# What is(n't) a friend? Dimensions of the friendship concept among adolescents

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ABSTRACT

Much research in network analysis of adolescent friendships assumes that friendships represent *liking* and social *interaction*, friendships are *directed*, and friendships are *equivalent* to one another. This study investigates the meaning of friendship for eight diverse cohorts of sixth graders. Analysis of focus group and survey data suggests that these adolescents construe friendship as a multidimensional role relation composed primarily of relational norms, expectations for mutual behavior. Their friendship definitions may also include mutual liking and interaction, and other structural expectations such as reciprocity, homophily, and transitivity. Lastly, boys and girls weight these dimensions differently in defining friendship.

## Introduction

Most work in network analysis of adolescent friendship ties conventionally assumes that friendships represent *liking* (and non-friendships represent non-liking or even disliking). Most also assume that whether person A is friends with B is distinct from whether B is friends with A, so the concept of friendship is *directional*. Even within this view of friendship as directed-liking, by modeling contagion on friendship networks, researchers generally assume that friendship also represents directed social *interaction* (while non-friendship prevents interaction). In sum, such work entails the tacit assumption that friendship, liking, and interaction are well described by a single dimension, which can be captured by simply asking people to nominate their friends on a survey. Lastly, the elegance and analytical leverage of social network analysis derives from a strong but often implicit assumption of *equivalence*: In this case, ties are interchangeable (friends are friends) and non-ties are interchangeable (non-friends are non-friends, whether they be acquaintances, strangers, enemies, parents, or romantic partners).

We acknowledge that these strong assumptions have enabled the application of powerful theories and rigorous network analysis tools to friendship nomination data, leading to decades of prominent and fruitful research. Nevertheless, we argue that friendship is often understood by survey respondents as a multidimensional concept composed primarily of relational norms and structural expectations. In investigating this

claim, we will assess the interwoven assumptions above – friendship as directed-liking, friendship as directed-interaction, and friendship as a one-dimensional concept. Lastly, this paper will demonstrate that friendship nominations are likely to violate the equivalence assumption above: The word friendship may have variable meanings because relational norms and structural expectations may vary across gender, age, or cultural differences.

We investigate these arguments in a two-year empirical study of sixth grade students in four diverse urban middle schools in the US. In qualitative fieldwork in 2017–18, we conducted focus group interviews in four sixth grade cohorts about what students mean by calling someone a friend. Notably, focus group participants hardly ever defined friendship as about liking someone else. Instead, students overwhelmingly defined friends as others who share a *mutual* agreement to behave as friends toward one another; that is, to abide by relational norms (e.g., *will stand up for me when others are against me, will never hurt me, will never tell anyone my secrets*). This definition stands in stark contrast to the conventional interpretation of friendship as directed-liking and interaction. Some interviewees further included structural expectations such as *someone who likes me or cares about me, who calls me his/her friend, who has much in common with me*, or *who has the same friends as me (part of my group)* within the definition of friendship. Such features raise provocative questions for research on reciprocity (a tendency for friendship nominations to be mutual), homophily (a tendency for people to nominate similar alters as friends), and transitivity (a tendency for

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people to nominate alters who are friends of their friends) as empirical regularities in adolescent friendship networks. Lastly, focus group discussions suggested that the definition of friendship may vary systematically by gender.

In the next step of the research we took 11 distinct and exemplary features mentioned in focus groups and constructed a survey that asked students to rank these 11 features in importance to how they define friendship. We deployed this survey in two sixth grade cohorts from the 2017−18 academic year and four sixth grade cohorts from 2018−19 to investigate the widespread assumption that friendship, liking, and interaction can be treated as a single dimension of directed-liking and interaction. Supporting our predictions, a principal component analysis of the rankings by all six cohorts reveals that friendship is not adequately represented by a single dimension, and that the most prominent dimension is not directly related to either liking or interaction. A ranking of features by respondents revealed that role-related prescriptive and proscriptive norms are the most central ingredients of their definition of friendship. Lastly, boys and girls differ in their emphasis on particular relational norms or structural expectations for the definition of friendship. Girls are more likely than boys to define friends as peers who like them, support them emotionally, keep their secrets, and never hurt them. Boys are more likely than girls to define friends as peers who call them friends, have similar interests, and have the same friends (part of the same group).

### The assumption of directionality

Social network analysts most often assume that friendship exists in the minds of individuals and is observable in a survey response by one party directed toward another; i.e., if A nominates B as friend on a survey this reflects A's friendship, liking, and behavior toward B and does not imply friendship, liking, or behavior from B to A (Block and Grund, 2014; Carley and Krackhardt, 1996; Leszczensky and Pink, 2019; Vaquera and Kao, 2008). Scholars conventionally assume that when person A nominates B but B does not nominate A the 'present' A→B tie works just like any other directed tie and the 'absent' B→A tie works just like any other non-tie (An and McConnell, 2015; Cheadle and Schwadel, 2012; Heidler et al., 2014). By this usage, a pattern of mutual friendship nominations is an empirical finding (perhaps caused by a norm of reciprocity) rather than part of the definition of friendship (Block, 2015). Further, researchers often interpret A's nomination of B on a survey as a social act toward B, 'sending' an 'overture' or offer of friendship, which B then 'receives' and may choose to 'reciprocate' or 'return' (Carley and Krackhardt, 1996: 8; Frank et al., 2013: 217; Wimmer and Lewis, 2010: 586). Note that researchers typically interpret survey nominations as sending, receiving, and reciprocating offers of friendship even though nominations are most often simultaneous and are never actually disclosed between parties.

A radically different idea – largely foreign to the social network analysis community – is that friendships are essentially *mutual*, not directional. This approach is closer to our intuitive understanding of friendship and well founded in psychological and anthropological research on friendship (Hruschka, 2010) where mutuality or "symmetric reciprocity" (Hartup and Stevens, 1997: 356) is regarded as among the most deep and universal features of the friendship concept. If friendship is a two-way (undirected) relation by definition, then unreciprocated nominations can instead be understood as a case of disagreement between two informants on the same relationship (Lee and Butts, 2018). Such discrepancies might derive from unbalanced sentiments within a friendship dyad, but asymmetric sentiments are arguably not the same thing as a regular friendship present in one direction and absent in the

other. A discrepancy may also reflect a desire or aspiration by an unpopular kid or 'wannabe' (Dijkstra et al., 2010) to become friends with a popular peer, but a one-sided aspiration for friendship is in fact a personal sentiment, not a regular friendship present in one direction and absent in the other. If a respondent has more friends than they are willing or able to nominate (due to fatigue, forgetting, or a cap on the number of nominations), this may produce unreciprocated nominations as an artifact, and again there is no reason to believe that a friendship exists in one direction and not the other. Of course, discrepant reports of friendship within a dyad may also reflect differences in construal of the survey question or of the meaning that the respondent assigns to the word friend, as we will discuss below.

