

When Do People Trust Their Social Groups?

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ABSTRACT

Trust facilitates cooperation and supports positive outcomes in social groups, including member satisfaction, information sharing, and task performance. Extensive prior research has examined individuals' general propensity to trust, as well as the factors that contribute to their trust in specific groups. Here, we build on past work to present a comprehensive framework for predicting trust in groups. By surveying 6,383 Facebook Groups users about their trust attitudes and examining aggregated behavioral and demographic data for these individuals, we show that (1) an individual's propensity to trust is associated with how they trust their groups, (2) groups that are smaller, closed, older, more exclusive or more homogeneous are trusted more, and (3) a group's overall friendship-network structure and an individual's position within that structure further predict trust. Last, we demonstrate how group trust predicts outcomes at both individual and group level such as the formation of new friendship ties.

CCS CONCEPTS

• **Human-centered computing** → **Social networking sites**;

KEYWORDS

Trust, groups, communities, Facebook

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† Work done while at Facebook.

1 INTRODUCTION

Trust contributes to the success of social groups by encouraging people to interpret others' actions and intentions favorably, thereby facilitating cooperation and a sense of community [5, 22, 33, 55, 60, 74]. In groups, trust increases member satisfaction, and task performance; reduces conflict [33, 77]; and promotes effective response to crisis [53].

Previous research has examined how different factors such as size [13, 21, 83], group cohesiveness [38], and activity [77] may impact people's trust in their social groups, both online [39] and offline [67]. However, previous studies tend to be small in scale, limited to specific contexts (e.g., online marketplaces), or only consider a specific type of group (e.g., organizations [18, 50]). Studies that address these three limitations may enrich our understanding of how trust is formed in social groups more generally.

In this work, we build on this rich prior literature on trust to present a framework for predicting an individual's trust in a social group, and examine how differences at the individual and group levels predict that trust. We focus our analysis on Facebook Groups, a Facebook feature that "allows people to come together to communicate about shared interests" [27]. As of May 2018, 1.4 billion people used Facebook Groups every month [28]. By combining a survey ($N=6,383$ valid responses) of individuals using Facebook Groups with aggregated behavioral logs, we are able to investigate, across a diverse sample, how an individual's trust in a group relates to characteristics of the individual, the group, and the individual's membership in that group.

The survey asked individuals about their general attitudes towards others and trust towards a Facebook group that they were a member of. While prior work has shown that an individual's general propensity to trust others influences their trust in a particular group [11, 14, 29, 66], we additionally examine the role of other individual-level differences (e.g. general attitude towards risk).

We combine these survey results with aggregated behavioral and descriptive data on Facebook Groups. This allows us to study the role of five categories of features that characterize either the group or the respondent's relationship with the group, based on prior literature: (1) basic group characteristics (size, privacy, etc.), e.g. [46], (2) the type of group [20], (3) group activity [46], (4) group homogeneity [56], and (5) group network structure [39].

We find that these variables robustly predict participants' trust in group, with both individual and group characteristics contributing predictive value (adjusted $R^2=0.26$). In particular, individual's general perceived social support, group's average clustering coefficient, and individual's degree centrality in the group were among the strongest predictors of the person's trust in that group. We also show that an individual's trust in a group can be estimated using observational data.

These results support previous findings showing that intragroup trust decreases with group size and increases with membership restriction [13, 21, 48, 56, 83], but we find that these trends only hold up to a certain scale. When the size of a group exceeds 150 members (roughly Dunbar's number, or the expected cognitive limit beyond which social relationships are difficult to maintain [23]), the membership policy of the group (public v.s. private) ceases to play a predictive role. Moreover, in deciding how much to trust a group, we show that group size matters less to individuals with a higher general propensity to trust.

While previous work suggests that people tend to trust groups that they are more active in [15], we find that only certain types of activities are associated with trust: People "like" and "comment" more in groups they trust but do not necessarily post more, suggesting that trust is associated more with directed communication than with information sharing.

Finally, we show that trust in groups is associated with both individual- and group-level outcomes. While increased trust leads to individuals being more likely to form friendships with other members of the group, it is also associated with a *lower* likelihood of the group growing bigger in size.

In summary, we (1) present results of a large survey of individuals' trust attitudes towards their social groups, (2) examine how characteristics of both the individual and group contribute to trust in a group, and (3) show how this trust affects future individual- and group-level outcomes. A deeper understanding of how these factors collectively contribute to trust in groups can better equip communities to foster trust among their members.

2 BACKGROUND

A rich scholarship engages with the definition and study of trust, and understanding the factors that may impact it. The prior work provides motivation for a multilevel approach for studying trust in social groups.

Prior work has defined trust as a belief in the reliability of others [33]. Previous work on trust can be roughly organized into examining trust (1) as a personal trait (i.e., a propensity to trust others), (2) with respect to a specific other individual (i.e., dyadic trust), or (3) with respect to multiple others (e.g., in groups or organizations). These differences

roughly correspond to how trust is conceptualized across disciplines — as arising from individual traits in psychology [67], as calculable using game theory in economics [78], or from relationships among people in sociology [35]. In this broad literature, trust has typically been either measured using surveys [67, 71], qualitative interviews [70], or through economic games that measure how much money people entrust others with [8]. In the present work, we measure trust through a survey asking about trust and its various correlates, and combine this with observed behavioral data.

