

Some Assembly Required: Team Recommender Systems and the Future of Work

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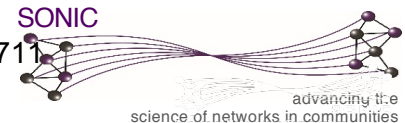
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Aphorisms about Networks

- Social Networks:
 - Its not what you know, its **who** you know
- Cognitive Social Networks:
 - Its not who you know, its **who others think** you know
- Knowledge Networks:
 - Its not who you know, its **what others think** you know



Cognitive Knowledge Networks

**It's not
who you know.
It's what
who you know
knows.**

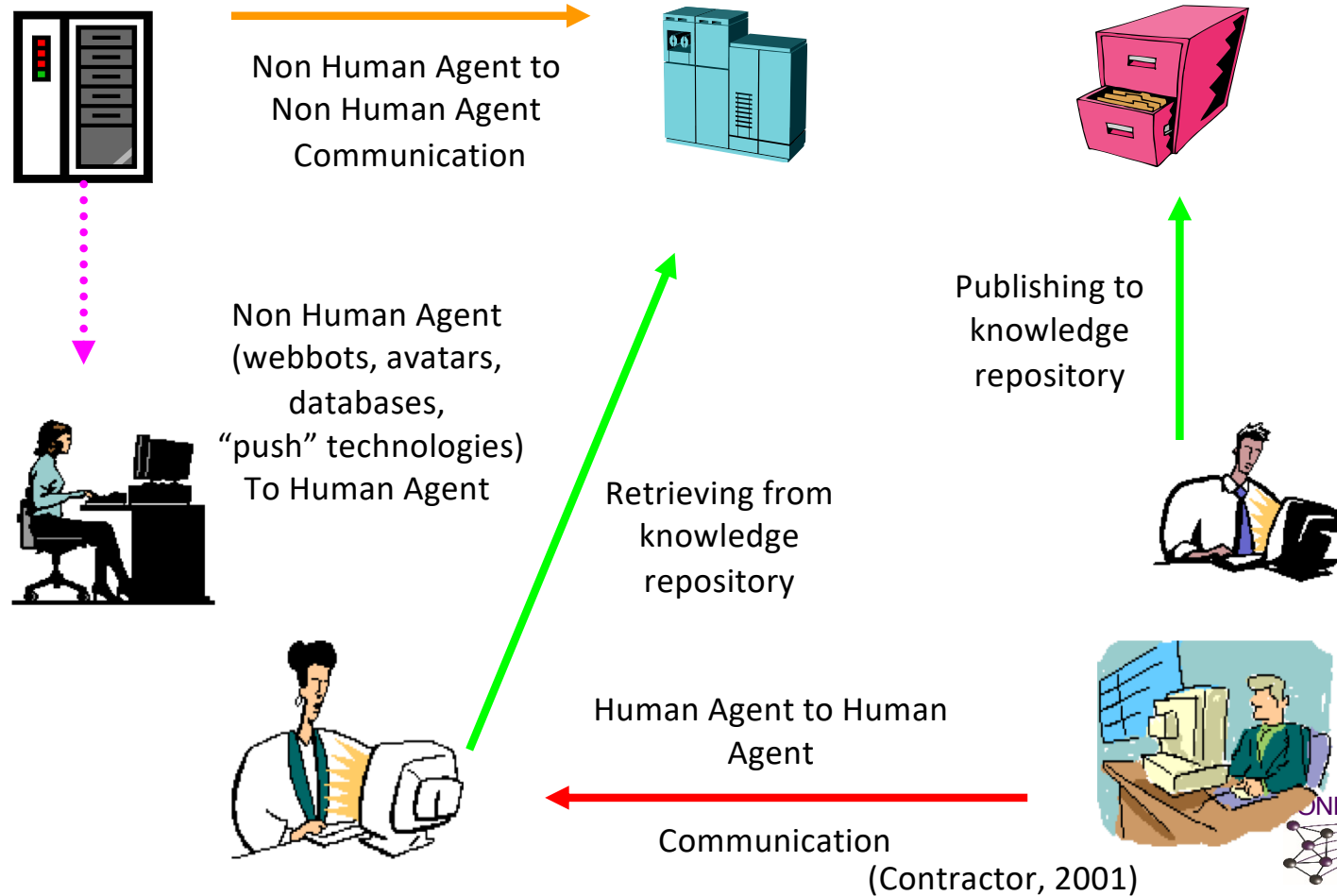
There's research. And then there's research written by the world's top analysts and strategists. The leading industry authorities on everything from F&B and healthcare to investing in the Pacific Rim. Bottom line? The only people who should be guiding your investment decisions are the people who are truly "in the know." Who measure success one investor at a time. Move your money. Get well connected.

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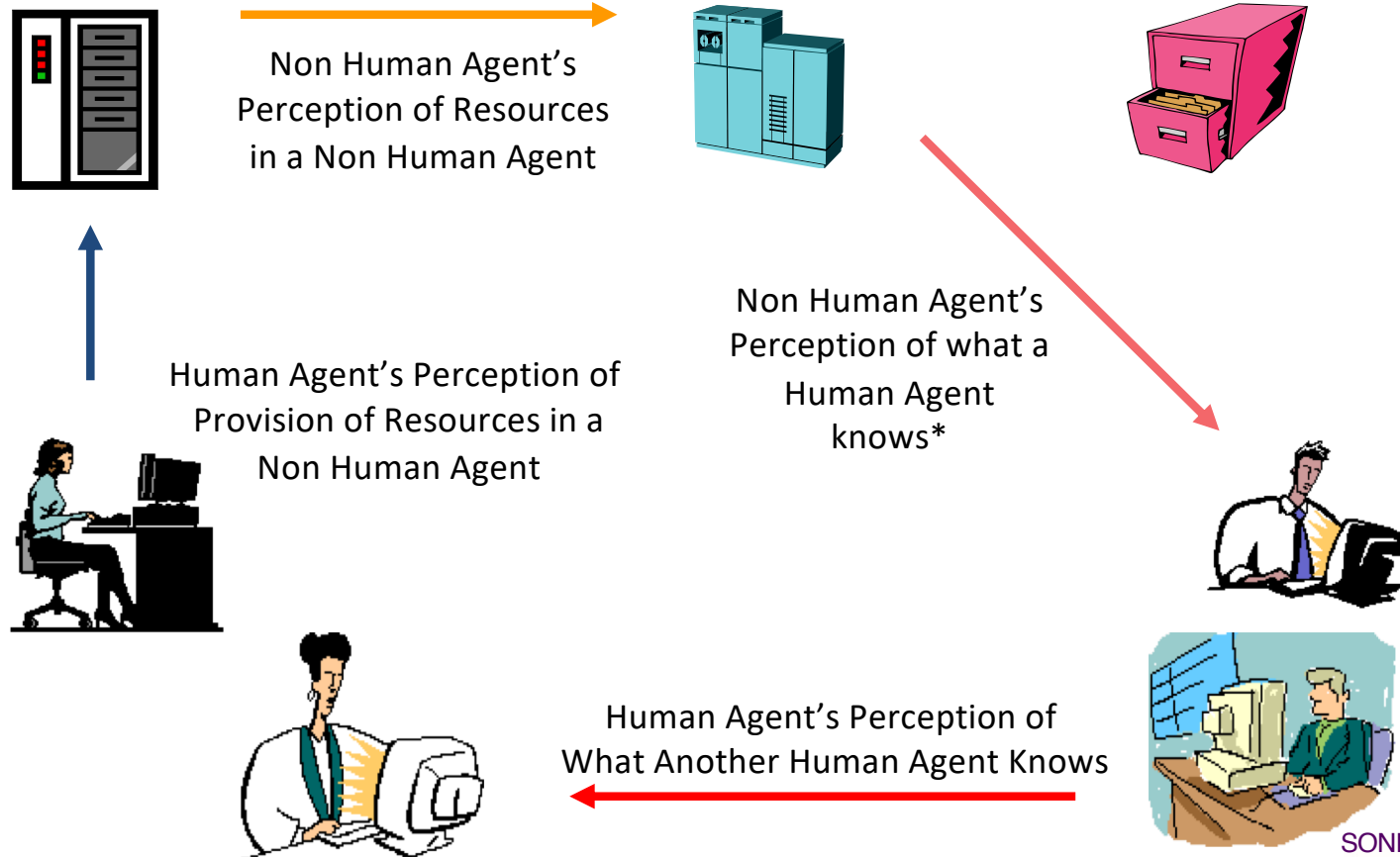
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Interaction Networks



Cognitive Knowledge Networks



**Why Netflix thinks I am gay and Amazon thinks I am pregnant* (Contractor, 2001)



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3D Strategy for Enhancing Knowledge Networks

- **Discovery:** Effectively and efficiently foster network links from people to other people, knowledge, and artifacts (data sets/streams, analytic tools, visualization tools, documents, etc.)
 - *“If only we knew what we knew”.*
- **Diagnosis:** Assess the “health” of internal and external networks - in terms of scanning, absorptive capacity, diffusion, robustness, and vulnerability to external environment
- **Design:** Model or re-wire networks using social and organizational incentives (based on social network research) and network referral systems to enhance evolving and naturally sustainable networks



“Discovery” Problems in Knowledge Networks

- IDC found Fortune 500 companies lose \$31.5 billion annually due to rework and the inability to find information
- The Delphi Consulting Group found that:
 - Only 12 percent of a typical company's knowledge is explicitly published → remaining 88 percent is ‘distributed knowledge’, comprised of employees' personal knowledge
 - Up to 42 percent of knowledge professionals need to do their jobs comes from other people's brains - in the form of advice, opinions, judgment, or answers; not from the channels in an organizational chart



Discovery Challenges

1. Who knows who?
2. Who knows what?
3. Who know who knows who?
4. Who knows who knows what?



From whom do we seek information?

From whom do we seek information?



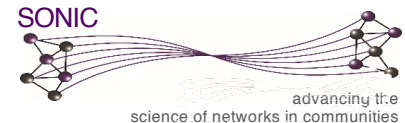
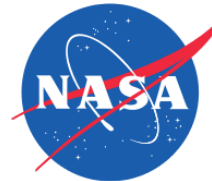
www.hbr.org

Competent Jerks, Lovable Fools, and the Formation of Social Networks

by Tiziana Casciaro and Miguel Sousa Lobo

Empirical Illustration Co-evolution of knowledge networks and 21st century organizational forms

- NSF KDI Initiative. PI: Noshir Contractor, University of Illinois.
- Co-P.I.s: Bar, Fulk, Hollingshead, Monge (USC), Kunz, Levitt (Stanford), Carley (CMU), Wasserman (Indiana).
- Three dozen industry partners (global, profit, non-profit):
 - Boeing, 3M, NASA, Fiat, U.S. Army, American Bar Association, European Union Project Team, Pew Internet Project, etc.



Public Goods/Transactive Memory

- Allocation to the Intranet
- Retrieval from the Intranet
- Perceived Quality and Quantity of Contribution to the Intranet

Transactive Memory

- Perception of others' knowledge
- Communication to allocate information

Communication to Retrieve Information

Inertia Components

- Collaboration
- Co-authorship
- Communication

Social Exchange

- Retrieval by coworkers on other topics

Proximity

- Work in the same location

Predictors of Communication to Retrieve Information

Odds (0.5 = neutral)

1. Social Communication	0.144
2. Perception of Knowledge & Communication to Allocate	0.995
3. Perception of Knowledge & Provision	0.972
4. Perception of Knowledge, Social Exchange, & Social Communication	0.851
5. Perception of Knowledge, Proximity, & Social Communication	0.882

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In Search of a Perfect Team at Work

Who works best with whom? Companies are crunching lots of data about their employees to answer that question.



AI is supplementing intuition in personnel decisions at some companies. ILLUSTRATION: MICHAEL WARASKA FOR THE WALL STREET JOURNAL



By **STU WOO**

1 COMMENTS

Updated March 12, 2017 11:02 p.m. ET

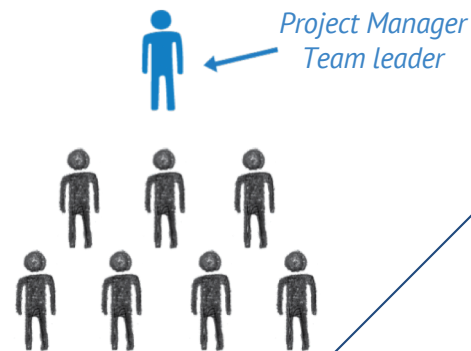


Contemporary teams are self-assembled teams

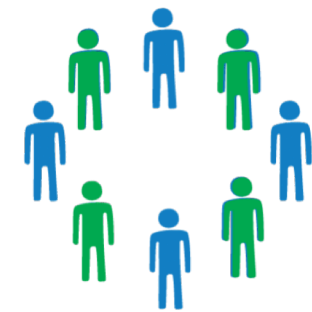
Contemporary teams are self-assembling with increasing frequency. We see them in organizations, crowdsourcing, virtual teams, and research projects.

However, the majority of the teams literature up until this point has focused on randomly assigned or staffed teams.

Traditional teams



Self-assembled teams



Four ways to assemble teams

		<i>Dimension 2: Structured Information</i>	
		Absent	Present
<i>Dimension 1: Personal Agency</i>	Absent	<i>I. Ad-hoc team formation, e.g., random assignment to teams; team membership determined based on another factor or arbitrarily</i>	<i>III. Team staffing</i>
	Present	<i>II. Naturalistic team formation Teaming with acquaintances, Teaming with friends</i>	<i>IV. Informed agentic formation</i>

Four ways to assemble teams

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	Present	<i>II. Naturalistic team formation Teaming with acquaintances, Teaming with friends</i>	<i>IV. Informed agentic formation</i>

Who Would You Like to Work With?

Use of Individual Characteristics and Social Networks in Team Formation Systems

Diego Gómez Zará¹², Matthew Paras¹, Marlon Twyman¹,
Jacqueline Ng¹, Leslie A. DeChurch¹, Noshir S. Contractor¹

¹Northwestern University
Evanston, IL, USA

²Pontificia Universidad Católica de Chile
Santiago, Chile

What do people look for when they search teammates?

This team assembly strategy offers to individuals choosing and looking for other teammates freely.

However, relatively little is known about how individuals search for teammates and what characteristics they look for.

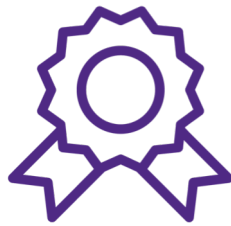
We explored the roles of **human capital** (i.e. abilities, competence, technical skills, soft skills like communication, and/or experiences of individuals) and **social capital** (i.e. quality of one's relationships with others and access to their resources) in team formation.



What social dimensions explain people's search preferences?

Human Capital

Competence



Warmth

Social Capital

Bonding capital



Bridging capital

What do people look for when choosing teammates?



Competence

It reflects traits related to perceived ability, including intelligence, skill, creativity and efficacy (Fiske, Cuddy, & Glick, 2007).

Stitch Fix

Our Executive Team



KATRINA LAKE

Founder & CEO

Katrina is passionate about helping women achieve everyday confidence.

