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ARTICLE

Social network analysis in social psychological ressearch (1990–2020): A scoping review

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“group, persons, relations” networks of people

- We are social animals, as such people are connected one with other, and strong interconnections between people signals groups.

- Nodes: individuals
- Links: social connection (e.g., friends, team-mates, colleaugues)
- Network: the group of people (e.g., a family, a sport team, a university)

- Network analytics can be used to detect socially relevant information:
- E.g., bullism, discrimination, popularity, persuasion, conformism, ideological polarization

- Properties of the node: which postion the individual occupies in the NTW (central, peripheral..)

- Properties of the network: how is structured the NTW (big, small, clustered, cohese)

Properties of the node

which postion the individual occupies in the NTW (central, peripheral..)

People network analysis

Mention your main sources of information

- Who have you spoken with about politics?
- List the last 6 people you have spoken to.

Mention your main sources of information

- Do these poeple know each other? Make a matrix

	Giulia	Marc	Oliver	Thomas	Sarah	Anna
Giulia	X					
Marc	0	X				
Oliver	1	0	X			
Thomas	1	1	0	X		
Sarah	1	1	1	0	X	
Anna	0	0	0	1	1	x

Count the 1_s (min=0,

Mention your main sources of information

- Mark in RED those who share your political ideology (rough categorization!)

	Giulia	Marc	Oliver	Thomas	Sarah	Anna
Giulia	X					
Marc	0	X				
Oliver	1	0	X			
Thomas	1	1	0	X		
Sarah	1	1	1	0	X	
Anna	0	0	0	1	1	x

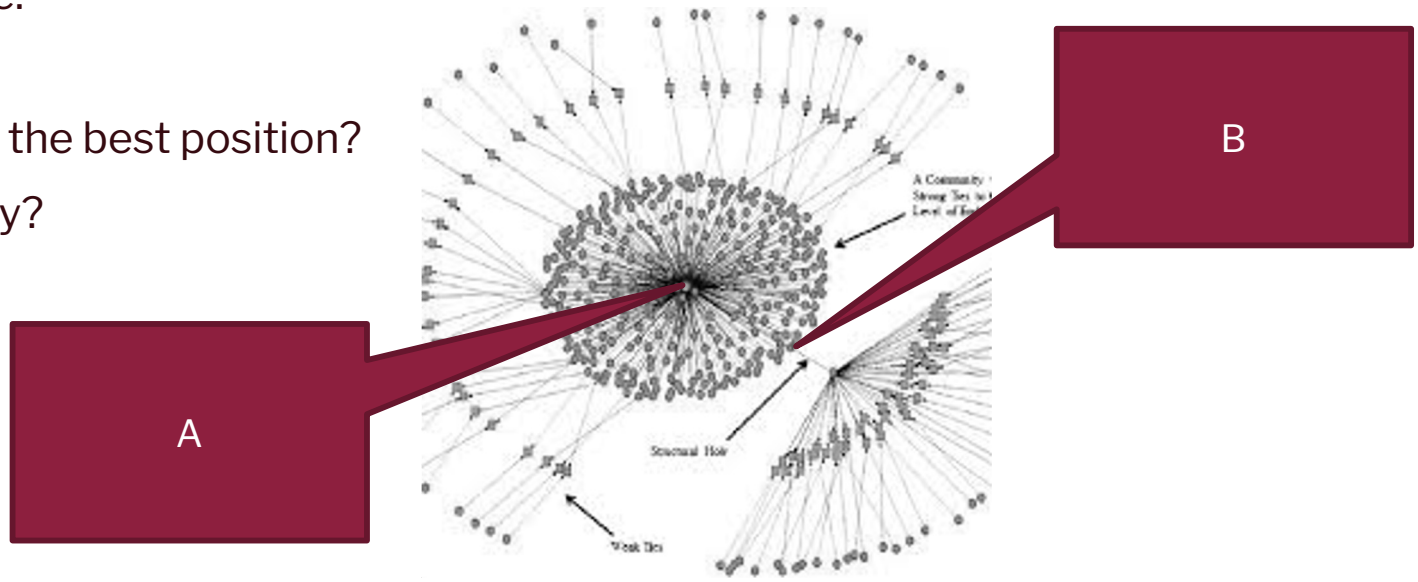
Count the 1_s separately for reds and blacks

- How many red (same political standing) names do you have in your network?
- How many people in your network know each other? (number of ones?)
- Is this number equal for red (same) and black (different political standing)?