Trust and the individual. One line of work has studied trust as an individual characteristic, similar to a personality trait. This work suggests that trust is rooted in life experiences and societal norms [3, 12, 67]. In this context, trust is generally referred to as "generalized trust" [57], a "propensity to trust" [29], or a "disposition to trust" [79]. A propensity to trust others has been associated with being older, married, having higher family income and college education and living in a rural area, but not with gender [59, 72]. Work has also studied cross-country differences in propensity to trust [9]. In this work, we refer to trust as an individual trait as a "disposition to trust", and include measures to understand individual's disposition to trust in order to explain trust in groups. To minimize cross-cultural effects, we focus on U.S.-based individuals. A disposition to trust is also related to other personal traits, such as risk-taking [19], feelings of social support, and group loyalty [7, 75]. We include these relevant concepts in our work.

Trust between individuals. At a dyadic level, trust can be modeled using social exchange theory [8, 10, 26, 40], where people are assumed to be rational actors who maximize their own benefits in interactions with others. Trust is then defined as the decision to undertake risks in these exchanges. Another significant line of work has examined dyadic trust in online settings. This work suggests that reputation [47, 63, 65, 81], homophily [1], and the language used in online profiles [49] mediate an individual's trust in someone else.

Trust in groups and organizations. While it is useful to study social interactions at dyadic level, many interactions take place in the context of groups, both offline and online. Significant work has studied how trust influences an organization's structure, productivity, and cohesiveness [30, 50, 51, 58]. Trust in organizations was positively associated with improved job performance, citizenship behavior (e.g., altruism and courtesy), and greater cooperation, and negatively associated with counterproductive activities such as disciplinary action and tardiness [18, 22]. Trust in online groups impacts various outcomes including member satisfaction, information sharing, and task performance in virtual teams [77], but

is also shown to be fragile and temporal when the team is formed around a common task with a finite life span [41, 53].

More recently, several studies have looked at trust in Facebook groups, mostly in the context of buy-and-sell groups [39, 56]. Qualitative research on Facebook buy-and-sell groups showed that trust can be fostered through mechanisms such as closed membership and sanctioning [56], and our quantitative analysis here confirms some of these findings.

Multilevel perspectives on trust. Given the diversity of approaches used to study trust, prior work has called for “multilevel perspectives” on trust [68] that account for trust at the individual, group, and organizational levels. Some work has proposed models of how trust in others depends on a disposition to trust [50]. And as previously noted, studies have also examined how trust at the individual level may mediate trust at other levels (e.g., in a specific community [66] or in groups [11, 29]). Nonetheless, such work remains largely theoretical. Empirical studies have tended to be small-scale and only examine a subset of the many characteristics and behaviors of individuals and groups that may mediate trust. In this work, we show how trust may be better modeled by considering individual and group-level features together in a generalizable framework.

Determinants of Trust in Groups

What contributes to trust in groups? Here we review relevant literature that guide the selection of our feature sets in predicting trust in groups.

Individual differences. Trust in groups can be mediated by one’s disposition to trust others, as it correlates with one’s initial intentions to trust a group, especially in ambiguous situations [34]. A disposition to trust can positively impact trust in different settings, including trust between individuals [80], in communities [66], in organizations [44], or in online services [79]. Similarly, a disposition to trust increases trustworthiness evaluations given to Airbnb hosts [49], though in other settings a disposition to trust was not associated with trust in peer sellers on an e-commerce website [43].

Past work also suggests an inverse relationship between risk aversion and trust [1] – the more comfortable an individual is with taking risks, the higher the trust they have in groups.

Further, prior literature treats membership of voluntary associations as an indicator of trust [61, 62]. Thus, greater in-group loyalty, as well as perceived social support from others, should both be linked with higher trust in groups due to increased group participation and perceived social capital.

Group characteristics. Trust in groups may also stem from basic properties of the group such as its size [13, 21, 83]. Smaller and more intimate groups are associated with higher

trust among members, perhaps because there is lower uncertainty and risk in participating in these groups. For similar reasons, older and more established groups could also foster higher trust amongst members. Past research also suggests that more inclusive and secure groups exhibit more trust, and that group cohesiveness promotes trust [30]. Recent qualitative work on Facebook Groups also suggests that by making membership exclusive and screening new members, trust can be enhanced [56].

Homogeneity, which relates to cohesiveness, may also contribute to trust. People tend to be closer to and trust others who are similar to them [52]. Research has also found a relationship between gender and age homophily and increased trust [1, 2].

Higher levels of group activity are also linked with greater trust [15, 77]. Familiarity breeds trust [36] and increased social interaction by providing “opportunities for people to get acquainted, to become familiar with one another, and to build trust” [64].