[Read More »](#)



MIKE SMITH

Chief Operating Officer

Mike leads the company's Operations and Stylist organizations.

[Read More »](#)



LISA BOUGIE

GM, Stitch Fix Women

Lisa leads the buying, product creation, planning and allocation teams.

[Read More »](#)



ERIC COLSON

Chief Algorithms Officer



SCOTT DARLING

Chief Legal Officer



CATHY POLINSKY

Chief Technology Officer

Stitch Fix | Your Personal Stylist. (n.d.). Retrieved May 20, 2018, from <https://www.stitchfix.com/about>

Northwestern University



What do people look for when choosing teammates?



Warmth

It captures traits that are related to perceived intent, including friendliness, helpfulness, sincerity, trustworthiness and morality (Fiske, Cuddy, & Glick, 2007)

Blue Apron

Our Story

In the summer of 2012, Matt Salzberg, Ilia Papas, and Matt Wadiak tested the first Blue Apron recipes in their tiny New York City apartments. Their goal was to make the experience of cooking with quality produce and specialty ingredients accessible to everyone, no matter where they live or how busy they are. The three hand-packed the first Blue Apron boxes themselves, delivered them to family and friends, and received immediate positive feedback.

Four years later, Blue Apron has expanded tremendously and as a team, we work every day to live and breathe our mission. We send over 8 million meals per month to our home chefs nationwide, and we have thousands of employees that work across four offices to ensure each customer gets the highest quality product every week.

Worn by apprentice chefs in France, the Blue Apron has become a symbol of lifelong learning in cooking. Since the beginning, the entire Blue Apron team has been awed by the dedication of our customers to their culinary education. We're thrilled to be welcomed into our customers homes and part of their weekly cooking routine.



Our mission is to make incredible home cooking accessible for everyone. (n.d.). Retrieved May 20, 2018, from <https://www.blueapron.com/pages/our-team>



What do people look for when choosing teammates?



Bonding capital

It characterizes the quality of a connection between two people, and work on strong and weak ties (Granovetter, 1977).

What do people look for when choosing teammates?

“So I started Warby Parker with three friends, Jeff Raider, Andy Hunt and Dave Gilboa. We happened to be talking about glasses. We were doing so in the computer lab in Huntsman Hall at Wharton. Dave was complaining that he just lost a \$700 pair of glasses. He left it in the seat pocket of an airplane because he was traveling right before school started... Andy had a similar story, Jeff had a similar story. Andy posited the question, “Why isn’t anybody selling glasses online?”... And I think we take that all for granted, but eight years ago, before we launched Warby Parker, nobody thought you could sell glasses online. But for us, the light bulbs started to go off.”



What do people look for when choosing teammates?



Bridging capital

It characterizes the degree to which someone occupies an advantaged position in a social networks, the class case of which is brokerage (Burt, 2000).

Getaround

Meet our founders



Jessica Scorpio

VP Marketing

Our rainmaker. Born in Canada, raised in Florida. Former political aide and non-profit founder. Jessica is the visionary behind our marketing and business strategy.

Sam Zaid

CEO

Our North Star. Born in England, raised in Canada. 2 time startup founder, former engineer and active mentor. Sam inspires us all to be better and he's the driving force behind our product.

Elliot Kroo

VP Technology

Our local. Born and raised in Stanford, California. Former Googler and successful iPhone app developer. Elliot is the genius behind our technology.

NGetaround. (n.d.). Retrieved March 20, 2018, from <https://www.getaround.com/about>
University



Research questions

In order to better understand how individuals look for teammates in self-assembled teams, we conducted a field experiment to explore two overarching questions:

RQ1: Do people seek out human capital or social capital in searching for collaborators?

RQ2: What individual traits can explain individuals' preferences for human capital or social capital?

Research design

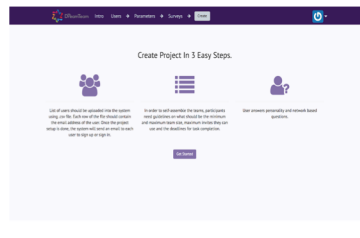
Procedure

We used a team search/recommender system called “My Dream Team Builder” to see the influence of participants’ traits and networks to their teammates searches.

This platform assists in forming new teams in higher education settings. We used a combination of survey and server data to explore our research question.



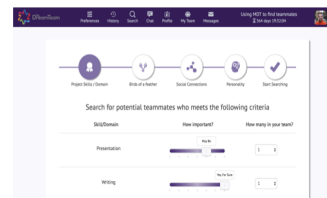
My Dream Team Platform



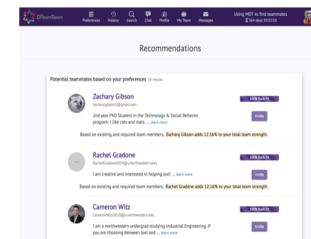
*Create a project
(Administrator Setup)*



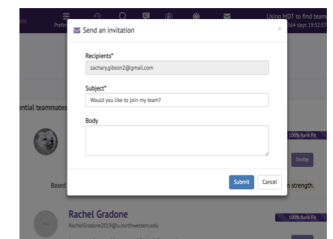
Initial survey



*Search
for Teammates*

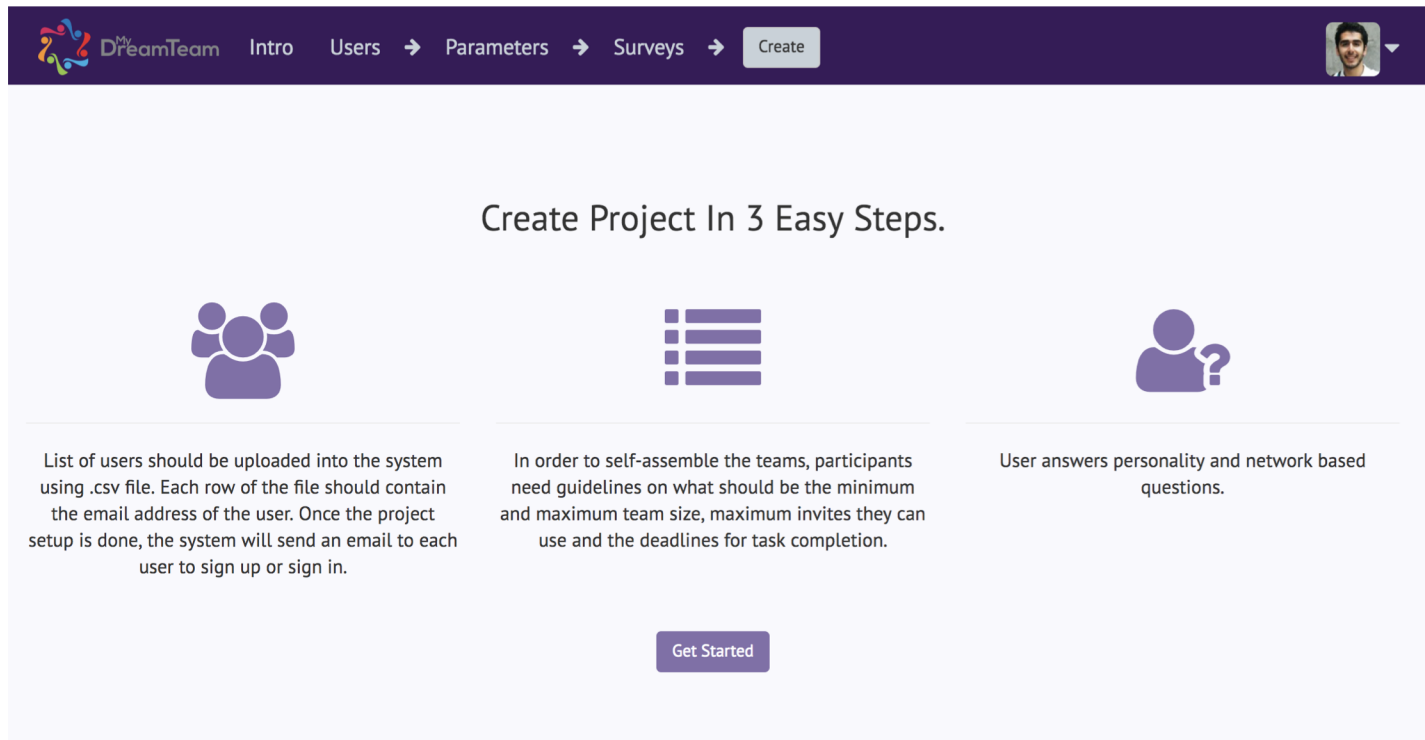


*View
Teammate Profiles*



*Form
Teams*

1. Create a project



The screenshot shows the 'Create Project' page in the MyDreamTeam application. The top navigation bar is dark purple with the MyDreamTeam logo and links for Intro, Users, Parameters, Surveys, and a 'Create' button. A user profile picture is in the top right. The main content area is light purple and titled 'Create Project In 3 Easy Steps.' It features three steps, each with an icon and a description:

- Step 1:** Icon of three people. Description: 'List of users should be uploaded into the system using .csv file. Each row of the file should contain the email address of the user. Once the project setup is done, the system will send an email to each user to sign up or sign in.'
- Step 2:** Icon of a list. Description: 'In order to self-assemble the teams, participants need guidelines on what should be the minimum and maximum team size, maximum invites they can use and the deadlines for task completion.'
- Step 3:** Icon of a person with a question mark. Description: 'User answers personality and network based questions.'

A 'Get Started' button is located at the bottom center of the three steps.

2. Initial survey

 Survey Completed by participants.
211 days 18:44:38 


Social skills



Please indicate the extent to which you agree or disagree that each statement describes you at this moment.

I am keenly aware of how I am perceived by others.

Strongly disagree

Disagree

Somewhat disagree

Neither agree nor disagree

Somewhat agree

Agree

Strongly agree

 14/89 

3. Search for teammates

The screenshot shows the DreamTeam web application interface. At the top is a dark purple navigation bar with the DreamTeam logo and icons for Preferences, History, Search, Chat, Profile, My Team, and Messages. On the right of the bar, it says "Using MDT to find teammates" with a clock icon and "364 days 19:32:04", and a user profile picture.

Below the navigation bar is a horizontal progress bar with five circular icons and labels: "Project Skills / Domain", "Birds of a feather", "Social Connections", "Personality", and "Start Searching". The "Start Searching" icon, which is a checkmark, is highlighted.

Below the progress bar, the text reads: "Search for potential teammates who meets the following criteria".

There are two rows of criteria, each with three columns: "Skill/Domain", "How important?", and "How many in your team?".

Skill/Domain	How important?	How many in your team?
Presentation	May Be	1
Writing	Yes, For Sure	1

4. View teammate profiles

The screenshot displays the DreamTeam web application. The top navigation bar includes icons for Preferences, History, Search, Chat, Profile, My Team, All Teams, and Messages. On the right, it shows the user's status: 'Using MDT to fi...' and a timer '287 days 19:33:13'. The main content area is titled 'Preference search results' and indicates 'Number of invitation(s) you can send: 9'. Below this, a box titled 'Potential teammates based on your preferences. 16 results' lists three candidates:

- Bryan** (bryan@gmail.com): 100% Rank Fit. Bio: 'Hi everyone! My name is Alex and I am a rising Junior at XXX University where I am st ... [learn more](#)'. Impact: 'Based on existing team, Bryan adds 4.55% to your total team strength.' Action: 'Invite' button.
- Alex** (aelex@gmail.com): 100% Rank Fit. Bio: 'Hi everyone! My name is Alex and I am a rising Junior at XXX University where I am st ... [learn more](#)'. Impact: 'Based on existing team, Alex adds 4.24% to your total team strength.' Action: 'Invite sent' button.
- Yun** (yun@gmail.com): 100% Rank Fit. Bio: 'Let's do it. ... [learn more](#)'. Action: 'Invite' button.

5. Form teams

The screenshot shows the 'My DreamTeam' web application. A modal window titled 'Send an invitation' is open in the center. The modal has three input fields: 'Recipients*' with the email 'jacqueline.ng@northwestern.edu', 'Subject*' with the text 'Would you like to join my team?', and a larger 'Body' text area. At the bottom of the modal are 'Submit' and 'Cancel' buttons. In the background, a list of team members is visible. The member 'Jacqueline Ng' is highlighted, showing her profile picture, name, email, a bio, and a '98% Rank Fit' badge. To the right of the modal, other team members are partially visible with '99% Rank Fit' and '98% Rank Fit' badges and 'Invite sent' buttons.

Send an invitation

Recipients*
jacqueline.ng@northwestern.edu

Subject*
Would you like to join my team?

Body

Submit Cancel

Jacqueline Ng
jacqueline.ng@northwestern.edu
Hi everyone, I am a 5th year grad student in IEMS. I'm excited to meet all of you and hope you will ... [learn more](#)
Based on existing team, Jacqueline Ng adds 17.06% to your total team strength.

99% Rank Fit
Invite sent

98% Rank Fit
Invite sent

98% Rank Fit
Invite

Field study

Setting		N	Females	Age Mean (SD)	Team Goal
1	Undergraduate course: Leadership	117	44%	20.21 (1.95)	Team leadership case analysis
2	Undergraduate course: SNA	74	39%	20.78 (1.19)	Consulting project
3	Undergraduate course: SNA	19	79%	19.68 (1.06)	Team leadership case analysis
4	Undergraduate course: SNA	57	41%	22.00 (1.67)	Consulting project
5	Executive education course: Networks	60	55%	30.42 (7.75)	Case analysis
6	Executive education course: Networks	61	62%	30.95 (9.01)	Case analysis
7	Graduate course: SNA	33	51%	26.03 (4.05)	Network analysis using Twitter data
8	Faculty Workshop	101	52%	46.25 (10.25)	Create a digital prototype to support students' learning

What did we measure?

	Interpersonal Constructs	Measured Variables
Human Capital	Competence	Respondents rated themselves on six project-related skills (5-item scale, $\alpha=.61$)
	Warmth	Psychological collectivism (15-item scale ¹ , $\alpha=.90$); Leadership propensity (8-item scale ² , $\alpha=.79$); Social skills (7-item scale ³ , $\alpha=.86$); Creativity (3-item scale ⁴ , $\alpha=.90$); Personality (5 factors, 4-item scales ⁵ , $\alpha=(O).78,(C).75,(E).80,(A).79,(N).64$)
Social Capital	Bonding	Respondents completed a network survey: “Who on this list do you know?,” “Who have you worked with on projects?,” and “With whom on this list do you enjoy working?”
	Bridging	Network centrality measures computed from the network survey: popularity (indegree), brokers, and second-level contacts.

