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Final Essay

Strength of Weak Ties Zachary Porter

Abstract

In the following essay, the sociological theory of Mark Granovetter's *The Strength of Weak Ties* is discussed. Noting the sociological theory of structural functionalism that was prevalent in the United States, Granovetter's work creates an element that had not been often previously established, a theoretical framework that can explain micro to macro level changes in society. Through the argument of the forbidden triad, this theory establishes the role of weak ties in creating bridges between different clusters in social networks. While this original theory may be limited in its development of the distribution of ties, it has been expanded upon and includes the role of informational environments in the diversity-bandwidth theory that establishes the contextual space that can create beneficial situations for the strength of both weak and strong ties. This theory has also been relevant to recent research in its indication of the strength of weak ties in online networks as well as the topology of 'small world' networks. Moreover, this theory may be a beneficial first step in the solution for reducing the rising anti-LGBTQ bias in the United States.

Introduction and Background

The Strength of Weak Ties can be noted to be one of the most influential papers by citation standards in sociological network theory with over 68,000 citations. However, when Mark Granovetter first tried to publish this extremely prominent work while doing his Ph.D in 1969, it was outright rejected (Komlik, 2022). While this may be due to various reasons, it should be noted that during this time period, network theory was just beginning to take root in sociology (Ritzer and Mizruchi, 2005). Harrison White, Mark Granovetter's Ph.D advisor, is recognized to be one of the founders of the study of social networks within contemporary

sociology, laying much of the theoretical basis for network theory in the early 1970's. However, from the 1930's to the 1970's, sociology in the United States had largely been influenced by the Talcott Parsons structural functionalist approach. This perspective viewed society as held together by shared norms and values to create a relatively stable system. Nonetheless, a problem arose with this approach due to the difficulty of measuring internalised norms because of individuals' private preferences as well as their lack of awareness of the reason for the behaviour. Therefore, this grand theoretical approach failed to draw the link between the macro-level patterns of society to the micro-level behaviours of individuals. This is where the success of Granovetter's works shines through.

Granovetter's novel use of social network analysis was then able to demonstrate the relationship between micro-level interactions and macro-level patterns. This methodological approach of sociometrics was first used by Moreno in the 1930's to draw a networked graph that used nodes and links to represent gender and social ties respectively amongst school age children. However, as Granovetter duly asserts, the use of the network analysis was rarely adopted within sociological theory during this time period. For those within the field that were using network analysis, one question that was of particular note was the transmission of ideas and behaviours. A theory that arose a few years prior to Granovetter's work was that the strength of the ties was what determined the adoption rate of a new behaviour. Researchers Coleman, Katz, and Menzel in 1966 found that a new drug was likely to be adopted by a physician if the another physician with whom he had regularly communicated with had previously adopted the drug (Mizruchi, 2005). According to their argument, it was the strength of the connection between physicians that helped the diffusion process. Thus, before Granovetter's theory took the stage, strong ties were thought to help explain micro-interactions to macro-level patterns.

Theory

Granovetter's theoretical framework uses two main rationales to establish the role that weak ties play in social networks. Granovetter begins his argument of the strength of weak ties in large networks by expressing the notion of the forbidden triad (Granovetter, 1973 p. 1363). Firstly, he considers the idea that for any relationship between individual's A and B and some arbitrary further set of individuals $S=C, D, E$, the strength of the tie between A and B will

determine the strength of the tie between the set of individuals tied to both of them. Therefore, if A and B have a weak tie from little interaction as well as A and C, then the tie between B and C may be more likely to exist and if they do connect, B and C may be less compatible. However, if A and B have a strong tie as well as A and C, then it is highly likely for B and C to either have a weak tie or a strong tie. If no type of connection currently exists between B and C, then he argues that it will eventually form over time and become some type of connection. Thus, he presents a forbidden triad that cannot exist in which if A and B have a strong tie as well as A and C, there is

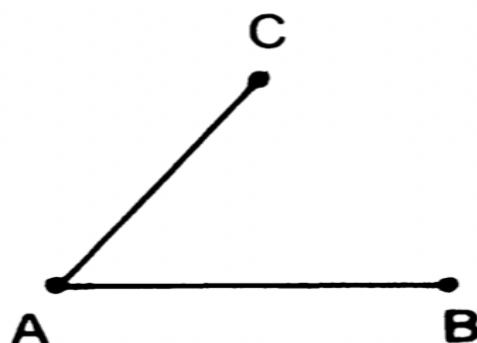


FIG. 1.—Forbidden triad

no connection between B and C, as seen in Fig. 1.