Network characteristics. Beyond simple group properties, the overall structure of relationships between individuals in the group, as well as the individual’s embeddedness the group’s social network may mediate trust. The number of friends a person has and the connections among these friends can both increase the likelihood of them joining a community [6, 73]. As dense networks promote cooperation and social norms, they are also likely to be associated with increased trust [17]. In buy and sell groups on Facebook, network density and the degree centrality of the seller are positively correlated with an intention to transact, which may signal higher trust in the group [39]. Our work uses similar features but directly measures trust via a survey, and considers the role of network features within a much large set of variables.

This rich prior literature motivates our analysis in this work, using a large-scale survey and analysis of system data to show how individual and group-level differences help predict trust in groups. Our research questions, then, include (a) can a baseline model that accounts only for individual attitudes predict trust in groups; (b) what is the relative contribution of the different sets of group-level features (basic group properties, group type, activity, homogeneity, and structural/network properties) on trust in groups beyond the baseline model.

3 METHOD

In this work, we conducted a survey of 10,000 respondents to a random sample of active Facebook Groups users in the U.S. People were invited to participate in the survey via an ad on Facebook. The survey was designed to measure both individual attitudes as well as trust in one of the randomly selected Facebook groups that they were members of. We augmented

this survey data with self-reported demographic data such as age and gender and server logs of these individuals’ activity and friendships on Facebook. All log data was de-identified and analyzed in aggregate on Facebook’s servers; researchers did not view any identifiable data nor access any specific posts in any groups. The study was approved by an internal board and Cornell’s Institutional Review Board under protocol #1805008006.

Sampling

The survey was issued to unique individual-group pairs. We used the following sampling strategy to identify eligible survey candidates. First, we identified Facebook groups that had at least five members, and that had a majority of their members located in the U.S. We then identified people in the U.S. who belong to at least one of these groups, and that had at least one interaction (e.g., creating, liking, or commenting on a group post) in the past 28 days. We then sampled eligible individual-group pairs, de-duplicating by both individual and group at random. The sampling was also stratified by group size (the number of members in the group) to better capture behavior across both smaller and larger groups. We note the following bias introduced by our sampling method: compared to all individuals who actively used groups in the past 28 days, our participants tended to be 8.7% older and were 17.5% more likely to be women.

Survey Design

The survey consisted of two sections: a section on individual differences regarding the participant’s general attitudes towards others, including disposition to trust and related concepts; and a section on trust in a specific Facebook group. Each section had four items, shown in Table 1. The order of questions was randomized within section. Participants were asked to report the extent to which they agreed or disagreed with each statement on a five-point Likert scale.

For the section on general attitudes towards others, we measured disposition to trust through an adaptation of the generalized trust question in World Values Survey [71]. The original question elicits a dichotomous response, worded as – “Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?”. We instead used a more granular 5-point Likert scale, which has been shown to be more reliable [54]. We also included measures of concepts related to disposition to trust reported in previous literature, including general social support [7, 37, 76], in-group loyalty [75], and risk aversion [54].

To measure an individual’s level of trust in a Facebook group that they were a member of, we created a four-item scale to measure trust in groups (section two in Table 1), based on previous literature on interpersonal trust. This

General Attitudes Towards Others	
Disposition to Trust	Most people can be trusted.
General Social Support	There are people in my life who give me support and encouragement.
General Risk Attitude	I’m willing to take risks.
General In-Group Loyalty	I would describe myself as a “team player”.
Trust in a Group	
Care	Other members of the group care about my well-being.
Reliability	Other members of this group can be relied upon to do what they say they will do.
Integrity	Other members of this group are honest.
Risk	I feel comfortable sharing my thoughts in this group.

Table 1: Trust in groups survey items. Participants reported the degree to which they agreed or disagreed to each of the survey items on a 5-point Likert scale.

scale is based on the framework of ability, integrity, and benevolence by [50, 69], and also adapts measures from several interpersonal trust scales including Rotter Interpersonal Trust Scale [67], the Specific Interpersonal Trust Scale [42], and a newer predisposition to trust scale [4].

In addition, to better understand what people use the group for, we also asked participants to use the taxonomy below to describe the group:

- Close friends and family (e.g., extended family)
- Education/Work/Professional (e.g., college, job)
- Interest-based (e.g., hobby, book club, sports)
- Lifestyle/Identity-based (e.g., health, faith, parenting)
- Location-based (e.g., neighborhood/local organization)
- Other

These categories were identified in previous qualitative research, in which we surveyed people who used Facebook Groups and asked them to describe a group they were part of (e.g., “my family”). Participants were requested to select all categories that applied to the group they were surveyed on, and we treated each group category as a binary variable. In our sample, around 34% of the groups were tagged as interest-based groups (most common), followed by 20% close friends and family groups. The first five categories capture most of the groups (covering 89%), which we use in our analysis.

Data and Statistical Approaches

In addition to data from the survey, we examined properties of groups including their sizes and membership privacy policies. For each group, we also looked at an individual’s activity in the group (e.g., time spent, likes, comments, and posts made), the group’s overall activity, as well as group members’ friendships with each other.