Note. ¹Psychological collectivism measured using Jackson, Colquitt, Wesson, & Zapata-Phelan (2006); ²Leadership propensity measured using Mumford, O'Connor, Clifton, Connelly, & Zaccaro (1993); ³Social skills measured using Ferris, Witt, & Hochwarter (2001); ⁴Creativity measured using Tierney, & Farmer, (2002); ⁵Big five factors of personality measured using Goldberg, Johnson, Eber, Hogan, Ashton, Cloninger, & Gough (2006)

Descriptive statistics

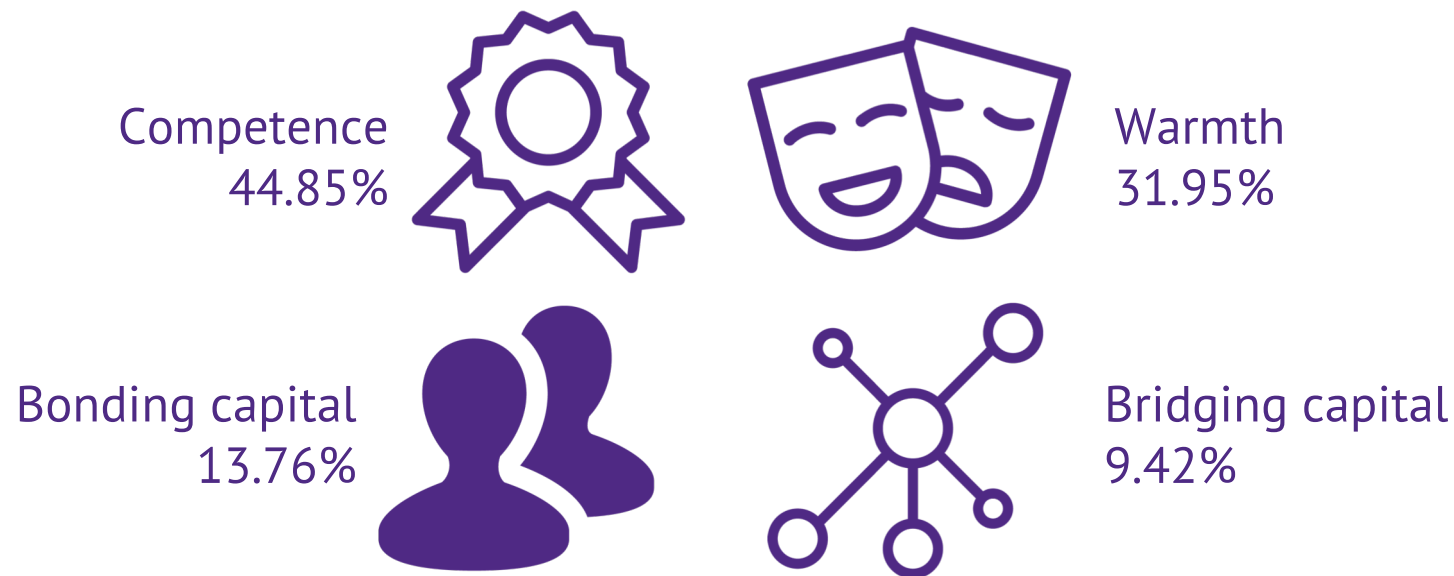
Study									
Variable	1	2	3	4	5	6	7	8	Total
Number of participants	117	74	19	57	60	61	33	101	522
Number of searches	410	55	104	41	190	49	87	219	1,155
Search queries per user; Mean (SD)	4.77 (12.28)	2.29 (2.31)	3.25 (3.5)	2.41 (1.66)	3.96 (3.94)	2.04 (1.81)	2.64 (2.42)	4.98 (7.34)	3.75 (7.45)
Max number of searches made by a user	113	11	16	7	15	9	13	39	113
Number of search preferences used per query	9.04 (4.48)	10.13 (4.05)	13.56 (3.94)	9.37 (3.1)	12.01 (5.09)	7.73 (4.84)	10.68 (4.24)	8.1 (4.25)	9.89 (4.76)

Results



What did participants look for?

Distribution of the search parameters across all the users' queries (# queries = 1,155)



What did participants look for?

Number of queries = 1,155

		Attribute	Number of search queries that include this attribute	Proportion of searches that include this attribute (%)
Human Capital	Competence	Project Skill #1	855	74.03%
		Project Skill #2	834	72.21%
		Project Skill #3	790	68.40%
		Project Skill #4	751	65.02%
		Project Skill #5	708	61.30%
		Project Skill #6	599	51.86%
	Warmth	Psychological collectivism	868	75.15%
		Creativity	855	74.03%
		Social skills	834	72.21%
		Leadership propensity	353	30.56%
		Similar personality	322	27.88%
Social Capital	Bonding Capital	Worked with in the past	541	46.84%
		Friendship	522	45.19%
		Shared collaborators	329	28.48%
	Bridging capital	Social network brokers	308	26.67%
		Popularity: prior collaborators	243	21.04%
		Popularity: known	203	17.58%
		Popularity: friendship	199	17.23%

What did participants look for?

Number of queries = 1,155

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		Popularity: known	203	17.58%
		Popularity: friendship	199	17.23%

Competence were the most used search preferences (51-74%)



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What did participants look for?

Number of queries = 1,155

Warmth search preferences were also used frequently: creativity, teamwork, and social skills.

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		Social network brokers	308	26.67%
	Bridging capital	Popularity: prior collaborators	243	21.04%
		Popularity: known	203	17.58%
		Popularity: friendship	199	17.23%

Prior collaborations and friendships were the most used social capital search preferences

What did participants look for?

Number of queries = 1,155

		Attribute	Number of search queries that include this attribute	Proportion of searches that include this attribute (%)
Human Capital	Competence	Project Skill #1	855	74.03%
		Project Skill #2	834	72.21%
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		Creativity	855	74.03%
		Social skills	834	72.21%
		Leadership propensity	353	30.56%
		Similar personality	322	27.88%
		Worked with in the past	541	46.84%
Bridging Capital	Social network brokers	Friendship	522	45.19%
		Shared collaborators	329	28.48%
		Social network brokers	308	26.67%
	Popularity	Popularity: prior collaborators	243	21.04%
		Popularity: known	203	17.58%
		Popularity: friendship	199	17.23%

Lastly, users looked for social brokers and people who have been working with many others.

What users' attributes explain their search preferences?

We performed a multivariate linear regression to predict how people's traits, competence skills, and social networks influenced the number of search preferences for *competence*, *warmth*, *bonding capital*, and *bridging capital*.

The DVs are the number of times that they used search preferences in each query.

The IVs are users' responses in the initial survey.

IVs: Users' survey responses

The screenshot shows a survey titled 'Social skills' with a progress bar at the top. Below the title, it says 'Please indicate the extent to which you agree or disagree that each statement describes you at this moment.' The statement is 'I am keenly aware of how I am perceived by others.' Below the statement is a Likert scale with seven options: 'Strongly disagree', 'Disagree', 'Somewhat disagree', 'Neither agree nor disagree', 'Somewhat agree', 'Agree', and 'Strongly agree'. A blue arrow points from the survey to a search interface below.

Multivariate linear regression for each dimension

DVs: Number of search preferences used in each query



Competence

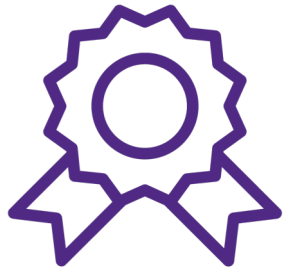
We create three additional measures for competence:

- Overall expertise:
 - Average user's self-reported score on the six project skills.
- Technical score:
 - Average user's self-reported scores in technical skills (e.g. web scraping, statistics)
- Soft score:
 - Average user's self-score in soft skills (e.g. presentation, communication, writing, etc.)
- Scarcity:
 - We defined it as the limited availability of a skill possessed by some participants in a group.
 - For each skill, we calculate the self-reported score of each user and see how many participants reported having an equal or better score than this participant.



	DV = Number of Search Preferences Used			
	<i>Competence</i>	<i>Warmth</i>	<i>Bonding</i>	<i>Bridging</i>
(Intercept)	-39.03 (14.23)**	-26.55 (8.37)**	0.56 (8.44)	-20.32 (8.32)*
Control				
Age	-0.01 (0.02)	0.01 (0.01)	-0.01 (0.01)	0 (0.01)
Gender (Female)	0.62 (0.19)**	0.07 (0.11)	0.16 (0.11)	-0.13 (0.11)
Individual traits				
Creativity score	0.63 (0.15)***	-0.01 (0.09)	0.09 (0.09)	0.33 (0.09)***
Collective score	0.22 (0.09)*	0.02 (0.06)	-0.01 (0.06)	0.14 (0.05)*
Social skills score	-0.28 (0.14)	0.33 (0.08)***	0.28 (0.09)**	0.13 (0.08)
Leadership score	-0.13 (0.13)	-0.04 (0.08)	-0.06 (0.08)	-0.14 (0.08)
Personality				
Agreeableness score	0.24 (0.09)**	-0.02 (0.05)	0.1 (0.05)	0.24 (0.05)***
Conscientiousness score	-0.08 (0.09)	0.13 (0.06)*	0.14 (0.06)*	0.06 (0.05)
Extraversion score	-0.18 (0.09)*	0.05 (0.05)	0 (0.05)	0.07 (0.05)
Neuroticism score	0.01 (0.09)	0.08 (0.05)	0.12 (0.05)*	0.02 (0.05)
Openness score	0.23 (0.19)	-0.19 (0.11)	-0.13 (0.12)	0.32 (0.11)**
Competence				
Overall expertise	11.75 (3.92)**	7.91 (2.3)***	0.26 (2.32)	5.87 (2.29)*
Technical score	-4.31 (1.49)**	-2.61 (0.88)**	-0.11 (0.88)	-2.15 (0.87)*
Soft score	-4.46 (1.62)**	-2.97 (0.95)**	0.06 (0.96)	-2.46 (0.95)**
Scarcity score	-0.33 (0.08)***	-0.27 (0.05)***	-0.11 (0.05)*	-0.16 (0.05)***
Contact network				
Indegree	0.84 (0.24)***	0.81 (0.14)***	0.55 (0.15)***	0.69 (0.14)***
Outdegree	-0.37 (0.16)*	0.09 (0.1)	0.04 (0.1)	-0.19 (0.1)*
Betweenness	-0.28 (0.13)*	-0.01 (0.08)	0.12 (0.08)	0.48 (0.08)***
Closeness	0.06 (0.2)	-0.12 (0.12)	0.24 (0.12)*	0.44 (0.12)***
Clustering	-0.02 (0.11)	0.21 (0.06)**	-0.01 (0.06)	0.47 (0.06)***
Collaboration network				
Indegree	-0.28 (0.31)	-0.43 (0.18)*	-0.35 (0.18)	-0.87 (0.18)***
Outdegree	0.21 (0.19)	0.16 (0.11)	-0.01 (0.11)	0.25 (0.11)*
Betweenness	0.08 (0.11)	0.19 (0.07)**	0.06 (0.07)	-0.12 (0.07)
Closeness	0.23 (0.22)	0.01 (0.13)	-0.19 (0.13)	-0.18 (0.13)
Clustering	0.47 (0.2)*	0.22 (0.12)	0.07 (0.12)	0.11 (0.12)
Friendship network				
Indegree	-0.46 (0.23)*	-0.5 (0.14)***	-0.24 (0.14)	0.1 (0.14)
Outdegree	-0.04 (0.18)	-0.25 (0.11)*	0.15 (0.11)	0.08 (0.1)
Betweenness	0.08 (0.11)	-0.08 (0.06)	-0.11 (0.06)	-0.19 (0.06)**
Closeness	-0.29 (0.18)	0.09 (0.11)	-0.21 (0.11)	0.14 (0.11)
Clustering	-0.75 (0.22)***	-0.34 (0.13)**	-0.03 (0.13)	-0.05 (0.13)
R ²	0.23	0.32	0.16	0.36

$p < .05$, ** $p < .01$, *** $p < .001$



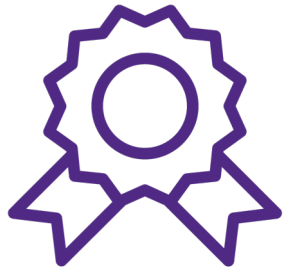
Competence

		DV = Number of Search Preferences Used		
	Competence	Warmth	Bonding	Bridging
(Intercept)	-39.03 (14.23)**	-26.55 (8.37)**	0.56 (8.44)	-20.32 (8.32)*
Control				
Age	-0.01 (0.02)	0.01 (0.01)	-0.01 (0.01)	0 (0.01)
Gender (Female)	0.62 (0.19)**	0.07 (0.11)	0.16 (0.11)	-0.13 (0.11)
Individual traits				
Creativity score	0.63 (0.15)***	0.12 (0.08)	0.12 (0.08)	0.09 (0.09)***
Collective score	0.22 (0.09)*	0.07 (0.05)	0.07 (0.05)	0.05 (0.05)*
Social skills score	-0.28 (0.14)	0.07 (0.08)	0.07 (0.08)	0.08 (0.08)
Leadership score	-0.13 (0.13)	-0.01 (0.08)	0.07 (0.08)	0.08 (0.08)
Personality				
Agreeableness score	0.24 (0.09)**	-0.01 (0.05)	0.07 (0.05)	0.05 (0.05)***
Conscientiousness score	-0.08 (0.09)	0.12 (0.05)	0.07 (0.05)	0.05 (0.05)
Extraversion score	-0.18 (0.09)*	0.07 (0.05)	0.07 (0.05)	0.05 (0.05)
Neuroticism score	0.01 (0.09)	0.07 (0.05)	0.07 (0.05)	0.05 (0.05)
Openness score	0.23 (0.19)	-0.01 (0.11)	0.07 (0.11)	0.11 (0.11)**
Competence				
Overall expertise	11.75 (3.92)**	7.91 (2.3)***	0.26 (2.32)	5.87 (2.29)*
Technical score	-4.31 (1.49)**	-2.61 (0.88)**	-0.11 (0.88)	-2.15 (0.87)*
Soft score	-4.46 (1.62)**	-2.97 (0.95)**	0.06 (0.96)	-2.46 (0.95)**
Scarcity score	-0.33 (0.08)***	-0.27 (0.05)***	-0.11 (0.05)*	-0.16 (0.05)***
Contact network				
Indegree	0.84 (0.24)***	0.81 (0.14)***	0.55 (0.15)***	0.69 (0.14)***
Outdegree	-0.37 (0.16)*	0.09 (0.1)	0.04 (0.1)	-0.19 (0.1)*
Betweenness	-0.28 (0.13)*	-0.01 (0.08)	0.12 (0.08)	0.48 (0.08)***
Closeness	0.06 (0.2)	-0.12 (0.12)	0.24 (0.12)*	0.44 (0.12)***
Clustering	-0.02 (0.11)	0.21 (0.06)**	-0.01 (0.06)	0.47 (0.06)***
Collaboration network				
Indegree	-0.28 (0.31)	-0.43 (0.18)*	-0.35 (0.18)	-0.87 (0.18)***
Outdegree	0.21 (0.19)	0.16 (0.11)	-0.01 (0.11)	0.25 (0.11)*
Betweenness	0.08 (0.11)	0.19 (0.07)**	0.06 (0.07)	-0.12 (0.07)
Closeness	0.23 (0.22)	0.01 (0.13)	-0.19 (0.13)	-0.18 (0.13)
Clustering	0.47 (0.2)*	0.22 (0.12)	0.07 (0.12)	0.11 (0.12)
Friendship network				
Indegree	-0.46 (0.23)*	0.5 (0.14)***	-0.24 (0.14)	0.1 (0.14)
Outdegree	-0.04 (0.18)	-0.25 (0.11)*	0.15 (0.11)	0.08 (0.1)
Betweenness	0.08 (0.11)	-0.08 (0.06)	-0.11 (0.06)	-0.19 (0.06)**
Closeness	-0.29 (0.18)	0.09 (0.11)	-0.21 (0.11)	0.14 (0.11)
Clustering	-0.75 (0.22)***	-0.34 (0.13)**	-0.03 (0.13)	-0.05 (0.13)
R ²	0.23	0.52	0.16	0.56

