Title:

Generalized Trust Rather Than Perception of Relational Mobility Correlates with
Nominating Close Friends in a Social Network

Short running head:

Trust and social networks

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1. This study was financially supported by JSPS KAKENHI (Grant No. 21K02984).

2. We acknowledge colleagues at the Department of Psychology, Teikyo University, for
their cooperation in recruiting participants. We would like to thank Editage
(www.editage.com) for English language editing.

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Abstract

A social environment, such as relational mobility, which represents the availability of opportunities to develop new relationships in society, cultivates an individual's psychology and social network. Generalized trust, which represents trust among people in general, is a tendency to expand individuals' social ties in a fluid society. Using the data of 170 students, we analyzed whether an individual's belief of generalized trust and perception of relational mobility are related to the social network. We conducted a survey to assess psychological measures and social networks under the COVID-19 pandemic for first-year university students. The analyses revealed that generalized trust was significantly associated with the presence of outdegrees (i.e., the nomination of close friends) and the absence of indegrees (i.e., being nominated by others). In contrast, perception of relational mobility was not significantly associated with generalized trust and any social network measures. Behavioral trust, measured using a Trust Game approximately six months later, was not significantly associated with network characteristics. The results support the argument that the belief of generalized trust functions as a psychological mechanism to expand individuals' relationships in their social networks.

Keywords: trust, social network, relational mobility, friendship.

1 Individuals form social ties and build large-scale and complex social networks
2 (Dunbar, 1993). Social ties bring various benefits, such as social support (Rosengren et
3 al., 1993) or information (Granovetter, 1973). Furthermore, social networks have been
4 investigated across multiple fields in the social sciences (Christakis & Fowler, 2009). A
5 series of observational studies using real-life social groups has revealed that individuals'
6 connections are associated with individuals' traits or behaviors. These include well-being
7 (Fowler & Christakis, 2008), empathy (Morelli et al., 2017), academic success (Stadtfeld
8 et al., 2019), and cooperative tendency (Apicella et al., 2012; Ehlert et al., 2020).

9 From the perspective of the emancipation theory of trust (Yamagishi, 2011),
10 "generalized trust" can be considered a psychological tendency regarding forming social
11 networks. Generalized trust represents trusting unfamiliar people, rather than a particular
12 individual, in an uncertain situation despite vulnerability to being betrayed (Thielmann &
13 Hilbig, 2015; Yamagishi, 2011). The emancipation theory of trust argues that generalized
14 trust motivates individuals to voluntarily approach new relationships instead of
15 maintaining existing social ties when other opportunities abound in society. Forming a
16 long-term commitment with others reduces the uncertainty that others would betray them,
17 but such a commitment relationship increases opportunity costs (i.e., the benefits the
18 individual may gain if they leave the relationship). Generalized trust emancipates
19 individuals from commitment relationships; individuals with high trust are likely to
20 abandon long-term relationships and seek new connections.

21 Similarly, "relational mobility" (Yuki et al., 2007; Yuki & Schug, 2012) predicts
22 that generalized trust functions to form and expand social ties in a fluid social
23 environment. The concept of relational mobility is based on a socio-ecological approach,
24 which understands human psychological tendencies as adaptive strategies for social
25 circumstances (Oishi & Graham, 2010). Therefore, relational mobility is defined as a

social-ecological construct representing the degree to which a given society allows individuals to develop new relationships (Yuki et al., 2007; Yuki & Schug, 2012). In societies with high relational mobility, individuals have many opportunities to develop new relationships; therefore, they are motivated to expand their social ties and do not persist in existing relationships to obtain additional interpersonal benefits. In contrast, in societies with low relational mobility, individuals are embedded in fixed relationships and cannot easily find new opportunities to form new relationships; therefore, they become cautious in harming existing relationships and are unwilling to develop new relationships with outsiders (Lou & Li, 2017; Yamagishi, 2011). Yuki and colleagues developed a psychological scale to assess individuals' perception of relational mobility around themselves (Yuki et al., 2007) and have shown that relational mobility can explain individual and cultural differences in generalized trust (Thomson et al., 2015; Thomson et al., 2018; Yuki et al., 2007). Relational mobility scales have explained cultural differences in various psychological processes or behaviors related to interpersonal relationships as well as generalized trust, such as perceptions of similarities with friends (Schug et al., 2009), sensitivity to social rejection (Lou and Li, 2017; Sato et al., 2014), moral decisions (Awad et al., 2020), and cooperation (Romano et al., 2021).