Out of the 10,000 survey responses we received, we filtered responses based on the completeness of the survey, as

Variable	Mean	SD	Correlations		
			1	2	3
General Attitudes Towards Others (N = 7,302)					
1. Disposition to Trust	3.30	1.07			
2. General Risk Attitude	3.64	1.02	0.19***		
3. General In-Group Loyalty	4.31	0.87	0.25***	0.20***	
4. General Social Support	4.51	0.83	0.24***	0.18***	0.38***
Trust in Groups (N = 6,383)					
1. Care	3.90	1.08			
2. Reliability	4.05	0.98	0.62***		
3. Integrity	4.20	0.95	0.60***	0.67***	
4. Risk	4.09	1.06	0.59***	0.54***	0.56***

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

Table 2: Descriptive summary of survey measures, including general attitudes and trust in groups. Sparklines represent the histogram of each measure.

well as availability of self-reported and log data. In the end, we retained 6,383 responses for our main analysis.

The main statistical techniques we used were multiple linear regression, random forests, and logistic regression. We first built a baseline model predicting trust in groups using variables capturing individual-level differences. Then, we identified five different sets of group-level features, conducted analysis on how much each set of feature improved the baseline model, and interpreted the relationship between each feature and trust separately. We next combined all features in a random forest model and compared the importance of each set of features in the combined model. Finally, we used logistic regression to predict group outcomes such as the densification of the friendship network within the group.

4 RESULTS

Trust in groups was measured in our survey across four dimensions: care, reliability, integrity and risk. As shown in Table 2, these dimensions of trust in groups are highly correlated. Thus, we defined a composite “trust in groups” score as the mean of all four dimensions, and report findings with respect to this composite score.

Individual Differences and Trust

Our baseline model includes individual attitudes as well as demographic information, which prior literature has associated differences with one’s disposition to trust [72]. Do these individual differences predict trust in groups? To answer this question, we built a baseline multiple linear regression model predicting trust in groups (see in Table 3).

Demographics. We found that demographic factors such as the age and gender of participants capture almost no variance

	Dependent variable:				
	Trust in Groups Composite				
	(1)	(2)	(3)	(4)	(5)
(Intercept)	4.07*** (0.04)	3.51*** (0.05)	3.18*** (0.06)	2.46*** (0.07)	1.98*** (0.08)
Age	-0.001* (0.001)	-0.003*** (0.001)	-0.002** (0.001)	-0.001* (0.001)	-0.001* (0.001)
Female	0.09*** (0.02)	0.06** (0.02)	0.08*** (0.02)	0.05* (0.02)	0.02 (0.02)
Disposition to Trust		0.19*** (0.01)	0.17*** (0.01)	0.13*** (0.01)	0.11*** (0.01)
Risk Attitude			0.09*** (0.01)	0.07*** (0.01)	0.05*** (0.01)
In-Group Loyalty				0.21*** (0.01)	0.16*** (0.01)
Social Support					0.19*** (0.01)
Adjusted R ²	0.003	0.06	0.07	0.11	0.14

Note: *p<.05; **p<.01; ***p<.001

Table 3: Baseline model predicting trust in groups using demographic, disposition to trust, risk attitude, in-group loyalty, and social support. (N=6,323 after removing missing age and gender observations)

of trust in groups (see Model 1 in Table 3). This result partially contrasts with the prior work that found a relationship between these demographic factors and one’s disposition to trust [72]. To better understand this result, we tested a model that used demographic variables to predict participants’ disposition to trust, to clarify if these factors are more predictive in this setting than in predicting trust in groups. While we found that older people were more trusting than young people ($\beta=0.006$, $p<.001$) and women were more trusting than men in general ($\beta=0.12$, $p<.001$), very little variance in disposition to trust is explained by these demographic factors [$R^2=0.01$, $F(2, 7174)=36.1$, $p<.001$].

General attitudes towards others. How does an individual’s general attitudes towards others predict their trust in groups? Corroborating prior work, one’s general disposition to trust significantly predicts one’s trust in groups (see Model 2 in Table 3). However, other factors also play significant roles (Model 3-5 in Table 3). Notably, the individual’s perceived social support ($\beta=0.19$, $p<.001$) and their general stated in-group loyalty ($\beta=0.16$, $p<.001$) contributed more to the prediction of trust in group than one’s disposition to trust ($\beta=0.11$, $p<.001$). A willingness to take risks ($\beta=0.05$, $p<.001$) was least predictive. Altogether, these factors capture a significant amount of the variance in trust in groups (adjusted $R^2=0.14$), as suggested by prior work.

Feature Set	Features
Basic Properties (5)	Group size, membership privacy policy, group tenure, number of admins/moderators
Category (5)	Self-reported group category
Activity (6)	Group-level and participant-group-pair level time spent, number of posts, number of likes or comments
Homogeneity (3)	Diversity of group age, gender, and similarity between participant and group average
Structural (5)	Network density, average clustering coefficient, participant degree centrality, cliqueness of participant’s friends in the group, average number of mutual friends with group members

Table 4: Five sets of group-level features used for predicting trust in groups.