$p < .05$, ** $p < .01$, *** $p < .001$

Women used competence search preferences more frequently than men





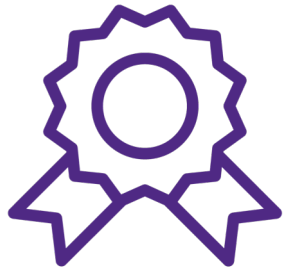
Competence

		DV = Number of Search Preferences Used		
	Competence	Warmth	Bonding	Bridging
(Intercept)	-39.03 (14.23)**	-26.55 (8.37)**	0.56 (8.44)	-20.32 (8.32)*
Control				
Age	-0.01 (0.02)	0.01 (0.01)	-0.01 (0.01)	0 (0.01)
Gender (Female)	0.62 (0.19)**	0.07 (0.11)	0.16 (0.11)	-0.13 (0.11)
Individual traits				
Creativity score	0.63 (0.15)***	0.29 (0.09)***	0.11 (0.09)	0.09 (0.09)***
Collective score	0.22 (0.09)*	0.07 (0.05)*	0.07 (0.05)	0.05 (0.05)*
Social skills score	-0.28 (0.14)	0.01 (0.08)	0.01 (0.08)	0.01 (0.08)
Leadership score	-0.13 (0.13)	-0.01 (0.08)	0.01 (0.08)	0.01 (0.08)
Personality				
Agreeableness score	0.24 (0.09)**	-0.01 (0.05)	0.01 (0.05)	0.05 (0.05)***
Conscientiousness score	-0.08 (0.09)	0.11 (0.05)	0.01 (0.05)	0.01 (0.05)
Extraversion score	-0.18 (0.09)*	0.01 (0.05)	0.01 (0.05)	0.01 (0.05)
Neuroticism score	0.01 (0.09)	0.01 (0.05)	0.01 (0.05)	0.01 (0.05)
Openness score	0.23 (0.19)	-0.19 (0.11)	-0.13 (0.12)	0.32 (0.11)**
Competence				
Overall expertise	11.75 (3.92)**	7.91 (2.3)***	0.26 (2.32)	5.87 (2.29)*
Technical score	-4.31 (1.49)**	-2.61 (0.88)**	-0.11 (0.88)	-2.15 (0.87)*
Soft score	-4.46 (1.62)**	-2.97 (0.95)**	0.06 (0.96)	-2.46 (0.95)**
Scarcity score	-0.33 (0.08)***	-0.27 (0.05)***	-0.11 (0.05)*	-0.16 (0.05)***
Contact network				
Indegree	0.84 (0.24)***	0.81 (0.14)***	0.55 (0.15)***	0.69 (0.14)***
Outdegree	-0.37 (0.16)*	0.09 (0.1)	0.04 (0.1)	-0.19 (0.1)*
Betweenness	-0.28 (0.13)*	-0.01 (0.08)	0.12 (0.08)	0.48 (0.08)***
Closeness	0.06 (0.2)	-0.12 (0.12)	0.24 (0.12)*	0.44 (0.12)***
Clustering	-0.02 (0.11)	0.21 (0.06)**	-0.01 (0.06)	0.47 (0.06)***
Collaboration network				
Indegree	-0.28 (0.31)	-0.43 (0.18)*	-0.35 (0.18)	-0.87 (0.18)***
Outdegree	0.21 (0.19)	0.16 (0.11)	-0.01 (0.11)	0.25 (0.11)*
Betweenness	0.08 (0.11)	0.19 (0.07)**	0.06 (0.07)	-0.12 (0.07)
Closeness	0.23 (0.22)	0.01 (0.13)	-0.19 (0.13)	-0.18 (0.13)
Clustering	0.47 (0.2)*	0.22 (0.12)	0.07 (0.12)	0.11 (0.12)
Friendship network				
Indegree	-0.46 (0.23)*	0.5 (0.14)***	-0.24 (0.14)	0.1 (0.14)
Outdegree	-0.04 (0.18)	-0.25 (0.11)*	0.15 (0.11)	0.08 (0.1)
Betweenness	0.08 (0.11)	-0.08 (0.06)	-0.11 (0.06)	-0.19 (0.06)**
Closeness	-0.29 (0.18)	0.09 (0.11)	-0.21 (0.11)	0.14 (0.11)
Clustering	-0.75 (0.22)***	-0.34 (0.13)**	-0.03 (0.13)	-0.05 (0.13)
R ²	0.23	0.52	0.16	0.56

$p < .05$, ** $p < .01$, *** $p < .001$

Creative people used more competence search preferences





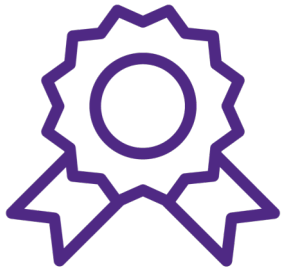
Competence

		DV = Number of Search Preferences Used		
	Competence	Warmth	Bonding	Bridging
(Intercept)	-39.03 (14.23)**	-26.55 (8.37)**	0.56 (8.44)	-20.32 (8.32)*
Control				
Age	-0.01 (0.02)	0.01 (0.01)	-0.01 (0.01)	0 (0.01)
Gender (Female)	0.62 (0.19)**	0.07 (0.11)	0.16 (0.11)	-0.13 (0.11)
Individual traits				
Creativity score	0.63 (0.15)***	-0.01 (0.09)	0.09 (0.09)	0.33 (0.09)***
Collective score	0.22 (0.09)*	0.02 (0.06)	-0.01 (0.06)	0.14 (0.05)*
Social skills score	-0.28 (0.14)	0.33 (0.08)***	0.28 (0.09)**	0.13 (0.08)
Leadership score	-0.13 (0.13)	-0.04 (0.08)	-0.06 (0.08)	-0.14 (0.08)
Personality				
Agreeableness score	0.24 (0.09)**	-0.02 (0.05)	0.1 (0.05)	0.24 (0.05)***
Conscientiousness score	-0.08 (0.09)	0.13 (0.06)*	0.14 (0.06)*	0.06 (0.05)
Extraversion score	-0.18 (0.09)*	0.05 (0.05)	0 (0.05)	0.07 (0.05)
Neuroticism score	0.01 (0.09)	0.08 (0.05)	0.12 (0.05)*	0.02 (0.05)
Openness score	0.23 (0.19)			0.11 (0.11)**
Competence				
Overall expertise	11.75 (3.92)**			0.29 (0.29)*
Technical score	-4.31 (1.49)**			0.87 (0.87)*
Soft score	-4.46 (1.62)**			0.95 (0.95)**
Scarcity score	-0.33 (0.08)***			0.35 (0.35)***
Contact network				
Indegree	0.84 (0.24)***			0.41 (0.41)***
Outdegree	-0.37 (0.16)*			0.11 (0.11)*
Betweenness	-0.28 (0.13)*			0.08 (0.08)***
Closeness	0.06 (0.2)	-0.12 (0.12)	0.24 (0.12)*	0.44 (0.12)***
Clustering	-0.02 (0.11)	0.21 (0.06)**	-0.01 (0.06)	0.47 (0.06)***
Collaboration network				
Indegree	-0.28 (0.31)	-0.43 (0.18)*	-0.35 (0.18)	-0.87 (0.18)***
Outdegree	0.21 (0.19)	0.16 (0.11)	-0.01 (0.11)	0.25 (0.11)*
Betweenness	0.08 (0.11)	0.19 (0.07)**	0.06 (0.07)	-0.12 (0.07)
Closeness	0.23 (0.22)	0.01 (0.13)	-0.19 (0.13)	-0.18 (0.13)
Clustering	0.47 (0.2)*	0.22 (0.12)	0.07 (0.12)	0.11 (0.12)
Friendship network				
Indegree	-0.46 (0.23)*	0.5 (0.14)***	-0.24 (0.14)	0.1 (0.14)
Outdegree	-0.04 (0.18)	-0.25 (0.11)*	0.15 (0.11)	0.08 (0.1)
Betweenness	0.08 (0.11)	-0.08 (0.06)	-0.11 (0.06)	-0.19 (0.06)**
Closeness	-0.29 (0.18)	0.09 (0.11)	-0.21 (0.11)	0.14 (0.11)
Clustering	-0.75 (0.22)***	-0.34 (0.13)**	-0.03 (0.13)	-0.05 (0.13)
R ²	0.23	0.52	0.16	0.56

$p < .05$, ** $p < .01$, *** $p < .001$

People with high overall competence were also looking for others with multiple expertise by selecting multiple search preferences.





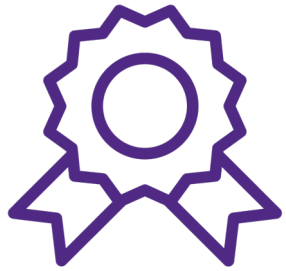
Competence

		DV = Number of Search Preferences Used		
	Competence	Warmth	Bonding	Bridging
(Intercept)	-39.03 (14.23)**	-26.55 (8.37)**	0.56 (8.44)	-20.32 (8.32)*
Control				
Age	-0.01 (0.02)	0.01 (0.01)	-0.01 (0.01)	0 (0.01)
Gender (Female)	0.62 (0.19)**	0.07 (0.11)	0.16 (0.11)	-0.13 (0.11)
Individual traits				
Creativity score	0.63 (0.15)***	-0.01 (0.09)	0.09 (0.09)	0.33 (0.09)***
Collective score	0.22 (0.09)*	0.02 (0.06)	-0.01 (0.06)	0.14 (0.05)*
Social skills score	-0.28 (0.14)	0.33 (0.08)***	0.28 (0.09)**	0.13 (0.08)
Leadership score	-0.13 (0.13)	-0.04 (0.08)	-0.06 (0.08)	-0.14 (0.08)
Personality				
Agreeableness score	0.24 (0.09)**	-0.02 (0.05)	0.1 (0.05)	0.24 (0.05)***
Conscientiousness score	-0.08 (0.09)	0.13 (0.06)*	0.14 (0.06)*	0.06 (0.05)
Extraversion score	-0.18 (0.09)*	0.05 (0.05)	0 (0.05)	0.07 (0.05)
Neuroticism score	0.01 (0.09)	0.08 (0.05)	0.12 (0.05)*	0.02 (0.05)
Openness score	0.23 (0.19)			0.32 (0.11)**
Competence				
Overall expertise	11.75 (3.92)**	7.87 (2.29)*		
Technical score	-4.31 (1.49)**	-2.15 (0.87)*		
Soft score	-4.46 (1.62)**	-1.46 (0.95)**		
Scarcity score	-0.33 (0.08)***	-0.16 (0.05)***		
Contact network				
Indegree	0.84 (0.24)***	0.69 (0.14)***		
Outdegree	-0.37 (0.16)*	-0.19 (0.1)*		
Betweenness	-0.28 (0.13)*	-0.01 (0.08)	0.12 (0.08)	0.48 (0.08)***
Closeness	0.06 (0.2)	-0.12 (0.12)	0.24 (0.12)*	0.44 (0.12)***
Clustering	-0.02 (0.11)	0.21 (0.06)**	-0.01 (0.06)	0.47 (0.06)***
Collaboration network				
Indegree	-0.28 (0.31)	-0.43 (0.18)*	-0.35 (0.18)	-0.87 (0.18)***
Outdegree	0.21 (0.19)	0.16 (0.11)	-0.01 (0.11)	0.25 (0.11)*
Betweenness	0.08 (0.11)	0.19 (0.07)**	0.06 (0.07)	-0.12 (0.07)
Closeness	0.23 (0.22)	0.01 (0.13)	-0.19 (0.13)	-0.18 (0.13)
Clustering	0.47 (0.2)*	0.22 (0.12)	0.07 (0.12)	0.11 (0.12)
Friendship network				
Indegree	-0.46 (0.23)*	0.5 (0.14)***	-0.24 (0.14)	0.1 (0.14)
Outdegree	-0.04 (0.18)	-0.25 (0.11)*	0.15 (0.11)	0.08 (0.1)
Betweenness	0.08 (0.11)	-0.08 (0.06)	-0.11 (0.06)	-0.19 (0.06)**
Closeness	-0.29 (0.18)	0.09 (0.11)	-0.21 (0.11)	0.14 (0.11)
Clustering	-0.75 (0.22)***	-0.34 (0.13)**	-0.03 (0.13)	-0.05 (0.13)
R ²	0.23	0.52	0.16	0.56

$p < .05$, ** $p < .01$, *** $p < .001$

However, people with either higher technical or soft skills used fewer search preferences.