While the emancipation theory of trust implies that generalized trust does not motivate individuals to form or maintain long-term commitment relationships (Yamagishi, 2011), relational mobility predicts an individual's willingness to commit to a long-term intimate relationship. In a society with high relational mobility, where other opportunities abound, efforts to maintain or strengthen their current relationships are beneficial for individuals to prevent their partners from leaving them for other opportunities (Yuki & Schug, 2020). In support of this prediction, previous studies have reported that high relational mobility is associated with self-disclosure to close friends

(Schug et al., 2010) and commitment behavior in a romantic relationship (Yamada et al., 2017).

The purpose of the current study is to empirically demonstrate the relationship between trust, perception of relational mobility, and social networks. The social network of friendship among first-year university students was obtained by asking students to nominate their close friends. The first-year university students are embedded in a "fluid friendship-market": the friendship is not fixed in the early semester, and they form new relationships with strangers (e.g., Sato & Yuki, 2015). We examined whether an individual's generalized trust or perception of relational mobility correlates with the tendency to form connections in their social network.

Several studies have investigated the relationship between generalized trust and social ties. Igarashi & Hirashima (2021) surveyed university students longitudinally and reported that the strength of generalized trust influenced the creation or termination of social ties with partners with whom individuals sought advice rather than those with whom they discussed personal matters³. Thus, it is expected from the emancipation theory of trust that generalized trust may be weakly associated with the characteristics of long-term commitments, such as intimate relationships. However, analyses of survey data suggest that generalized trust is positively associated with the possession of intimate relationships, including friendships (Delhey & Newton, 2003; Glanville et al., 2013). Furthermore, Igarashi et al. (2008) assessed individuals' subjective perceptions of an egocentric network in friendships and suggested that generalized trust was positively associated with perceptions of closeness surrounding the self. Evidence that generalized trust plays a role in forming social ties even in intimate networks has not been well accumulated, and it is therefore important to investigate the issue.

However, the argument of relational mobility suggests that a fluid social

environment may motivate individuals to build long-term intimate commitments. If generalized trust serves as a fundamental psychological mechanism for approaching strangers in the early stages of relationship formation, it may motivate individuals to form social ties, even in friendships. Furthermore, individual differences in perceptions of relational mobility, which are reflected by the relational mobility scale (Yuki et al., 2007), are also expected to be associated with the formation of friendships (Schug et al., 2010). We aimed to investigate the relative importance of generalized trust and the perception of relational mobility in the formation of social relationships by observing a friendship network. An empirical examination of the association between an individual's psychological tendencies and social networks would provide important implications for theories on generalized trust and relational mobility.

Methods

We conducted a survey to measure generalized trust, perception of relational mobility, and social networks for first-year undergraduate students at a university in Tokyo, Japan⁴. Participants read a consent form before participating in the study. Participants were informed that participation in the study was voluntary, that they would not be disadvantaged if they did not participate, and could withdraw their consent while participating. Confidentiality of their responses was also assured. Their completion of the survey was considered as approval to participate in the study. The data, code for analysis, and materials can be found in the Open Science Framework (https://osf.io/p5m73/?view_only=198bdde7c9e045dda1f37b7efefa25c0).

Participants

One hundred seventy first-year undergraduate students (79 men, 88 women, and three unreported genders; mean age of 18.91, and standard deviation of 0.88) participated in the survey. Twelve non-Japanese students were included in the participants (7.2%). In the year in which the survey was conducted, 213 first-year students were admitted to the department; thus, 79.8% of the total first-year students in the department participated in the survey.

In Japan, the university semester usually starts in April every year. However, in the year the survey was conducted (i.e., 2020), the start of the semester was postponed due to the coronavirus disease 2019 (COVID-19) pandemic. In the university where the current study was conducted, all classes were conducted online, and students were prohibited from entering the campus until June 2020. Since June 2020, although most classes continued online, some classes were conducted face-to-face; therefore, the first-year students could meet other students and make new friends. We conducted the survey approximately six months after students started the face-to-face lessons (i.e., November 2020). The survey was conducted in one day, and first-year students completed questions during a required subject in the department.

