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Simmelian Ties

Super Strong and Sticky

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The importance of informal relations in organizations has been a well-established theme in the organizational literature, dating back to Mayo's famous Hawthorne experiments (Roethlisberger & Dickson, 1939). Most of the work in this area since that time has underscored how the structure of such relations can have profound implications for the members of the organization (Burt, 1992; Krackhardt & Brass, 1994). A small number of scholars have forced attention on the overlooked fact that the content of these relations should be taken into account when making substantive predictions about their consequences (Krackhardt, 1992; Lincoln & Miller, 1979). The purpose of this chapter is to combine both these perspectives and show that the quality of a dyadic relationship fundamentally changes as a function of the overall structure in which the relationship is embedded. To do this, I build on Granovetter's theory of weak ties and on Simmel's classic discussion of the social triad.

*Krackhardt, David
1998 "Simmelian Tie: Super Strong and Sticky." In Roderick Kramer and Margaret Neale (eds.) Power and Influence in Organizations. Thousand Oaks, CA: Sage, pp. 21-38.

Strong Versus Weak Ties

There is perhaps no more cited work in the literature on networks than Granovetter's (1973) "The Strength of Weak Ties." He proposed that weak, infrequent ties are often more influential and critical than strong ties in assisting an individual in gathering and taking advantage of information that is disseminated through the social network. His seminal paper has generated years of mostly confirmatory research (Granovetter, 1982, 1994).

Recently, however, some have questioned this diversion from research on the strong ties that are critical links in systems under some conditions (Krackhardt, 1992; Krackhardt & Stern, 1988; Nelson, 1989).[1] I draw from this discussion to build in a new direction. Granovetter (1973, p. 1361) suggested that strong ties are composed of four elements: (a) the amount of time spent interacting, (b) emotional intensity in the interaction, (c) the extent of "mutual confiding," and (d) the degree of "reciprocal services" performed. Krackhardt (1992) amended this set of criteria, suggesting that trust is the key element that makes strong ties important. He asserted that the strong tie requires simultaneously (a) frequent interaction, (b) affection, and (c) a history of a relationship (i.e., there is no such thing as an instant strong tie). To differentiate his definition from Granovetter's, he used the term *Philos,* the Greek word for "friend," to identify a relationship that had all three of these qualities.

These concepts have in common a focus on the dyad. Both Granovetter and Krackhardt suggested that, to determine whether a tie is strong or not, one has only to observe the interactions and sentiments between a pair of people. I extend this thinking about the importance of a strong tie by broadening the focus beyond the isolated dyad.

Simmel's Triadic Model

Simmel also focused attention on social relationships as a key to understanding how and why people behave and think as they do. Also, while others have examined structural units larger than dyads (e.g., Kadushin's [1968] "social circles"; Alba & Moore, 1983), Simmel (1950, pp. 135-169) provided the first and most thorough theoretical foundation for the idea that social triads are fundamentally different in character from dyads. This difference is not due simply to the fact that triads have more participants. Rather, the difference is one of quality, of dynamics, and of stability. Because this difference is key to motivating this chapter, I briefly describe the main arguments in Simmel's model.

Simmel (1950) distinguished dyads from triads on several grounds. First, he noted that dyads preserve much more individuality than triads because, within a dyad, no majority can be mustered to outvote any individual. In any group of three or larger, an individual can be outvoted by the other group members, suppressing individual interests for the interests of the larger group.

Second, individuals have much more bargaining power in a dyad than in a triad. When faced with only one other partner, the dyadic group can be dissolved if the demands of one of its members are not met. In a triad, the demanding individual can withdraw, but the group still remains as a dyad. The withdrawing individual has the most to lose by withdrawing, isolating himself or herself while the others retain each other's company. Thus, the threat of withdrawal carries less weight.

Third, conflict is inevitable in any relationship over time and is more readily managed and resolved in a triad. In a standard dyadic arrangement, conflicts escalate and positions harden. In the presence of a third party, such positions are more likely to be moderated. The third party can reformulate and present the concerns of the other parties without the harsh rhetoric and emotional overtones. As Simmel (1950, p. 145) stated, "The appearance of the third party indicates transition, conciliation, and abandonment of absolute contrast." Even if a third party does not act decisively in resolving a conflict between two parties, his or her mere presence can ameliorate dissension: "Such mediations need not occur in words: A gesture, a way of listening, the quality of feeling which proceeds from a person, suffices to give this dissent between two others a direction toward consensus" (p. 145).

