describe different forms of social bonds that promote cooperation (Lin, 2001). Individuals benefit from cohesive ties through help and favors, and on a larger scale, cohesive relationships foster trusting communities capable of collective action (Coleman, 1988; Granovetter, 1985; Uzzi, 1996). Actors perceive cohesive relationships as a "unifying force" (Lawler, 2001), making the relationship an end in itself. Individuals are willing to invest in cohesive relationships without the premise of a higher expected return (e.g., with favors or gifts). Economic exchange, like other forms of social interaction, contributes to social cohesion (Kuwabara, 2011; Uzzi, 1997; Granovetter, 2017). For instance, many people maintain personal relationships with their regular hairdressers, financial advisors, or personal trainers, which makes them return to the same place and person even when eventually a better one shows up because they want to preserve the relationship.

While cohesive relationships might aggregate into societal cohesion in complex ways, they are certainly necessary to form cohesive societies (Schiefer & van der Noll, 2017). Hence, the actor-to-actor level is a pertinent starting point for understanding changes in the structure of our relationships. Understanding these micro-mechanisms is crucial for insights into how the platform economy affects the formation of relationships on a larger scale (Molm, 2010). From a practical standpoint, understanding these mechanisms can help platforms design reputation systems that facilitate meaningful interactions. Therefore, we seek to answer the following research question: *How do reputation systems affect commitment and social cohesion?*

In the offline world, information about past interactions is sparsely transmitted between people. In contrast, online reputation systems reflect the experiences of up to hundreds of customers with a particular actor (Resnick & Zeckhauser, 2002; Tadelis, 2016). Cheshire (2011) posited that reputation systems reduce uncertainty in economic interactions, incentivizing cooperative behavior and providing a large pool of experiences to assess others' behavior. When we develop our arguments on how these aspects affect commitment and cohesion, we assume a perfect information system that automatically reflects complete past behavior without noise, informing all actors. This common assumption in the literature (Tsvetkova, 2021) allows a clear development of theory on the specific feature of reputation systems to make past behavior public and simplifies the experimental design. We will revisit this assumption in the discussion.

The theory developed in this paper is grounded in social exchange theory, which defines social interaction as the exchange of goods between actors called exchange partners. Through repeated exchange, actors develop sentiments towards each other and the exchange relation itself (Lawler, 2001), making the exchange relation a distinct social object (Berger & Luckmann, 1966). Within social exchange theory, social cohesion is an actor's feeling of attachment to the exchange relation to another actor (Kuwabara, 2011).

We expand social exchange theory by explaining how socio-psychological cohesion mechanisms are altered when a reputation system makes the behavior of actors public. We focus on exchanges involving negotiation, interpersonal interaction, and some risk for both parties. The key argument is that reputation systems constrain the emergence of cohesive relationships by (1) diminishing commitment and (2) reducing the expressive value of cooperation.

To test these hypotheses, we conduct a laboratory experiment simulating a market where subjects repeatedly negotiate exchanges to earn money. Our experimental design advances previous designs (Kuwabara, 2011; Lawler & Yoon, 1996; Molm et al., 2007a; Buskens et al., 2010; Raub & Weesie, 1990) by not presupposing a specific exchange network, allowing any pair of actors to exchange. This approach captures the effect of reputation systems on commitment behavior, allowing different relationship structures to emerge with and without a reputation system. Existing experimental designs would not capture the effect of a reputation system on commitment behavior and thus are unsuitable to study the mechanisms we are interested in. Our design allows any pair of actors to exchange, resembling a market setting. It treats the emerging exchange structure as a behavioral outcome rather than a determinant of it (for elaboration see Kollock, 1994). However, we constrain exchange by allowing each actor to only exchange with one other actor at a time, an assumption we will revisit in the discussion.

Past experiments studying reputation effects have used the Prisoner's dilemma game or high-risk trust games (Tsvetkova, 2021). In market settings with partner choice, these fixed payoff matrices mean that actors always prefer to exchange with the most reputable actor (for an example, see Frey & Van De Rijt, 2016). That is, actors with good reputations always exchange with one another, while those with bad reputations cannot compensate. Negotiated exchange tasks, common in social exchange literature, fulfill the criterion of allowing compensation for bad reputation. However, they usually do not involve risk, making reputation negligible. Kollock (1994) showed that reputation becomes critical when actors can deviate from agreements. Accordingly, economic interactions on online platforms involve negotiated exchange with some risk, typically due to unobservable qualities (e.g., battery run time of a used phone) (Shapiro, 1983). We therefore employ a new two-person cooperation game combining negotiated exchange with the opportunity to deviate from agreements.

2 Theoretical Background

2.1 Uncertainty and Commitment

The most prominent explanation why actors choose to exchange repeatedly, despite having plentiful alternatives, is the mechanism of uncertainty reduction (Kollock, 1994; Lawler et al., 2000; Molm et al., 2000). In exchanges involving risk, actors face uncertainty about others' exchange behavior: Will the other cooperate or deceive me? When actors exchange, they become familiar with each other's behavior, reducing uncertainty between them. Under low uncertainty, actors are inclined to exchange repeatedly with the same partner because they can reliably achieve positive exchange outcomes (Thye et al., 2011; Podolny, 1994). Cooperation is more likely between repeated exchange partners because actors are more inclined to cooperate when they feel the exchange is part of an ongoing relationship rather than a one-time interaction (Kollock, 1994; Bolton et al., 2004). In contrast, when strangers interact, positive outcomes are less certain because they know less about each other's behavior. Cooperation is less likely because the exchange might be a one-shot interaction, and the other party might choose a different partner in the future, which is unlikely between exchange partners with an established personal relationship (Uzzi, 1997).

This argument aligns with sociological and economic theories that propose stable relationships as a means to overcome uncertainty (Eccles, 1981; Geertz, 1978; Petersen & Rajan, 1994). Therefore, we hypothesize:

> **H1:** *For every exchange relation, the more frequently the actors have exchanged in the past, the more likely is a further exchange between them (commitment).*

2.2 The Public Reduction of Uncertainty

The mechanism of uncertainty reduction assumes that information about the behavior of past exchange partners is not shared (Kollock, 1994). That is, no one besides actors A and B knows about actor A's behavior in an exchange with B. Private information reduces uncertainty between acquainted exchange partners but not between strangers, promoting commitment between acquaintances while hindering exchange between strangers. Reputation systems reduce uncertainty between strangers by publicizing actors' past behaviors (Resnick & Zeckhauser, 2002). Actors learn about their exchange partners' behavior and also about strangers' behavior through others' experiences with them. When actors know about strangers' past behavior, they lower the uncertainty barrier to exchange (Cheshire & Antin, 2009). For instance, Norbutas et al. (2020) showed that reputation systems sufficiently reduce uncertainty to enable exchange in illegal and anonymous dark-net markets, which are highly uncertain and lack legal assurance for risk-taking actors.

With a reputation system, experiences are not private to the exchange partners but feed into a public reputation (Resnick & Zeckhauser, 2002). When information is shared through a reputation system, the uncertainty discrepancy between known exchange partners and strangers is reduced. Consequently, actors are as certain about strangers' behavior as they are about their previous exchange partners and may not see a reason to exchange repeatedly with the same partner. While loyalty to a past exchange partner might persist due to positive emotions from cooperation (Lawler & Yoon, 1996), actors are more likely to seek out strangers for potentially more lucrative exchanges without facing higher uncertainty. Past research has documented this effect as a response to lower market uncertainty, reflected in the level of information asymmetry about traded goods in laboratory settings (Kollock, 1994) and in the debt market (Podolny, 1994).