Each participant completed a paper-based questionnaire. The survey took about 15 minutes in total. Participants were told that they could receive a gift certificate worth 500 yen (approximately 4.60 US dollars) as a reward for their participation.

Psychological measures

Generalized trust was assessed on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree) to measure participants' beliefs about the trustworthiness of others. We used a five-item generalized trust scale modified by Yamagishi et al. (2015) from an original generalized trust scale (Yamagishi & Yamagishi, 1994). The scale

1 included items such as "generally, I trust others," "most people are trustworthy," and so
2 on (see Supplementary Material).

3 Participants completed a relational mobility scale (Yuki et al., 2007), comprising
4 a 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). The
5 measure was developed to assess individuals' perceptions of the extent to which they had
6 opportunities to build new personal relationships or terminate old ones around their social
7 surroundings. Following the instructions used in previous studies (Yamada, Kito, & Yuki,
8 2015; Thomson et al., 2018), participants were asked to imagine people with whom they
9 usually interacted (such as friends and acquaintances, colleagues in the workplace, people
10 in the neighborhood) and rate how well each item described them. The scale consisted of
11 12 items, such as "people have many chances to get to know other people," "people can
12 choose who they interact with," and so on (see Supplementary Material).

13 Moreover, participants were asked to complete additional questions for another
14 research project, but we do not report the results of their analysis here because these
15 measures were not directly related to the current study's purpose. Finally, we asked the
16 participants to complete demographic information, such as gender, age, and nationality
17 (Japanese or not).

19 **Social network measures**

20 The social networks were measured using a name generator method. Participants
21 received a booklet in which all names of newcomers at the department were listed, and
22 they were asked to nominate up to 10 persons whom they would call their close friends.
23 Each student's name was listed along with a unique code in the booklet, and participants
24 were instructed to complete the codes from the list.

25 We conducted a social network analysis using each participant as a node and the

friendship between two participants as a link. The numbers of outdegree, indegree, and reciprocal ties were obtained for each participant (Figure 1). Outdegree and indegree represented the number of friends a participant has nominated and the number of friends who nominated the participant, respectively. Reciprocal ties represented the number of ties in which participants and their friends mutually recognized each other as friends.

Results

All analyses were conducted using R ver. 4.1.2 (R Core Team, 2021) under macOS Big Sur/Monterey 10.16.

Summary of measurements

Psychological traits. We obtained scores for each participant for the generalized trust and relational mobility scale by averaging each item. Reliability coefficients (Cronbach's alpha coefficients) for the generalized trust and relational mobility scores were 0.79 and 0.82, respectively. The mean scores of generalized trust and relational mobility were 3.89 (standard deviation = 1.11) and 3.95 (standard deviation = 0.59), respectively. Supplementary Figure S1 shows the distributions of each score.

We explored whether the unusual social atmosphere during the current study (i.e., the COVID-19 pandemic) had a significant impact on the present data (e.g., the possibility that self-refraining from going out due to the pandemic weakened the perception of relational mobility) by comparing previous reports⁵. Supplementary Table S1 summarizes comparisons of the mean relational mobility scores between the data in this study (only Japanese participants) and comparable previous studies conducted in Japan. The scores in this study did not appear to be significantly lower than those in other studies. Rather, the scores in this study were moderately higher than those in several previous

studies ($d > 0.5$).

Social network characteristics. Supplementary Figure S2 illustrates the distributions of each network measure. On average, participants had 3.40 (standard deviation = 2.36) outdegrees and 2.88 (standard deviation = 1.70) indegrees. Participants had 2.18 reciprocal ties (standard deviation = 1.54) on average, and the proportion of reciprocal ties was 64.40 % of the total number of degrees.

Relationship between Generalized Trust, Relational Mobility, and Social Network Measures

Correlation between Measures. Supplementary Table S2 summarized the zero-order correlation coefficients between obtained variables. The score of generalized trust positively and significantly correlated with the number of outdegrees ($r = .16, p = .032$): the participants with higher trust had nominated a more significant number of friends than those with lower trust. In contrast, the generalized trust score did not have significant correlations with indegrees ($r = .02, p = .757$) and reciprocal ties ($r = .09, p = .218$). The relational mobility score did not have a significant correlation with any measures (generalized trust: $r = .11, p = .172$, outdegrees: $r = .04, p = .632$; indegrees: $r = -.01, p = .875$; reciprocal ties: $r = -.005, p = .951$).