Group Differences and Trust

To understand the relationship between group characteristics and trust in groups, we identified five distinct sets of group-level features (see Table 4). In this section, we measure the incremental predictive value of each of these sets of group-level features, after controlling for the individual differences discussed above. Here, the “baseline model” refers to a model that only includes the individual differences (Model 5 in Table 3). For each feature set, we add the features as independent variables in the multiple linear regression model to the baseline model. In each subsection, we report how much the model gains from each feature set. The coefficients of the baseline do not change significantly.

Basic Group Properties. The first set of group-level features consisted of some basic group properties: group size, membership privacy policy, group tenure (how long a group has existed), the number of group admins, and its number of moderators. Adding these features to the baseline model increased the model’s adjusted R^2 by 0.08 ($p < .001$). The most significant predictor of trust was group size: consistent with previous work on trust and group sizes [13, 21, 83], people had lower trust in bigger groups ($\beta = -0.15$ on log scale, $p < .001$).

Apart from a group’s size, the literature review suggested that a group’s membership privacy policy can also affect perceptions of trust. On Facebook, group admins can set the group to be “public”, “closed”, or “secret”. Public groups are accessible to non-members, while closed and secret groups are only accessible to current members; closed groups differ from secret groups in whether their existence is known to non-members. We found no significant differences between closed and secret groups, so we analyze them together as “private” groups.

Controlling for group size (public groups are 68% larger on average), we found that people trusted public groups *less* than private groups ($\beta = -0.08$, $p < .01$), as suggested by prior work.

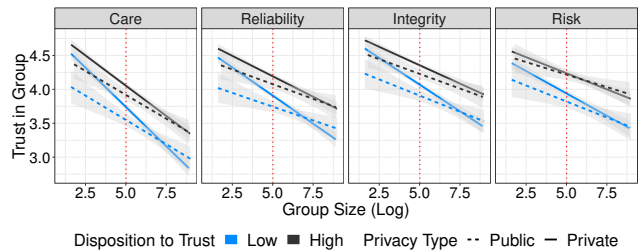


Figure 1: The relationship between trust in groups and group size, for each dimension (panels), across groups of different membership privacy policies (line style) and individuals with different propensity to trust (line color). (Dunbar’s number 150 is marked by the vertical red dotted line for reference.)

Notably, we found an interaction effect between group size and privacy type in predicting trust ($\beta = 0.04$, $p < .01$), meaning that the larger the group, the smaller the difference there is between trust in private and public groups. We conducted an informal analysis to see how quickly this difference between group types dissipates. We conducted a series of t-tests in which we compared the mean difference in the trust composite score between public and private groups above a certain size threshold, starting from 10 in increments of 10. These tests show significant differences between groups larger than the threshold until the threshold exceeds 150 where we no longer observe significant difference between public and private groups ($p = .052$).

Incidentally, this size threshold roughly corresponds to Dunbar’s number — the maximum number of stable social relationships a person can maintain due to limitations in cognitive resources [23]. Private groups provide control and exclusivity over membership, but also allow individuals to reason about who is in the group and how group members relate to each other, which increases trust by creating a shared identity [56]. However, once the number of group members exceeds Dunbar’s number, individuals may no longer be able to perform this mental reasoning, blurring differences in trust between private and public groups.

Figure 1 summarizes the impact of group size on trust in public and private groups, as well as the effect of an individual’s trust attitude. The figure clearly shows that individuals with high disposition to trust (black lines) and private groups (solid lines) are both factors that contribute to trust, but that while the effect of private groups disappears with size (dashed and solid lines cross), the reverse is true for individual attitude: an interaction effect between group size and individual’s disposition to trust ($\beta = 0.01$, $p < .01$) shows that people with a greater disposition to trust others were less sensitive to changes in group size (visually represented by gentler slope in Figure 1).

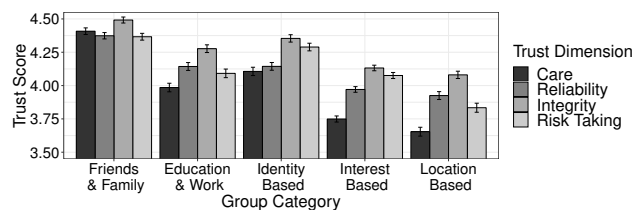


Figure 2: People have highest trust in friends and family groups, and lowest in interest- and location-based groups.

Other basic group properties relate to trust in the following ways. Longer group tenure predicts higher trust ($\beta=0.04$ on log scale, $p<.001$), potentially due to more stable group relationships and higher familiarity among group members [77]. The number of admins also predicts higher trust ($\beta=0.10$ on log scale, $p<.001$). This is consistent with previous work predicting the survival of Facebook groups [46], which found that groups with more than one admin were more likely to survive than groups with only one. Finally, the number of moderators did not contribute to prediction of group trust in the model.