Social capital

- Coleman (1990) defined social capital as any aspect of social structure that creates value and facilitates the actions of the individuals within that social structure.

- Which is the best position?
- And Why?



Social capital

Bonding Social Capital

strongly tied individuals, such as family and close friends

little diversity
Stronger personal connections

-> provides strong emotional and substantive **support** and enables **mobilization**.

Bridging social capital

individuals from different backgrounds make connections between social networks

tentative relationships
broader social horizons or world views

-> open up opportunities for information or new resources.

Degree Centrality	Betweenness Centrality
Definition: Number of ties connected to a node **In-degree:** Number of incoming links (prominence, popularity) **Out-degree:** Number of outgoing links (activity, initiative)	**Definition:** Frequency a node lies on shortest paths **Significance:** Brokerage / bridging capital Social influence (Granovetter, 1977)
Applications: School popularity (Kreutzmann et al., 2018) Team identification in sports (Graupensperger et al., 2020)	**Applications:** Few psychology studies used it (e.g. Zingora et al., 2019) Captures **network brokerage potential**

Social capital

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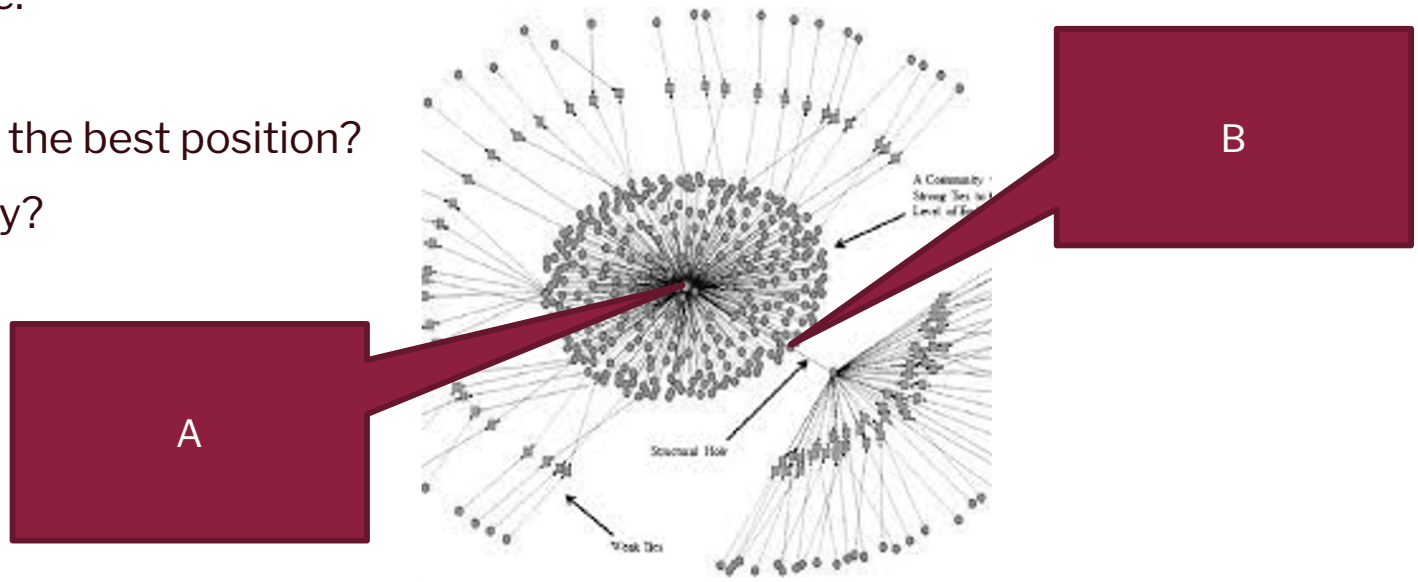

Political Psychology

Political Psychology, Vol. 33, No. 6, 2012
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The Effect of Social Networks on the Quality of Political Thinking

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In this article we investigate the effect of social networks on the quality of political thinking. First, the article introduces new social network concepts into the literature and develops the corresponding measures. Second, the article explores the quality of political thinking as a concept and develops its measures based on the volume and the causality of thoughts, and their integrative complexity. We make use of a survey to collect information on social networks and the experimental manipulation controls for the effect of policy frames. Our findings consistently show the significant negative impact of cohesive social networks on the quality of policy-relevant thinking. We conclude that close-knit social networks could create "social bubbles" that would limit how one communicates with others and reasons about politics.