Probability of existence of social ties. We employed an exponential random graph model (ERGM) to investigate whether the generalized trust and relational mobility scores were related to the existence of social ties. ERGMs are statistical models that infer the probability that a tie between two nodes exists in a network, considering that observations (i.e., social ties) are not independent of each other. ERGMs examine whether the attributes of each node or homophily (i.e., sharing the same characteristics between two nodes) are related to the presence or absence of social ties. We performed the ERGM

using an "ergm" implemented in "ergm" package in R (Hunter, Handcock, et al., 2008). The ergm function infers parameter values by employing a maximum likelihood estimation with a Markov Chain Monte Carlo algorithm.

In the ERGMs, in addition to the terms of generalized trust and relational mobility scores, we controlled for other attributes of each node: the participants' gender (0 = man, 1 = woman), standardized age, and nationality (0 = non-Japanese, 1 = Japanese). Furthermore, we added the following network structural terms, which represent network characteristics in the whole network. ERGMs include an edges term as an intercept (i.e., the number of edges in the network when statistically controlling for the effects of other variables). We added the reciprocal ties term to represent the number of reciprocal ties in the network. We further included geometrically weighted indegree and outdegree distribution (GWID and GWOD) terms, which represent the number of indegrees and outdegrees, respectively, of each node. We estimated a transitivity parameter, which represents shared partnerships by three-person closed triangles (GWESP: geometrically weighted edgewise shared partner). We controlled for the influence of homophily between the two nodes based on gender, nationality, age, generalized trust, and relational mobility scores. Homophily on continuous variables (i.e., age, generalized trust, and relational mobility) was examined using the absolute differences in them between dyad nodes. We analyzed the data of 165 students (79 men and 86 women) after omitting missing values.

Table 1 summarizes the results of the ERGMs. The generalized trust of each node was significantly associated with the presence of outdegrees (estimate = 0.24, $p = .001$). In contrast, the generalized trust score was related to the absence of indegrees entering the node (estimate = -0.25 , $p = .004$). We did not find a significant relationship between relational mobility scores and the probability that social ties existed (outdegree: estimate

= 0.05, $p = .446$; indegree: estimate = -0.08 , $p = 0.354$). The model also showed that the similarity of gender between the two nodes was significantly related to the formation of ties (estimate = 0.73 , $p < .001$). Women had smaller and greater number of outdegrees and indegrees, respectively, than men in our sample (outdegree: estimate = -0.49 , $p = .010$; indegree: estimate = 0.68 , $p = .002$). Following the proposed method (Hunter, Goodreau, et al., 2008), we graphically evaluated the goodness-of-fit of our model to the data by observing whether the simulated network, which was generated by the estimated parameters, resembled the observed network. Supplementary Figure S3 shows the results of the simulations. The simulated network appears to capture the key network statistics of the observed network.

Supplementary Table S3 shows the results of the two ERGMs in which the terms of the node's generalized trust score on indegrees or outdegrees were excluded. The node's generalized trust score was significantly and independently associated with the presence of outdegrees (Model 1 in Supplementary Table S3: estimate = 0.09 , $p = .038$). However, the association between generalized trust and the absence of indegrees became insignificant when we removed the term for the effect of generalized trust on outdegrees (Model 2 in Supplementary Table S3: estimate = 0.001 , $p = .986$). These results indicate that the significant association between generalized trust and the absence of indegrees can be observed under the assumption that we statistically control for the influence of generalized trust on outdegrees.

Relationship With Behavioral Trust in the Trust Game

As a supplementary analysis, in addition to the attitudinal trust assessed by the scale (i.e., the generalized trust score), we explored whether the behavioral tendency to trust others correlated with other measures. To measure "behavioral trust," we

conducted a Trust Game (TG; Berg et al., 1995). Approximately six months after the first survey, we invited the students who had participated in the survey for the TG experiment.