Group category. As previously described, participants in our survey labeled groups with one of six categories. Including group category features as binary variables (first five categories) to the baseline model significantly improved trust predictions ($p<.001$), increasing the model’s adjusted R^2 by 0.05. To illustrate differences in trust across these categories, we also conducted ANOVA and plot the average trust for groups per category in Figure 2 (we exclude groups marked as “other” from this analysis as it is unclear what “other” represents). Post-hoc Tukey tests showed that people trust close friends and family groups the most, followed by identity-based and education and work groups ($p<.001$). They trust interest- and location-based groups least ($p<.001$).

Why does trust differ by group category? For friends and family groups, high trust is a strong sign of bonding social capital [62]. Identity-based groups (e.g., parenting groups) and education and work groups elicit trust by establishing a shared identity among group members [56]. Finally, interest- and location-based groups may represent less bonding and more bridging social capital [35], especially for information sharing. People use these groups more as places to transact and exchange (both physical goods and information) than as places to build relationships [35]. By comparing groups across different categories, we can develop a more holistic understanding of trust across different types of social groups that also draws from insights from previously isolated studies [39, 56].

Activity. We consider both the survey participant’s activity in the group, as well as the overall group activity across all members. The activity metrics that we consider are time spent in the group and the number of actions (posts, likes, or comments) taken in the group, averaged across the 28 days preceding the survey. In the case of public groups, activity also included contributions from nonmembers. An individual’s overall site engagement was not predictive of trust, and thus was excluded from our analyses.

Time spent in the group, both by the individual ($\beta=0.04$, $p<.001$) and by other group members ($\beta=0.05$, $p<.001$) independently predicts higher trust in groups. With respect to the group as a whole, the number of posts per member ($\beta=0.07$, $p<.001$), and the number of likes and comments per post ($\beta=0.07$, $p<.001$) were both associated with higher trust.

With respect to a participant’s activity in a group, the number of posts was not associated with higher trust, while the number of comments or likes was associated with higher trust ($\beta=0.10$ on log scale, $p<.001$).

Including activity features (time spent, group activity, and participant in group activity) to the baseline model improves its adjusted R^2 by 0.04 ($p<.001$). Results hold even if we control for group category (including group categories in the regression model as independent variables). Why is this the case? Liking and commenting were interactions much more common in groups compared to posting (6x times more frequent). Thus, posting may be less predictive because it is rarer. Meanwhile, posting also has diverse motivations and is influenced by a variety of factors other than trust (e.g., self-esteem [31]). In contrast, likes and comments are forms of direct communication that people use to maintain relationships with others [25] and may therefore be more conducive to building trust.

Homogeneity and homophily. Trust may also be influenced by homogeneity — how similar people in a group are to each other — and homophily — how similar an individual is to others in the group.

For each group, we measured age and gender diversity by computing the gender entropy of the group’s members, and the standard deviation of their ages. To measure homophily, we constructed a distance measure based on the approach of [1]. If the participant had the same gender with the majority of the group members, we coded the gender distance as 0, otherwise 1. If the participant’s age was within 5 years of the average age of the group, we coded the age distance as 0, otherwise 1. The total distance from average group members was calculated as the L_1 distance, i.e., the sum of gender and age distance $\in (0, 1, 2)$. As different types of groups may have different demographic compositions, we controlled for group category in this analysis.

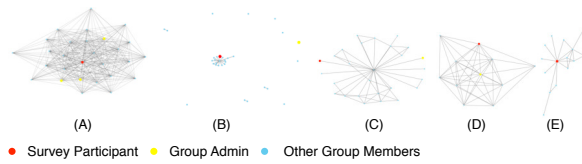


Figure 3: Groups differ in network density, participant degree centrality, and how participant’s friends are linked to each other. Each node represent a group member. Each edge represents a friendship between two members. The survey participant is colored in red, and group admins are colored in yellow.

Adding homogeneity and homophily features to the baseline model results in small improvement (increased adjusted R^2 by less than 0.01, $p < .001$). Nonetheless, we found that both gender ($\beta = 0.15$, $p < .001$) and age homogeneity ($\beta = 0.01$, $p < .001$) were associated with higher trust (regardless of whether we control for group category).

Surprisingly, homophily, measured as described above, was not predictive of trust in groups. This finding contrasts with previous work on trust and homophily in dyadic exchange, which found that trust increases with gender and age homophily [1, 2], possibly due to the limitation of our metric. While we only studied age and gender homophily here, future work may consider other forms of homophily (e.g., with respect to interests, location, or socio-economic status).

Network structure. To understand how network structure mediates trust, we calculated the following network features for each group: (1) *network density* – the number of friendships in the entire group friendship graph divided by the number of possible combinations; (2) *average clustering coefficient* – a measure of the degree to which an individual’s friends also know one together, calculated as the average of the local clustering coefficient for each node in the group membership graph; (3) *participant degree centrality* – the number of friends a participant has in the group, normalized by group size; (4) *k-core existence* – a measure of how a participant’s friends in the group are connected with each other, calculated as whether a k -core component [73] exists for participant’s friendship graph in the group (we found that $k=5$ resulted in the greatest model improvement); (5) *average mutual friend count* – the mean number of mutual friends between participant and group members.