Under a private information regime, market participants often cooperate within stable, ongoing exchange relationships but may exploit strangers or arm's-length relationships (Kollock, 1994; Uzzi, 1997). With a public reputation, this strategy becomes difficult because strangers would learn about past behavior, and even established exchange partners might hesitate after learning about an actor's uncooperative behavior. An inferior reputation limits future exchange opportunities (Przepiorka, 2013; Diekmann et al., 2014). Therefore, actors are more likely to cooperate with a reputation system in place, and market participants might anticipate or learn the increased chance of cooperation, increasing their willingness to exchange with strangers (Cheshire, 2011). This line of reasoning aligns with scientific evidence (Bolton et al., 2005; Kuwabara, 2015; Raub & Weesie, 1990).

Accordingly, researchers have predicted that stable relationships play a smaller role when market uncertainty is low (Uzzi, 1996; Podolny, 1994). When reputation systems reduce uncertainty by publicizing past behavior, we expect actors to form fewer stable relationships. Instead, they may rely on a market logic of exchange to achieve favorable exchange outcomes regardless of the partner, leading to unstable, fleeting exchange patterns. That is, with a reputation system, actors are more likely to exchange with strangers or infrequent exchange partners. Therefore, we hypothesize:

> **H2:** *For every exchange relation, with a reputation system, actors are less likely to exchange repeatedly (i.e., commit to the exchange relation) than without the reputation system.*

2.3 Cooperation and Social Cohesion

In the social exchange literature, the main determinant of social cohesion is the expressive value of cooperation (Molm et al., 2007a). An actor receives gratitude from the expressive value conveyed by an exchange partner's cooperative actions, which goes beyond the exchanged goods (Molm et al., 2007b; Lawler, 2001). In practice, expressive value might be transmitted through facial expressions, gift-giving, compliments, or kindness. The exchange partner can infer information from such cooperative behaviors, such as the willingness to exchange again in the future and to develop or maintain a relationship (Molm et al., 2007b). The positive sentiment produced by expressive acts promotes the formation of cohesive relationships (Lawler, 2001).

In uncertain markets, exchange carries a risk of exploitation, meaning the exchange partner might not reciprocate (or reciprocate less than agreed upon) (Molm et al., 2007b). Under risk, successful exchange depends on the cooperation of the exchange partners (Molm, 2010). Taking risks signals trust, and honoring trust signals trustworthiness and the desire to exchange again in the future. Voluntary acts of giving indicate that both actors value the relationship (Molm et al., 2007b; Uzzi, 1997). Therefore, risk-taking conveys expressive value. To illustrate, if I look after my friend's cat while she is on holiday and she does the same for me, I feel valued by her willingness to do me a favor without any guarantee of return and vice versa. We both understand this as a signal that we value our friendship. If we had made a binding agreement about this exchange to eliminate the risk of no return, the cats would still be cared for, but the favor would turn into a requirement and lose its expressive value.

The affect theory of social exchange (Lawler, 2001) assumes that actors ascribe emotions resulting from exchange to social units. Lawler argued that a joint exchange task, where exchange partners jointly engage in an activity to carry out the exchange, leads to a feeling of shared responsibility for the outcome, inducing exchange partners to ascribe more emotions to the exchange partner and their relationship. Accordingly, Kuwabara (2011) showed that the degree to which actors engage in a joint activity to carry out the exchange moderates the relationship between expressive value and cohesion. Joint activity inclines the actor to attribute emotions from affective acts to the exchange relation (Kuwabara, 2011; Lawler, 2001). In line with these results, Molm et al. (2013) later found that combining joint tasks, such as negotiation, with voluntary elements of exchange creates a climate of cooperation and solidarity that diminishes the conflictual aspects of negotiation and promotes cooperation in joint exchange tasks. Successfully completing joint exchange tasks ties together the otherwise distinct actions of voluntary exchange. The combination of a joint task and voluntary elements of exchange leads to high levels of social cohesion.

In many markets, exchange usually requires joint activity such as bargaining or coordinating the transfer of goods. Although platforms and other intermediaries seek to mitigate risk (Parigi & State, 2014) and most exchanges are based on binding agreements, some risk usually remains (Kollock, 1994). This risk is inherent in most economic exchanges, often in the form of information asymmetry. Despite an agreement, actors might deviate from the other's expectations positively (e.g., sending a small present) or negatively (e.g., late shipping). Negative deviations are limited by the assurance structures implemented by platforms. However, when actors do not exploit the ambiguity or unenforceability of agreements and cooperate instead, their behavior can be seen as a voluntary act of giving that involves a risk of no return and conveys expressive value.

Taken together, many typical online and offline markets (and as later in our experimental design) provide the necessary conditions of risk and joint activity to produce social cohesion between actors:

> **H3:** *For every actor, cooperative exchange with another exchange partner increases social cohesion towards the exchange partner.*

2.4 The Reduction of Affective Value

When actors cooperate, their actions convey expressive value and generate social cohesion. However, reputation systems fundamentally change the incentives to cooperate (Cheshire, 2011). As argued above, if an actor is uncooperative, for example by deceiving another actor, the reputational damage is greater when their behavior is public. This is because without a reputation system, an uncooperative actor might find another unsuspecting exchange partner but when all actors learn about their misconduct, the uncooperative actor cannot evade the negative consequences, leading to fewer exchange opportunities or less profitable exchanges (Przepiorka, 2013). Reputation systems alter the incentive to cooperate by making uncooperative behavior publicly known and thus costly, amplifying the extrinsic interest in a good reputation (Diekmann et al., 2014).

When Molm et al. (2007b) stated that cooperation must be voluntary to convey expressive value, they implied that cooperative behavior must be attributed to the benevolence of the actor. However, with a reputation system in place, purely self-interested actors are more likely to cooperate as well. In this context, benevolent behavior cannot easily be distinguished from selfish behavior driven by the extrinsic interest in a good reputation (Bolton et al., 2004; Kuwabara, 2015). When an actor interprets a cooperative act, they cannot unambiguously see it as a signal of intrinsic goodwill because it may be driven by the desire for a good reputation. The reputation system thus disguises signals of trust and affection, making it harder for actors to infer genuine sentiments about their exchange relationships from cooperative behavior. While reputation systems promote cooperation, they might reduce the expressive value conveyed by voluntary acts of giving. Consequently, the reputation system moderates the relationship between cooperative behavior and social cohesion. It weakens the link between the two by obscuring an exchange partner's true motives of cooperation.

In their longitudinal analysis of users on a couch-surfing platform, Parigi & State (2014) showed that the introduction of reputation functions led to fewer nominations of close friends on the platform. If information decreases uncertainty in interactions, their findings support the idea that reputation systems reduce the expressive value of cooperation and hinder the formation of cohesive relationships. In line with their findings, we derive the following hypothesis:

> **H4:** *With a reputation system, the effect of cooperative exchange on social cohesion is weaker than without the reputation system.*

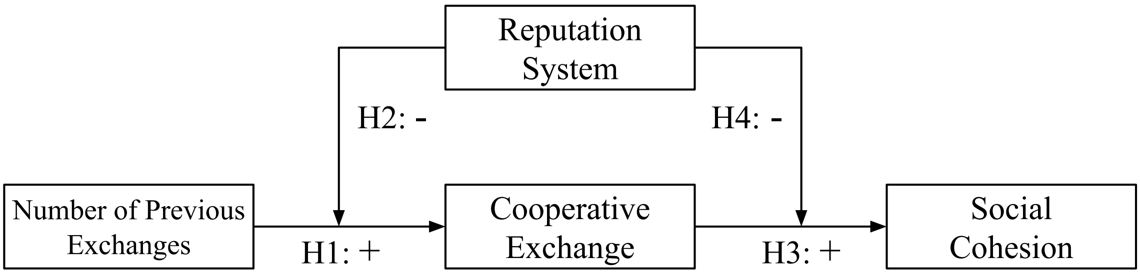

Figure 1: Path model of the hypothesized effects of reputation systems on social cohesion and commitment on the level of the exchange relation (or dyad).