The TG is an incentivized economic game in which monetary allocation is conducted between "Trustor" and "Trustee." The Trustor receives the money as an endowment and decides what fraction to transfer to the Trustee. The transferred money is tripled (or multiplied by a factor larger than two) and sent to the Trustee. The Trustee decides what fraction of the tripled money is sent back to the Trustor. The Trustor earns more money than the endowment if the Trustee returns more money to the Trustor. However, if the Trustee returns little or no money, the Trustor earns less money. Thus, the Trustor decides whether to trust others at the risk of being betrayed. The Trustor's decision is considered a behavioral measurement of trust. In contrast, the Trustee's return is understood to be a measure of trustworthiness (i.e., reciprocity toward others' trust). See Supplementary Analysis for a detailed description of the methodology and a summary of participants' behaviors in the TG.

As a result, we found that behavioral trust in the TG was not significantly correlated with the generalized trust score ($r = .02, p = .761$), relational mobility score ($r = -.12, p = .141$), or any social network measures (outdegree: $r = -.04, p = .603$, indegree: $r = -.05, p = .559$ reciprocal ties: $r = -.08, p = .323$) (Supplementary Table S2).

Discussion

The current study measured the social network of friendship among Japanese first-year university students and examined whether trust or perception of relational mobility

reflects the social network's characteristics. We found that generalized trust correlated significantly with the individuals' outdegrees: participants with higher generalized trust nominated more persons as their close friends than those with lower trust. However, an individual's generalized trust score was related to the absence of indegrees in the social network, and was not significantly associated with the number of indegrees and reciprocal ties that the individual had. We found that the perception of relational mobility was not significantly related to generalized trust and any social network characteristic. On the other hand, our finding that generalized trust correlated significantly with the outdegrees suggested that generalized trust functioned as a psychological mechanism to expand individuals' relationships in interpersonal competitive markets.

As suggested by the emancipation theory of trust (Yamagishi, 2011), generalized trust would be related less to network characteristics in long-term commitment relationships such as intimate networks (Igarashi & Hirashima, 2021). However, in the current study, we found that generalized trust was related to expanding social ties in friendship networks. The emancipation theory of trust argues that generalized trust releases individuals from the increased opportunity costs of sticking with the existing relationship. However, in real-life friendships, situations where individuals must abandon the current connection to obtain new opportunities may be limited (i.e., students could keep their current friends even if they found new ones, because the cost of maintaining friends would not be high). Rather, as predicted by the argument of relational mobility, individuals would be incentivized to maintain close relationships even in a society with many opportunities. The current study suggests that generalized trust may reflect a psychological tendency to extend social ties outward in fluid interpersonal situations (e.g., the early stage of building relationships) rather than a strategy aimed at emancipating individuals from commitment relationships. Students in our sample, compared to those

1 before the pandemic, might be constrained regarding their opportunities to make friends
2 due to the university lockdown imposed because of COVID-19. Therefore, the
3 association between generalized trust and voluntary friendship formation was clear. This
4 study provides empirical evidence suggesting a function of generalized trust in
5 interpersonal situations.

6 Moreover, the findings on indegrees in the current study suggest that generalized
7 trust may reflect a tendency to access strangers unilaterally rather than form reciprocal
8 intimacy relationships. Generalized trust did not significantly correlate with the number
9 of indegrees and reciprocal ties. The ERGMs showed that an individual's generalized trust
10 predicted the probability of the absence of indegrees in the social network when the
11 influence of generalized trust on outdegrees was controlled. Overall, it may be more
12 natural to interpret these findings by the dynamics of recognizing others as friends rather
13 than the signals that high-trust people provide to others. Individuals with high trust
14 intuitively or optimistically may nominate someone they consider a friend, regardless of
15 their counterpart's recognition. On the other hand, individuals with low trust may have
16 concerns about whether their counterparts would recognize them as friends, thus
17 refraining from nominating them in the first place. For persons with low trust, recognition
18 from counterparts may play an essential role in forming friendship networks. Therefore,
19 high-trust people had a greater number of outdegrees (i.e., nominating more people as
20 friends) than low-trust people; however, not all their nominations mutually recognized
21 them as friends. These tendencies would have led to the result that high-trust people had
22 a lower proportion of indegrees (given that the number of outdegrees was constant) than
23 low-trust people, whereas there was no difference in the frequency of indegrees and
24 reciprocal ties.