Simmel (1950) focused on the triad, then, as distinct from the dyad as a unit of analysis and representative of larger structures. By defining the specific features of dyads, he was able to demonstrate how the addition of a third party produced a fundamental change in the dynamics between the original two actors. He argued, however, that adding more people to the group did not change the dynamics commensurately: "[Adding a third party to a dyad] completely changes them, but . . . the further expansion to four or more persons by no means correspondingly modifies the group any further" (p. 138). Thus, the key to understanding the quality of a tie between two actors can be reduced to asking whether it is part of a strong triad or not.

All three of the forces—toward reduced individuality, reduced individual power, and moderated conflict—contribute to the group's survival and preserve its identity at the expense of the individual, at least when compared with the isolated dyad. Thus, as a consequence of this theory, one would expect that individuals who are a part of a three-person (or more) informal group are less free, less independent, and more constrained than a person who is only part of a strong dyadic relationship.

Simmelian Tie Defined

Based on Simmel's (1950) theory of triadic structures, I define a "Simmelian tie" as follows: Two people are Simmelian tied to one another if they are reciprocally and strongly tied to each other and if they are each reciprocally and strongly tied to at least one third party in common.

This definition resembles the concept of a clique (Luce & Perry, 1949), and there is a strong symmetry between the two ideas. Cliques are defined on a graph as a maximal set of three or more nodes (people, in this case), all of whom are directly and reciprocally connected to each other. Thus, each pair of people in a clique are Simmelian tied to each other; conversely, any pair of individuals who are Simmelian tied are comembers of at least one clique. Thus, I argue here that a coclique relationship—the existence of a strong tie that is reinforced through a common tie to at least one third person—is a qualitatively different tie that deserves attention and analysis in its own right, just as Simmel (1950) argued that triads are a fundamental sociological unit. I call such a coclique relationship "Simmelian" to differentiate it from Granovetter's (or Krackhardt's) definition of a strong tie.

Durability of Simmelian Ties

Simmelian ties might be best thought of as "super-strong" ties, ties that qualitatively add durability and power beyond that found in simply strong dyads. Thus, the primary proposition that emerges from a theory of Simmelian ties is that, once formed, Simmelian ties are "sticky"—that is, they will last longer than other forms of merely strong ties. Because a person Simmelian tied is less independent and less powerful, and because interpersonal conflict is more likely attenuated, people are less likely to want to or be able to sever a Simmelian tie. This leads to two immediate predictions.[2] The first easily follows directly from the primary proposition:

> *Prediction 1:* A Simmelian tie from actor A to actor B at any point in time will more likely be followed by a tie from actor A to actor B at a subsequent point in time than will a non-Simmelian tie.

Scott Feld (1997), in an exploration of Granovetter's concept of embeddedness, made a similar prediction. He operationalized the concept of embeddedness between two actors as the extent to which others nominated both actors. This is a modification of the Simmelian tie, as defined here, for two reasons. First, Feld counts the number of alters who nominate the two parties. The Simmelian argument, as mentioned previously, suggests that the effect of groups larger than three is not substantive, and therefore only a dichotomous value is used; a tie is either Simmelian or it is not. Second, for any given pair of nodes, A and B, Feld counts the set of third others who jointly nominate A and B; thus, asymmetric ties are allowed. The argument here is that ties from third others should be strong ties (reciprocated ties) to enforce "group" norms and values. Scott did show, however, a small correlation between the extent of embeddedness and the probability that a tie would continue to exist for 6 months.

Although it is true that one could predict specifically the subsequent existence of Simmelian ties (rather than the simple existence of any tie), it is sufficient to show that the Simmelian ties are more likely to be followed by any kind of tie to support the proposition. For purposes of this chapter, I focus only on this definition of stability.

The second prediction also follows from the primary proposition but requires more explanation:

> *Prediction 2:* Simmelian ties will occur with greater frequency than would be expected by chance, given the overall structure of the relations.