### The assumption of equivalence

A friendship network is typically represented as a sociomatrix consisting of "1" (friend) and "0" (non-friend) scores. Any subsequent algebraic operations on such a matrix depend on two strong equivalence assumptions. First, all "1" scores are interchangeable; a friend is a friend. Second, all "0" scores are interchangeable; a non-friend is a non-friend. All kinds of non-friends – whether they are strangers, acquaintances, enemies, lovers, or family members – are treated as equivalent.

The often tacit assumption of equivalence is foundational to social network analysis, drawing our attention to the structure of interconnections among elements rather than to heterogeneity of the elements or of their relations. For example, under these assumptions we can say that one node is *reachable* by another node through a *path* of a particular length, and that such path lengths are strictly comparable. We may then compute a centrality measure for each node (An and McConnell, 2015; Falzon et al., 2018; Smith et al., 2017), showing that a particular node lies on the most shortest paths connecting other nodes or can reach other nodes by the shortest paths. We can also say that two nodes are structurally equivalent (Cranmer and Desmarais, 2011; Kreager et al., 2016) or identify structural holes (Burt, 1992), or observe centralized or cohesive network structures (Moody and White, 2003; Smith et al., 2016). That work has delivered eminently valuable insights, but rarely recognizes that many such insights are predicated on the assumption of equivalent ties, which then serves as a scope condition.[1] In choosing sociometric measures for a given study population, researchers then should be attentive to the issue of whether the equivalence assumption may be violated in a systematic and important way.

Some heterogeneity in the meaning of ties is inevitable and also forgivable, given the powerful lenses of social network analysis that are enabled by the equivalence assumption. However, if heterogeneity in definitions of friendship is deep and related to categorical distinctions in a subject population (e.g., gender or race), this raises particular concerns about interpreting patterns of self-reported friendship within and across categories. For example, gender differences in the structure of adolescent friendships (Berndt, 1982; Cheadle and Goosby, 2012; Hall, 2011; Kreager et al., 2011) or patterns of gender homophily and asymmetric friendship nominations within and across genders (McMillan et al., 2018; Snijders and Steglich, 2015) are assumed to reflect gender differences in how boys and girls make or break friendships rather than differences in how boys and girls define the term friend. Extensive work in developmental psychology has examined gender differences in adolescent relational behavior, showing for example that boys tend to participate collectively in shared hobbies and activities (as groups)

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[1] Feld and Elmore (1982) acknowledged potential heterogeneity in respondents' construal of the friendship concept on surveys, and suggested that imposing a cap on the number of nominations (e.g., five closest friends) constrains them to include only the most important relationships. This would trim the impact of the grossest discrepancies, such as when one respondent reserves the term friend only for a small core of 'BFFs' and another respondent regards all classmates, all Quakers, or all Facebook contacts as friends.

whereas girls focus more on dyadic affective attachments, expressive behavior, or social support in dyads (Ko et al., 2015; Laursen and Bukowski, 1997; Rose and Rudolph, 2006). Although those patterns are pervasive and widely recognized, such work has not explicitly addressed the question of whether the *definition* of friendship differs for boys and girls. If boys and girls define friendship differently, then any comparison of network structure or dynamics by gender (indeed, any analysis of friendship networks that includes boys and girls) is problematic. This problem may apply to a variety of social categories or distinctions, but we will focus on gender, which is highly salient for adolescents.

### The assumption that friendship is synonymous with interaction

Researchers typically make a tacit assumption that measuring friendship is the same as measuring social interaction. This can take three forms: measuring interaction and interpreting it as friendship, measuring friendship and interpreting it as interaction, or using a composite measure that conflates the two dimensions. First, we consider research that employs measures of interaction and interprets them as friendship. For example, Snijders et al. (2013: 269) ask students to report on "social activities" such as going to the movies, having dinner, playing football, or going shopping, and then interpret those interactions as friendship relations. Similarly, de la Haye et al. (2017: 20) measure friendship as "the kids at school that you hang out with the most," Baerveldt et al. (2004: 61) use "who do you talk to about personal problems?" and Young and Weerman (2013: 340) measure friends as those with whom the respondent "usually associated." Paluck and Shepherd (2012: 902) took the union of four behavioral questions (who spent time with, communicated online with, would defend, would talk to if something bad happened) and interpreted that union as friendship; i.e., any of those incoming, outgoing, or mutual behaviors indicates a friend.

Second, researchers interpret friendship nominations as interaction. Treating friendship and interaction as synonymous allows them to regard friendship data as a substrate for diffusion (Lewis et al., 2012; Smith and Burow, 2018), as when researchers study the contagion of smoking on friendship networks (adams and Schaefer, 2016; Copeland et al., 2017; Mercken et al., 2010). It is rarely recognized that such work requires a strong assumption that a respondent interacts concurrently with *all* nominated friends and *never* interacts with non-nominated alters. Modeling directed friendship nominations as vectors for social influence implies that ideas, behavior, or viruses cannot spread from one person to another unless the second person regards the first as a friend; i. e., a virus must travel upstream on long paths of friendship nominations to spread through a school classroom. We point out that work investigating the dynamics of friendship networks (Cheadle et al., 2013; Stadtfeld and Pentland, 2014) also conflates friendship with interaction when it invokes *spatial proximity* as a mechanism for patterns in friendship nominations such as reciprocity, transitivity, and homophily. In fact, reciprocity, transitivity, or homophily in friendship nominations only follow from physical propinquity if friendship is equivalent to interaction. It is the interaction, not the labeling of friendship, that makes spatial proximity relevant to formation of friendships.