25 Although these dynamics should be tested theoretically or empirically in future

research, the findings of cross-cultural psychology may suggest that this interpretation is possible. In East Asian societies, including Japan, in which people's trust and relational mobility are low (Thomson et al., 2018; Yamagishi & Yamagishi, 1994; Yamagishi, 2011; Yuki et al., 2007), an interdependent self-construct is dominant (Markus & Kitayama, 1991). Also, it has been suggested that an interdependent self-construct includes concerns about the evaluation of others (Hashimoto & Yamagishi, 2013; Uchida et al., 2019). In contrast, in American society, where higher trust and relational mobility are observed and an independent self-construct is dominant, people tend to report having many friends (Adams & Plaut, 2003). Although we should consider cultural differences in beliefs regarding interpersonal relationships as a factor affecting social network formations, the current study found an association between generalized trust and the tendency to actively expand friendships, even within a low-trust society.

If relational mobility theoretically plays an important role in expanding or maintaining the intimate relationship, the individual's perception of it should be associated with relationship-formation tendencies. However, our results did not show significant associations between the individual's perception of relational mobility and any social network measures. The insignificant individual-level correlations between the relational mobility score and the other measures may be attributed to the possibility that the relational mobility scale (Yuki et al., 2007) reflects shared cultural beliefs about fluidity in their society rather than the surroundings around individuals. The homogeneity of individuals within a particular society may be explained not only by individuals' adaptation to their social environments but also by culturally transmitted beliefs via social learning (Mesoudi, 2011). If the perception of relational mobility strongly reflects the aspect of culturally shared beliefs, it may not necessarily correlate with individual-level tendencies (although it could account for cultural-level differences).

1 However, we should interpret the insignificant individual-level correlations in
2 relational mobility carefully for several reasons. Indeed, previous research has indicated
3 the role of the perception of relational mobility in predicting cultural differences in
4 generalized trust (Thomson et al., 2018; Yuki et al., 2007). Yuki et al. (2007) reported
5 that the perception of relational mobility correlates with generalized trust, even at the
6 individual level. One possible interpretation of this inconsistent finding could be the use
7 of different samples. As our target sample was first-year students, their experiences of
8 being placed in a new relationship formation (e.g., Sato & Yuki, 2015) may have led to
9 higher relational mobility scores than those observed in several previous studies. In
10 addition, previous studies have not yet fully examined the regional diversity of the
11 relationship between relational mobility and interpersonal psychology among Japanese
12 individuals: most previous studies have reported results using samples from Hokkaido
13 (the northern region of Japan) (Supplementary Table S1). In cross-cultural psychology, it
14 has been suggested that cultural differences are not always reducible to individual
15 differences (e.g., Kitayama et al., 2009; Na et al., 2009). In other words, while relational
16 mobility explains the variance in interpersonal psychologies between nations (Awad et
17 al., 2020; Romano et al., 2021; Thomson et al., 2018), it may not always explain the
18 variance between individuals in a particular society within the same nation. Under certain
19 conditions, perceptions of relational mobility may play a role beyond culturally shared
20 beliefs, and may be linked to interpersonal psychologies related to adaptation in social
21 environments. Further studies are needed to explore the conditions under which
22 perceptions of relational mobility are related to individuals' psychological tendencies
23 through inter-regional comparisons within the same country (e.g., Milfont et al., 2020).
24 Of course, in addition to the type of sample, there could be other causes, such as
25 chronological changes from previous studies. Further data accumulation is expected to

1 improve the theory of relational mobility.

2 Furthermore, the present study's findings suggest that the belief in general people
3 measured by questionnaires, rather than behavior assessed in abstract experimental
4 situations (i.e., TG), is associated with forming social relationships in daily life. It has
5 been suggested that behavior in the TG may be an unstable indicator because of a mixture
6 of motives other than trust, such as pro-sociality (Alós-Ferrer & Farolfi, 2019). Moreover,
7 the results may be attributed to other causes regarding the research design of the present
8 study. For example, because the participants played the TG with students at the same
9 university, the behavior in the TG may have represented trust among in-group members
10 rather than strangers. Changes in participants' traits because of the longitudinal interval
11 between assessments may have led to insignificant correlations with behavior in the TG.
12 Additional empirical evidence about the association between social behavior and
13 networks must be accumulated using controlled experimental methods.