This prediction derives from two reasonable assertions about Simmelian ties. First, one may easily see that, given equal opportunity for different ties to come into existence, those that last longer will be observed more frequently at any given moment. As an analogy, suppose one were to throw a set of tennis balls in rapid succession at two walls, one green and one red. Suppose further that the green wall was covered with a particularly sticky surface such that once the balls hit the surface they stuck to the surface for as much as a minute before falling to the ground. The red wall, however, was covered with a less sticky substance so that the balls fall relatively quickly to the ground. At any given time, one would expect to see more balls on the green wall than on the red wall.

This assumes that balls are thrown equally frequently to each wall. If the number of balls thrown at the red wall far exceeds the number of balls thrown at the green wall, we may not observe more balls on the green wall despite the advantage of having a sticky surface. Also, given that Simmelian ties have more stringent requirements for their existence (there must exist three individuals, each mutually tied to each other, for even one Simmelian tie to exist from one actor to another), one might posit that they are relatively rare to begin with, thus concluding that even with relative staying power they would not overcome this initial disadvantage.

The second critical assertion, then, is that we have reason to expect from other theoretical and empirical work that Simmelian ties compensate for this initial frequency deprivation. In particular, balance theory (Heider, 1958) indirectly predicts the existence of Simmelian ties in a social system. Heider's argument is psychological in nature: People feel more comfortable with balanced triads than they do with unbalanced ones. Heider further points out that balance in social relations implies both symmetry in the relation (p. 205) and transitivity in the relation (p. 206). Thus, as people strive to make their world balanced, more transitive-symmetric triads should be observed. Davis (1968) argues that the explanation for this occurrence is even simpler: People are forced together by time and space constraints. That is, if you spend time with a friend, and the friend spends time with his or her friend, then you and that second friend are likely to find yourselves in the same place at the same time with the mutual friend, creating an opportunity for another friendship link with that second friend. Thus, without relying on Heiderian psychology, Davis also predicts Simmelian ties will tend to occur relatively frequently.

Whatever the true underlying mechanism, the empirical work of Davis and others (Davis, 1979; Davis & Leinhardt, 1972; Doreian, Kapuscinski, Krackhardt, & Sczypula, 1996; Holland & Leinhardt, 1970, 1972, 1977) has shown that transitive-symmetric triads tend to occur much more often than we would expect by chance, given the density of ties. For example, Davis (1970) reports in an overall study of hundreds of groups of people that the existence of the 3-0-0 triad (defined as all three actors mutually linked to each other) appeared statistically more frequently (relative to chance appearance given the density and reciprocity in the matrix of relations) than any of the other 15 kinds of triads that might have existed.

Although these authors did not explore the relative probability of particular kinds of ties within these structures, I take this as evidence that Simmelian ties are not so disadvantaged at the start that they cannot capitalize on their durability to be seen more frequently than would be expected by chance. Thus, I predict Prediction 2 will hold.

To examine these predictions, I analyzed the data Newcomb (1961) collected over a 15-week period in a college living group composed of 17 undergraduates. Newcomb asked each member of this group to rank order each of the other 16 people on how much they liked them (Nordlie, 1958) (a rank of "1" was assigned to the person the respondent liked best, and a rank of "16" was assigned to the person the respondent liked least). Although the rank orders are less than ideal for purposes of this chapter, the fact that they were replicated systematically for 15 weeks allows exploration of the stability of the relations over that time.

To determine if the Simmelian ties were stable over time, I had to define a tie as existing if it exceeded an arbitrary ranking threshold. In some sense, they were all friends, although Newcomb (1961) recounts that some friction developed among some of the people during parts of the study. For any given threshold, a binary friendship matrix **F** may be constructed as follows:

$$\mathbf{F}^{t}_{ij} = \begin{cases} 1 & \text{If } \mathbf{FR}^{t}_{ij} \leq \text{threshold} \\ 0 & \text{otherwise,} \end{cases} \tag{2.1}$$

where $\mathbf{FR}_{ij}^{t}$ is the ranking that person i gave to person j at period t (lower rankings indicate stronger liking).