3 Methods

3.1 The Game

The game we used to test the hypotheses imposes a cooperation problem that combines negotiated and voluntary elements into a compound exchange task. The exchange task has a negotiation stage where actors choose partners from a group of possible partners and a deviation stage to execute the exchange with the chosen partner. The logic of the two-stage game is as follows. In the *negotiation stage*, pairs of actors make a joint decision to exchange S_1 units against S_2 units from their budgets M. By making this decision, both partners decide not to exchange with any other partner in the market – i.e. the exchange network is negatively connected. In the *deviation stage*, the actors who agreed to exchange send units unilaterally. They may send the agreed number of units S_1/S_2 or they may deviate (D_1/D_2) by up to L units from the agreement in the positive or negative direction. Both actors make their decisions simultaneously. This possibility mirrors the risk that is inherent to economic exchange and establishes uncertainty in the market. The payoff of actor one corresponds to the negotiated amount plus the deviation of actor two ($S_2 + D_2$) multiplied by the cooperation multiplier c plus the units that remain from their budget ($M - S_1 + L - D_1$).

Because actors need to concede some units when they make offers to compete to exchange with reputable actors, they cannot simply expect a higher payoff when exchanging with a more reputable actor. Thus, actors do not strictly prefer to exchange with the most reputable available actor. The less reputable actor can compensate the more reputable actor in the negotiation stage for the lower expected deviation. A focal actor with an inferior reputation may, for example, offer to send 15 units and only receive 12 to compensate for the expectation of the other than the focal actor will deviate negatively. This is in line with real-world markets where less reputable actors ask lower prices to compensate lower customer expectations or higher uncertainty (Przepiorka, 2013). This game, therefore, allows us to meaningfully study partner choice with reputation (see Appendix A for more detail).

In the experiment, we emulated an infinitely repeated game, where actors are informed about others' decisions after each round. The experiment implements two information conditions: In the *baseline condition*, actors only learn about the deviation of their exchange partner. In the *reputation condition*, actors learn about the deviation of all actors in the market. Accordingly, actors' decisions in the deviation stage are crucial to establishing cooperative relationships and acquire a good reputation. Further, while actors might expect different levels of deviation by information condition, the crucial difference is in uncertainty. Actors obtain full information in the reputation condition to assess the expected deviation of another, while reputation is purely dyadic in the baseline condition.

3.2 Design & Procedures

The implementation of the reputation system in this experiment follows the design of previous experiments (Tsvetkova, 2021). Two design decisions to be made are the obliviation of the reputation system and the aggregation of reputation values. In the present design, the reputation system presents the full history of deviations of a respective actor as well as their average. These choices reflect the implementation of reputation systems on many popular online platforms and are likely to be effective in reducing uncertainty and incentivizing cooperation.

The experiment took place in a laboratory at a Dutch public research university. Subjects were recruited via the subject pool of the lab. Although everybody could register, the pool mostly consisted of students. Up to 30 subjects could sign up for one of eight sessions. The 168 subjects who signed up were on average 22.7 years ($SD = 6.64$) and mostly female (64.88% female, 32.74% male, 2.38 % others). Subjects received instructions on paper and could publicly ask clarifying questions before the start of the session. Subjects were privately paid in cash directly after.

Subjects were assigned to groups of six and played one practice round before groups were shuffled to play 20 to 30 payoff rounds. The groups remained thenceforth. The exact number of rounds was randomly drawn from a binomial distribution with a mean of 25 rounds. At the beginning of each round, subjects received 15 (M) abstract units to exchange. Subjects learned that for each unit left from their budget at the end of the round, they received one euro cent and for each unit received through exchange, they received three (c) euro cents. Subjects had to follow two steps to exchange.

First, they negotiated an agreement with another subject in the group via the computer interface shown in Figure 2. To do so, they could send offers to other subjects. To send an offer, subjects selected another player (second column) and chose how many units they want to send and how many units they want to receive (i.e., the other sends) in turn using two sliders below the table (not shown here). Subjects could only send one offer per recipient at a time, which was displayed in the last column of their trading table. The recipient of the offer could then accept or reject the offer (next to last column). When rejected, the offer disappeared from the screen and the sender could send another one. When accepted, the sender and the recipient agreed to exchange. In this case, all pending (incoming and outgoing) offers of the exchange partners were closed and the players were excluded from further negotiation. Subjects had two minutes per round to agree with another player. Otherwise, they could not exchange in the ongoing round.

Participant	Select for Offer	Average difference between agreed and sent units	Differences between agreed and sent units	Incoming offers	Accept/decline incoming offers	Outgoing offers
YOU		1 more	1,			
Participant BLUE	Select BLUE	0		You receive **6** (€0.24), the other receives **9** (€0.36)	Accept Decline	You receive **13** (0.46€), the other receives **8** (0.26€)
Participant RED	Select RED	0				
Participant GREEN	Select GREEN	-2 less	-2,	You receive **9** (€0.32), the other receives **10** (€0.36)	Accept Decline	
Participant ORANGE	Select ORANGE	0				
Participant PURPLE	Select PURPLE	0				You receive **13** (0.46€), the other receives **8** (0.26€)

Figure 2: Trading table of the computer interface to negotiate exchanges

Second, after the negotiation, players received another five (L) units and were asked to send units to their exchange partner. They could send the agreed amount or deviate by up to five units in the positive or negative direction (D). After both partners had sent units, the exchange partner was informed about the other's decision, and subjects were shown their round payoff. Before the next round, all obtained units were converted into money and transferred to a hidden account that was only displayed to the subjects at the end of the experiment.

The maximum round payoff was when two actors agreed on exchanging 15 for 15 units, both send 20 (15 + 5) units, and both earn 60 cents (20 x 3 cents). To illustrate, when subjects agreed to exchange 15 for 10 and both send one more than agreed on, actor one earns 37 cents since they receive 11 (10 + 1) units (33 cents) and 4 (20 - 16) units remain from their budget (4 cents), and actor two earns 57 cents since they receive 16 (15 + 1) units (48 cents) and have 9 (20 - 11) remaining units from their budget (9 cents). As subjects received twenty cents for a round without an exchange, even suboptimal and unfair exchanges yield a higher pay-off than not exchanging. This is to ensure that the overall number of exchanges does not vary strongly between subjects, groups, and conditions, i.e., that all subjects exchange in all rounds.

Information about past behavior was displayed to the subjects in the second and the third column of the trading table in Figure 2. In the *baseline condition*, during the negotiation, subjects were shown the list of deviations of their previous exchange partners in previous exchanges with them, as well as the average. Subjects were provided with a complete history of their own deviations. In the *reputation condition*, subjects received a list of all deviations of a given player no matter who the exchange partner was. To ensure that different behaviors in the reputation and the baseline condition are not due to difficulties in recalling previous exchange partners in the reputation condition, the deviations were colored in the color of the affected player (third column). For example, if player green deviated by minus one in an exchange with player red, the information was displayed next to player green in red font to all actors who had access to the information.

3.3 Measures

The dependent variable of social cohesion was measured in two ways at the end of the experiment. Both measures are designed to capture feelings of cohesion towards the exchange relation, or stated more simply, how valuable the relationship is to the actors. First, subjects were allowed to independently gift up to one euro to each of the five other players in their group (Lawler & Yoon, 1996). Every player sent and received only one randomly chosen gift. The gifted amount was multiplied by three before it was added to the receiver's account. The remaining money was added to the gifter's account.