With this forbidden triad established, Granovetter furthers his argument by establishing the role of a bridge within a network and that no strong tie can be a bridge, only weak ties. A bridge in a network is the one and only link that connects to points. Thus, if there is a bridge between A and B, this is the only route for information to flow from any person who is in the cluster of A to reach B, and the reciprocal is the same. Not only this, but for anyone who is indirectly connected with A, even outside of A's clusters, to connect with someone connected indirectly to B, the information still needs to travel through this path because as stated previously, a bridge is the one and only link that connects to points. With the logic of the forbidden triangle in mind, no strong ties can be a bridge. Assume A and B had a strong tie and were the bridge between two clusters. If A had a strong tie with another node C in its cluster, then a weak or strong tie between B and C would either form or exist and eliminate the bridge that was the only connection between the two clusters. Therefore, a strong tie can be a bridge between A and B if and only if neither of the two have any other alternative strong ties, which Granovetter argues to be highly unlikely in large networks. Granovetter also notes the difference between a bridge and what he refers to as a local bridge. While it may happen

infrequently that a specific link in a network is the only path between two points, he refers to local bridges as the shortest path length of degree n between two clusters. These local bridges provide a significant role within social networks as they are the shortest connection between two clusters for many individuals. Thus, while not all weak ties are necessarily bridges, the bridges in large networks are necessarily composed of weak ties. Therefore, weak ties are strong in the sense that they provide a bridge for novel information to flow within a cluster within a network, and if that bridge were to be removed, that cluster would lose the ability to access that information from the network. In this way, micro-level decisions concerning the strength of a tie impact the macro-level patterns of information in the system.

Limitations/Critiques

One main limitation in Granovetter's work on the strength of weak ties arises in omission of the distribution of tie strength an individual has. In the empirical research that he presents in his paper, Granovetter measures how many individuals received jobs through their connection in the social network. Out of a sample size of 100 individuals in Boston who he personally interviewed, 54 found a job through their contacts. Out of this smaller sample, 16.7% reported they found their job through a contact that saw at least twice a week, 55.6% reported they found their job through a contact that saw more than twice a year but less than twice a week, and 27.8% reported they found their job from someone they saw once a year or less. He also found similar results when asking participants where their contacts received the information about the job, with 39.1% were directly from their employer, 45.3% reported one intermediary between himself and his employer, 12.5% reported two intermediaries, and 3.1% more than 2. However, while this appears to be strong evidence for his theory that weak ties play a vital role in social networks, what he failed to ask was what was the distribution of ties that the individuals have in their network. Indeed, not everyone is going to have the same amount of strong ties as weak ties. As Dunbar's number famously claims, people have on average around 150 ties, with only a small number of those, 3-5, being strong connections (Dunbar, 1993). Therefore, as individuals have a higher proportion of weak ties, the probability that an individual would attain a job through a

weak tie is much higher than an individual attaining a job through a strong tie based upon the distribution of tie strength in an individual's network.

Extensions to the Theory

A further extension of Granovetter's work can be seen in the diversity-bandwidth trade-off theory of Aral and Van Alstyne (2011). This was developed in response to evidence countering Granovetter's work in which strong cohesive ties were more advantageous in some situations (Obstfeld, 2005). According to the Aral and Van Alstyne, the strength of the ties to provide novel information is dependent on the informational context as well as the diversity and bandwidth of the network. In an informational environment where information is changing quickly, with rapid movement of many topics, and there is overlapping information between individuals, then strong ties are more beneficial in this cohesive environment. There is more bandwidth in the strong cohesive relationship in a strong tie that allows for more novel information to flow through the network in these situations. However, weak ties provide more novel information in diverse networks with informational environments where there is much slower information flow between individuals, with less topics, and less overlapping information. Bruggemen (2016) extends this notion further by arguing that bandwidths should be maximised to match with the proportional knowledge complexity. Therefore, individuals should spend less resources on strengthening a connection with someone when the informational knowledge exchanged is simple and diversify their network so that their bandwidth is increased for actors that are sharing highly complex information and their bandwidth is decreased for actors sharing information that is simpler. Thus, one could maximise both the strength of weak ties as well as the strength of strong ties.