Lastly, some scholars combine both interactions and friendship in an omnibus measure that conflates the two dimensions. For example, de la Haye et al. (2010: 163) measure "friends they 'hang around with' the most." McFarland et al. (2014: 1095) measure friends as "classmates that they 'hung around' with as friends." As Kitts (2014) notes, this composite approach supports the interpretation of friendship ties as interaction (constraining heterogeneity in the meaning of ties by removing non-interacting friends), but is a poor fit for theories of

network diffusion because the ambiguity is shifted into *null* ties. Null ties in composite friendship-interaction networks could include frequent interaction partners who are not friends (perhaps lovers, kin, neighbors, or friends of friends) or could include friends who do not interact the most.

### The assumption that friendship is synonymous with sentiments

Researchers interested in modeling the dynamics of friendship networks (e.g., reciprocation, triad closure) often make a tacit assumption that measuring friendship is the same as measuring social sentiments (Fujimoto and Valente, 2015; Wimmer and Lewis, 2010). Again, this can take three forms: measuring friendship and interpreting it as sentiments, measuring sentiments and interpreting them as friendship, or using a single measure that conflates the two dimensions. First, some researchers measure (positive) sentiments and assume they represent friendship. For example, scholars interpret nominations of "get along with" (Schaefer et al., 2017: 89) and "like the most" (Huitsing et al., 2012: 649) as measures of friendship.

Second, researchers commonly interpret friendship nominations as liking (Block, 2015; Doreian and Conti, 2017; Stadtfeld and Pentland, 2015). This is also demonstrated by the line of work that measures friendships and antipathies as opposites by asking respondents two sociometric questions, one about friendship and another about disliking (Fujimoto et al., 2017). For example, some researchers may contrast "best friends" with those they "like the least" (Rambaran et al., 2015: 168) or those they do "not find it easy to get along with" (Rubineau et al., 2019: 36) instead of asking students about the peers they *like the most* and *like the least* (or *dislike the most*). Further, Kitts and Quintane (2020) show that extensive research invoking structural balance theory (which is predicated on positive and negative interpersonal sentiments) as an account for transitivity in friendship networks (e.g., McFarland et al., 2014; Stadtfeld and Pentland, 2015; Wimmer and Lewis, 2010) has implicitly assumed not only that friendship nominations represent positive sentiments but that *non*-nominations of friendship represent *negative* sentiments. Indeed, the assumption that friendship nominations and non-nominations are the same as positive and negative sentiments is required to apply structural balance theory to friendship networks. This requirement applies to balance-theoretic accounts for reciprocity (Eder and Hallinan, 1978) as well as transitivity.

Lastly, some scholars combine both sentiments and friendship in an omnibus measure that conflates the two dimensions, as Berndt and Perry (1986) combine best-friend nominations and liking ratings to identify friends and non-friends among students. The assumption that liking and friendship are one dimension is most explicit when researchers employ a single scale to capture both. Boda and Néray (2015) use a 5-point scale on a survey {*I hate him/her, I do not like him/her, He/she is neutral to me, I like him/her, He/she is my friend*) to describe a continuum between hatred and friendship. Vörös and Snijders (2017: 109) measure affective relationships on a similar scale: *hate, dislike, neutrality, liking, friendship*. Ellwardt et al. (2012) use the following scale: *very difficult, difficult, neutral, friendly, good friend*.

### The assumption that friendship is one-dimensional

The assumption that friendship is synonymous with sentiments is often combined with the assumption that friendship is synonymous with interaction. The same researchers may assume that friendship ties are positive sentiments (and non-ties are negative sentiments) when modeling the dyadic and triadic forces of network change and assume that friendship ties are interaction (and non-ties are non-interaction)

when modeling the dynamics of behavioral influence on networks. When combined with the assumptions of directionality and equivalence, this implies that friendship is a concept with one underlying dimension, which is interpretable as directed friendship/liking/interaction (vs. non-friendship/non-liking/non-interaction).

It will help to consider a few examples of this melding of friendship, sentiments, and interaction. Harrigan and Yap (2017) use a vignette measure of interaction – inviting (avoiding) for lunch – and interpret it as liking (disliking), which they assume is synonymous with a friend (enemy) relation. Snijders and Baerveldt (2003) explicitly operationalize friendship as an intimate affective relationship (sentiments) of emotional support (interaction) between ego and alter. Buhrmester (1990: 1103) asks children to identify "close friends" as "kids you know very well, spend a lot of time with in and out of school, and who you talk to about things that happen in your life." Marineau et al. (2016) measure peers' nominations of regular interaction partners who were called friends and interpreted the measure as positive sentiments. Brewer and Webster (2000: 363) define friendship as "those individuals who you feel close to, who you interact with frequently, those who you would seek out to do some type of social activity."

*Challenging conventional assumptions*

We extend a recent sympathetic critique (Kitts, 2014; Kitts and Quintane, 2020) of using friendship measures as proxies for networks of either sentiments or interaction, such as when applying theories about sentiments or interaction to friendship nomination data. This work has argued that friendship is commonly construed by survey respondents as a *role relation* (Lorrain and White, 1971), a socially constructed label that entails norms, mutual expectations, or repertoires for how parties will behave toward one another within their chosen roles. By this usage, friendship may also include expectations for sentiments (especially *mutual* liking) or interaction behavior (particularly *reciprocal* exchange), but a friendship nomination is not merely a self-report of one-way liking or one-way social interaction.

To be sure, friends often like each other, talk with each other, spend time together, and trust and support each other, but the association of friendship with interaction or sentiments is not a simple one-to-one mapping. Kitts (2014) notes a particular problem that *null* ties in a friendship network (non-friends) may not correspond to null ties for interaction or null ties (or negative ties) for sentiments. We cannot, for example, assume that non-best-friends in a school class dislike or avoid interacting with each other. The zeros in a sociomatrix are equally important to defining a network as the ones, and the mapping of friendship to interactions or sentiments depends importantly on the zeros for both sides.