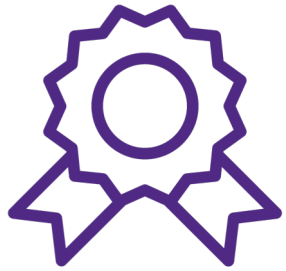
Competence

		DV = Number of Search Preferences Used		
	Competence	Warmth	Bonding	Bridging
(Intercept)	-39.03 (14.23)**	-26.55 (8.37)**	0.56 (8.44)	-20.32 (8.32)*
Control				
Age	-0.01 (0.02)	0.01 (0.01)	-0.01 (0.01)	0 (0.01)
Gender (Female)	0.62 (0.19)**	0.07 (0.11)	0.16 (0.11)	-0.13 (0.11)
Individual traits				
Creativity score	0.63 (0.15)***	-0.01 (0.09)	0.09 (0.09)	0.33 (0.09)***
Collective score	0.22 (0.09)*	0.02 (0.06)	-0.01 (0.06)	0.14 (0.05)*
Social skills score	-0.28 (0.14)	0.33 (0.08)***	0.28 (0.09)**	0.13 (0.08)
Leadership score	-0.13 (0.13)	-0.04 (0.08)	-0.06 (0.08)	-0.14 (0.08)
Personality				
Agreeableness score	0.24 (0.09)**	-0.02 (0.05)	0.1 (0.05)	0.24 (0.05)***
Conscientiousness score	-0.08 (0.09)	0.13 (0.06)*	0.14 (0.06)*	0.06 (0.05)
Extraversion score	-0.18 (0.09)*	0.05 (0.05)	0 (0.05)	0.07 (0.05)
Neuroticism score	0.01 (0.09)	0.08 (0.05)	0.12 (0.05)*	0.02 (0.05)
Openness score	0.23 (0.19)			
Competence				
Overall expertise	11.75 (3.92)**			
Technical score	-4.31 (1.49)**			
Soft score	-4.46 (1.62)**			
Scarcity score	-0.33 (0.08)***			
Contact network				
Indegree	0.84 (0.24)***			
Outdegree	-0.37 (0.16)*			
Betweenness	-0.28 (0.13)*			
Closeness	0.06 (0.2)			
Clustering	-0.02 (0.11)	0.21 (0.06)**	-0.01 (0.06)	0.47 (0.06)***
Collaboration network				
Indegree	-0.28 (0.31)	-0.43 (0.18)*	-0.35 (0.18)	-0.87 (0.18)***
Outdegree	0.21 (0.19)	0.16 (0.11)	-0.01 (0.11)	0.25 (0.11)*
Betweenness	0.08 (0.11)	0.19 (0.07)**	0.06 (0.07)	-0.12 (0.07)
Closeness	0.23 (0.22)	0.01 (0.13)	-0.19 (0.13)	-0.18 (0.13)
Clustering	0.47 (0.2)*	0.22 (0.12)	0.07 (0.12)	0.11 (0.12)
Friendship network				
Indegree	-0.46 (0.23)*	0.5 (0.14)***	-0.24 (0.14)	0.1 (0.14)
Outdegree	-0.04 (0.18)	-0.25 (0.11)*	0.15 (0.11)	0.08 (0.1)
Betweenness	0.08 (0.11)	-0.08 (0.06)	-0.11 (0.06)	-0.19 (0.06)**
Closeness	-0.29 (0.18)	0.09 (0.11)	-0.21 (0.11)	0.14 (0.11)
Clustering	-0.75 (0.22)***	-0.34 (0.13)**	-0.03 (0.13)	-0.05 (0.13)
R ²	0.23	0.52	0.16	0.56

$p < .05$, ** $p < .01$, *** $p < .001$

People mentioned as contacts by many used more competence search preferences.
Not the same for those who mentioned many as contacts





Competence

		DV = Number of Search Preferences Used		
	Competence	Warmth	Bonding	Bridging
(Intercept)	-39.03 (14.23)**	-26.55 (8.37)**	0.56 (8.44)	-20.32 (8.32)*
Control				
Age	-0.01 (0.02)	0.01 (0.01)	-0.01 (0.01)	0 (0.01)
Gender (Female)	0.62 (0.19)**	0.07 (0.11)	0.16 (0.11)	-0.13 (0.11)
Individual traits				
Creativity score	0.63 (0.15)***	-0.01 (0.09)	0.09 (0.09)	0.33 (0.09)***
Collective score	0.22 (0.09)*	0.02 (0.06)	-0.01 (0.06)	0.14 (0.05)*
Social skills score	-0.28 (0.14)	0.33 (0.08)***	0.28 (0.09)**	0.13 (0.08)
Leadership score	-0.13 (0.13)	-0.04 (0.08)	-0.06 (0.08)	-0.14 (0.08)
Personality				
Agreeableness score	0.24 (0.09)**	-0.02 (0.05)	0.1 (0.05)	0.24 (0.05)***
Conscientiousness score	-0.08 (0.09)	0.13 (0.06)*	0.14 (0.06)*	0.06 (0.05)
Extraversion score	-0.18 (0.09)*	0.05 (0.05)	0 (0.05)	0.07 (0.05)
Neuroticism score	0.01 (0.09)	0.08 (0.05)	0.12 (0.05)*	0.02 (0.05)
Openness score	0.23 (0.19)	-0.19 (0.11)	-0.13 (0.12)	0.32 (0.11)**
Competence				
Overall expertise	11.75 (3.92)**	7.91 (2.3)***	0.26 (2.32)	5.87 (2.29)*
Technical score	-4.31 (1.49)**	-2.61 (0.88)**	-0.11 (0.88)	-2.15 (0.87)*
Soft score	-4.46 (1.62)**	-2.97 (0.95)**	0.06 (0.96)	-2.46 (0.95)**
Scarcity score	-0.33 (0.08)***	-0.27 (0.05)***	-0.11 (0.05)*	-0.16 (0.05)***
Contact network				
Indegree	0.84 (0.24)***	0.84 (0.13)***	0.55 (0.15)***	0.60 (0.14)***
Outdegree	-0.37 (0.16)*	-0.37 (0.16)*	-0.37 (0.16)*	-0.37 (0.16)*
Betweenness	-0.28 (0.13)*	-0.28 (0.13)*	-0.28 (0.13)*	-0.28 (0.13)*
Closeness	0.06 (0.2)	0.06 (0.2)	0.06 (0.2)	0.06 (0.2)
Clustering	-0.02 (0.11)	-0.02 (0.11)	-0.02 (0.11)	-0.02 (0.11)
Collaboration network				
Indegree	-0.28 (0.31)	-0.28 (0.31)	-0.28 (0.31)	-0.28 (0.31)
Outdegree	0.21 (0.19)	0.21 (0.19)	0.21 (0.19)	0.21 (0.19)
Betweenness	0.08 (0.11)	0.08 (0.11)	0.08 (0.11)	0.08 (0.11)
Closeness	0.23 (0.22)	0.23 (0.22)	0.23 (0.22)	0.23 (0.22)
Clustering	0.47 (0.2)*	0.47 (0.2)*	0.47 (0.2)*	0.47 (0.2)*
Friendship network				
Indegree	-0.46 (0.23)*	-0.5 (0.14)***	-0.24 (0.14)	0.1 (0.14)
Outdegree	-0.04 (0.18)	-0.25 (0.11)*	0.15 (0.11)	0.08 (0.1)
Betweenness	0.08 (0.11)	-0.08 (0.06)	-0.11 (0.06)	-0.19 (0.06)**
Closeness	-0.29 (0.18)	0.09 (0.11)	-0.21 (0.11)	0.14 (0.11)
Clustering	-0.75 (0.22)***	-0.34 (0.13)**	-0.03 (0.13)	-0.05 (0.13)
R ²	0.23	0.52	0.16	0.56

$p < .05$, ** $p < .01$, *** $p < .001$

Finally, people mentioned as friends by many and those who were located in friendship cliques, were less likely to use competence search preferences





Warmth

	DV = Number of Search Preferences Used			
	Competence	Warmth	Bonding	Bridging
(Intercept)	-39.03 (14.23)**	-26.55 (8.37)**	0.56 (8.44)	-20.32 (8.32)*
Control				
Age	-0.01 (0.02)	0.01 (0.01)	-0.01 (0.01)	0 (0.01)
Gender (Female)	0.62 (0.19)**	0.07 (0.11)	0.16 (0.11)	-0.13 (0.11)
Individual traits				
Creativity score	0.63 (0.15)***	-0.01 (0.09)	0.09 (0.09)	0.33 (0.09)***
Collective score	0.22 (0.09)*	0.02 (0.06)	-0.01 (0.06)	0.14 (0.05)*
Social skills score	-0.28 (0.14)	0.33 (0.08)***	0.28 (0.09)**	0.13 (0.08)
Leadership score	-0.13 (0.13)	-0.04 (0.08)	-0.06 (0.08)	-0.14 (0.08)
Personality				
Agreeableness score	0.24 (0.09)**	-0.02 (0.05)	0.1 (0.05)	0.24 (0.05)***
Conscientiousness score	-0.08 (0.09)	0.13 (0.06)*	0.14 (0.06)*	0.06 (0.05)
Extraversion score	-0.18 (0.09)*	0.05 (0.05)	0 (0.05)	0.07 (0.05)
Neuroticism score	0.01 (0.09)	0.08 (0.05)	0.12 (0.05)*	0.02 (0.05)
Openness score	0.23 (0.19)	-0.19 (0.11)	-0.1 (0.11)	-0.1 (0.11)
Competence				
Overall expertise	11.75 (3.92)**	7.91 (2.3)***	0.01 (0.01)	0.01 (0.01)
Technical score	-4.31 (1.49)**	-2.61 (0.88)**	0.01 (0.01)	0.01 (0.01)
Soft score	-4.46 (1.62)**	-2.97 (0.95)**	0.01 (0.01)	0.01 (0.01)
Scarcity score	-0.33 (0.08)***	-0.27 (0.05)***	-0.1 (0.05)	-0.1 (0.05)
Contact network				
Indegree	0.84 (0.24)***	0.81 (0.14)***	0.55 (0.14)***	0.47 (0.14)***
Outdegree	-0.37 (0.16)*	0.09 (0.1)	0.1 (0.1)	0.1 (0.1)
Betweenness	-0.28 (0.13)*	-0.01 (0.08)	0.1 (0.08)	0.1 (0.08)
Closeness	0.06 (0.2)	-0.12 (0.12)	0.2 (0.12)	0.2 (0.12)
Clustering	-0.02 (0.11)	0.21 (0.06)**	-0.01 (0.06)	0.47 (0.06)***
Collaboration network				
Indegree	-0.28 (0.31)	-0.43 (0.18)*	-0.35 (0.18)	-0.87 (0.18)***
Outdegree	0.21 (0.19)	0.16 (0.11)	-0.01 (0.11)	0.25 (0.11)*
Betweenness	0.08 (0.11)	0.19 (0.07)**	0.06 (0.07)	-0.12 (0.07)
Closeness	0.23 (0.22)	0.01 (0.13)	-0.19 (0.13)	-0.18 (0.13)
Clustering	0.47 (0.2)*	0.22 (0.12)	0.07 (0.12)	0.11 (0.12)
Friendship network				
Indegree	-0.46 (0.23)*	-0.5 (0.14)***	-0.24 (0.14)	0.1 (0.14)
Outdegree	-0.04 (0.18)	-0.25 (0.11)*	0.15 (0.11)	0.08 (0.1)
Betweenness	0.08 (0.11)	-0.08 (0.06)	-0.11 (0.06)	-0.19 (0.06)**
Closeness	-0.29 (0.18)	0.09 (0.11)	-0.21 (0.11)	0.14 (0.11)
Clustering	-0.75 (0.22)***	-0.34 (0.13)**	-0.03 (0.13)	-0.05 (0.13)
R ²	0.25	0.32	0.16	0.56

p < .05, ***p* < .01, ****p* < .001

The main drivers of warmth searches come from highly overall competent individuals.





Warmth

	DV = Number of Search Preferences Used			
	Competence	Warmth	Bonding	Bridging
(Intercept)	-39.03 (14.23)**	-26.55 (8.37)**	0.56 (8.44)	-20.32 (8.32)*
Control				
Age	-0.01 (0.02)	0.01 (0.01)	-0.01 (0.01)	0 (0.01)
Gender (Female)	0.62 (0.19)**	0.07 (0.11)	0.16 (0.11)	-0.13 (0.11)
Individual traits				
Creativity score	0.63 (0.15)***	-0.01 (0.09)	0.09 (0.09)	0.33 (0.09)***
Collective score	0.22 (0.09)*	0.02 (0.06)	-0.01 (0.06)	0.14 (0.05)*
Social skills score	-0.28 (0.14)	0.33 (0.08)***	0.28 (0.09)**	0.13 (0.08)
Leadership score	-0.13 (0.13)	-0.04 (0.08)	-0.06 (0.08)	-0.14 (0.08)
Personality				
Agreeableness score	0.24 (0.09)**	-0.02 (0.05)	0.1 (0.05)	0.24 (0.05)***
Conscientiousness score	-0.08 (0.09)	0.13 (0.06)*	0.14 (0.06)*	0.06 (0.05)
Extraversion score	-0.18 (0.09)*	0.05 (0.05)	0 (0.05)	0.07 (0.05)
Neuroticism score	0.01 (0.09)	0.08 (0.05)	0.12 (0.05)*	0.02 (0.05)
Openness score	0.23 (0.19)	-0.19 (0.11)	-0.13 (0.12)	0.32 (0.11)**
Competence				
Overall expertise	11.75 (3.92)**	7.91 (2.3)***	0.26 (2.32)	5.87 (2.29)*
Technical score	-4.31 (1.49)**	-2.61 (0.88)**	-0.11 (0.88)	-2.15 (0.87)*
Soft score	-4.46 (1.62)**	-2.97 (0.95)**	0.06 (0.96)	-2.46 (0.95)**
Scarcity score	-0.33 (0.08)***	-0.27 (0.05)***	-0.11 (0.05)*	-0.16 (0.05)***
Contact network				
Indegree	0.84 (0.24)***	0.81 (0.14)***	0.55 (0.15)***	0.69 (0.14)***
Outdegree	-0.37 (0.16)*	0.09 (0.1)	0.04 (0.1)	-0.19 (0.1)*
Betweenness	-0.28 (0.13)*	-0.01 (0.08)	0.12 (0.08)	0.48 (0.08)***
Closeness	0.06 (0.2)	-0.12 (0.12)	0.17 (0.12)	0.14 (0.12)
Clustering	-0.02 (0.11)	0.21 (0.06)**	0.11 (0.11)	0.11 (0.11)
Collaboration network				
Indegree	-0.28 (0.31)	-0.43 (0.18)*	0.11 (0.35)	0.12 (0.35)
Outdegree	0.21 (0.19)	0.16 (0.11)	0.11 (0.19)	0.12 (0.19)
Betweenness	0.08 (0.11)	0.19 (0.07)**	0.11 (0.11)	0.12 (0.11)
Closeness	0.23 (0.22)	0.01 (0.13)	0.11 (0.11)	0.12 (0.11)
Clustering	0.47 (0.2)*	0.22 (0.12)	0.11 (0.11)	0.12 (0.11)
Friendship network				
Indegree	-0.46 (0.23)*	-0.5 (0.14)***	-0.11 (0.11)	-0.12 (0.11)
Outdegree	-0.04 (0.18)	-0.25 (0.11)*	-0.11 (0.11)	-0.12 (0.11)
Betweenness	0.08 (0.11)	-0.08 (0.06)	-0.11 (0.11)	-0.12 (0.11)
Closeness	-0.29 (0.18)	0.09 (0.11)	-0.21 (0.11)	0.14 (0.11)
Clustering	-0.75 (0.22)***	-0.34 (0.13)**	-0.03 (0.13)	-0.05 (0.13)
R ²	0.25	0.32	0.16	0.56

p < .05, ***p* < .01, ****p* < .001

In contrast, people who have been working with many did not use many warmth search preferences