KEY WORDS: social networks, political thinking, political discussion

political discussion networks: self report measures of interactions

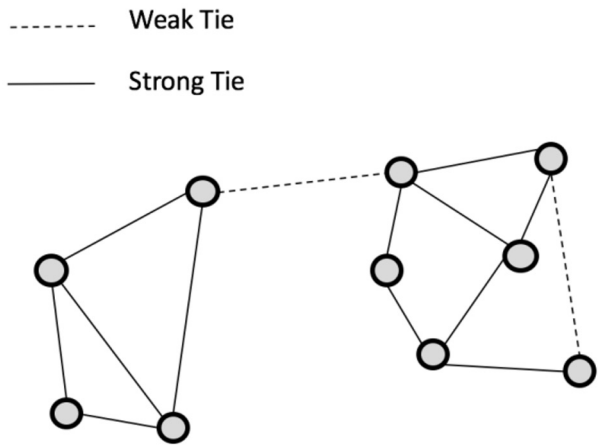
Table 5. The Expected Values of the Number of Thoughts, the Number of Causal Thoughts, and the Integrative Complexity of Thoughts Decrease as Network Cohesiveness Increases from Its Minimum Value to Its Mean, and to Its Maximum Value, Holding Other Variables at Their Means

Dependent Variable	Changes in the Expected Value of the Dependent Variable		
	Cohesiveness at its minimum (A non-cohesive network)	Cohesiveness at its mean	Cohesiveness at its maximum (Extremely close-knit network)
The number of thoughts	11.3	8.2	4.4
The number of causal thoughts	5.4	3.5	1.1
The integrative complexity of thoughts	2.9	2.4	1.8

Weak tie theory (Granovetter, 1973)

In his 1973 paper entitled “The strength of weak ties”, Mark Granovetter developed his theory of weak ties.

DEFINITION



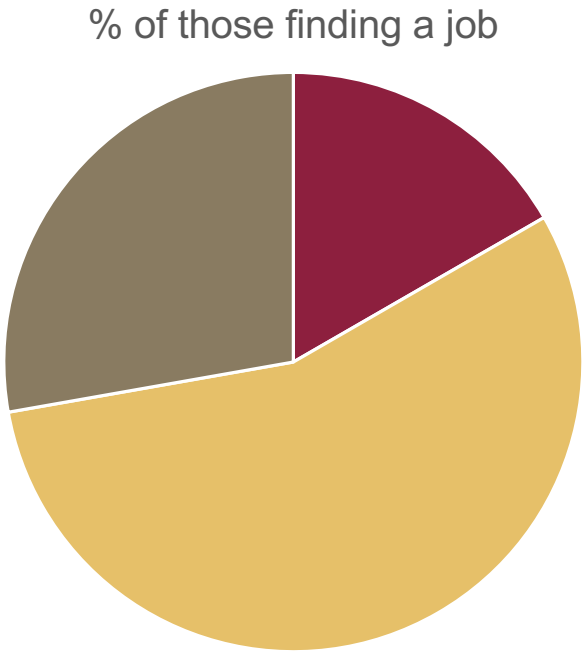
*The **strenght** of a tie is a (probably linear) combination of the amount of time , the emotional intensity, the* intimacy *(mutual confiding), and the reciprocal services which characterize the tie.*

Weak tie theory (Granovetter, 1973)

Strong Ties	Weak Ties
emotionally intense, frequent, and involving multiple types of relationships, such as ties **WITHIN** the network of friends, advisors, and coworkers ->The information possessed by any one member of the clique is likely to be either shared quickly or already redundant with the in-formation possessed by the other members.	ties that reach **OUTSIDE** of one's social clique are likely to be weak (that is, not emotionally in-tense, infrequent, and restricted to one narrow type of relationship) ->weak ties are often a bridge between densely interconnected social cliques and thus provide a source of unique information and resources

Granowetter's Study

- Random sample of job changers
- Question: How often did you saw the contact through which you got the new job?
  - *Often*
  - *Occasionally*
  - *Rarely*



- Guess: which colour represents the «often»