For comparative purposes, I separated the ties into three mutually exclusive and exhaustive categories:

1. A tie ($\mathbf{F}_{ij}$) is asymmetric if and only if $\mathbf{F}_{ij} = 1$ and $\mathbf{F}_{ji} = 0$.
2. A tie ($\mathbf{F}_{ij}$) is Simmelian if and only if $\mathbf{F}_{ij} = 1$ and $\mathbf{F}_{ji} = 1$ and there exists at least one k such that all four of the following statements are true:
   i. $\mathbf{F}_{ik} = 1$
   ii. $\mathbf{F}_{ki} = 1$
   iii. $\mathbf{F}_{jk} = 1$
   iv. $\mathbf{F}_{kj} = 1$
3. A tie ($\mathbf{F}_{ij}$) is sole symmetric if and only if $\mathbf{F}_{ij} = 1$ and $\mathbf{F}_{ji} = 1$ and the tie is not Simmelian.

These definitions count ties as a set of ordered pairs of nodes. It is worth pointing out that one could have counted ties here as a set of unordered pairs of nodes, similar to the way in which Holland and Leinhardt (1972, 1975) counted unordered sets of triads in their triad census. This choice affects the counts in significant ways. For example, in the simplest case, consider the following triad:

$$A \leftrightarrow B \leftarrow C$$

One method is to claim that there are two ties represented in this equation, one symmetric (*A*,*B*) and one asymmetric (*B*,*C*). Another method is to state that there are three ordered ties: *A*,*B* and *B*,*A*, both of which are reciprocated, and *B*,*C*, which is not reciprocated. Our natural intuition is to go with the first method because our eye sees only two lines and because the latter seems to "double count" the symmetric ties. If we consider what each individual in the equation is experiencing, however, the second interpretation makes more sense. That is, in this equation, there are three critical events: (a) *A* sends (with commensurate intention, risk, and all that the act of sending entails) a tie to *B*, and *A experiences the reciprocated tie from B;* (b) *B* sends a tie to *A*, and *B* experiences the tie being reciprocated; and (c) *B* sends another tie to *C*, but in this case *B* experiences a nonreciprocation. Thus, from the actors' point of view, we count clearly three events, not two.

In the case of Simmelian ties resulting from a clique of three actors, we count six events (ordered pairs) at a time, not three. That is, the existence of a Simmelian tie embedded in a group of three, *A*, *B*, and *C*, requires that each of the three actors experience the constraint of the Simmelian tie with the two other actors, for a total of six events. Person *A* experiences the Simmelian constraint when considering whether to continue his or her relationship with Person *B*; separately, Person *B* experiences the Simmelian constraint when considering whether to continue his or her relationship with Person *A*. These are separate experiences and separate choices, and thus they constitute separate countable predictions. Thus, I differ with the tradition that treats unordered ties as countable events because the Simmelian theory, which focuses on the asymmetric action and choice of its actors, guides me to do so.

Static Test Against a Random Model

The first test was simply to determine whether Simmelian ties occurred with frequencies greater than one would expect by chance, given the structure of the Newcomb (1961) friendship patterns, and to compare these frequencies with those of other types of non-Simmelian ties. It is important to control for the structure in these comparisons because the frequency of types of ties would be heavily influenced by density (e.g., denser matrices will create more Simmelian ties by chance). To get a sense of how frequent each type of tie would be under a random model, I generated a set of 1,000 matrices[3] of several moderate thresholds (5-10).[4]

Table 2.1 shows the observed number of ties averaged across all 15 weeks for each type (asymmetric, sole symmetric, and Simmelian), the expected number of ties of each type (the mean occurrence of each type across the 1,000 simulated matrices), and the probability of finding more than the observed number of the tie type among the 1,000 randomly generated matrices (this latter number serves as a one-tailed significance test).