14 Whereas several important insights were gained, this study has some limitations
15 and areas for improvement. First, the social network data and analyses in this study should
16 be improved. Although we used nodes with complete responses for analyses, we cannot
17 rule out the possibility that the deletion of nodes may bias the results on indegrees due to
18 the non-independence of analysis units in the network data (i.e., ignoring the outdegrees
19 of a particular node may affect the indegrees of other nodes). Methods for handling
20 missing data in social networks, such as multiple imputations, have been proposed, and
21 their effectiveness has been theoretically investigated (e.g., Krauss et al., 2020). However,
22 their application to ERGMs with complex parameters (e.g., geometrically weighted
23 parameters) remains challenging, and uncertainty in predictions still exists. Further
24 replication studies using other social groups with smaller proportions of missing data
25 would be required to examine the robustness of our findings. Second, to test whether the

1 correlation between generalized trust and outdegrees is spurious, we should control for
2 other personal factors that would theoretically influence the formation of social
3 relationships (e.g., extraversion or preferences for similarity). From the theories of
4 interpersonal relationships, future studies should consider other factors which would
5 affect the process of forming social ties. Third, we should investigate different types of
6 social networks and temporal changes. The type of network also affects the stability of
7 relationships (e.g., the changes of social ties may be often observed in the networks other
8 than friendships). Investigating the types of social networks in which trust and relational
9 mobility play a role would provide fruitful insights into the theory of interpersonal
10 relationships. Fourth, we cannot completely rule out the possibility that the unusual period
11 of the COVID-19 pandemic influenced people's beliefs about society.

12 Future studies that compare social networks across different samples would
13 provide interesting insights into the context of research on relational mobility. Since our
14 sample consisted of university students in Japan (i.e., one of the East Asian societies
15 where relational mobility is lower), a comparison between societies with high and low
16 relational mobility is needed. Further research on social networks may contribute to
17 rethinking the theory related to interpersonal relationships in social psychology.

18 19 **Conflict of Interests**

20
21 The authors declare that the research was conducted in the absence of any
22 commercial or financial relationships that could be construed as a potential conflict of
23 interest.

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Footnote

3. Igarashi & Hirashima (2021) also found that generalized trust influenced the creation of new ties in the personal discussion network when analyzed separately from the advice-seeking network. However, given the multiplexity of two networks (i.e., students seek advice from those with whom they discuss personal matters and vice versa), the effect of trust was observed only in the advice-seeking network.

4. The Ethical Committee for Human Psychological Research at Teikyo University (No. 557 and 583) approved the current study.

5. The purpose of analysis here is not to conduct a meta-analysis, and it is not sure that we cover all studies. It should be noted that there may be other comparable studies, including unpublished data.

1
2 Figure 1: Schematic of social network measures. Each node and arrow represent each
3 participant and relationship, respectively. The arrow points from each participant to
4 their friend.
5
6

Table 1
Results of the exponential random graph model to predict the probability that a tie between two nodes exists in a network

Parameters	Estimate	SE	p
Degrees (intercept)	−10.57	0.56	< .001
Reciprocal ties	4.15	0.27	< .001
GWESP	1.66	0.08	<.001
GWOD	0.61	0.30	0.042
GWID	5.02	0.53	< .001
Homophily (Gender)	0.73	0.12	< .001
Homophily (Nationality)	0.54	0.28	0.050
Absolute difference (Age)	−0.05	0.04	0.214
Absolute difference (Generalized trust)	−0.04	0.04	0.324
Absolute difference (Relational mobility)	0.04	0.04	0.334
Outdegree (Women)	−0.49	0.19	0.010
Indegree (Women)	0.68	0.22	0.002
Outdegree (Japanese)	−0.13	0.42	0.751
Indegree (Japanese)	−0.14	0.46	0.764
Outdegree (Age)	−0.08	0.09	0.332
Indegree (Age)	−0.04	0.11	0.683
Outdegree (Generalized trust)	0.24	0.07	0.001
Indegree (Generalized trust)	−0.25	0.09	0.004
Outdegree (Relational mobility)	0.05	0.07	0.446
Indegree (Relational mobility)	−0.08	0.09	0.354

1 *Note.* Each estimate represents the change in the log odds of a tie when one unit of each
2 variable changes. Continuous variables were standardized. Indegree (*attribute*) and
3 outdegree (*attribute*) represent the influence of the node's attributes on the existence of
4 indegrees to and outdegrees from the node, respectively. The GWESP, GWOD, and
5 GWID parameters were estimated with the decay parameters fixed at 0.7, 0.2, and 2.0,
6 respectively. SE: standard error.

7

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