Granowetter's Study

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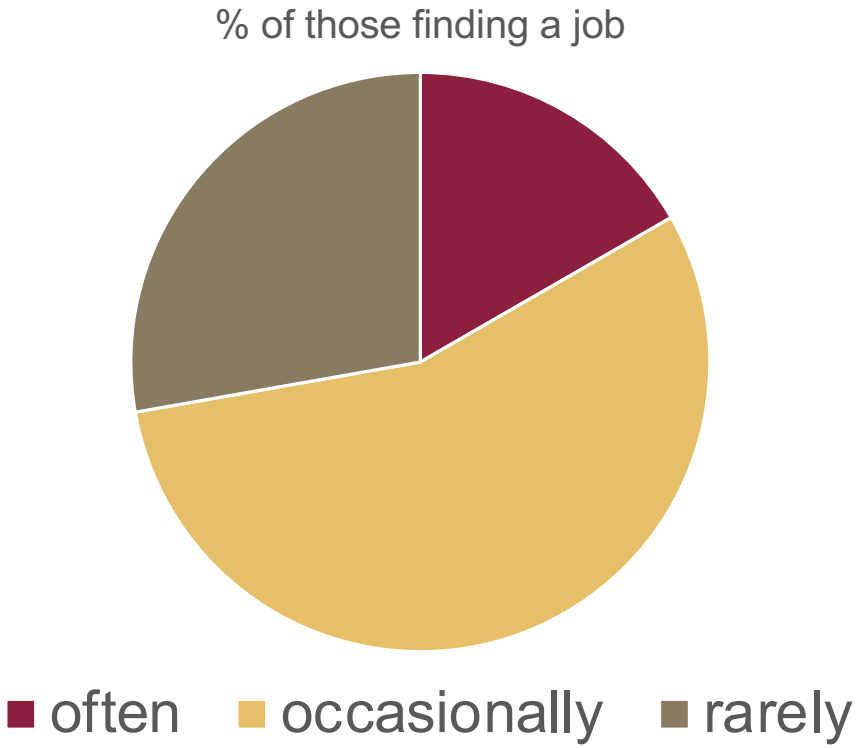
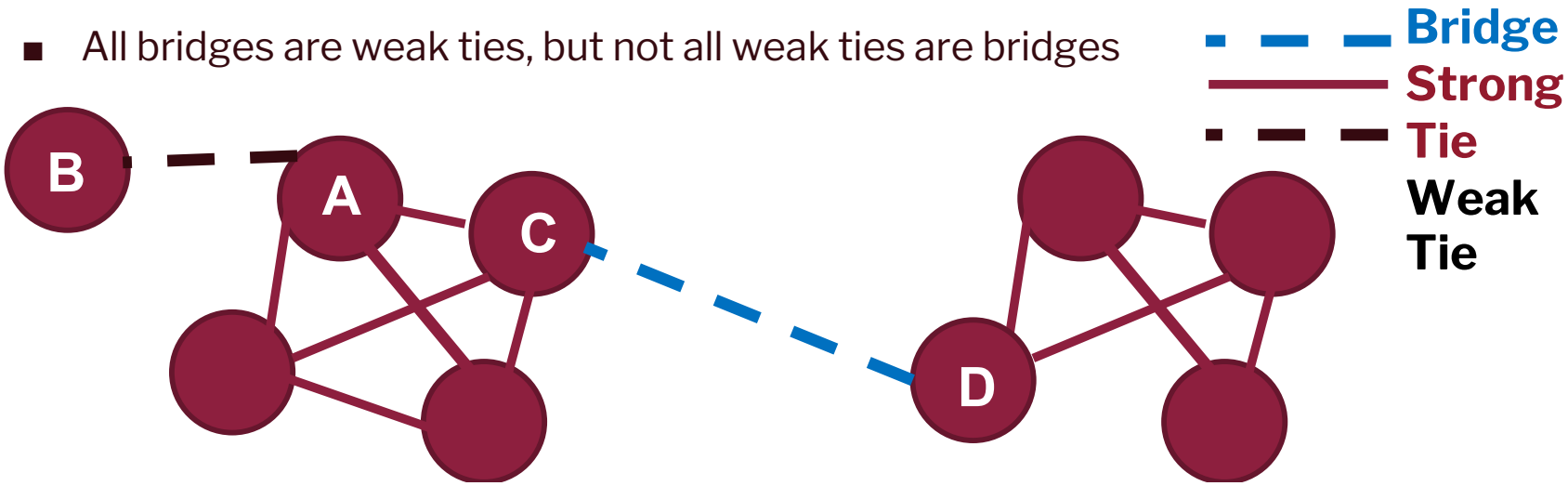