Second, subjects reported on their relationships to each of the five other group members on five items that have been used before to measure social cohesion (Kuwabara, 2011; Molm et al., 2007b). On seven-point Likert scales, subjects reported how close/distant, united/divided, team-oriented/self-oriented, and harmonious/conflictual they would describe each of their relationships, and whether it is a relationship of partners/competitors. The questionnaire items were summed up to a composite score being the second measure of social cohesion (Cronbach's alpha .92). Matching the possible range of the gift, the questionnaire measure was re-scaled to obtain a measure with 1 indicating maximal cohesion and 0 indicating no cohesion towards an actor.

The units of analysis are the (undirected) dyad-round and the (directed) dyad. We used two measures of cooperation: the total deviation (positive or negative), and the number of exchanges in a dyad. The number of exchanges reflects the level of commitment and the total deviation the degree of cooperation determining the expressive value in the exchange relation. On the dyad-round level, the total previous deviation is the sum of previous deviations by both exchange partners in the dyad. On the directed dyad level, the total deviation is the sum of the deviations by the other in the dyad. Dummies were added for whether an exchange took place in the given dyad-round, whether the dyad also exchanged in the previous round, and whether it was the first exchange in a given dyad.

Additionally, for every dyad-round, we calculated the actors' dyadic and public reputation rank. The reputation rank was calculated by ordering all actors in the group by their reputation through the lens of an actor and assigning ranks to the possible exchange partners (1 being best and 5 being worst). The dyadic reputation is based only on the deviations of the respective actor towards the partner in the dyad, while the public reputation is based on all deviations of a given actor. To obtain a dyad-level measure, we calculated the absolute distance between the reputation rank of both actors in the dyad.

We included age and gender as controls. The models with the demographic controls yielded highly similar results (Appendix B), which is why we present the more parsimonious models without demographic controls. In the dyad-round analysis, we controlled for round number. Table 1 displays the descriptives of the dyad-round variables, and Table 2 of the dyad variables.

Table 1: Descriptive statistics at the dyad-round level (n = 9,380)

	no reputation system				reputation system			
Variable	Mean	Sd	Min	Max	Mean	Sd	Min	Max
trade	0.14		0	1	0.14		0	1
new partner	0.02		0	1	0.02		0	1
change partner	0.05		0	1	0.04		0	1
previous total deviation	3.4	26.83	-131	240	7.04	25.95	-72	236
previous number of exchanges	1.98	3.62	0	24	1.89	3.72	0	24
distance in public reputation rank	1.38	1.11	0	4	1.38	1.11	0	4
distance in dyadic reputation rank	1.12	0.94	0	4	1.16	0.95	0	4

Table 2: Descriptive statistics at the dyad level (n = 840)

	no reputation system				reputation system			
Variable	Mean	Sd	Min	Max	Mean	Sd	Min	Max
number of exchanges	4.77	6.95	0	25	4.77	7.5	0	25
total deviation (other)	6.8	29.05	-71	125	12.27	29.58	-91	123
social cohesion (gift)	.25	.38	0	1	.28	.41	0	1
social cohesion (questionnaire)	.52	.23	0	1	.52	.24	0	1

3.4 Analytical Strategy

First, the behavior in the game will be assessed by comparing some descriptive measures between conditions. The first part of the analysis tests hypotheses 1 and 2 on commitment. To do so, we fitted logistic multi-level models on whether an exchange took place including the two measures of cooperation and the hypothesized interaction effect between the reputation condition and the number of previous exchanges. Multi-level models are necessary because exchange decisions are joint decisions of two actors and thus cross-nested in actors, and dependent on other exchange decisions in the group and thus nested in groups. All models include random intercept terms at the dyad and the group level. We also included random intercept terms for the cross-nested structure of dyads in actors. The third exchange per group in each round was excluded from the analysis since the remaining two subjects could only exchange with one another.

We controlled for the possible confounder that the reputation system might prime actors to exchange with another actor with a similar reputation which would order actors in pairs that are then more likely to exchange with one another. Consequently, the number of exchanges would be more predictive of the pairings of exchange partners in a given round. To control for this aspect, we included the distance in dyadic and public reputation rank within dyads in the model. Since public reputation is only observable in the reputation condition, we added an interaction term with the reputation condition. Average marginal effects were calculated to test interaction effects in the logistic models. For further exploratory analysis, we fitted a series of equivalent models on partner change and new partner choice to better understand the commitment behavior in the experiment.

To assess hypotheses 3 and 4 on cohesion, we fitted OLS regression models at the directed dyad level on the social cohesion measures including the two measures of cooperation and the hypothesized interaction effect between the reputation condition and the total deviation of the other. All models include robust standard errors clustered at the actor level. Finally, we will compare the structure of emerging relationships. Two-sided z-tests were used to obtain p-values for the coefficients in the multi-level models and t-tests for all other statistical tests.

4 Results

4.1 Commitment

Figure 3 provides a series of descriptive comparisons between the two conditions. Panel A shows the rate of exchanges between strangers, i.e., new exchange partners, per round. In both conditions, the rate of new exchange partners drops sharply throughout the first ten rounds. In rounds 5 to 10, fewer strangers agreed on exchanges in the reputation condition than in the baseline condition. As a result, 60.5% of dyads exchanged at least once in the baseline condition while only 57.1% did in the reputation condition ($p < .001$). Equivalently, panel B presents the change rate of exchange partners, e.g., the share of exchanging dyads that did not exchange in the previous round. It shows a decreasing trend while actors in the baseline condition maintain a significantly higher rate of partner change in the later rounds. These panels are surprising since they suggest that the higher uncertainty about strangers in the baseline condition does not stop actors from exchanging with strangers. This challenges the theoretical expectation that the reputation system bridges the uncertainty between strangers and thereby promotes exchange with strangers.

To test our hypotheses on commitment, we turn to the multivariate analysis. Table 3 shows the logistic multi-level models on whether an exchange took place. Model 1 shows that previous exchange makes actors more likely to exchange again, as hypothesis 1 predicts ($b = .704, p < .001$). Model 2 includes the interaction effect between the number of previous exchanges and the reputation system. The second hypothesis predicts that in the reputation condition, actors are more inclined to exchange with previous exchange partners than in the baseline condition. Thus, we expect the number of previous exchanges to be a weaker predictor in the reputation condition, controlling for other possible determinants of partner choice. Unexpectedly, the interaction effect points in the opposite direction and is significant ($b = .234, p = .039$). The average marginal effects of the number of previous exchanges on the probability of exchange are not significantly different between conditions. (4.3% and 3.41% points, $p = .24$). We do not find an effect of the reputation system on in the importance of previous exchanges for choosing an exchange partner.