**Empirical study of adolescent friendship**

The remaining part of this paper reports on an empirical study of sixth graders from four urban middle schools in the northeastern United States. The student population is economically disadvantaged and racially diverse. Approximately two thirds of the students identify as Latino/a or Hispanic, about one third identify as Black or African American, about one quarter identify as White, about one tenth identify as American Indian or Alaska Native, and about one twentieth identify with other categories (Asian, Native Hawaiian, or other Pacific Islander).[2]

*Focus group interviews*

In qualitative fieldwork in the 2017−18 academic year, we interviewed sixth grade students in the four schools about what they mean

when they call someone a friend. We gathered students in three distinct rounds of focus groups, where each focus group was single gender and either English or Spanish, and included up to seven students from the same school. In total, we conducted 20 focus groups including 47 girls and 38 boys. In the first round of focus groups, we asked open-ended questions about how respondents define friendship. To ensure that we captured each participant's independent opinion before discussion (avoiding a tendency to conform to the crowd or to opinion leaders) we asked respondents to begin by writing private responses on paper:

> *We all may define the word friend in our own way. We are interested in what you mean by the word friend. So, on the piece of paper in front of you, write some things to finish this sentence, "To me, a friend is someone who: _____."*

This generated 72 written lists containing hundreds of definitions (1578 words). We then allowed subjects to discuss the definition of friend in focus groups and these focus group discussions were recorded and transcribed (4348 words). The written and transcribed lists were organized and coded by two project staff to yield 11 distinct defining features of friendship. Detailed analysis of these qualitative data is beyond our scope here, so we will report overall conclusions that pertain to the focus of this paper.

Discussion in focus groups did not support the conventional assumption that adolescents are listing their most liked peers when they nominate friends, or that they must dislike peers that they fail to nominate. In most focus groups, no students even mentioned that liking someone is part of regarding them as a friend. Although sentiments such as liking or caring were occasionally discussed, in the vast majority of those cases the participants described a friend as *someone-who-likes-me* rather than as *someone-I-like*. Subjects more commonly used the word *care* than *like* and in that case the dominance of *someone-who-cares-about-me* over *someone-who-I-care-about* was even stronger. In fact, we observed only two students including *I-like* or *I-care-about* as part of the definition of friend and 29 students mentioning *likes-me* or *cares-about-me* as part of the definition. Reasonable challenges to this startling finding might suggest that students did not understand the question or failed to mention *someone-I-like* because it was obvious and taken for granted. However, when probed focus group participants maintained that they need not like a peer to consider that peer a friend and described how they could dislike friends.

Students overwhelmingly defined friendship as a mutual agreement to *behave* as friends toward one another, as a set of prescriptive and proscriptive behavioral norms. Many students emphasized that friends defend each other against harm, and phrases like "someone who sticks up for me" or "would never hurt me" almost always came up. These definitions occasionally included physical violence, as when one boy (Kirk) defined friend as someone who "will defend you when you're getting bullied" and another boy (Thacyrus) defined a friend as someone "who would take a bullet for you. Like have your back like every time."[3] This is often explicitly articulated as a mutual arrangement, as when a girl (Rosie) said, "If I was someone's closest friend I would stand up for them if someone was hurting them, so I want them to do the same back." Another boy (Six), said "Someone who would look after you and you're doing the same for them. If that person does not look after you, you're not friends with them."

Students often mentioned spending time together as a defining property of friendship. Many of the students (especially boys) included the phrase "hang out with" in their accounts, and several added specifics such as "play video games with" (CJ, boy) or "go for a walk to the park or to the bus with" (Nathan, boy). Boys' accounts more often emphasized

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[2] These figures add up to more than 100% because these racial and ethnic categories are not mutually exclusive.

[3] All names here are pseudonyms chosen by the students themselves. Many students chose old-fashioned Anglo-American names (e.g., Betty, Mark, Tracy, Chris), although most of their given names were either quite unique or were of Spanish origin.

activities or included some form of instrumental aid, as when one boy (Bastian) said, "like the math work you don't get, they go and help you out on it," whereas girls' accounts more often emphasized an emotional connection, as in someone who "loves and cares for you, do things for you, help you when you're down, who's there for you, spends time with you." (Teddy Bear, girl).

Notably, these friendships may include more than two persons: Within a *group* of friends, all members call each other friends and have a mutual obligation to abide by the norms associated with friendship. They also often spend time ('hang out') together. A boy (David) said, "We are mostly in a big group together when we're at lunch. You know I talk to them on the bus, you know. We're mostly just you know hanging out."

The friendship group may also transcend social interaction, as there is inertia in students' use of friendship titles. A boy (Lex) described a longstanding group: "Cause I went to elementary school with some of these students. And they're still here but they don't talk to me as much but I still consider them friends because we have a history."

Students described friendships as public alliances of two or more individuals who are loyal and faithful to one another, especially regarding their behavior toward each other and respecting each other to outside parties. It may also include expectations that members of a friendship agree on expression of personal tastes (favorite music, clothing styles, video games). In the focus group discussion, boys were particularly likely to describe friendships as alliances or collaborations, rather than as emotional commitments or sources of affection.

A second round of focus groups (with different respondents) targeted the distinction between friendship and liking. Students were asked to (privately) list the students they *liked* on a piece of paper, and then list their *friends* on a separate sheet. The two lists typically included some overlap, but more than 90 % of respondents included liked others who were not called friends and/or included peers called friends who they did not like. Asked to elaborate on their responses, the focus groups then discussed and explained how friendship and liking need not go together. In fact, no student said that friendship and liking were the same thing. One boy (Chris) remarked, "Some people I don't call friends like I just *like.* We're just close, we have a strong bond… I like them more than a friend… just say bro or something like that." A girl (Selena) gave a common example of liking-more-than-a-friend, "might like the other person as their crush." A common reason for disliking named friends is conflicts, particularly disagreements over tastes. One boy (Rice) explained, "You may not see eye to eye on everything and it might cause arguments." Another boy (Mark) similarly described how such disagreements lead to disliking within friendships, "like you start to not like them [your friend] because they don't like the same stuff that you do… like maybe different video games or like different like, like comics or something."

Some expressed friendship as an obligation, not a feeling. Asked why she might call someone a friend despite disliking her, a girl (Betty) remarked, "some people are afraid." A common theme is calling others friends out of concern for their feelings, such as a girl (Rosie) who said, "I don't wanna say you're not my friend because then I feel bad. So sometimes I'll say it out of pity." Another girl (Lei) said, "they have no friends and they ask you to be their friends but you don't want to feel bad so you ask them to be your friend."