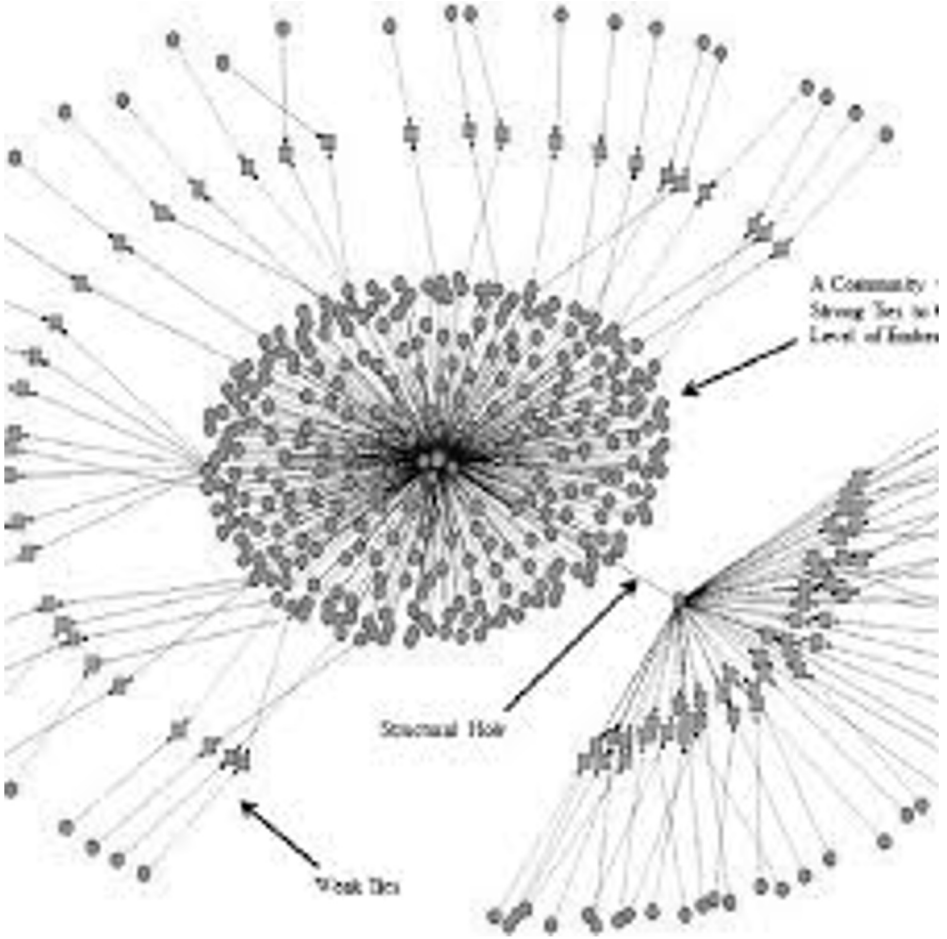
Weak ties & Bridges

- **Bridges** are essential to the flow of information that **integrates otherwise disconnected social clusters** into a broader society" (Burt, 1992).
- This basically means that to get more out of a social media, you need to figure out where your network is weak, and then **follow those people who give you access to additional clusters.**
- **Building and maintaining weak ties** over large structural holes enhances information benefits and creates even more efficient and effective networks.
- All bridges are weak ties, but not all weak ties are bridges



Ostracism

to be excluded and ignored



Networks Metrics: centrality (e.g., indegree)

Ostracism

Ostracism often pervades our interactions with loved ones, coworkers, and friends. Research suggests that ostracism can have negative physiological, psychological, and behavioral effects ranging from elevated blood pressure to alienation to aggression.

-> psychological functioning (e.g., decreases in positive mood)
-> interpersonal behaviors (e.g., increases in social susceptibility or aggressive behaviors)

Cyber ball

Cyberball is a virtual ball-tossing game that is used to manipulate the degree of social inclusion or ostracism in social psychological experiments.