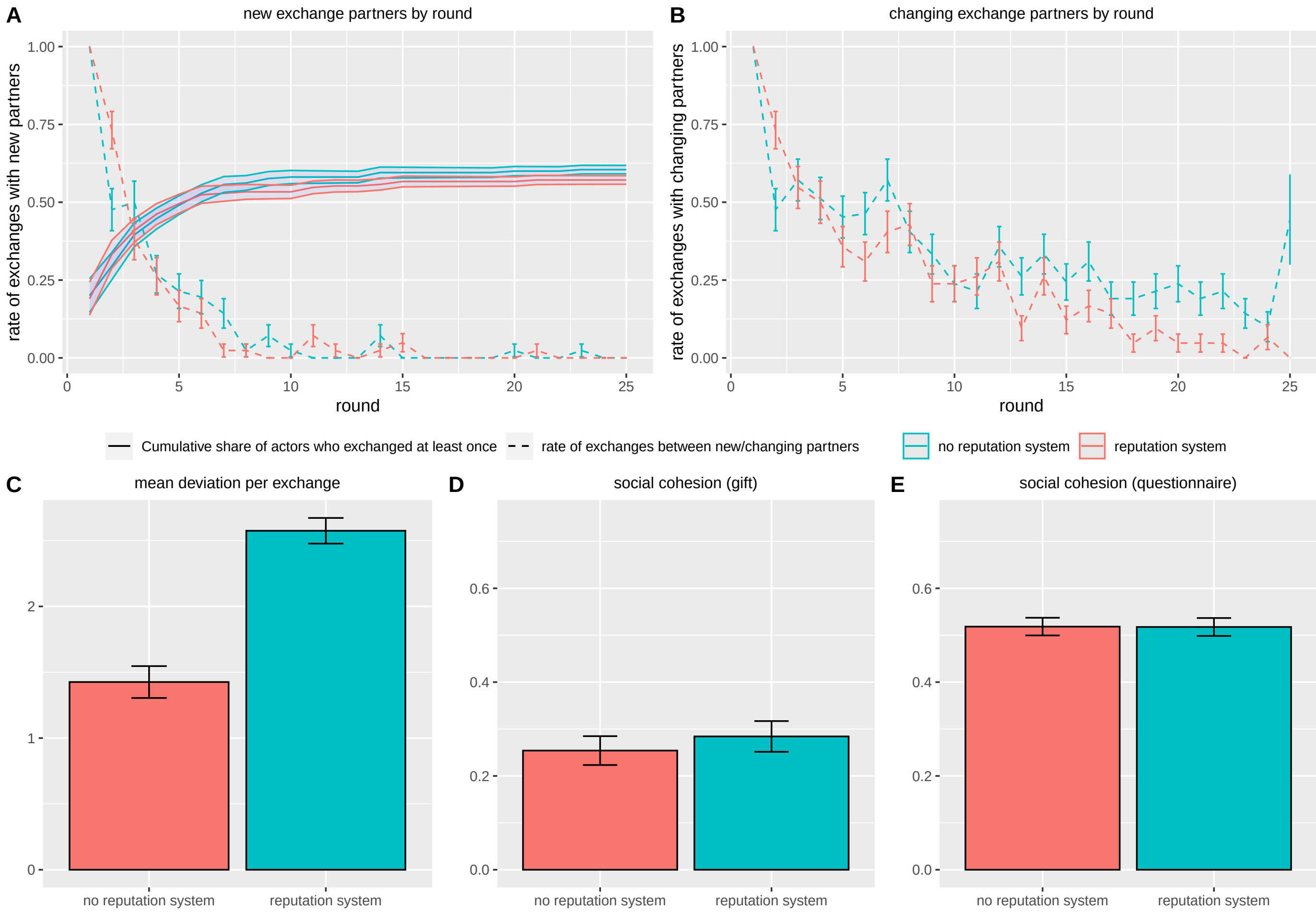

Figure 3: Comparison between the reputation and the baseline condition of (A) the rate of new exchange partners by round, (B) the rate of changing exchange partners by round, and at the actor level (C) mean deviation per exchange, (D) mean social cohesion (gift), and (E) mean social cohesion (questionnaire) with bars denoting .95 confidence intervals.

Table 3: Logistic multi-level regression results on exchange at the dyad-round level (n = 9,380)

	Dependent variable:		
	exchange		
	(1)	(2)	(3)
log(total previous deviation)	0.145**	0.125*	0.100*
	(0.049)	(0.049)	(0.048)
log(number of previous exchanges)	0.704***	0.597***	0.569***
	(0.060)	(0.078)	(0.078)
reputation system (RS)		−0.249	−0.213
		(0.277)	(0.274)
distance public reputation ranks			−0.041
			(0.087)
distance dyadic reputation ranks			−0.267***
			(0.070)
log(number of previous exchanges) X RS		0.234*	0.286*
		(0.113)	(0.114)
distance public reputation ranks X RS			−0.312*
			(0.129)
constant	−3.433***	−3.309***	−3.314***
	(0.165)	(0.210)	(0.209)
Observations	9,380	9,380	9,380
Dyads	420	420	420
Actors	168	168	168
Log Likelihood	−2,117.751	−2,115.370	−2,098.198
Akaike Inf. Crit.	4,249.503	4,248.740	4,220.397
Bayesian Inf. Crit.	4,299.527	4,313.057	4,306.153
Note:	*p<0.05; **p<0.01; ***p<0.001		

We need yet to control for the distance in reputation ranks to see if the public reputation scores prime actors to exchange with the most reputable partner confounding the effect of uncertainty. Model 3 includes distance in dyadic and public reputation rank within dyads and shows that a high distance in dyadic reputation rank decreases the probability of exchange ($b = -.267, p < .001$). The same holds for the distance in public reputation in the reputation condition ($b = -.353, p < .001$). The ordering effect of public reputation is significantly stronger in the reputation condition ($p = .011$). However, the interaction effect between the number of previous exchanges and the reputation condition is even greater ($b = .286, p = .011$), while the difference in average marginal effects is still insignificant (4.42% and 3.26% points, $p = .122$). Therefore, hypothesis 2 is rejected – the reduced uncertainty of the reputation system did not promote exchange between strangers.

Finally, we sought to understand whether the reduced uncertainty in the reputation system could explain the higher rates of partner change and new partners in the reputation condition. We ran an exploratory analysis on partner change and the choice of new exchange partners. We neither find a significant effect of the reduced uncertainty on partner change nor new partner choice. The ordering effect of the reputation system appears to explain the lower rate of partner change but not the lower rate of new partners in the reputation condition. The full analysis can be found in Appendix C.

4.2 Social Cohesion

Next, we turn to our results on social cohesion. Panel C in Figure 3 shows that there is a significant difference in the number of units deviated per exchange between the conditions ($p < .001$). Accordingly, subjects earned 47.02 euro cents in the baseline condition and 50.38 euro cents per round in the reputation condition (7.14% more, $p = .001$). With the reputation system, exchange partners deviated more positively, i.e., sent more units compared to the agreement than in the baseline condition. That is, the reputation system indeed incentivizes cooperative behavior. In our experiment, the difference between the baseline and the reputation condition reflects the share of cooperation that is induced by the increased instrumental interest in a good reputation as opposed to benevolence.

Panels D and E compare the social cohesion measures between conditions. While actors sent slightly higher gifts ($p = .135$) and reported higher cohesion in the questionnaire ($p = .52$) in the reputation condition, neither difference is significant. The more positive deviations in the reputation condition appear not to result in higher levels of cohesion.