The focus group data also raised a number of novel issues that may be points of concern for social network analysts of adolescent friendships, who have often focused on patterns of reciprocity, homophily, and transitivity (Goodreau et al., 2009). Raising problems for the study of reciprocity of friendship nominations, participants often described friendship as mutual by definition (i.e., *a friend is someone who calls you a*

*friend).* Some claimed that mutuality is essential to friendship, and many argued that if you are not someone's friend they cannot be your friend. Participants described friendship like an honorary title with an expectation for mutuality. A girl (Tracy) remarked, "If you wanna title [someone] as a friend you could [but] normally like you'd expect to hear them say it back" or a boy (Steen) said "I made a point to become friends with them because they called me their friend" and another (Mark) added, "It has to go both ways." And this expectation that the title is mutual is also expressed as a norm with social consequences. A girl (DeeDee) remarked, "If they consider you a friend and you don't see yourself as their friend, it's gonna cause a conflict. Then, the whole school ends up finding out." The latter looks like a norm for reciprocation, but the pressure embodied in this norm derives from the essentially mutual nature of friendship. If one student wants to take on the title of friendship with another, but the second does not agree to do so, the friendship cannot be established and the desires of the first student are frustrated. In the eyes of our research subjects, this is a non-friendship, not a one-way friendship.

When students were explicitly prompted to describe a one-way friendship, they typically still defined friendship as a mutual obligation, but where one of the members breached the norms of friendship. For example, a girl (Samantha) said "I had a friend when I was in elementary and she wasn't *my* friend, like she used to tell my secrets and stuff." Another girl (Anna) connected the shared adoption of the friend label as a key to mutual trust to abide by relational norms:

> If I can call someone a friend then they can call me a friend too, because if I have their back, then I want them to have my back too… If you called them a friend, um like they should be your friend too… if they're not going to count you as their friend, but you count them as your friend, and you tell them everything, they might tell other people stuff since they don't count you.

Raising problems for the study of transitivity, some define friendship as being essentially transitive: A friend of a friend is a friend *by definition*, which is incompatible with a causal argument for transitive triad closure (that a friend of a friend *becomes* a friend). A girl (Manny) said, "sometimes I may be friends with someone because I am friends with someone who's friends with someone," adding "Yeah I'm really fake." Another girl (Z) said that having the same other friends was most important to her own definition of friendship, explaining that "when I'm friends with someone, we normally have like this little group of us that's like we're all close friends with each other and we've all known each for like a really long time."

Raising problems for studies of homophily, some respondents define friendship as including similarity: a friend is someone who has a lot in common with you. For example, several gave definitions of friend that included "has the same interests as me" (Tyrone, boy) or "plays the same type of games as you" (Arnardo, boy). Here dyadic cohesion among friends is due to similarity rather than liking. David (boy) added, "I want to say that you don't really *like* them because, you know, we mostly have the same things in common most of the time."

Although such structural expectations were not as prominent as behavioral norms, they are highly suggestive and require us to think deeply about empirical work on reciprocity, homophily, and transitivity using friendship nominations. Clearly, adolescent friendship can be more than a dyadic phenomenon, and respondents can include local network patterns in their usage of the friend concept.

Focus groups also gave an opportunity to begin exploring the equivalence assumption for ties (all friendships are interchangeable relations) and non-ties (all non-friendships are interchangeable non-

relations). Particularly troublesome for this assumption is our observation that boys and girls tended to define friendships as different sets of behaviors (e.g., "would take a bullet for me" vs. "won't tell anyone my secrets"), although both largely agreed that friendship is primarily a set of role-related norms.

We have mentioned three patterns that are provocative for literatures on adolescent friendship networks: First, directed liking and directed interaction appear to be much less important than behavioral norms as defining features of friendship. Second, structural patterns such as reciprocity, homophily, and transitivity may also be part of the definition of friendship. And third, boys and girls may apply different definitions of friendship. It is even more provocative that our focus groups suggested these three issues may interact with one another. For example, whereas girls in the focus groups often used language like "who cares about you and your problems," boys were more likely to describe friendship as allegiance to a club for mutual protection. Friends "have each other's backs" in their words. They are bound by mutual agreements of friendship, which are embedded in other mutual agreements of friendship (with their other friends, who are also their friends' friends). They form a friendship group with norms governing behavior within the group, and even expect that members will share tastes in clothes, music, sports teams, and video games, as if marking their membership. This mutually obligated team does not seem to rest on the vagaries of interpersonal sentiments among members. Indeed, as the students readily admit, they may dislike some other members of this clique; that is, they may dislike their friends, just as they may like others who are not members of their group of friends. In sum, this implies a supra-dyadic interpretation of friendship, especially for boys, that can include structural patterns such as mutuality, homophily, and clustering by definition. Girls more often described dyadic expressive dimensions of friendship, but some similarly described friendship as a group-level phenomenon that does not depend on universal liking for all dyads. For example, one girl (Kayla) said, "It doesn't matter if one person in the group doesn't like another person."

Investigating these arguments more rigorously required quantitative data over a larger population of subjects. Coding and analysis of the students' written accounts and discussions from the first two rounds of focus group interviews revealed 11 exemplary features of friendship that seem to represent distinct sub-regions in the space of meaning for the friendship concept.

**A friend is someone who…**
[NoHurt] would never hurt me
[Defend] sticks up for me when others are against me
[Support] helps me feel better when I feel bad
[Secrets] never tells anyone my secrets
[Help] helps me do things that I want (or need) to do
[Time] spends a lot of time with me
[Likes-Me] likes me or cares about me
[I-Like] I like or care about
[Reciprocity] calls me his/her friend
[Homophily] has much in common with me
[Closure] is friends with my other friends (part of my group)

A third round of focus groups explored the students' representation of the friendship concept in light of these features, and tested ways of having students compare and rank the features. We included directed liking (*I-like*) and interaction (*Time*) on this list of 11 descriptors – even though few students mentioned them in the focus groups – to allow for the possibility that these features were often left unmentioned because they were obvious and taken for granted. Reminding all respondents that *I-like* and *Time* are viable answers allowed respondents to weight these features against the others.

## Analysis of survey data

Analysis of the 11 features above allows us to see whether friendship can be adequately represented as a single dimension of directed-liking and interaction, and to assess the relative importance of the 11 features in the respondents' definition of friendship. To pursue these questions, we constructed an electronic survey that asked students to rank the 11 features above in importance to how they define friendship, by dragging the features on a tablet screen until they were listed in the respondents' preferred order. To eliminate order effects in the population due to the initial rank order of the list we randomized this initial order, turning any individual-level order effects into noise.