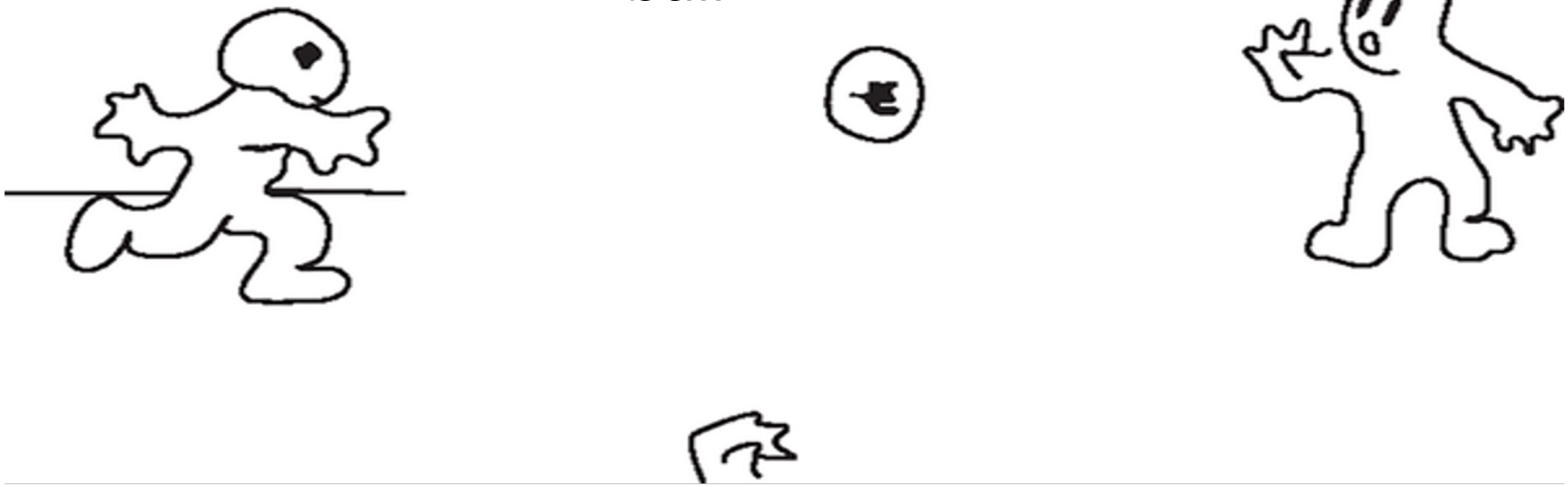
The program varies the degree to which the participant is passed the ball

Ostracized players are not passed the ball after two initial tosses and thus obtain fewer ball tosses than the other players.

Included players are repeatedly passed the ball and obtain an equal number of ball tosses as the other players.

Hartgerink CHJ, van Beest I, Wicherts JM, Williams KD (2015) The Ordinal Effects of Ostracism: A Meta-Analysis of 120 Cyberball Studies. PLOS ONE 10(5): e0127002. https://doi.org/10.1371/journal.pone.0127002
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0127002

Cyber ball



https://www1.psych.purdue.edu/~willia55/Announce/cyberball.htm

Meta-analysis: Hartgerink et al. 2015

200 published papers involving the Cyberball paradigm to study ostracism
over 19,500 participants

the average ostracism effect is large ($d > |1.4|$) and generalizes across structural aspects (number of players, ostracism duration, number of tosses, type of needs scale), sampling aspects (gender, age, country), and types of dependent measure (interpersonal, intrapersonal, fundamental needs).

Wölfer & Scheithauer (2014), “Social Influence and Bullying Behavior: Intervention-Based Network Dynamics of the fairplayer.manual Bullying Prevention Program”

Purpose:

To evaluate how a bullying prevention program (*fairplayer.manual*) affects **peer network structures** and **bullies’ social influence**.

Key Research Question:

👉 Does the intervention reduce the *centrality and social influence* of bullies within classroom networks?

Design:

328 middle-school students (13.7 years, 51% girls)

Pretest–posttest, control vs. intervention groups

Network data collected via peer nominations (“Who do you like to spend time with?”)

Analytic Framework:

Social Network Analysis (SNA):
Extracted four **centrality measures** using *UCINET*:

Indegree: Number of incoming ties (social importance)
Bonacich centrality: Embeddedness in the network
Closeness: Reachability within the network
Betweenness: Linking or bridging power

Bullying behavior. At pre- and posttest, students were asked to report the frequency at which they display bullying behavior on the Revised Bully/Victim Questionnaire (Olweus, 1996). E.g., I took money or other things from him or her or damaged his or her belongings