Relevant Research

Granovetter's research is highly relevant to another famously cited work, that of Watts and Strogatz's *Collective Dynamics of 'Small World' Networks* (1998). In this paper, Watts and Strogatz point to the notion that the topology of network connectivity is most often assumed to

be either completely random or completely regular. However, they argue that most real-world networks lie somewhere between these two states. First, they demonstrate how they create these ‘small-world’ networks through the rewiring process in which they take a regular lattice and randomly rewire each link with probability p , as seen in Figure 2. Thus, they can control the lattice from being a completely regular lattice, $p = 0$, to a completely random network, $p = 1$. In the small world networks that are between $0 < p < 1$, they find the clustering coefficient to be much larger than random networks, however the path length is almost as small as the random network. The reverse is true for ‘small world’ networks compared to regular structured networks, in which the path length is quite large and the clustering coefficient is high as well when $p = 0$. However, once the rewiring process starts to take place and the ‘small-world’ network is created, the path length drops rapidly in order to create the short cuts between clusters. These short cuts have a nonlinear effect on path length because of their ability to not only shorten the distance of two newly connected new nodes, but also the distance between their neighbourhoods and the neighbourhoods of their neighbourhoods. Linking back to Granovetter’s work, these short cuts are the bridges of the highly clustered nature of ‘small-world’ social networks that allow for these weak ties to be the bridge that simultaneously reduces the path length and allows for the connection of neighbourhoods. If these bridges are removed, as when $p = 0$, the network stays highly clustered but it makes the information much harder to flow to certain areas due to the increase in path length, just as Granovetter argued.

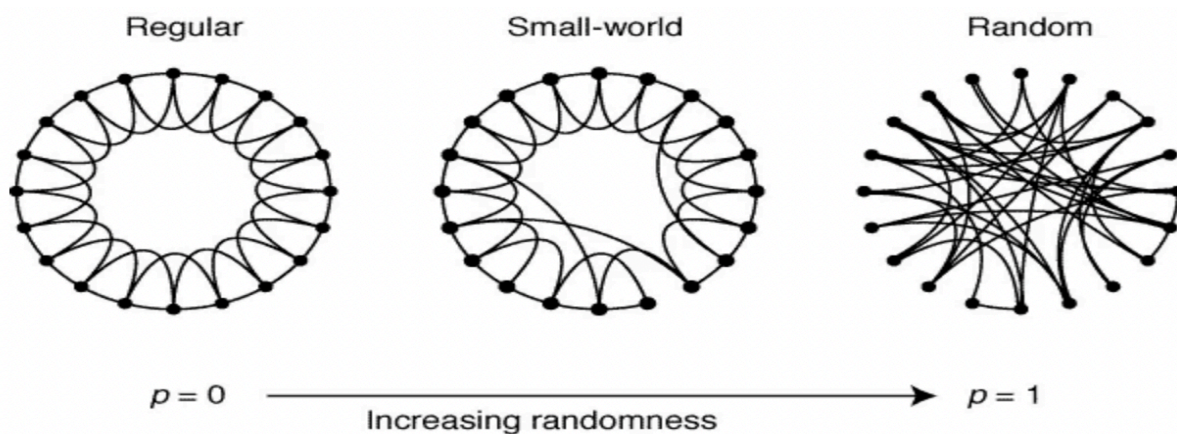


Figure 2. The random rewiring or ‘tuning’ between a regular lattice ring network and a random network with probability p , not removing any edges or nodes in the process.

Grabowicz et al. (2012) is also directly linked to Granovetter's work on the strength of weak ties. In this research, the authors attempt to answer whether the theory of the strength of weak ties not only applies to offline networks, but also to online networks as well, specifically Twitter. They collected data from November thru December of 2008 of over two million users and forty-eight million follower connections, as well as tweets, retweets, and mentions. Using the clustering detection algorithm Oslo to identify the structure of the network, the authors identified four types of links that were dependent on the node's position in the structure of the groups found: internal links, between group links, intermediary links, and no group links. Here the authors find to be the case that internal links had a higher distribution of mentions and reciprocal mentions, thus indicating a higher intensity or tie than the other links. Parallel to Granovetter's work indicating strong ties belong to the same group and have similar connections. However, intermediary links, which are links that are singular individuals who are part of both groups, appear to attract mentions just as likely as internal links as well as attract retweets even more than between group links. Intermediary links are argued to introduce more diversity to the groups, in which one can see them as the 'bridge' the role weak ties play between the groups in Granovetter's work, or the role of the 'short cut' in Watts and Strogatz 'small world' networks.