We administered this survey to two sixth grade cohorts from the 2017−18 academic year (N = 132) and four sixth grade cohorts from 2018−19 (N = 322), for a total of 454 respondents. Of this number, 18 students (4%) were missing the relevant data, including 13 who skipped through the friendship dimensions question without dragging any features. Those uninformative records were excluded from the analysis below as non-respondents, thus making the analytic sample size equal to 436. A more stringent criterion would exclude as nonrespondents students who only dragged a few items, which would require us to designate an ad hoc threshold for number of moved items in order for us to regard the survey response as valid. Increasing this threshold would reduce noise but also reduce the number of cases and delete potentially valuable information. We explored a large range of such thresholds and results were very robust except for one minor discrepancy, as we will explain later.

For the four school cohorts in 2018−19, we administered the ranking task twice, once in September and once in March, each time randomizing the initial order of friendship features. We took the mean rank for each item across both observations within subjects. For a handful of subjects who had to complete the survey a second time on a make-up day (such as when the first survey was interrupted), we similarly consolidated the multiple observations by taking the mean rank for each item. Thus, each subject is represented by a single case while multiple observations, if any, are merged to mitigate noise and better estimate the respondent's true subjective ranking.

We do not expect school-level effects on the definition of friendship for individuals, so for each analysis we verify patterns within each school population and then pool cases across schools for greater statistical power and ease of exposition. All findings reported below employ the full sample of sixth grade students pooled across the six cohorts.

## Investigating the assumption of unidimensionality

First, we examine the dimensionality of the friendship concept. Again, social network analysts typically assume that friendship, liking, and interaction can be described with one dimension and so friend

**Table 1**
Principal Component Loadings (N = 436).

|  | PC1 | PC2 | PC3 |
|---|---|---|---|
| ILike | −0.389 | **−2.799** | 0.640 |
| LikesMe | −1.212 | **−2.618** | −0.124 |
| Reciprocity | **1.924** | 0.315 | 0.494 |
| Homophily | **2.504** | 0.435 | −0.138 |
| Closure | **2.745** | 0.581 | −0.063 |
| NoHurt | **−2.358** | 0.673 | 0.117 |
| Secrets | **−1.658** | **1.223** | 0.062 |
| Support | **−1.524** | **1.218** | **1.311** |
| Defend | **−1.849** | **1.107** | −1.133 |
| Time | 1.131 | 0.117 | **1.686** |
| Help | 0.687 | −0.251 | **−2.853** |

nominations can be used as a proxy for directed-liking and social interaction. Treating friendship as a one-dimensional concept implies that a single dimension can represent the variance of diverse facets of the friendship concept, a claim that we can assess empirically by analyzing the correlations among the 11 ranked features in our survey. We performed a principal component analysis to find a reduced set of orthogonal dimensions (principal components) that explain the most variance in the original data. The conventional interpretation of friendship nominations is supported if a single dimension explains a large portion of the variance, and if directed-liking (*I-Like*) and social interaction (*Time*) load together on this most prominent dimension. We illustrate the interrelationships of these features by projecting them onto a three-dimensional space, described by the first three principal components. The matrix of loadings of the original 11 friendship variables on these principal components is reported in Table 1, with boldface used to highlight positive or negative loadings for variables that aid in interpreting each dimension.

The first principal component accounts for 28.9 % of the variance across the 11 features of the friendship concept, and is not related to either interaction or liking. This discredits the idea that friendship, liking, and interaction can be represented as a single dimension. Instead, this first component is interpretable as a continuum between two kinds of role-related expectations, one seeing friendship as norms for behavior (*Defend, NoHurt, Support, Secrets*) and the other seeing friendship as expectations for structural patterns (*Reciprocity, Closure, Homophily*), that is, friendship as a clique of similar peers. The second component explains 16.6 % of the variance and is interpretable as a continuum between mutual sentiments (*I-Like, Likes-Me*) and behavioral norms (*Support, Defend, Secrets*). This suggests that respondents do see (mutual) affection as a distinct component of the definition of friendship, but undermines the conventional belief that *directed* liking is a good summary interpretation of the friendship nomination. The third principal component explains 12.1 % of the variance and distinguishes instrumental aid (*Help, Defend*) from expressive interaction (*Time, Support*). Sentiments and interaction load on separate orthogonal components. The two sentiment variables (*I-Like, Likes-Me*) are positively correlated only with each other and both are not correlated with interaction (*Time*).[4]

Fig. 1 allows us to visualize these results more intuitively, plotting the 11 items in a two-dimensional space defined by their loadings on the first two principal components. Here we see that prescriptive (*Defend, Support*) and proscriptive (*NoHurt, Secrets*) role-related relational norms cluster tightly together in this meaning-space. The three structural expectations – having a lot in common with me (*Homophily*), having the same friends / belonging to the same group as me (*Closure*), and calling me a friend (*Reciprocity*) – cluster together as well. This represents the tendency to call someone a friend because they belong to the same subgroup of similar and interconnected peers (cohesive in a structural sense). As before, sentiments (*I-Like, Likes-Me*) cluster together, far apart from all of the other features. It is tempting to interpret help on goals or tasks (*Help*) as associated with spending time together (*Time*), but the two are near one another in this two-dimensional space because they load little on the first two components. In other words, what *Help* and *Time* have in common here is that neither is very related to the dimensions of role-related relational norms and sentiments. Recall that the third dimension in Table 1 (not pictured in Fig. 1, but available as an animation at this link: http://www.jameskitts.com/pubs/SocialNetworks2021/PCAPlot3D.mp4) was a contrast between instrumental aid (*Help, Defend*) and expressive interaction (*Time, Support*).



**Fig. 1.** Loadings on First Two Principal Components of 11 Defining Features of Friendship (N = 436).

### Ranking the features of friendship

Our fieldwork suggested that prescriptive and proscriptive role-related relational norms (*NoHurt, Defend, Support, Secrets*) are key defining features of friendship, and that neither directed-liking (*I-Like*) nor social interaction (*Time*) are the sole defining feature or even particularly important features. Table 2 addresses these observations by presenting the overall average ranking of the 11 features, where '1' represents the highest possible rank.