Figure 3 illustrates how several group networks in our sample differ along these network features. For example, Group A has higher network density and higher average clustering coefficient than group B. Groups C and D differ in the participant’s degree centrality. Group D contains a 5-core, but E does not.

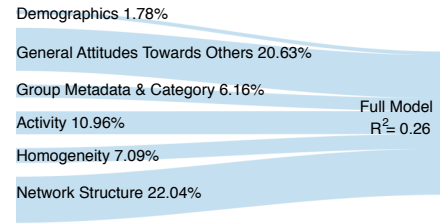


Figure 4: For each feature set, we calculated the average feature importance (measured by relative percent increase in MSE when a feature is removed) in predicting trust in groups. Network structure was the most important, followed by an individual’s general attitudes towards others.

These network features, when added to the baseline model, improves its adjusted R^2 by 0.10 ($p < .001$). Each feature was positively associated with trust in groups ($p < .001$), though we note that these network features correlate highly with one another. Considering these features separately, the average clustering coefficient was most predictive, followed by the participant’s degree centrality and group density.

Predicting Trust in Groups

Thus far, we have shown how various sets of group characteristics separately contribute to trust, after controlling for individual characteristics. Here, we examine how these features can together predict the composite trust in groups.

A random forest model that uses all feature sets reached a performance of out-of-sample adjusted R^2 of 0.26 and a mean-squared error (MSE) of 0.53. We obtained similar performance using multiple linear regression.

To understand the relative importance of the different feature sets, we ranked all features by how much a random permutation of their values increased the model’s MSE. These values are shown in Figure 4. We find that network features are most important, followed by an individual’s general attitude towards others. Least important were demographic features. Overall, this result suggests that both individual and group characteristics are important in predicting trust in groups.

Predicting trust using only observational data. As we demonstrate relatively robust performance in predicting trust in groups, one might consider using such predictions to make better group or community recommendations. In such a scenario, it may not be feasible to survey every user about their general attitudes towards others. As such, we additionally explored how well we could predict trust in groups using only observational data. Using the same approach but excluding survey measures, our best model obtained an adjusted R^2 of 0.15 and MSE of 0.59. In this model, network structure

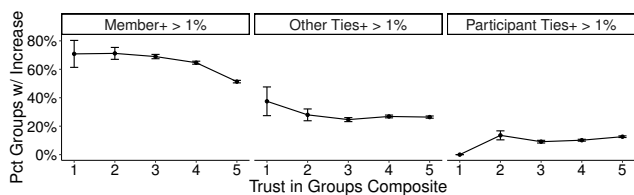


Figure 5: Groups with higher trust ratings are less likely to increase in size (left), more likely for the survey participant to form new connections in them (right), and had no effect on the likelihood of forming friendships among group members other than the rater (center).

features were again most important, but instead followed by group activity features.

Group Outcomes

Theoretical accounts of trust emphasize the impact of trust on community outcomes, attributing trust to prosperity [32], among other things. We analyze how trust relates to group outcomes as an online community, specifically, through three different measures: (1) percentage of group membership growth, (2) percentage of new tie formation (the number of tie increase divided by the number of pre-existing ties) among other members of the group, and (3) percentage of new tie formation by the survey participant in the group. All three measures were calculated by comparing the day of the survey to 28 days after. The absolute values of these measures were very small (median around 1%), so we binarized each measure (1 if it grew by more than 1%).

Figure 5 shows the percentage of groups that had an increase by more than 1% in each of the group outcomes listed above. Through logistic regression, controlling for the group metadata features listed above (e.g., group size), we found that higher trust was associated with *lower* likelihood of a group increasing in size (odds ratio -0.87, $p < .001$); and *higher* likelihood for the survey participant to form more new friendships in the group (odds ratio 1.29, $p < .001$). Trust in group did not have predictive power over the likelihood of *other* group members forming friendships in the group.

These results suggest a tension between trust and growth for online groups. Our finding is consistent with previous work on online community that “cliqueishness” (indicated by a large density of triangles) makes the community less attractive to join, and less likely to grow in size [6]. On the one hand, growth in size is an important indicator of success for online groups [46]. On the other hand, trust, partially elicited by small groups and exclusive membership [56] sets limits on group expansion, but encourages individuals to make new connections within the group. Future work can look into the relationship between trust and group survival, as well as other interaction dynamics within the group.

5 DISCUSSION

In this paper, we present a framework for predicting an individual’s trust in one of their social groups on Facebook. Through a large survey of members of a diverse set of groups on Facebook, we show that both individual characteristics and group characteristics contribute substantially to one’s trust in a group. With this more holistic view of trust in groups, we are able to explain a significant portion of an individual’s trust in groups ($R^2=0.26$), and also show how trust in groups relates to outcomes such as membership growth and the formation of new within-group friendships.