TABLE IV. Network Change Scores

Group	Status	Indegree	Bonacich	Closeness	Betweenness
Intervention	No Bully (n = 181)	.40 (9.94)	.15 (1.64)	−10.28 (14.61)	−.26 (8.45)
	Bully (n = 28)	−3.82 (9.89)	−1.10 (2.09)	−21.25 (18.94)	−6.03 (10.19)
Control	No Bully (n = 103)	.57 (7.16)	−.15 (2.16)	−.68 (7.30)	−.63 (6.58)
	Bully (n = 16)	−1.37 (10.67)	.68 (1.92)	−1.56 (6.53)	.75 (8.35)
Intervention group[a] $F(1, 320)$		.13	7.34***	54.78***	3.82*
Bullying status[b] $F(1, 320)$		.10	.01	1.99	1.11
Group × Status $F(1, 320)$		1.14	10.58***	7.44***	6.86***
ES (Cohen's *d*)		.24	.90	1.39	.73

[a]Coded as "0" control group and "1" intervention group;

[b]Coded as "0" nonbully and "1" bully; standard deviations are reported in the respective parenthesis; effects are controlled for all respective initial network parameters; effects sizes contrasting bullies in control group versus bullies in intervention group; one-tailed significances.

*$p < .05$.

***$p < .001$.

•**Before intervention:** Bullies occupied *central, influential positions* (higher on all centrality measures).
•**After intervention:**
•In the **intervention group**, bullies' **closeness, bonachic and betweeness significantly decreased**. Indegree remained the same
•This reduction did **not** occur in the control group.
•Bullies were **not isolated**, but their **power and prestige** diminished.

Properties of the network

how is structured the NTW (big, small, clustered, cohese..)

Social Group: entitativity/social cohesion

- **Entitativity:** Perceived unit (which distinguishes a GROUP from an aggregate of people)
- Property that makes a group appear as a coherent, distinct and unitary entity.
- A highly entitative group is relatively **homogeneous** (nodes resemble each other) and has an **evident internal structure** (ties) and has clear boundaries that distinguish it from other groups.

NTW Metrics: **clustering coefficient** (the degree to which nodes in a graph tend to cluster together 1= every node is conneceted with all the others); **density** (proportion of realized ties vs. possible ties)

High (manipulated) group entitativity increases…

- **ingroup identification** because these groups contribute more easily to the individuals' self-esteem and self-efficacy and provide them with a clear understanding of who they are and of their relationships with others, satisfying their needs for inclusion and differentiation (Yzerbyt, et al., 2000)
- **intergroup bias:** tendency to favor the own group over the other group (Mlisky, 1993; Castano et al. 2002)
- **behavioral and attitudinal bias:** behaviors of group members are explained not taking into account situational features, but rather using the group as the main cause (Gaertner and Schopler, 1998)

Social capital

BONDING STRUCTURES

tight-knit (entitative) groups. Entitative groups are defined through *bonding structures* derived from densely connected personal networks

-> trust, cooperation, mutual **support**, solidarity, social control, conformity pressure

NTW measures:
DENSITY (proportion of realized ties vs. possible ties)
+ strong, frequent, enduring links

BRIDGING STRUCTURES

loose-knit (non-entitative) little homophily, high diversity, access to resources transmitted between the parties

-> non-redundant information, creativity, social change, perfomance

NTW measures:
Betweeness, heterophily,

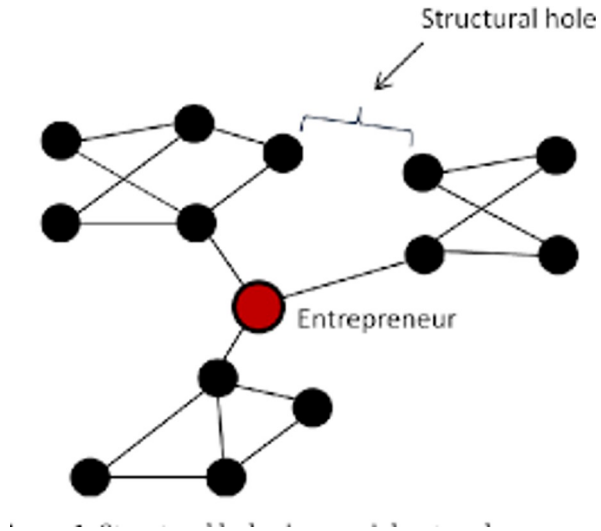
+ weak, infrequent, transient links

Homophily & Heterophily

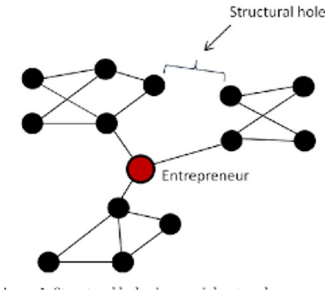
- **Homophily:** Ties among similar individuals (ingroup)
- **Heterophily:** Ties among dissimilar individuals (outgroup)
- **Applications:**
  - Ethnic homophily in immigrant networks (Titzmann et al., 2016)
  - Group diversity and performance (Zheng & Wei, 2018)

Burt's (1992) structural holes

- A **structural hole** is said to exist between two alters who are not connected to each other.
- advantageous for ego to be connected to many alters who are themselves unconnected to the other alters in ego's network.