Warmth

	DV = Number of Search Preferences Used			
	Competence	Warmth	Bonding	Bridging
(Intercept)	-39.03 (14.23)**	-26.55 (8.37)**	0.56 (8.44)	-20.32 (8.32)*
Control				
Age	-0.01 (0.02)	0.01 (0.01)	-0.01 (0.01)	0 (0.01)
Gender (Female)	0.62 (0.19)**	0.07 (0.11)	0.16 (0.11)	-0.13 (0.11)
Individual traits				
Creativity score	0.63 (0.15)***	-0.01 (0.09)	0.09 (0.09)	0.33 (0.09)***
Collective score	0.22 (0.09)*	0.02 (0.06)	-0.01 (0.06)	0.14 (0.05)*
Social skills score	-0.28 (0.14)	0.33 (0.08)***	0.28 (0.09)**	0.13 (0.08)
Leadership score	-0.13 (0.13)	-0.04 (0.08)	-0.06 (0.08)	-0.14 (0.08)
Personality				
Agreeableness score	0.24 (0.09)**	-0.02 (0.05)	0.1 (0.05)	0.24 (0.05)***
Conscientiousness score	-0.08 (0.09)	0.13 (0.06)*	0.14 (0.06)*	0.06 (0.05)
Extraversion score	-0.18 (0.09)*	0.05 (0.05)	0 (0.05)	0.07 (0.05)
Neuroticism score	0.01 (0.09)	0.08 (0.05)	0.12 (0.05)*	0.02 (0.05)
Openness score	0.23 (0.19)	-0.19 (0.11)	-0.13 (0.12)	0.32 (0.11)**
Competence				
Overall expertise	11.75 (3.92)**	7.91 (2.3)***	0.26 (2.32)	5.87 (2.29)*
Technical score	-4.31 (1.49)**	-2.61 (0.88)**	-0.11 (0.88)	-2.15 (0.87)*
Soft score	-4.46 (1.62)**	-2.97 (0.95)**	0.06 (0.96)	-2.46 (0.95)**
Scarcity score	-0.33 (0.08)***	-0.27 (0.05)***	-0.11 (0.05)*	-0.16 (0.05)***
Contact network				
Indegree	0.84 (0.24)***	0.81 (0.14)***	0.55 (0.15)***	0.69 (0.14)***
Outdegree	-0.37 (0.16)*	0.09 (0.1)	0.04 (0.1)	-0.19 (0.1)*
Betweenness	-0.28 (0.13)*	-0.01 (0.08)	0	0
Closeness	0.06 (0.2)	-0.12 (0.12)	0	0
Clustering	-0.02 (0.11)	0.21 (0.06)**	0	0
Collaboration network				
Indegree	-0.28 (0.31)	-0.43 (0.18)*	-0	-0
Outdegree	0.21 (0.19)	0.16 (0.11)	-0	-0
Betweenness	0.08 (0.11)	0.19 (0.07)**	0	0
Closeness	0.23 (0.22)	0.01 (0.13)	-0	-0
Clustering	0.47 (0.2)*	0.22 (0.12)	-0	-0
Friendship network				
Indegree	-0.46 (0.23)*	-0.5 (0.14)***	-0	-0
Outdegree	-0.04 (0.18)	-0.25 (0.11)*	-0	-0
Betweenness	0.08 (0.11)	-0.08 (0.06)	-0.11 (0.06)	-0.19 (0.06)**
Closeness	-0.29 (0.18)	0.09 (0.11)	-0.21 (0.11)	0.14 (0.11)
Clustering	-0.75 (0.22)***	-0.34 (0.13)**	-0.03 (0.13)	-0.05 (0.13)
R ²	0.25	0.32	0.16	0.56

$p < .05$, ** $p < .01$, *** $p < .001$

People who chose many friends, and were chosen as friends by many, were less likely to use warmth search preferences.





Bonding capital

	DV = Number of Search Preferences Used			
	Competence	Warmth	Bonding	Bridging
(Intercept)	-39.03 (14.23)**	-26.55 (8.37)**	0.56 (8.44)	-20.32 (8.32)*
Control				
Age	-0.01 (0.02)	0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
Gender (Female)	0.62 (0.19)**	0.07 (0.11)	0.16 (0.11)	-0.01 (0.06)
Individual traits				
Creativity score	0.63 (0.15)***	-0.01 (0.09)	0.09 (0.09)	0.31 (0.09)**
Collective score	0.22 (0.09)*	0.02 (0.06)	-0.01 (0.06)	0.01 (0.05)
Social skills score	-0.28 (0.14)	0.33 (0.08)***	0.28 (0.09)**	0.01 (0.05)
Leadership score	-0.13 (0.13)	-0.04 (0.08)	-0.06 (0.08)	-0.01 (0.05)
Personality				
Agreeableness score	0.24 (0.09)**	-0.02 (0.05)	0.1 (0.05)	0.02 (0.03)
Conscientiousness score	-0.08 (0.09)	0.13 (0.06)*	0.14 (0.06)*	0.02 (0.03)
Extraversion score	-0.18 (0.09)*	0.05 (0.05)	0 (0.05)	0.02 (0.03)
Neuroticism score	0.01 (0.09)	0.08 (0.05)	0.12 (0.05)*	0.02 (0.03)
Openness score	0.23 (0.19)	-0.19 (0.11)	-0.13 (0.12)	0.32 (0.11)**
Competence				
Overall expertise	11.75 (3.92)**	7.91 (2.3)***	0.26 (2.32)	5.87 (2.29)*
Technical score	-4.31 (1.49)**	-2.61 (0.88)**	-0.11 (0.88)	-2.15 (0.87)*
Soft score	-4.46 (1.62)**	-2.97 (0.95)**	0.06 (0.96)	-2.46 (0.95)**
Scarcity score	-0.33 (0.08)***	-0.27 (0.05)***	-0.11 (0.05)*	-0.16 (0.05)***
Contact network				
Indegree	0.84 (0.24)***	0.81 (0.14)***	0.55 (0.15)***	0.69 (0.14)***
Outdegree	-0.37 (0.16)*	0.09 (0.1)	0.04 (0.1)	-0.19 (0.1)*
Betweenness	-0.28 (0.13)*	-0.01 (0.08)	0.12 (0.08)	0.48 (0.08)***
Closeness	0.06 (0.2)	-0.12 (0.12)	0.24 (0.12)*	0.44 (0.12)***
Clustering	-0.02 (0.11)	0.21 (0.06)**	-0.01 (0.06)	0.47 (0.06)***
Collaboration network				
Indegree	-0.28 (0.31)	-0.43 (0.18)*	-0.35 (0.18)	-0.87 (0.18)***
Outdegree	0.21 (0.19)	0.16 (0.11)	-0.01 (0.11)	0.25 (0.11)*
Betweenness	0.08 (0.11)	0.19 (0.07)**	0.06 (0.07)	-0.12 (0.07)
Closeness	0.23 (0.22)	0.01 (0.13)	-0.19 (0.13)	-0.18 (0.13)
Clustering	0.47 (0.2)*	0.22 (0.12)	0.07 (0.12)	0.11 (0.12)
Friendship network				
Indegree	-0.46 (0.23)*	-0.5 (0.14)***	-0.24 (0.14)	0.1 (0.14)
Outdegree	-0.04 (0.18)	-0.25 (0.11)*	0.15 (0.11)	0.08 (0.1)
Betweenness	0.08 (0.11)	-0.08 (0.06)	-0.11 (0.06)	-0.19 (0.06)**
Closeness	-0.29 (0.18)	0.09 (0.11)	-0.21 (0.11)	0.14 (0.11)
Clustering	-0.75 (0.22)***	-0.34 (0.13)**	-0.03 (0.13)	-0.05 (0.13)
R ²	0.25	0.52	0.16	0.56

p < .05, ***p* < .01, ****p* < .001

Conscientious people and those with higher neuroticism used more bonding capital search preferences.





Bonding capital

	DV = Number of Search Preferences Used			
	Competence	Warmth	Bonding	Bridging
(Intercept)	-39.03 (14.23)**	-26.55 (8.37)**	0.56 (8.44)	-20.32 (8.32)*
Control				
Age	-0.01 (0.02)	0.01 (0.01)	-0.01 (0.01)	0 (0.01)
Gender (Female)	0.62 (0.19)**	0.07 (0.11)	0.16 (0.11)	-0.13 (0.11)
Individual traits				
Creativity score	0.63 (0.15)***	-0.01 (0.09)	0.09 (0.09)	0.33 (0.09)***
Collective score	0.22 (0.09)*	0.02 (0.06)	-0.01 (0.06)	0.14 (0.05)*
Social skills score	-0.28 (0.14)	0.33 (0.08)***	0.28 (0.09)**	0.13 (0.08)
Leadership score	-0.13 (0.13)	-0.04 (0.08)	-0.06 (0.08)	-0.14 (0.08)
Personality				
Agreeableness score	0.24 (0.09)**	-0.02 (0.05)	0.1 (0.05)	0.24 (0.05)***
Conscientiousness score	-0.08 (0.09)	0.13 (0.06)*	0.14 (0.06)*	0.06 (0.05)
Extraversion score	-0.18 (0.09)*	0.05 (0.05)	0 (0.05)	0.07 (0.05)
Neuroticism score	0.01 (0.09)	0.08 (0.05)	0.12 (0.05)*	
Openness score	0.23 (0.19)	-0.19 (0.11)	-0.13 (0.12)	
Competence				
Overall expertise	11.75 (3.92)**	7.91 (2.3)***	0.26 (2.32)	
Technical score	-4.31 (1.49)**	-2.61 (0.88)**	-0.11 (0.88)	
Soft score	-4.46 (1.62)**	-2.97 (0.95)**	0.06 (0.96)	
Scarcity score	-0.33 (0.08)***	-0.27 (0.05)***	-0.11 (0.05)*	
Contact network				
Indegree	0.84 (0.24)***	0.81 (0.14)***	0.55 (0.15)***	
Outdegree	-0.37 (0.16)*	0.09 (0.1)	0.04 (0.1)	
Betweenness	-0.28 (0.13)*	-0.01 (0.08)	0.12 (0.08)	
Closeness	0.06 (0.2)	-0.12 (0.12)	0.24 (0.12)*	
Clustering	-0.02 (0.11)	0.21 (0.06)**	-0.01 (0.06)	0.47 (0.06)***
Collaboration network				
Indegree	-0.28 (0.31)	-0.43 (0.18)*	-0.35 (0.18)	-0.87 (0.18)***
Outdegree	0.21 (0.19)	0.16 (0.11)	-0.01 (0.11)	0.25 (0.11)*
Betweenness	0.08 (0.11)	0.19 (0.07)**	0.06 (0.07)	-0.12 (0.07)
Closeness	0.23 (0.22)	0.01 (0.13)	-0.19 (0.13)	-0.18 (0.13)
Clustering	0.47 (0.2)*	0.22 (0.12)	0.07 (0.12)	0.11 (0.12)
Friendship network				
Indegree	-0.46 (0.23)*	-0.5 (0.14)***	-0.24 (0.14)	0.1 (0.14)
Outdegree	-0.04 (0.18)	-0.25 (0.11)*	0.15 (0.11)	0.08 (0.1)
Betweenness	0.08 (0.11)	-0.08 (0.06)	-0.11 (0.06)	-0.19 (0.06)**
Closeness	-0.29 (0.18)	0.09 (0.11)	-0.21 (0.11)	0.14 (0.11)
Clustering	-0.75 (0.22)***	-0.34 (0.13)**	-0.03 (0.13)	-0.05 (0.13)
R ²	0.25	0.52	0.16	0.56

p < .05, ***p* < .01, ****p* < .001

People mentioned by many as contacts, and those who were closer to others, used more bonding capital search preferences



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advancing the
science of networks in communities



Bonding
capital

	DV = Number of Search Preferences Used			
	Competence	Warmth	Bonding	Bridging
(Intercept)	-39.03 (14.23)**	-26.55 (8.37)**	0.56 (8.44)	-20.32 (8.32)*
Control				
Age	-0.01 (0.01)			0 (0.01)
Gender (Female)	0.62 (0.14)**			-0.13 (0.11)
Individual traits				
Creativity score	0.63 (0.15)**			0.33 (0.09)***
Collective score	0.22 (0.09)*			0.14 (0.05)*
Social skills score	-0.28 (0.12)			0.13 (0.08)
Leadership score	-0.13 (0.05)			-0.14 (0.08)
Personality				
Agreeableness score	0.24 (0.09)*			0.24 (0.05)***
Conscientiousness score	-0.08 (0.05)			0.06 (0.05)
Extraversion score	0.18 (0.07)*			0.07 (0.05)
Neuroticism score	0.01 (0.09)	0.08 (0.05)	0.12 (0.05)*	0.02 (0.05)
Openness score	0.23 (0.19)	-0.19 (0.11)	-0.13 (0.12)	0.32 (0.11)**
Competence				
Overall expertise	11.75 (3.92)**	7.91 (2.3)***	0.26 (2.32)	5.87 (2.29)*
Technical score	-4.31 (1.49)**	-2.61 (0.88)**	-0.11 (0.88)	-2.15 (0.87)*
Soft score	-4.46 (1.62)**	-2.97 (0.95)**	0.06 (0.96)	-2.46 (0.95)**
Scarcity score	-0.33 (0.08)***	-0.27 (0.05)***	-0.11 (0.05)*	-0.16 (0.05)***
Contact network				
Indegree	0.84 (0.24)***	0.81 (0.14)***	0.55 (0.15)***	0.69 (0.14)***
Outdegree	-0.37 (0.16)*	0.09 (0.1)	0.04 (0.1)	-0.19 (0.1)*
Betweenness	-0.28 (0.13)*	-0.01 (0.08)	0.12 (0.08)	0.48 (0.08)***
Closeness	0.06 (0.2)	-0.12 (0.12)	0.24 (0.12)*	0.44 (0.12)***
Clustering	-0.02 (0.11)	0.21 (0.06)**	-0.01 (0.06)	0.47 (0.06)***
Collaboration network				
Indegree	-0.28 (0.31)	-0.43 (0.18)*	-0.35 (0.18)	-0.87 (0.18)***
Outdegree	0.21 (0.19)	0.16 (0.11)	-0.01 (0.11)	0.25 (0.11)*
Betweenness	0.08 (0.11)	0.19 (0.07)**	0.06 (0.07)	-0.12 (0.07)
Closeness	0.23 (0.22)	0.01 (0.13)	-0.19 (0.13)	-0.18 (0.13)
Clustering	0.47 (0.2)*	0.22 (0.12)	0.07 (0.12)	0.11 (0.12)
Friendship network				
Indegree	-0.46 (0.23)*	-0.5 (0.14)***	-0.24 (0.14)	0.1 (0.14)
Outdegree	-0.04 (0.18)	-0.25 (0.11)*	0.15 (0.11)	0.08 (0.1)
Betweenness	0.08 (0.11)	-0.08 (0.06)	-0.11 (0.06)	-0.19 (0.06)**
Closeness	-0.29 (0.18)	0.09 (0.11)	-0.21 (0.11)	0.14 (0.11)
Clustering	-0.75 (0.22)***	-0.34 (0.13)**	-0.03 (0.13)	-0.05 (0.13)
R ²	0.25	0.52	0.16	0.36