In the ranking, two norms – one prescriptive (*Defend*) and one proscriptive (*NoHurt*) – are clearly the most important ingredients of friendship. Two other norms (*Support* and *Secrets*) are also important, but gender differences – to be discussed later – diminish their overall ranking somewhat. Sentiments are nontrivial, but incoming liking (*Likes-me*) is more important than outgoing liking (*I-Like*), which also appeared in the fieldwork. The lowest ranks are for spends a lot of time with me (*Time*), calls me a friend (*Reciprocity*), has much in common with me (*Homophily*), helps me do things that I want (or need) to do (*Help*), and is friends with my friends or part of my group (*Closure*). Recall that these dimensions appear because they received support in the focus group data, so low rank here does not mean the features are entirely unimportant. One girl (Casey) remarked that the ranking task was difficult because "like most things on this list should be number 1 so it was really hard for me to choose which one had the top priority."

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[4] When 11 objects are ranked, the expected correlation between any two objects' ranks is -0.1 because of interdependence in the task (raising the rank of one feature necessarily decreases the expected rank of any other feature). The *I-Like* and *Likes-Me* variables are correlated with *Time* at -0.113 and -0.117, which can best be described as uncorrelated.
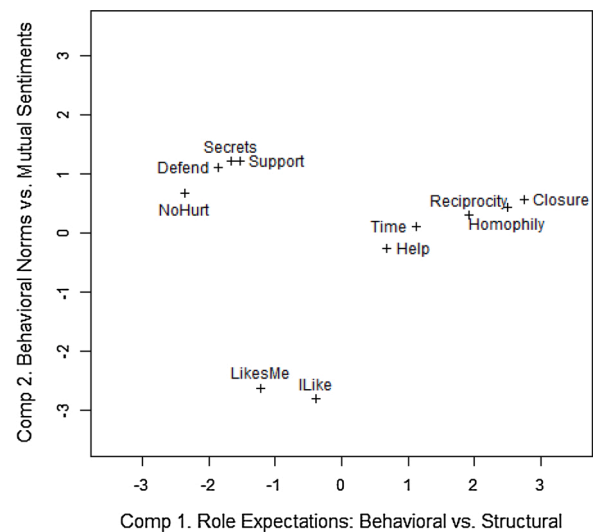
**Table 2**
Average Ranking of 11 Defining Features of Friendship (N = 436).

| Feature | Avg Rank | Question |
| --- | --- | --- |
| NoHurt | 4.799 | would never hurt me |
| Defend | 4.873 | sticks up for me when others are against me |
| LikesMe | 5.360 | likes me or cares about me |
| Support | 5.397 | helps me feel better when I feel bad |
| ILike | 5.598 | I like or care about |
| Secrets | 5.934 | never tells anyone my secrets |
| Time | 6.011 | spends a lot of time with me |
| Reciprocity | 6.508 | calls me his/her friend |
| Homophily | 6.798 | has much in common with me |
| Help | 7.093 | helps me do things that I want (or need) to do |
| Closure | 7.629 | is friends with my other friends (part of my group) |

**Table 3**
Average Ranking of 11 Defining Features of Friendship by Gender (N = 436).

| Feature | Boys' Avg Rank | Girls' Avg Rank | Diff by Gender | *p*-val |
|---|---|---|---|---|
| Closure | 6.932 | 8.289 | −1.357 | 0.000 |
| Homophily | 6.020 | 7.535 | −1.515 | 0.000 |
| Reciprocity | 6.249 | 6.752 | −0.503 | 0.060 |
| Time | 5.998 | 6.023 | −0.025 | 0.918 |
| Help | 6.933 | 7.243 | −0.310 | 0.206 |
| ILike | 5.759 | 5.446 | 0.313 | 0.239 |
| LikesMe | 5.734 | 5.006 | 0.728 | 0.005 |
| Support | 5.704 | 5.106 | 0.598 | 0.014 |
| Secrets | 6.391 | 5.502 | 0.889 | 0.000 |
| NoHurt | 5.301 | 4.324 | 0.977 | 0.000 |
| Defend | 4.979 | 4.774 | 0.205 | 0.425 |

p-values are based on 250,000 permutations.

*Investigating the assumption of equivalence: gender*

Some may wonder if gender differences in the definition of friend expressed in our focus group interviews may have been an artifact of the way boys and girls talk publicly about friendship. Previous work on gender differences in networks has overwhelmingly used confidential surveys to measure friendship, so our focus group data might be suspected as reflecting gender performance in public. We will rule out that explanation by investigating the same question using private survey-based rankings of friendship features. We employ self-reported gender, which we believe also corresponds in all cases to biological sex, to consider gender differences in weighting dimensions of the friendship concept.

To pursue this question, we compute gender differences in mean ranks. We report statistical significance for gender differences in average ranking for each friendship feature using nonparametric permutation tests, given the interdependent nature of the ranking data. This entails comparing the observed gender difference to the simulated distribution of gender differences after permuting the gender labels in the data (under the assumption of no gender difference). Since the set of all possible permutations of the gender labels is intractably large, we approximate this distribution by randomly shuffling the gender labels of all students and then computing a simulated gender difference 250,000 times. We compare each observed gender difference in the original data against that distribution of simulated differences to yield a *p*-value. The mean ranks, gender differences, and *p*-values are listed in Table 3, and detailed results for the permutation tests are reported in online Append ix A. To facilitate visual interpretation, Table 3 groups the features together in the clusters that had appeared in Fig. 1.

This analysis reveals that in defining friendship girls place greater emphasis than boys on a peer who would never hurt them (*NoHurt*), who never tells their secrets (*Secrets*), who likes them (*LikesMe*), and who helps them feel better (*Support*). Boys are more likely than girls to define friendship as a peer with much in common with them (*Homophily*), who calls them friend (*Reciprocity*), and who has the same friends as them (*Closure*). The tendency for boys to weight Reciprocity higher than girls is borderline significant ($p < .1$) and less robust, as it apparently depends on the cutoff value for handling nonresponses to the ranking task.[5] Challenging the assumption of strict equivalence across categorical distinctions opens new kinds of research questions for analysis of friendship networks. New research may explore whether gender

differences in the definition of friendship may play a role in observed gender differences in network structure and dynamics.