The third relevant and most research pertaining to Granovetter's empirical work on the strength of weak ties is that of Rajkumar et al. (2022) empirical work concerning tie strength and the labour market. As opposed to Granovetter's and Grabowicz et al.'s observational methods, Rajkumar et al. took an experimental approach to test the theory and find casual evidence for the strength of weak ties. To conduct this investigation, the authors performed two large scale experiments on LinkedIn, one in 2015 and the other in 2019, with a sample size of 4 million and 16 million respectively. In these two experiments, the authors augmented the "People You May Know" function of LinkedIn and randomly assigned users to groups that would receive recommendations of individuals who were either weak or strong ties. They measured the tie strength by the number of mutual friends as well as interaction intensity, which consisted of the amount of bilateral communication between two users. According to their findings, the amount of mutual friends had a nonlinear effect on the job transmission of applicants, in which those with low levels of mutual friends who added more friends in common increased the probability of job transmission up to the point of around ten friends, in which adding more friends in common reduced the likelihood of job transmission. Also, the weakest ties with the lowest

interaction intensity were shown to increase the probability of job transmission, while the strongest ties with the high levels of interaction activity had the least likelihood of job transmission. While this may be casual evidence and much in line with Granovetter's empirical observational studies, the authors noted that when applied to different sectors of the economy, tie strength has different outcomes in job applications. While weak ties are more beneficial for the digital sectors, adding strong ties had more of an impact in non-digital sectors concerning job application. Therefore, the strength of the tie and the impact that it might have may be dependent on the sector in the economy. This may be logical when applying the diversity-bandwidth theory, in which different sectors of the economy have different informational environments and thus diversity-bandwidth trade-offs could possibly explain the relevance to the findings that weak ties are not always optimal for each economic sector. However, more work needs to be done as this appears to apply to job applications, and the authors noted that due to time constraints, they were not able to analyse the relevance to job transmissions.

Relevance to today's world

The strength of weak ties may also play a vital role in reducing some of the anti-LGBTQ prejudice in the United States. As of May 2 in the United States, there have been 471 anti-LGBTQ bills introduced into legislation this year according to the American Civil Liberties Union (ACLU, 2023). Moreover, democratic representative of Montana Zooey Zephyr, the first trans woman elected to the state house of Montana, was silenced on April 26th for criticising a bill that would prohibit minors from receiving gender-affirming medical care. She can now no longer physically attend any meetings of the House and must participate in any discussions or votes remotely (Zhou, 2023). Another incident occurred on April 29th, in which a group of white supremacist and neo-Nazis with swastika flags and a banner displaying the words “there will be blood” appeared to chant violently in protest outside of a drag brunch in Columbus Ohio (Filby, 2023). With the rising anti-LGBTQ prejudice socially and politically, the strength of weak ties may play a vital role in reducing prejudice via positive intergroup contact (Allport et al., 2015). According to recent literature (Hewstone et al, 2004), direct contact and, most importantly, indirect cross-group friendship was negatively correlated with out-group prejudice and positively correlated to positive attitudes towards out-group members. Thus, when it was established that

within the strong ties of an ingroup that a particular member either had a weak tie or played the intermediary link between groups, as seen in Grabowicz et al. (2012), prejudice was reduced. In this situation, one may see the strength of weak ties as being a possible first step in the solution for reducing anti-LGBTQ prejudice. In the current climate in the United States, where political actors of the LGBTQ community are silenced for speaking against current legislation or when it might not be safe in some areas, such as Columbus, for a direct cross-group friendship between a member of the LGBTQ group with an anti-LGBTQ group, an ally of LGBTQ can play the role of creating either a weak tie between the two groups or an intermediary link, as seen in Grabowicz et al. (2012). This may be a good solution, as the bridges that weak ties and intermediary ties create can play a pivotal role in decreasing prejudice, as has been seen in previous work on intergroup contact between heterosexual and gay and lesbian individuals (Herek and Capitanio, 1996). As ties strength are not static and changing the strength of ties can be used beneficially (Bruggeman, 2016), now may be a great time to intentional tune tie strength in order to maximise the benefits of the strength of weak ties and strong ties in such a way as to create greater levels of social cohesion and lower levels of social and political prejudice.