Table 4: Regression results on social cohesion at the directed dyad level (n = 840)

	Dependent variable:			
	gift	questionnaire	gift	questionnaire
	(1)	(2)	(3)	(4)
log(total deviation)	0.345***	0.306***	0.458***	0.382***
	(0.043)	(0.022)	(0.065)	(0.033)
log(number of exchanges)	0.149***	0.101***	0.150***	0.101***
	(0.011)	(0.005)	(0.011)	(0.005)
reputation system (RS)			0.037	−0.001
			(0.023)	(0.012)
log(total deviation) X RS			−0.195*	−0.122**
			(0.080)	(0.041)
constant	0.088***	0.390***	0.070***	0.392***
	(0.016)	(0.008)	(0.020)	(0.010)
Observations	840	840	840	840
Actors	168	168	168	168
Groups	28	28	28	28
R^2	0.326	0.515	0.332	0.520
Adjusted R^2	0.325	0.514	0.329	0.518

Note: *p<0.05; **p<0.01; ***p<0.001

Next, we present the multivariate analysis shown in Table 4. Models 1 and 2 show that both the total deviation ($b_g = .345, p < .001$ and $b_q = .306, p < .001$) and the number of exchanges ($b_g = .149, p < .001$ and $b_q = .101, p < .001$) in a dyad have significant positive effects on both social cohesion measures. This confirms hypothesis 3 that cooperative exchange leads to cohesion. Further, models 3 and 4 include the interaction effect between the reputation condition and total deviation. According to hypothesis 4, we expect that the reputation system decreases the expressive value of sending more units, i.e., the positive effect of deviation on cohesion is smaller. For both measures – the gift and the questionnaire – there is a significant negative interaction effect ($b_g = -.195, p = .015.$ and $b_q = -.122, p = .003$). Given that the main effect of the reputation system is close to zero, the level of social cohesion is similar for strangers (deviation 0) and increases more strongly with positive deviation in the baseline condition. Thus, hypothesis 4 is supported.

To be confident in this finding, we need to verify that it is not solely driven by non-cooperative dyads in the baseline condition, which might be particularly incohesive. To do so, we run a robustness check adding an interaction term between $log(total\ deviation)$ and the sign of total deviation, thus allowing different coefficients for positive and negative total deviations. In this model, the effects of the interaction terms between the total deviation and the reputation condition shrink slightly but are still significant ($b_g = -.16, p = .049$ and $b_q = -.082, p = .041$). Therefore, we find a significant negative relationship between the reputation system and the expressive value of cooperation.

4.3 Relationship Structure

Finally, we compare the relationship structures between the two conditions. Taken together, our hypotheses suggest that actors develop a few salient cohesive relationships in the baseline condition and multiple less cohesive relationships in the reputation condition. Given our results on commitment behavior, however, if we expect any difference, actors should develop slightly more relationships in the baseline condition. Concerning the level of cohesion, the question is whether the reduction in the expressive value of cooperation outweighs the increase in cooperation in the reputation condition.

Figure 4 shows the cohesion of the five relationships by actor ranked by level of cohesion. In both conditions, we can see that actors developed one salient cohesive relationship with the other four being considerably less cohesive. Interestingly, the questionnaire measure captured more gradual levels of cohesion while the gift measure did not detect clear differences in cohesion between the relations ranked two to five. Generally, the two conditions produced surprisingly similar relationship structures. There are no significant differences between conditions when comparing the levels of cohesion of the ranked relationships. The restrained commitment behavior in the baseline condition did not result in multiple cohesive relationships but actors appear to have developed one salient cohesive relationship like in the reputation condition. The increase in cooperation in the reputation condition and the reduced expressive value in exchange offset one another resulting in similar levels of cohesion in both conditions.

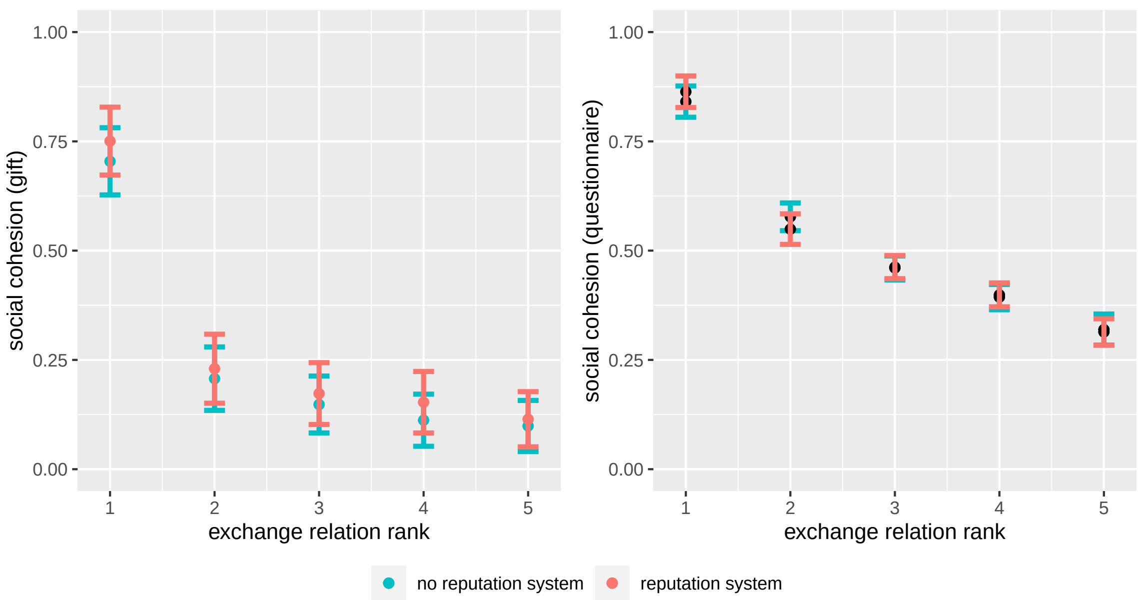

Figure 4: Comparison of the relationship structures between conditions ordered by social cohesion at the actor level including .95 confidence intervals

5 Discussion

We studied how reputation systems affect the emergence of cohesive relationships in markets using a lab experiment. We let participants exchange repeatedly in an uncertain market with and without reputation systems and captured the resulting relationship structure.

Commitment to an exchange partner has been identified as a strategy to reduce uncertainty (Kollock, 1994; Podolny, 1994). Because reputation systems bridge this uncertainty, they were expected to render stable, personal relationships unnecessary for exchange (Tadelis, 2016). However, our results indicate that reputation systems do not decrease commitment behavior. With a reputation system, participants were more likely to repeatedly exchange with the same partners. This finding challenges the long-standing assumption that reputation systems reduce commitment and lead to transient interaction patterns (Bolton et al., 2004). Reputation systems may prompt actors to exchange with equally reputable partners (Frey & Van De Rijt, 2016; Podolny, 1994), helping them quickly identify and commit to preferred partners.

Our findings suggest that, beyond promoting cooperation, reputation systems also function as matchmakers for market participants – a phenomenon that is underexplored in the literature (Tadelis, 2016). Only with a reputation system actors can be certain that their current partner is optimal, potentially discouraging exploration of other partners. Without a reputation system, actors need to interact with various partners to understand their behavior. The idea that reputation systems curb the exploration of exchange partners through interaction is a new theoretical perspective deserving more attention.

Regarding the quality of relationships, we find that reputation systems reduce the affective value of cooperation. This effect offsets the increase in cooperation induced by the reputation system, resulting in relationships of similar cohesion with and without reputation systems. The theoretical insight is that the reputational context shapes how actors perceive the expressive value of risk-taking acts, constraining the dyadic emergence of social cohesion. Actors have stronger emotional responses to expressive acts when they can infer the genuine motives of their partners. Thus, when reputation is salient, actors cooperate more but do not necessarily form stronger relationships. The development of cohesive relationships cannot be solely explained by dyadic behavior but must be assessed within the broader social context. Actors consider the incentive structure of the social and economic environment and evaluate others' actions accordingly.

We show that reputation systems decrease the affective value of cooperation when holding cooperation constant, providing a cohesion-based explanation for why relationships under a reputation system might be weaker, as found by Parigi & State (2014). Yet, unlike Parigi & State, we find that relationships under a reputation system are similarly cohesive, with the reduced affective value offset by increased cooperation. One reason for the divergent findings may be that Parigi & State (2014) studied a couch-surfing platform involving voluntary exchanges without explicit agreements. While our commitment and cohesion mechanisms may apply to voluntary exchanges, they might differ in non-market settings designed to facilitate purposeful social relationships rather than economic exchanges.