An interesting and consistent pattern emerges among these results. First, we compare the frequency of Simmelian ties with the frequency of non-Simmelian ties. In absolute terms, asymmetric ties were more frequent than Simmelian ties when the density was low (outdegree = 5 or 6). For all outdegrees (or densities), the appearance

TABLE 2.1 Observed and Expected Number of Ties of Each Type

	Asymmetric			*Sole Symmetric*			*Simmelian*		
Outdegree	*Observed*	*Expected*	*p*	*Observed*	*Expected*	*p*	*Observed*	*Expected*	*p*
5	41.13	58.61	1.000	17.07	24.13	.919	26.80	2.26	.001
6	45.20	63.89	1.000	13.87	30.61	1.000	42.93	7.50	.001
7	48.87	67.01	.999	9.47	32.92	1.000	60.67	19.08	.001
8	50.80	68.10	.999	7.33	29.13	1.000	77.87	38.78	.001
9	50.47	66.91	.994	6.40	19.91	.980	96.13	66.18	.002
10	51.33	63.73	.993	5.87	9.79	.799	112.80	96.47	.022

NOTE: The observed number of ties is the number of ties of that type observed averaged across all 15 weeks of data for the particular outdegree threshold. The expected number is the number of ties of that type averaged across all 1,000 randomly generated matrices with that particular outdegree. The p value is calculated by observing how often the number of ties in the randomly generated matrices exceeds the number of observed ties. The formula for $p = N_o + 1 / N_r + 1$, where N_r is the number of randomly generated matrices and N_o is the number of those matrices in which the number of ties exceeded the number of observed ties.

of Simmelian ties was more frequent than sole-symmetric ties. Thus, under most conditions, Simmelian ties outnumber other kinds of ties, with the exception that under conditions of low density, asymmetric ties outnumber Simmelian ties.

If we compare the observed frequencies relative to what we would expect to find by chance, however, we find a much stronger picture in support of Prediction 2. In all cases, the number of occurrences of asymmetric ties and sole-symmetric ties is substantially less than we expect by chance, given the structure of the matrices. These numbers, for the most part, are strongly statistically significant. For example, the estimated expected number of asymmetric ties given an outdegree of 6 was 63.89, the average (across all 15 weeks) observed number of asymmetric ties was only 48.87, and all 1,000 randomly generated matrices exceeded this observed mean. Similarly, the estimated number of expected sole-symmetric ties with an outdegree of 6 was 30.61, the average number of observed sole-symmetric ties was only 13.87, and all 1,000 randomly generated matrices exceeded this observed mean.

By contrast, the number of observed Simmelian ties exceeded the expected number for all outdegrees reported in Table 2.1. For example, the estimated number of expected Simmelian ties when the outdegree is 6 was 7.5; the observed average number of Simmelian ties in the Newcomb (1961) data, however, was 42.93; and this observed value exceeded the number of Simmelian ties in all 1,000 randomly generated matrices.

The fact that asymmetric ties do not appear in the Newcomb (1961) data as often as would be predicted by chance is not a surprise given the strength of the norm of reciprocity (Gouldner, 1960). That sole-symmetric ties are so statistically rare, however, is surprising. Because the three types of ties are mutually exclusive and exhaustive, one interpretation of this finding is that Simmelian ties so dominate the landscape that little room is left for the occurrence of sole-symmetric ties. Substantively, perhaps people tend to look not just for individual friends but also for groups of friends with whom to associate.

Dynamic Test Against a Random Model

I now discuss the test of Prediction 1, which directly addresses the stability of each kind of tie. Specifically, we are concerned here with the following question: What is the probability that a tie at time *t* will still be there at time t + lag?

To examine temporal stability, I calculated a conditional probability over a lagged period of time for each type of tie:

$$P_{(\text{type; t; lag})} = \frac{N_c}{N_p} \quad (2.2)$$

where N_p is the number of ij ordered pairs wherein a tie of the designated type exists at time t (these ties are predicting the existence of a subsequent tie), and N_c is the number of these ties that correctly predicted the existence of a tie $\mathbf{F}_{ij}$ at period t + lag.

Table 2.2 shows these conditional probabilities for each type of tie when outdegree threshold = 8[5] and lag = 1 for all 14 available time periods (Time 1 to Time 2, Time 2 to Time 3, . . . Time 14 to Time 15). In addition to the conditional probability, the significance of this probability is reported against the null hypothesis that the results could have been generated randomly.[6]

As Table 2.2 shows, Simmelian ties have a substantially greater chance of predicting ties at $t + 1$ week than either asymmetric or sole-symmetric ties. An asymmetric tie has an average probability of .80 of continuing at period $t + 1$. Sole-symmetric ties have an average