Conclusion

In conclusion, Granovetter's work on the strength of weak ties plays an important role in sociology. As much of the previous work before Granovetter was not able to link the micro-level interactions to macro-level patterns, the importance of his argument and the accuracy in its description of real world networks, as seen in the role bridges play in 'small-world' networks, should not go unnoticed. While there have been extensions to this theory, particularly the importance of the informational environment, recent work still emphasises the strength of these weak ties in both offline and online networks, clueing one into the functional role they play at multiple levels of society. In this way, one can see how this theory establishes a critical element in sociological thinking in its novel approach to step away from the grand normative approach of its time and zoom in on a particular type of interaction in society using a newer sociometric approach which was not gaining as much attention in the literature, thus avoiding the mistake of looking for the keys under the street light. While it may be quite difficult to establish micro to

macro level theories, one may take heart and remember that this theory itself was rejected on its first attempt at publication.

Bibliography

- Allport, G.W., Clark, K. and Pettigrew, T.F. (2015) *The nature of prejudice*. New York: Basic Books.
- Aral, S. and Van Alstyne, M. (2011) “The diversity-bandwidth trade-off,” *American Journal of Sociology*, 117(1), pp. 90–171. Available at: <https://doi.org/10.1086/661238>.
- Bruggeman, J. (2016) “The strength of varying tie strength: Comment on aral and Van Alstyne,” *American Journal of Sociology*, 121(6), pp. 1919–1930. Available at: <https://doi.org/10.1086/686267>.
- Dunbar, R.I. (1993) “Coevolution of neocortical size, group size and language in humans,” *Behavioral and Brain Sciences*, 16(4), pp. 681–694. Available at: <https://doi.org/10.1017/s0140525x00032325>.
- Filby, M. (2023) *The Columbus Dispatch*, 30 April. Available at: <https://eu.dispatch.com/story/news/2023/05/01/heres-what-we-know-about-the-nazis-protesting-a-columbus-drag-brunch/70169948007/> (Accessed: May 3, 2023).
- Grabowicz, P.A. *et al.* (2012) “Social features of online networks: The strength of intermediary ties in online social media,” *PLoS ONE*, 7(1). Available at: <https://doi.org/10.1371/journal.pone.0029358>.
- Granovetter, M. (1973) “The Strength of Weak Ties,” *American Journal of Sociology*, 78(6), pp. 1360–1380.
- Herek, G.M. and Capitanio, J.P. (1996) ““some of my best friends’ intergroup contact, concealable stigma, and heterosexuals’ attitudes toward gay men and Lesbians,”

Personality and Social Psychology Bulletin, 22(4), pp. 412–424. Available at: <https://doi.org/10.1177/0146167296224007>.

Hewstone, M. *et al.* (2004) “Intergroup contact in a divided society: Challenging segregation in Northern Ireland,” *Social Psychology of Inclusion and Exclusion*, pp. 283–310. Available at: <https://doi.org/10.4324/9780203496176-18>.

Komlik, O. (2022) *Mark Granovetter didn't win (yet) the nobel prize. here is his rejection letter, from 1969, Economic Sociology & Political Economy*. Available at: <https://economicsociology.org/2014/10/13/mark-granovetter-didnt-win-yet-nobel-prize-her-e-is-his-rejection-letter-from-1969/> (Accessed: May 5, 2023).

Mapping attacks on LGBTQ rights in U.S. state legislatures (2023) *American Civil Liberties Union*. Available at: <https://www.aclu.org/legislative-attacks-on-lgbtq-rights> (Accessed: May 5, 2023).

Obstfeld, D. (2005) “Social networks, the *tertius iungens* orientation, and involvement in Innovation,” *Administrative Science Quarterly*, 50(1), pp. 100–130. Available at: <https://doi.org/10.2189/asqu.2005.50.1.100>.

Rajkumar, K. *et al.* (2022) “A causal test of the strength of weak ties,” *Science*, 377(6612), pp. 1304–1310. Available at: <https://doi.org/10.1126/science.abl4476>.

Ritzer, G. and Mizruchi, M. (2005) “Network Theory,” in *Encyclopedia of social theory*. Thousand Oaks, CA: Sage, pp. 535–540.

Watts, D.J. and Strogatz, S.H. (1998) “Collective dynamics of ‘small-world’ networks,” *Nature*, 393(6684), pp. 440–442. Available at: <https://doi.org/10.1038/30918>.

Zhou, L (2023) *Vox* 26 April Available at: <https://www.vox.com/politics/2023/4/26/23699211/zooey-zephyr-montana-republicans-anti-trans-legislation> (Accessed: May 2, 2023)