This study builds on many previous studies of trust in groups, and extends this work by showing how features previously studied in isolation may interact with each other, and how important these features are relative to each other. Beyond confirming that both an individual’s general disposition to trust others [29] and a group’s size [13] affect that individual’s trust in a group, we further show that group size matters less to individuals with a greater disposition to trust, and that an individual’s feelings of receiving social support from others in general is actually more predictive of trust in groups than their general disposition to trust. Apart from demonstrating that people do trust smaller, more private groups, we show that among groups with more than 150 members, the effect of exclusive membership decreases. Where previous work has suggested a relation between group connectivity and trust [17, 82], we further show that network measures such as the average clustering coefficient in a group are among the strongest predictors of trust in a group. Our findings that directed communication such as likes and comments contributes to group trust corroborate similar observations in qualitative studies [56].

Nonetheless, several null results suggest areas for future exploration. While prior work suggests trust differs with sociodemographic factors [16], we found that age and gender explain close to zero variance in one’s trust in groups; future work may consider exploring other factors such as geography or socioeconomic status. Cultural differences may also play a significant role in trust: prior work found that an indirect relationship between two people was more likely to increase trust for Japanese than Americans [82], suggesting that network structure may be more predictive of trust among the former. While we found that gender- and age-homogenous groups were more trusted, we also found no evidence that gender or age homophily predicts trust in groups, in contrast to previous literature suggesting that relationships between similar individuals tend to be more trusting [1, 2, 52]. Understanding the extent to which these findings apply to specific situations — moms’ buy-and-sell groups on Facebook are known to garner trust [56] — remains future work.

Future work may also involve investigating other potential correlates of trust such as psychological safety [24] and belonging [84], as well as other outcomes of trust on online groups. For example, high trust may lead to greater willingness to attend an event, share (or believe) information originating in the group, or donate to a cause.

And while our study focuses on groups on Facebook, community design choices may also affect perceptions of trust. For example, anonymity may increase trust by making it easier for vulnerable populations to talk about sensitive issues, but also have a disinhibiting effect and increase harassment and thus reduce trust [45]. Indicators of reputation or popularity such as up-votes and down-votes may also influence trust, especially in the absence of other social signals [65].

Design Implications

The work reported here has several potential implications for the design of online communities.

For example, we showed that certain types of actions (e.g., commenting and liking) are more positively associated with trust than others (e.g., posting). This adds nuance to previous findings that people have higher trust in communities in which they are more active [15]. This suggests that platforms could prioritize showing group posts with no interactions to ensure that more posts and members receive responses on their posts from other group members. At the same time, these findings may also inform the design of content recommendation systems. If these findings more generally indicate that *directed communication* is a key signal of trust, then that may be particularly valuable in ensuring that people who are members of many online communities see content from the communities that they trust the most.

And consistent with prior work [46], we found that trust grows with the number of group admins and decreases with group size. As online communities grow, it may be beneficial for platforms to encourage groups to recruit additional admins and moderators to maintain levels of trust. In particular, our finding that membership policy (e.g., open vs. closed) ceases to be predictive of trust above a group size of 150 has implications for the safe growth of online communities. If a group is already above this scale and still shows signs of strong trust, then perhaps that trust will be robust to further growth.

We also found that certain network properties of online communities (e.g., the average clustering coefficient) are strong predictors of trust. These findings may offer online communities a more holistic perspective on how to grow. In particular, adding members that increase the average clustering of the group may be beneficial both to new members and to the group as a whole.

Given that trust can be estimated from behavioral signals, platforms may also be able to provide better indicators of

trust in groups and how it may be changing over time. For instance, systems may be able to preemptively warn group admins if they detect a trend of decreasing trust in a group.

Our findings also suggest alternative recommendation strategies for groups. Designers may consider recommending smaller, less popular groups rather than larger, more popular ones if an individual is looking to make connections with others. However, tightly-knit groups with few members may not be good candidates for recommendation as these groups may be less likely to accept new members. But depending on an individual's general disposition to trust others, factors such as group size may end up less important.

Limitations

While we studied a wide range of groups, our analysis is limited to groups formed on Facebook. For instance, understanding how trust differs in communities with different policies on anonymity (e.g., Reddit or Nextdoor) remains an important area for future exploration. Nonetheless, the interactions we examined are common on other social media platforms (e.g., posting or liking). Given the large number and diversity of groups we surveyed, we expect that most of our findings will be generalizable to other platforms¹. While we controlled for individual differences such as demographics and an individual's general attitudes towards others, understanding differences that may arise in offline groups, and with regards to other factors such as location remains future work. Also, individuals may still choose to join groups based on other unobserved differences. Finally, our methodology is correlational and does not suggest causation. While greater trust may lead one to connect to other members of a group, it may also arise from making these connections.

6 CONCLUSION

Groups play a significant role in individual's social experiences and interactions. Core to a group's proper functioning is trust, which predicts numerous positive outcomes for a group and its members. In this paper, we present a framework for predicting an individual's trust in a social group, and identify characteristics of both the individual and the group that help predict the individual's trust in the group. We hope that this work can contribute to future research and design decisions that better support trust in online communities, and to the fostering of long-term meaningful interactions online and offline.

¹Code to reproduce our analysis is available at <https://github.com/infoxiao/trust-in-groups>

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