A broader conclusion from this work is that market participants do not create relationships for purely functional reasons. This finding challenges classical theories suggesting that actors form social ties to facilitate exchange in uncertain markets (Eccles, 1981; Geertz, 1978; Petersen & Rajan, 1994; Uzzi, 1996). Economists and sociologists predicted that stable relationships would play a minor role in low-uncertainty markets (Williamson, 1989; Podolny, 1994), expecting the market logic of exchange to prevail. Our findings suggest that this functional view is incomplete. Cohesive ties appear to be emotion-driven byproducts of economic interactions, forming even in markets with reputation systems that do not require stable relationships to overcome uncertainty. Regardless of uncertainty, actors value familiarity and a shared history of exchange. In our study, personal ties are thus not created for economic purposes, but once formed, they facilitate repeated exchanges, largely replacing a market logic of exchange (Granovetter, 2017; Uzzi, 1997).

5.1 Limitations and Future Research

Our study has several limitations, offering opportunities for future research. First, exchange relations were negatively connected, meaning actors could only exchange with one actor per round. This setup allowed us to analyze partner choice and commitment while keeping the game manageable. Many real-world exchange networks are negatively connected to some extent. For example, Airbnb hosts can only host one guest at a time, and guests book only one accommodation at a time. However, much economic exchange occurs in positively connected networks where actors can exchange with multiple others simultaneously. In such cases, it is unclear what relationship structures would emerge. We expect that our socio-psychological mechanisms operate in positively connected networks as well, but the question remains how actors choose partners when they can exchange with multiple others. To investigate this meaningfully, actors must be able to compensate others for their inferior reputation, a feature of our compound exchange task. Our experimental design could be adapted to study the effects of reputation systems on inequality in earnings and relationships in positively connected networks.

Another limitation is our assumption of a perfect reputation system. In practice, many reputation systems rely on mutual reviews of exchange partners (Resnick & Zeckhauser, 2002). Even though real-world actors often have detailed and rich online reviews, reputation can be incomplete, noisy, or not salient to all market participants (Tadelis, 2016). Despite the perfect conditions in our study, we did not see differences in the emergent relationship structures, suggesting our conclusions may hold for imperfect systems as well. However, the effects on cooperation and its expressive value might be weaker with imperfect reputation systems.

Online reputation systems enable the voluntary exchange of reviews valuable to the receiver but not necessarily contributing to the sender's reputation. These acts of giving fall outside the reputation system and might promote social cohesion between actors (Molm et al., 2012). Future research could explore whether mutual reviewing extends the beneficial effects of reputation systems on social cohesion.

A third limitation is that payoffs were stable over time and across actors. In reality, actors have different needs and tastes at different times. A more realistic model could assume payoffs that vary over time and between actors. For example, someone might have a favorite restaurant but still want to try different places occasionally. When experiences reflected in a reputation are not fully transferable across time and actors, individuals may explore other exchange partners despite having accurate information about others' experiences. Reputation could then be studied as a multi-dimensional concept, not leading to the strong ordering effects observed in this study. Personal preferences and experiences might prevail (Norbutas et al., 2020). More research is needed to understand how these different sources of uncertainty affect partner choice in social exchange.

Moreover, our exchange networks were ephemeral and insulated from shocks such as the entrance or exit of actors or changes in behavior or interest. While exchange networks might change less endogenously with a reputation system, actors could respond more sensitively to exogenous shocks because the barrier of uncertainty to change partners is lower. Reputation systems might, therefore, reduce endogenous variation in exchange structures but also diminish their stability against external shocks. This question is important both socially and economically and requires future research.

5.2 Conclusion

This work contributes to the growing body of literature on the social implications of online reputation systems by examining their effects on the structure and cohesion of emerging relationships. With an increasing share of both online and offline exchanges occurring under institutionalized online reputation systems, there have been concerns about their large-scale effects on our relationships. Our findings alleviate these concerns, showing that reputation systems do not negatively impact the formation of cohesive relationships. We argue that previous theories, which made dim and inaccurate predictions, relied too heavily on a functional view of relationships in markets. However, our findings also question the purported societal benefits promoted by some platforms of the sharing economy. Beyond the instrumental value of cooperation, we find no evidence that reputation systems foster interactions between strangers or produce more cohesive relationships.

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A Game-Theoretical Analysis of the Game

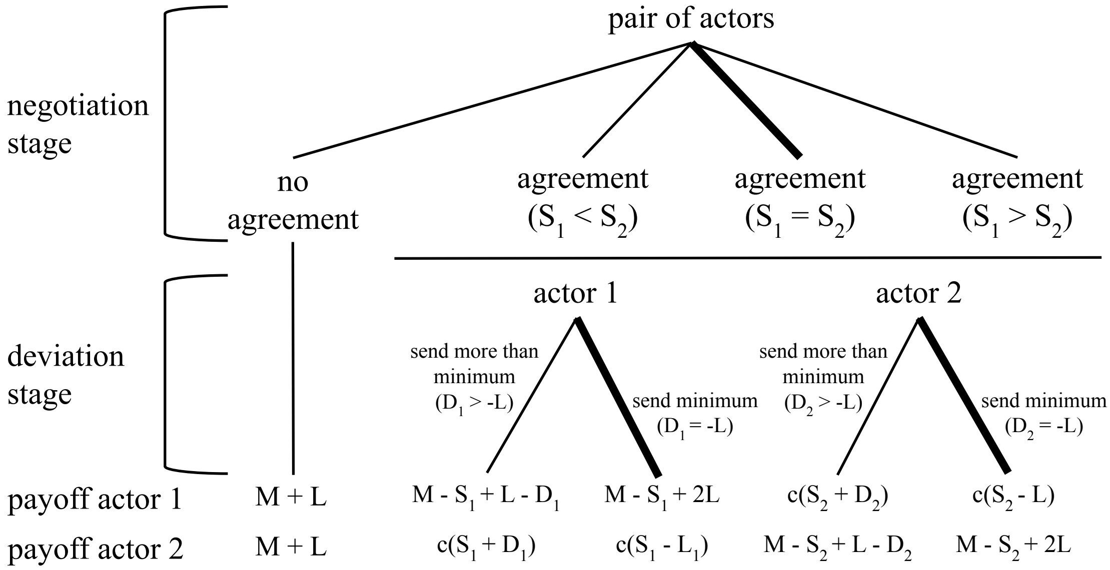

Figure 5: Decision path model of the compound cooperation game. $S_1, S_2 \in [0, M]$; $D_1, D_2 \in [-L, L]$; $M > L$; $c > 1$. Bold lines indicate the equilibrium decision path.

For a first analysis of the above cooperation game, we make the standard game-theoretic assumptions that actors are exclusively maximizing their own payoff, behave rationally, expect rational behavior of other actors, and have full information about the logic and payoff of the game. In a one-shot game, pairs of actors would always send the least possible amount $S - L$ in the deviation stage. Both actors know that and would therefore strictly exchange with the partner agreeing to the highest S. This market reaches an equilibrium when all actors agree to fair exchanges ($S_1 = S_2$). The bold lines in Figure 5 indicate this decision path. This game constitutes a cooperation dilemma since all payoffs would be higher if both actors send more than $S - L$ units with a maximum at $S + L$ units.