* $p < .05$, ** $p < .01$, *** $p < .001$

Creative people and those
with team values used
more bridging search
preferences



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	DV = Number of Search Preferences Used			
	Competence	Warmth	Bonding	Bridging
(Intercept)	-39.03 (14.23)**	-26.55 (8.37)**	0.56 (8.44)	-20.32 (8.32)*
Control				
Age	-0.01 (0.02)	0.01 (0.01)	-0.01 (0.01)	0 (0.01)
Gender (Female)	0.62 (0.19)**	0.07 (0.11)	0.16 (0.11)	-0.13 (0.11)
Individual traits				
Creativity score	0.63 (0.15)***	-0.01 (0.09)	0.09 (0.09)	0.33 (0.09)***
Collective score	0.22 (0.09)*	0.02 (0.06)	-0.01 (0.06)	0.14 (0.05)*
Social skills score	-0.28 (0.12)			0.13 (0.08)
Leadership score	-0.13 (0.08)			-0.14 (0.08)
Personality				
Agreeableness score	0.24 (0.05)***			0.24 (0.05)***
Conscientiousness score	-0.08 (0.05)			0.06 (0.05)
Extraversion score	-0.18 (0.05)			0.07 (0.05)
Neuroticism score	0.01 (0.05)			0.02 (0.05)
Openness score	0.23 (0.05)			0.32 (0.11)**
Competence				
Overall expertise	11.75 (3.5)			5.87 (2.29)*
Technical score	-4.31 (1.4)			-2.15 (0.87)*
Soft score	-4.46 (1.62)**	-2.97 (0.95)**	0.06 (0.96)	-2.46 (0.95)**
Scarcity score	-0.33 (0.08)***	-0.27 (0.05)***	-0.11 (0.05)*	-0.16 (0.05)***
Contact network				
Indegree	0.84 (0.24)***	0.81 (0.14)***	0.55 (0.15)***	0.69 (0.14)***
Outdegree	-0.37 (0.16)*	0.09 (0.1)	0.04 (0.1)	-0.19 (0.1)*
Betweenness	-0.28 (0.13)*	-0.01 (0.08)	0.12 (0.08)	0.48 (0.08)***
Closeness	0.06 (0.2)	-0.12 (0.12)	0.24 (0.12)*	0.44 (0.12)***
Clustering	-0.02 (0.11)	0.21 (0.06)**	-0.01 (0.06)	0.47 (0.06)***
Collaboration network				
Indegree	-0.28 (0.31)	-0.43 (0.18)*	-0.35 (0.18)	-0.87 (0.18)***
Outdegree	0.21 (0.19)	0.16 (0.11)	-0.01 (0.11)	0.25 (0.11)*
Betweenness	0.08 (0.11)	0.19 (0.07)**	0.06 (0.07)	-0.12 (0.07)
Closeness	0.23 (0.22)	0.01 (0.13)	-0.19 (0.13)	-0.18 (0.13)
Clustering	0.47 (0.2)*	0.22 (0.12)	0.07 (0.12)	0.11 (0.12)
Friendship network				
Indegree	-0.46 (0.23)*	-0.5 (0.14)***	-0.24 (0.14)	0.1 (0.14)
Outdegree	-0.04 (0.18)	-0.25 (0.11)*	0.15 (0.11)	0.08 (0.1)
Betweenness	0.08 (0.11)	-0.08 (0.06)	-0.11 (0.06)	-0.19 (0.06)**
Closeness	-0.29 (0.18)	0.09 (0.11)	-0.21 (0.11)	0.14 (0.11)
Clustering	-0.75 (0.22)***	-0.34 (0.13)**	-0.03 (0.13)	-0.05 (0.13)
R ²	0.25	0.52	0.16	0.36

Participants who were agreeable and open searched for brokers and popular participants.





Bridging
capital

	DV = Number of Search Preferences Used			
	Competence	Warmth	Bonding	Bridging
(Intercept)	-39.03 (14.23)**	-26.55 (8.37)**	0.56 (8.44)	-20.32 (8.32)*
Control				
Age	-0.01 (0.02)	0.01 (0.01)	-0.01 (0.01)	0 (0.01)
Gender (Female)	0.62 (0.19)**	0.07 (0.11)	0.16 (0.11)	-0.13 (0.11)
Individual traits				
Creativity score	0.63 (0.15)***	-0.01 (0.09)	0.09 (0.09)	0.33 (0.09)***
Collective score	0.22 (0.09)*	0.02 (0.06)	-0.01 (0.06)	0.14 (0.05)*
Social skills score	-0.28 (0.14)	0.33 (0.08)***	0.28 (0.09)**	0.13 (0.08)
Leadership score	-0.13 (0.13)	-0.04 (0.08)	-0.06 (0.08)	-0.14 (0.08)
Personality				
Agreeableness score	0.24 (0.09)**	-0.02 (0.05)	0.1 (0.05)	0.24 (0.05)***
Conscientiousness score	-0.08 (0.09)	0.13 (0.06)*	0.14 (0.06)*	0.06 (0.05)
Extraversion score	-0.18 (0.08)**	0.05 (0.05)	0.01 (0.05)	0.07 (0.05)
Neuroticism score	0.01 (0.08)	0.01 (0.08)	0.01 (0.08)	0.02 (0.05)
Openness score	0.23 (0.11)	0.01 (0.08)	0.01 (0.08)	0.32 (0.11)**
Competence				
Overall expertise	11.75 (3.9)			5.87 (2.29)*
Technical score	-4.31 (1.4)			-2.15 (0.87)*
Soft score	-4.46 (1.6)			-2.46 (0.95)**
Scarcity score	-0.33 (0.09)			-0.16 (0.05)***
Contact network				
Indegree	0.84 (0.24)***	0.22 (0.09)**	0.01 (0.09)	0.69 (0.14)***
Outdegree	-0.37 (0.1)	0.01 (0.06)	0.01 (0.06)	-0.19 (0.1)*
Betweenness	-0.28 (0.1)	0.01 (0.06)	0.01 (0.06)	0.48 (0.08)***
Closeness	0.06 (0.1)	0.01 (0.06)	0.01 (0.06)	0.44 (0.12)***
Clustering	-0.02 (0.1)	0.24 (0.09)**	0.01 (0.06)	0.47 (0.06)***
Collaboration network				
Indegree	-0.28 (0.31)	-0.43 (0.18)*	-0.35 (0.18)	-0.87 (0.18)***
Outdegree	0.21 (0.19)	0.16 (0.11)	-0.01 (0.11)	0.25 (0.11)*
Betweenness	0.08 (0.11)	0.19 (0.07)**	0.06 (0.07)	-0.12 (0.07)
Closeness	0.23 (0.22)	0.01 (0.13)	-0.19 (0.13)	-0.18 (0.13)
Clustering	0.47 (0.2)*	0.22 (0.12)	0.07 (0.12)	0.11 (0.12)
Friendship network				
Indegree	-0.46 (0.23)*	-0.5 (0.14)***	-0.24 (0.14)	0.1 (0.14)
Outdegree	-0.04 (0.18)	-0.25 (0.11)*	0.15 (0.11)	0.08 (0.1)
Betweenness	0.08 (0.11)	-0.08 (0.06)	-0.11 (0.06)	-0.19 (0.06)**
Closeness	-0.29 (0.18)	0.09 (0.11)	-0.21 (0.11)	0.14 (0.11)
Clustering	-0.75 (0.22)***	-0.34 (0.13)**	-0.03 (0.13)	-0.05 (0.13)
R ²	0.25	0.52	0.16	0.36

p < .05, ***p* < .01, ****p* < .001

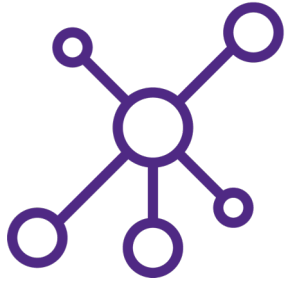
People with high overall competence used search preferences to find brokers and popular participants.



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Bridging
capital

	DV = Number of Search Preferences Used			
	Competence	Warmth	Bonding	Bridging
(Intercept)	-39.03 (14.23)**	-26.55 (8.37)**	0.56 (8.44)	-20.32 (8.32)*
Control				
Age	-0.01 (0.02)	0.01 (0.01)	-0.01 (0.01)	0 (0.01)
Gender (Female)	0.62 (0.19)**	0.07 (0.11)	0.16 (0.11)	-0.13 (0.11)
Individual traits				
Creativity score	0.63 (0.15)***	-0.01 (0.09)	0.09 (0.09)	0.33 (0.09)***
Collective score	0.22 (0.09)*	0.02 (0.06)	-0.01 (0.06)	0.14 (0.05)*
Social skills score	-0.28 (0.14)	0.33 (0.08)***	0.28 (0.09)**	0.13 (0.08)
Leadership score	-0.13 (0.13)	-0.04 (0.08)	-0.06 (0.08)	-0.14 (0.08)
Personality				
Agreeableness score	0.24 (0.09)**	-0.02 (0.05)	0.1 (0.05)	0.24 (0.05)***
Conscientiousness score	-0.08 (0.09)	0.13 (0.06)*	0.14 (0.06)*	0.06 (0.05)
Extraversion score	-0.18 (0.09)*	0.05 (0.05)	0 (0.05)	0.07 (0.05)
Neuroticism score	0.01 (0.09)	0.08 (0.05)	0.12 (0.05)*	0.02 (0.05)
Openness score	0.23 (0.19)	-0.19 (0.11)	-0.13 (0.12)	0.32 (0.11)**
Competence				
Overall expertise	11.75 (3.92)**	7.91 (2.3)***	0.26 (2.32)	5.87 (2.29)*
Technical score	-4.31 (1.49)**	-2.61 (0.88)**	-0.11 (0.88)	-2.15 (0.87)*
Soft score	-4.46 (1.62)***	2.97 (0.95)**	0.06 (0.95)	-2.46 (0.95)**
Scarcity score	-0.33 (0.09)***			-0.16 (0.05)***
Contact network				
Indegree	0.84 (0.24)***			0.69 (0.14)***
Outdegree	-0.37 (0.1)			-0.19 (0.1)*
Betweenness	-0.28 (0.1)			0.48 (0.08)***
Closeness	0.06 (0.1)			0.44 (0.12)***
Clustering	-0.02 (0.1)			0.47 (0.06)***
Collaboration network				
Indegree	-0.28 (0.1)			-0.87 (0.18)***
Outdegree	0.21 (0.1)			0.25 (0.11)*
Betweenness	0.08 (0.1)			-0.12 (0.07)
Closeness	0.23 (0.22)	0.01 (0.13)	-0.19 (0.13)	-0.18 (0.13)
Clustering	0.47 (0.2)*	0.22 (0.12)	0.07 (0.12)	0.11 (0.12)
Friendship network				
Indegree	-0.46 (0.23)*	-0.5 (0.14)***	-0.24 (0.14)	0.1 (0.14)
Outdegree	-0.04 (0.18)	-0.25 (0.11)*	0.15 (0.11)	0.08 (0.1)
Betweenness	0.08 (0.11)	-0.08 (0.06)	-0.11 (0.06)	-0.19 (0.06)**
Closeness	-0.29 (0.18)	0.09 (0.11)	-0.21 (0.11)	0.14 (0.11)
Clustering	-0.75 (0.22)***	-0.34 (0.13)**	-0.03 (0.13)	-0.05 (0.13)
R ²	0.25	0.52	0.16	0.36

*p < .05, **p < .01, ***p < .001

People who were known by many, who were themselves brokers, and belonged to cliques looked for brokers and popular participants.



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Bridging
capital

	DV = Number of Search Preferences Used			
	Competence	Warmth	Bonding	Bridging
(Intercept)	-39.03 (14.23)**	-26.55 (8.37)**	0.56 (8.44)	-20.32 (8.32)*
Control				
Age	-0.01 (0.02)	0.01 (0.01)	-0.01 (0.01)	0 (0.01)
Gender (Female)	0.62 (0.19)**	0.07 (0.11)	0.16 (0.11)	-0.13 (0.11)
Individual traits				
Creativity score	0.63 (0.15)***	-0.01 (0.09)	0.09 (0.09)	0.33 (0.09)***
Collective score	0.22 (0.09)*	0.02 (0.06)	-0.01 (0.06)	0.14 (0.05)*
Social skills score	-0.28 (0.14)	0.33 (0.08)***	0.28 (0.09)**	0.13 (0.08)
Leadership score	-0.13 (0.13)	-0.04 (0.08)	-0.06 (0.08)	-0.14 (0.08)
Personality				
Agreeableness score	0.24 (0.09)**	-0.02 (0.05)	0.1 (0.05)	0.24 (0.05)***
Conscientiousness score	-0.08 (0.09)	0.13 (0.06)*	0.14 (0.06)*	0.06 (0.05)
Extraversion score	-0.18 (0.09)*	0.05 (0.05)	0 (0.05)	0.07 (0.05)
Neuroticism score	0.01 (0.09)	0.08 (0.05)	0.12 (0.05)*	0.02 (0.05)
Openness score	0.23 (0.19)	-0.19 (0.11)	-0.13 (0.12)	0.32 (0.11)**
Competence				
Overall expertise	11.75 (3.92)**	7.91 (2.3)***	0.26 (2.32)	5.87 (2.29)*
Technical score	-4.31 (1.49)**	-2.61 (0.88)**	-0.11 (0.88)	-2.15 (0.87)*
Soft score	-4.46 (1.62)**	-2.97 (0.95)**	0.06 (0.96)	-2.46 (0.95)**
Scarcity score	-0.33 (0.08)***	-0.27 (0.05)***	-0.11 (0.05)*	-0.16 (0.05)***
Contact network				
Indegree	0.84 (0.24)***	0.81 (0.14)***	0.55 (0.15)***	0.69 (0.14)***
Outdegree	-0.37 (0.16)*	0.09 (0.1)	0.04 (0.1)	-0.19 (0.1)*
Betweenness	-0.28 (0.11)**	0.01 (0.08)	0.13 (0.08)	0.48 (0.08)***
Closeness	0.06 (0.1)	0.01 (0.08)	0.13 (0.08)	0.44 (0.12)***
Clustering	-0.02 (0.1)	0.01 (0.08)	0.13 (0.08)	0.47 (0.06)***
Collaboration network				
Indegree	-0.28 (0.11)**	0.01 (0.08)	0.13 (0.08)	-0.87 (0.18)***
Outdegree	0.21 (0.1)	0.01 (0.08)	0.13 (0.08)	0.25 (0.11)*
Betweenness	0.08 (0.1)	0.01 (0.08)	0.13 (0.08)	-0.12 (0.07)
Closeness	0.23 (0.1)	0.01 (0.08)	0.13 (0.08)	-0.18 (0.13)
Clustering	0.47 (0.2)	0.01 (0.08)	0.13 (0.08)	0.11 (0.12)
Friendship network				
Indegree	-0.46 (0.2)	0.01 (0.08)	0.13 (0.08)	0.1 (0.14)
Outdegree	-0.04 (0.14)	-0.08 (0.06)	-0.11 (0.06)	0.08 (0.1)
Betweenness	0.08 (0.11)	-0.08 (0.06)	-0.11 (0.06)	-0.19 (0.06)**
Closeness	-0.29 (0.18)	0.09 (0.11)	-0.21 (0.11)	0.14 (0.11)
Clustering	-0.75 (0.22)***	-0.34 (0.13)**	-0.03 (0.13)	-0.05 (0.13)
R ²	0.25	0.52	0.16	0.36

$p < .05$, ** $p < .01$, *** $p < .001$

But, those who were mentioned as colleagues by many, did not use many search preferences to find brokers and popular users.



NORTHWESTERN
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Discussion



What are our main results?

- Users overwhelmingly preferred human capital over social capital when searching for potential teammates.
- Focusing on *human capital*, people used more search preferences related to competence over warmth.
- Turning to *social capital*, the results show that users valued bonding (past collaborators, friendship and shared collaborators) over bridging (people's brokerage, popularity) in their networks



What are our main results?

- The combinations of search preferences were strongly related to users' profiles.
- Segregation patterns: competent people were looking for other competent participants.
 - Participants who possessed multiple skills looked for others who possess multiple skills.
 - Similarly, specialists in one area looked also for other specialists.
- People who possess multiple skills were more likely to use *warmth* search preferences than those who did not possess multiple skills.
- In contrast, people with lot of friends/co-workers used less *warmth* search preferences.