*Questioning the generality of our observations*

We believe in the broad generality of our conclusion that friendship should be regarded as a multidimensional role relation emphasizing relational norms and structural expectations, not as a single dimension of directed-liking and interaction. We also believe in the generality of our conclusion that friend nominations (and non-nominations) may be problematic for the equivalence assumption. The specific patterns of relational norms and structural expectations that we find here are robust across six sixth grade cohorts in the same city, but we do not argue that these specific patterns will hold true across all populations. It is notable that we examine students at the transition to adolescence because research has shown that the specific norms and expectations associated with the friend role change throughout the life course. For example, work in developmental psychology (e.g., Berndt, 1982; Bigelow, 1977; Hartup and Stevens, 1997) has examined how particular friendship expectations – such as shared interests and activities, demographic similarity, propinquity, reciprocity, behavioral norms, and emotional intimacy – change in importance from childhood through adolescence and into adulthood.[6] These findings at other ages are consistent with our broad conclusions above. For example, Felmlee et al. (2012) studied behavioral norms associated with friendship for college students and found that these norms were weighted differently by men and women.

Despite supporting evidence in research on older populations, it is unlikely that our argument for the centrality of relational norms and structural expectations to defining friendship applies to early childhood. As preschoolers appear not to have a sophisticated understanding of friendship, particularly its normative dimensions, their relationships are more often represented as mutual play partners. Indeed, for subjects at that age, researchers may as well eschew friendship surveys altogether and instead observe mutual play or other interaction events (e.g., Martin et al., 2013). We examine one snapshot at the transition to adolescence and leave study of developmental patterns in the importance of these features to later work.

Another reason to doubt the universality of our particular rankings and dimensions is that we examine distressed middle schools in economically disadvantaged majority-minority neighborhoods (predominantly Latino/a and Black), where the students face threats of violence and other victimization by peers, gangs, or police. Such risks increase the need for mutual protection and may affect patterns of friendship (by leading students to use friendships as defensive cliques rather than deep emotional connections) as found by Chan Tack and Small (2017). (Such issues may be more salient and manifest differently for boys than for girls, as we find here). Definitions of friendship may be different in privileged affluent majority-White schools, where many other studies have been conducted.

In fact, the apparent limitations above actually raise further challenges for the equivalence assumption: If respondents might define friendship differently depending on their gender, age, race, ethnicity, primary language, socioeconomic status, or neighborhood environment, then this demands further scrutiny of the standard assumption that friendship means the same thing across all of these differences. Differences in networks by demographic categories, homophily within these categories, and friendship asymmetries within and across these categories all require further investigation in light of the findings reported here for gender.

We do expect that beyond early childhood friendship will be

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[5] We do include 9 respondents (<3%) who moved only one item a single slot from the initial random ranking. If we require more movement to deem a response as valid, this diminishes noise but also reduces the sample size and ignores meaningful data; in robustness checks (reported in online Appendix B) at higher cutoff thresholds this gender difference is significant at $p<.05$ or is not significant at all, so the Reciprocity result is best described as borderline significant and less robust. Other conclusions are not sensitive to handling of nonresponses.

[6] Key work (e.g., Bigelow, 1977) on friendship expectations asked respondents to think of their best friends of the same sex before describing expectations of friends, and this makes the boundary between the definition of friendship and description of specific friendships unclear.

construed primarily in terms of relational norms and structural expectations. We expect this broad claim to hold true across most social contexts and subpopulations, regardless of gender, culture, race, ethnicity, language, or socioeconomic status. We expect that variation from one context to another will appear primarily in the specific norms or expectations that are associated with the friend role as we find here for gender, but this is a topic for future research. In any case, the findings here demonstrate a particular context where the assumption of equivalence can be very misleading, and it raises new perspectives on many previous studies of adolescent friendship networks.

## Conclusion

This paper invites us to think more deeply about what we think we know about friendship networks in the social network analysis community. We have shown theoretical and empirical problems with the conventional practice of treating friendship as synonymous with directed-liking and directed-interaction (and non-friendship as equivalent to non-interaction and disliking). Our focus group interviews and surveys offer little evidence that our adolescent subjects mean directed liking or directed interaction when they nominate friends. We instead find that friendship is a multidimensional role relation, composed primarily of relational norms for role-related behavior. Secondary features of the friendship definition include expectations of liking and interaction (but typically mutual or incoming rather than outwardly directed), and even structural patterns such as reciprocity, homophily, and transitivity in friendship nominations. Further, the specific norms constituting friendship may differ across individuals and vary systematically by gender. This heterogeneity complicates interpreting the relationship between gender and structural patterns in friendship networks and even raises basic inferential challenges for analyzing friendship networks including more than one gender. Such analyses may be further confounded by heterogeneity in meanings of friendship by age or other demographic categories or identities, although those questions go beyond the scope of this paper.

Shall we agree with Fischer's (1982: 288) provocative claim from studying adults that friendship is "probably too vague a concept to be used in scientific research"? Instead, we agree that friendship itself is a distinct and deeply consequential social phenomenon, especially for adolescents. There is much to learn about friendship as a role relation loaded with normative obligations that change through the life course and that vary by gender and culture.

Relaxing the assumption that friendship is synonymous with directed liking and interaction enables researchers to examine the correspondence of friendship to the dynamics of sentiments and interaction. For example, how does declaring and rejecting friendships affect adolescents' patterns of interaction and sentiments? What dynamics of interaction and sentiments lead to declaring and rejecting friendships, or to asymmetric friendship nominations on surveys?[7] Relaxing this assumption further allows us to address new kinds of questions about friendship as a role relation and social label. For example, holding sentiments and interaction constant, is gender, race, or age related to whether two people call each other friends or use some other label to represent their relationship? How do relationships with third parties affect use of the friendship label within a dyad and how can friendship be expressed in structures beyond the dyad? How does friendship as a social contract create opportunities, obligations, or constraints for social exchange? How do all of these processes play out together over time?

Moving beyond treating friendship as a proxy for sentiments and

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[7] The conceptual refinement here makes such questions possible, but the data requirements can be daunting. Research in computational social science promises to deliver insights on this interplay of interaction, sentiments, and role relations (Bahulkar et al., 2017; Kitts, 2014; Kitts and Quintane, 2020; Zhang and Butts, 2017).

interaction also allows more direct investigation of social network theories. Researchers interested in behavioral contagion or spatial propinquity theory may study social interaction rather than friendship. Researchers interested in structural balance theory or homophilous attraction may study positive and negative sentiments rather than friendship. Researchers interested in structural theories of power may study patterns of access or opportunity structures rather than friendship. Research has only just begun to map the conditions under which these distinct network concepts may be overlayed (Kitts and Quintane, 2020), and this inquiry is fostered by thinking more critically about the meaning of friendship.

## Acknowledgements

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