Burt's (1992) structural holes



three primary benefits:

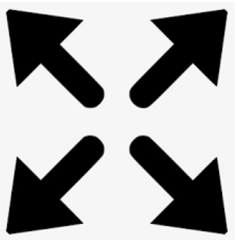
- *more unique and timely access to information* ***(information benefit)***
- *greater bargaining power and thus control over resources and outcomes* ***(power benefit)***
- *greater visibility and career opportunities throughout the social system.*

Brokerage is theoretically and empirically associated with a competitive advantage, more likely resulting in promotions
Gabbay and Zuckerman 1998

There are several ways to optimize structural holes in a network to ensure **maximum information benefits**:

- **The size of the network**
- **Efficient networks**.
- **Effective networks**.
- **Weak ties**.

The size of the network.



- The size of a network determines the **amount of information** that is shared within the network.
- A person has a much better chance to receive **timely** information in a big network than in a small one.
- The size of the network is, however, not dependant merely on the number of actors in the network, but the number of *non-redundant* actors.
- It's not just about how many people you follow on Twitter, it's also **who** you follow.

Effective networks

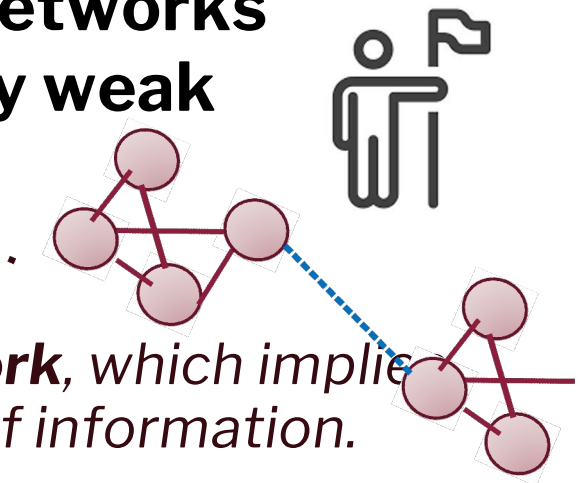
- **distinguishing primary from secondary contacts** in order to focus resources on preserving primary contacts" (Burt, 1992:21).
- **building relationships with actors that lead to the maximum number of other secondary actors, while still being non-redundant.**
- This means that if 10 people give you access to the same network of information, only follow the most important one — their voice will be clearer and not drowned out by the others.
- Effectiveness describes the redundancy or degree of overlap between contacts and the exchanged resources in a network. Supporters who are not connected to each other might tend to share diverse opinions and information with the ego, which is therefore not redundant.
- In networks with high effectiveness, most of the contacts do not know each other. (Burt 1992) and the ego has more the possibility to connect unconnected contacts, hence to broker, and to enjoy more social capital in terms of strategic use of information and/ or contacts.

- The number of alters minus the average number of ties that each alter has to other alters.

Efficient networks

- Efficiency in a network is concerned with **maximizing the number of *non-redundant* contacts** in a network in order to maximize the number of structural holes per actor in the network.
- It is possible to **eliminate redundant contacts** by linking only with a primary actor in each redundant cluster.
- This saves time and effort that would normally have been spent on maintaining redundant contacts.
- What this basically means is that if you follow people who all follow each other, your network isn't very efficient and you need to get rid of some people.

-> to achieve networks rich in information benefits it is necessary to build large networks with non-redundant contacts and many weak ties over structural holes.



information benefits:

- ***More contacts are included in the network****, which implies that you have access to a larger volume of information.*
- ***Non-redundant contacts ensure that this vast amount of information is diverse and independent****.*
- ***Linking with the primary actor in a cluster implies a connection with the central player in that cluster.*** *This ensures that you will be one of the first people to be informed when new information becomes available.*