For the following theoretical consideration, we relax the assumption that actors assume rational behavior of others. This is in line with previous studies showing that there is substantial variance between individuals in expectation of cooperation and decisions about cooperation (Camerer, 2011). Actors, therefore, expect and observe some variance in the behavior in the deviation stage of the game, which makes partner choice a relevant factor in the negotiation stage. Instead of strictly preferring the actor who agrees to send the highest S, actors will now agree with the partner where $S_2 + \mathbb{E}(D_2) - S_1$ is maximal, assuming that D_1 is independent of S_1, S_2, and the exchange partner. Since actors are uncertain about the future deviations of other actors, they might expect a given D based on the available information about another actor's past behavior (i.e., their reputation). We can thus substitute the expectation term in the formula with a reputation term for the other actor. In a given round of an infinitely repeated game, the market therefore reaches an equilibrium when all actors agree on exchanges with $S_2 + Rep(a_2) - S_1 = S_1 + Rep(a_1) - S_2 \Leftrightarrow 2(S_2 - S_1) = Rep(a_1) - Rep(a_2)$.

Importantly, the equilibrium can be reached with all possible pairings of actors, when the less reputable actor compensates the more reputable actor in the negotiation stage for the lower expected deviation. That is, actors do not strictly prefer the most reputable available actor.

B Robustness Checks

See Table 5 for the models at the round-dyad level and Table 6 for the models at the dyad level including demographic controls for age and gender.

C Partner Change Analysis

We sought to understand the role the reputation system plays in partner change – i.e. exchanging with different partners in subsequent rounds – and new partner choice. To do so, a data set was constructed at the dyad-round level that joins the dyads that exchanged in the previous round with all eighth dyads that have exactly one actor in common with the dyad that exchanged in the previous round. The differences between the dyad characteristics of the exchanging dyad and the new dyad were calculated to obtain the independent variables for the analysis.

Table 5: Logistic multi-level regression results on exchange at the dyad-round level including demographic controls (n = 9,380)

	Dependent variable:		
	exchange		
	(1)	(2)	(3)
log(total previous deviation)	0.15** (0.05)	0.12* (0.05)	0.10* (0.05)
log(number of previous exchanges)	0.71*** (0.06)	0.60*** (0.08)	0.57*** (0.08)
reputation system (RS)		−0.26 (0.28)	−0.27 (0.27)
distance public reputation ranks			−0.05 (0.09)
distance private reputation ranks			−0.29*** (0.07)
age (actor 1)	−0.02 (0.02)	−0.02 (0.02)	−0.02 (0.02)
age (actor 2)	0.004 (0.02)	0.01 (0.02)	0.004 (0.02)
gender male (actor 1)	−0.24 (0.31)	−0.17 (0.31)	−0.14 (0.30)
gender other (actor 1)	−0.02 (0.75)	0.11 (0.77)	0.15 (0.74)
gender male (actor 2)	0.27 (0.28)	0.26 (0.29)	0.28 (0.28)
gender other (actor 2)	0.07 (1.10)	0.20 (1.12)	0.22 (1.09)
log(number of previous exchanges) X RS		0.24* (0.11)	0.29* (0.11)
distance public reputation ranks X RS			−0.31* (0.13)
constant	−3.11*** (0.72)	−3.16*** (0.74)	−3.09*** (0.72)
Observations	9,380	9,380	9,380
Log Likelihood	−2,116.68	−2,114.25	−2,096.94
Akaike Inf. Crit.	4,255.36	4,254.49	4,225.89
Bayesian Inf. Crit.	4,333.97	4,347.39	4,340.23
Note:			*p<0.05; **p<0.01; ***p<0.001

Table 6: Regression results on social cohesion at the directed dyad level including demographic controls (n = 840)

	Dependent variable:			
	gift	questionnaire	gift	questionnaire
log(total deviation)	0.347***	0.306***	0.455***	0.382***
	(0.043)	(0.022)	(0.065)	(0.033)
number of exchanges	0.148***	0.101***	0.149***	0.101***
	(0.011)	(0.005)	(0.011)	(0.005)
reputation system (RS)			0.033	−0.002
			(0.023)	(0.012)
age	0.001	0.0004	0.001	0.0003
	(0.002)	(0.001)	(0.002)	(0.001)
gender male	−0.064**	−0.009	−0.061*	−0.007
	(0.024)	(0.012)	(0.024)	(0.012)
gender other	0.087	0.025	0.085	0.029
	(0.074)	(0.038)	(0.074)	(0.038)
log(total deviation) X RS			−0.187*	−0.121**
			(0.080)	(0.041)
constant	0.076	0.384***	0.063	0.387***
	(0.042)	(0.022)	(0.044)	(0.022)
Observations	840	840	840	840
R^2	0.335	0.516	0.340	0.521
Adjusted R^2	0.331	0.513	0.334	0.517
Note:				*p<0.05; **p<0.01; ***p<0.001

A dummy variable shows whether the exchange in the given round took place within the dyad from the previous round (0) or within the other joint dyad (i.e., the exchange partners changed) (1). For the models on new exchange partners, we excluded all dyads that had exchanged at least once resulting in a slightly lower sample size. All models include random intercepts at the dyad level. Due to non-convergence, we removed the random intercept terms at the actor level, and in models 3 and 4 at the group level. This should not be problematic since these random intercept terms accounted for less than .1% of the variance.

Table 7 presents the results. Model 1 shows that there is a significant interaction effect between the difference in previous exchanges and the reputation system ($b = -.1.918, p = .006$). Yet, the difference between the average marginal effects in both conditions is not significant (6.13% and 1.06% points; $p = .063$). Model 2 includes the differences in reputational distances between both dyads on partner change. To examine whether the implicit ranking of exchange partners might prompt actors to exchange with another actor of a similar rank, we interacted the difference in distances between the public reputation ranks with the reputation condition dummy. However, even after controlling for the ordering effect, there is no significant difference in the average marginal effect of the number of previous exchanges between conditions (5.5% and .99% points; $p = .096$). The ordering effect, in turn, is significantly stronger in the reputation condition (average marginal effects: -.51% and .33% points; $p = .025$). Models 3 and 4 show the regression models on new partner choice and draw a substantively equivalent picture except that the ordering effect does not explain the higher rate of new partners in the reputation condition (average marginal effects: -.14% and .54% points; $p = .096$).

Table 7: Logistic multi-level regression results on partner change and new partner choice at the pair-dyad-round level (n = 14,962)

	Dependent variable:			
	partner change		new partner	
	(1)	(2)	(3)	(4)
diff. in log(total deviation)	2.187*** (0.601)	1.988*** (0.598)	1.696 (1.246)	1.210 (1.118)
diff. in log(number of previous exchanges)	0.330 (0.460)	0.305 (0.464)	1.725 (1.135)	0.551 (1.052)
round number	−0.060*** (0.009)	−0.061*** (0.009)	0.167*** (0.049)	0.160** (0.054)
reputation system (RS)	−6.229** (2.231)	−5.519* (2.212)	−11.275* (5.272)	−13.998* (5.941)
diff. in dist. public reputation ranks		0.100 (0.079)		0.532** (0.196)
diff. in dist. dyadic reputation ranks		−0.087 (0.057)		−0.106 (0.149)
diff. in log(number of previous exchanges) X RS	1.912** (0.710)	1.681* (0.702)	3.705* (1.728)	4.704* (1.976)
diff. in dist. public reputation ranks X RS		−0.288* (0.115)		−0.653* (0.295)
constant	−16.826*** (3.331)	−15.740*** (3.293)	−23.551*** (6.196)	−19.092*** (5.014)
Observations	14,962	14,962	8,972	8,972
Log Likelihood	−1,929.038	−1,925.836	−570.083	−554.877
Akaike Inf. Crit.	3,876.075	3,875.672	1,156.167	1,131.754
Bayesian Inf. Crit.	3,944.595	3,967.032	1,212.982	1,209.875
Note:				*p<0.05; **p<0.01; ***p<0.001