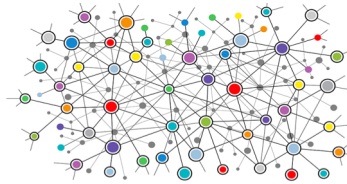


What are our main results?

- In terms of personality, people who used *bonding capital* search preferences were more neurotic and conscientious.
- People who used *bridging capital* search preferences (i) possessed multiple skills, (ii) were more agreeable and open and (iii) popular and brokers in the contact networks.



Study 2



Who invites whom?



**Marlon
Twyman**



**Leslie
DeChurch**



Daniel Newman

This research was supported by the **National Science Foundation** SES-SBE 1219469 & SMA-SBE 1262474.

Research Question: Which factors determine who works together?

The Idea



Human Capital
(Competence, Warmth)
Social Capital
(Bonding, Bridging)

Research Question: Which factors determine who works together?

The Idea



Human Capital
(Competence, Warmth)
Social Capital
(Bonding, Bridging)

Participants

410 Students in
Environmental Ecology
& Social Psychology

2 Universities

10 Weeks

2 Semesters

63 Teams

Research Question: Which factors determine who works together?

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Human Capital
(Competence, Warmth)
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Platform



My Dream Team
Query Search Tool
2 Weeks to Team Up



Preferences

History

Search


Chat


Profile

My Team


Messages

Using MDT to find teammates
⌚ 364 days 19:32:04







Project Skills / Domain




Birds of a feather



Social Connections




Personality



Start Searching


Search for potential teammates who meets the following criteria

Skill/Domain	How important?	How many in your team?
Presentation	<div><div>May Be</div><div><div></div><div></div></div></div>	<div>1</div>
Writing	<div><div>Yes, For Sure</div><div><div></div><div></div></div></div>	<div>1</div>
Statistics	<div><div>Don't Care</div><div><div></div><div></div></div></div>	<div>1</div>


Preferences
History
Search
Chat
Profile
My Team
Messages
Using MDT to find teammates
330 days 23:05:19

Recommendations

Potential teammates based on your preferences. 16 results




Zachary Gibson
zachary.gibson2@gmail.com
2nd year PhD Student in the Technology & Social Behavior program. I like cats and stats. ... [learn more](#)

Based on existing and required team members, Zachary Gibson adds 12.56% to your total team strength.

100% Rank Fit

[Invite](#)




Rachel Gradone
RachelGradone2019@u.northwestern.edu
I am creative and interested in helping out! ... [learn more](#)

Based on existing and required team members, Rachel Gradone adds 12.16% to your total team strength.

100% Rank Fit

[Invite](#)




Cameron Witz
CameronWitz2019@u.northwestern.edu
I am a northwestern undergrad studying Industrial Engineering. If you are choosing between Joel and ... [learn more](#)

Based on existing and required team members, Cameron Witz adds 12.05% to your total team strength.

100% Rank Fit

[Invite](#)




Xiang Li
xiang.li@northwestern.edu
My self-summary ... [learn more](#)

Based on existing and required team members, Xiang Li adds 11.31% to your total team strength.

99% Rank Fit

[Invite](#)




Alex Alwan
AlexanderAlwan2019@u.northwestern.edu
Hi everyone! My name is Alex Alwan and I am a rising Junior at Northwestern University where I am st ... [learn more](#)

Based on existing and required team members, Alex Alwan adds 9.92% to your total team strength.

98% Rank Fit

[Invite](#)




Diego Gomez-Zara
dgomezara@u.northwestern.edu
I'm a cool Chilean guy ... [learn more](#)

Based on existing and required team members, Diego Gomez-Zara adds 9.72% to your total team strength.

97% Rank Fit

[Invite](#)




Yun Huang
yunh.jr@gmail.com
Let's do it! ... [learn more](#)

Based on existing and required team members, Yun Huang adds 8.73% to your total team strength.

97% Rank Fit

[Invite](#)



Jacqueline Ng
jacqueline.ng@northwestern.edu
Hi everyone, I am a 5th year grad student in IEMS. I'm excited to meet all of you and hope you will ... [learn more](#)

Based on existing and required team members, Jacqueline Ng adds 8.49% to your total team strength.

96% Rank Fit

[Invite](#)

Research Question: Which factors determine who works together?

The Idea



Human Capital
(Competence, Warmth)
Social Capital
(Bonding, Bridging)

Participants

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& Social Psychology

2 Universities

10 Weeks

2 Semesters

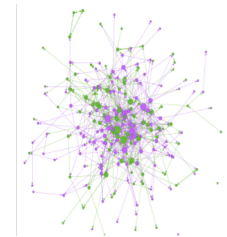
63 Teams

Platform



My Dream Team
Query Search Tool
2 Weeks to Team Up

Measures

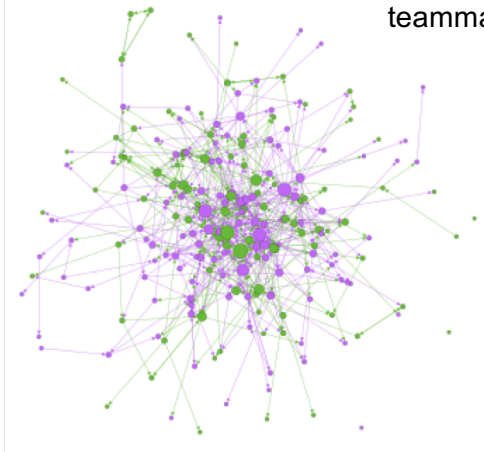


Relationship:
Invitation to Team Up



A Teammate Recommender System

1. People are **3-4x** as likely to team up with **prior collaborators**



577 invitations in Sample 1 colored by university (Purple = U1, Green = U2)

2. People are **1.5-2x** as likely to team up with an **algorithm “recommended” teammate**

“Invite to collaborate” network

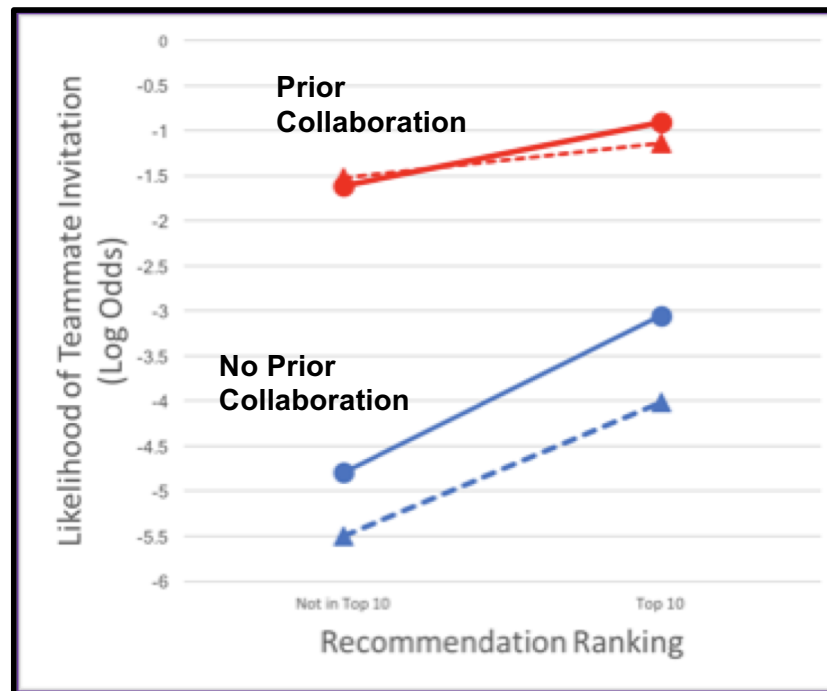
3. Algorithmic teammate recommendations significantly improve the chances of teaming up for those who have not previously collaborated



472 invitations in Sample 2 colored by university (Purple = U1, Green = U2)

Note. Exponential random graph models (ERGM) run on the teammate invitation networks of 2 samples; Endogenous controls: Activity, reciprocity, popularity, transitivity, closure; Exogenous controls: Individual’s competence, gender homophily, disciplinary homophily

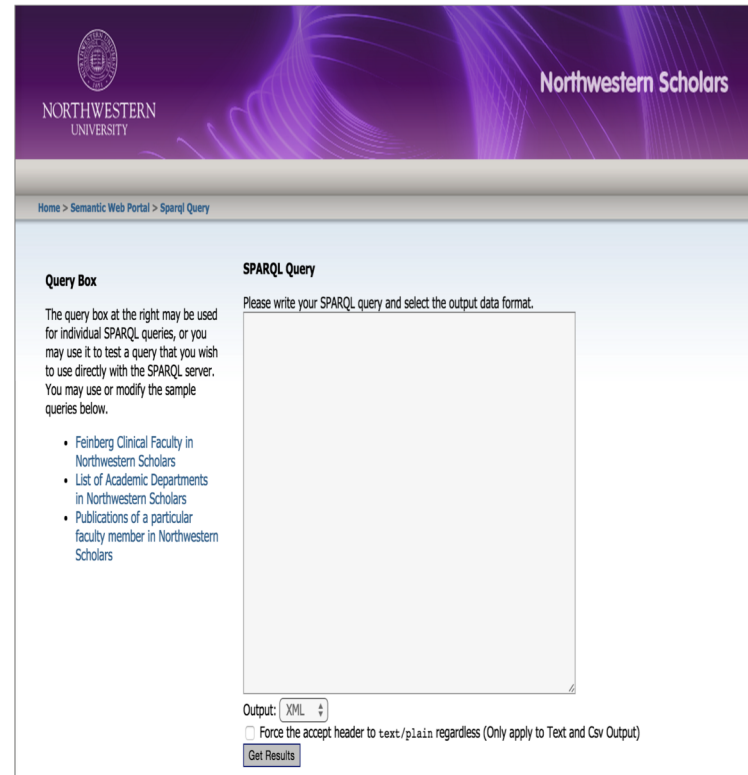
People Were More Likely to Team Up with “Recommended Strangers”



Note. Exponential random graph models (ERGM) run on the teammate invitation networks of 2 samples; Significant interaction represented by multiplicative term “prior collaborator x appeared in top 10 recommended teammates.” Interaction term was statistically significant ($p < .05$) in both samples.

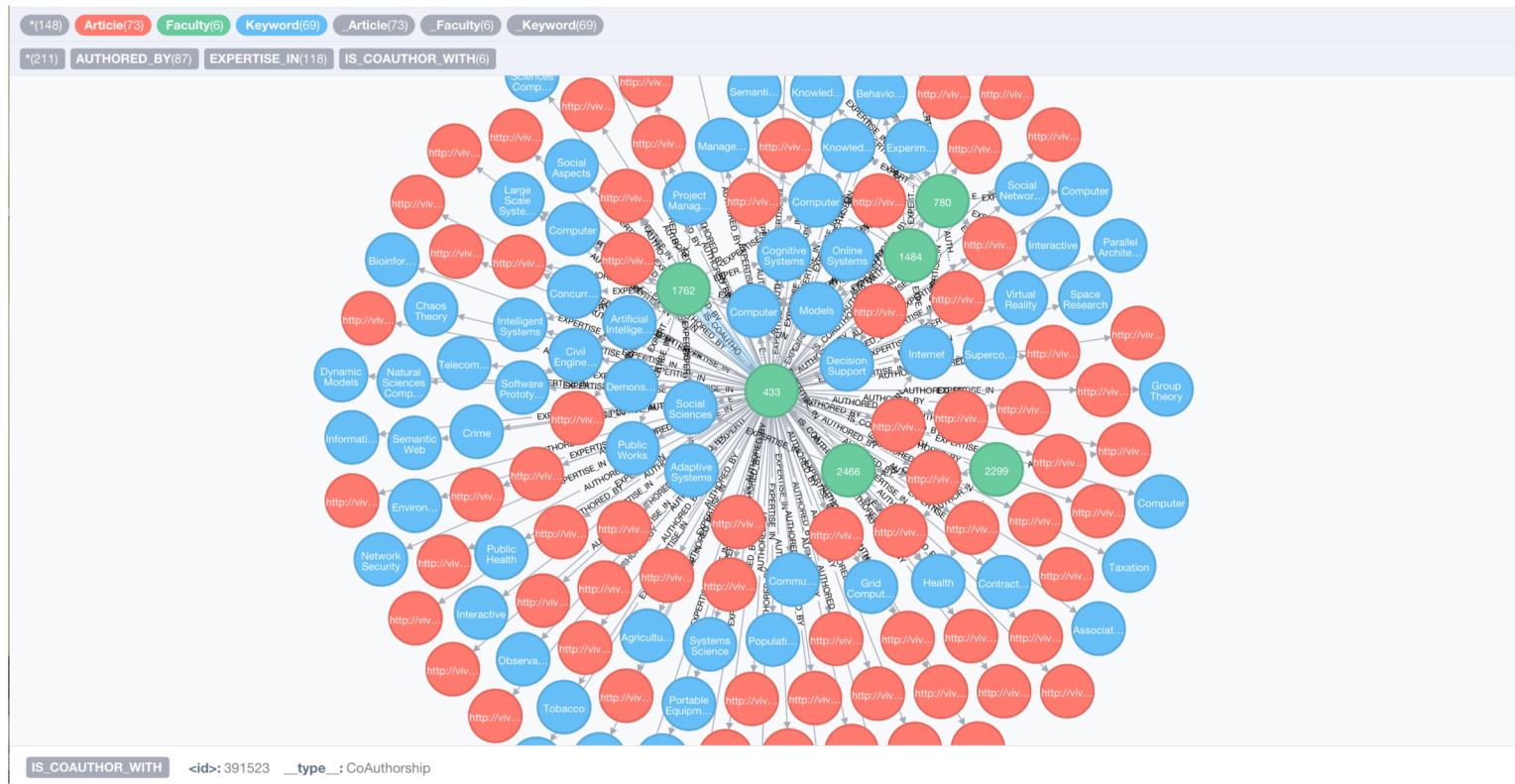
NU VIVO Endpoint

- NU Scholars has implemented a semantic service of its data.
- The data currently available through semantic endpoint is:
 - Researcher Information
 - Journal Articles
 - Awarded Grants
 - Curriculum vitae data



The screenshot shows the Northwestern Scholars website's SPARQL Query interface. The header features the Northwestern University logo and the text "Northwestern Scholars". Below the header, a breadcrumb trail reads "Home > Semantic Web Portal > Sparql Query". The main content area is divided into two sections: "Query Box" and "SPARQL Query". The "Query Box" section contains a paragraph explaining the query box's purpose and a list of sample queries: "Feinberg Clinical Faculty in Northwestern Scholars", "List of Academic Departments in Northwestern Scholars", and "Publications of a particular faculty member in Northwestern Scholars". The "SPARQL Query" section has a text input area for writing a query and a dropdown menu for selecting the output data format, currently set to "XML". Below the dropdown is a checkbox labeled "Force the accept header to text/plain regardless (Only apply to Text and Csv Output)". At the bottom of the "SPARQL Query" section is a "Get Results" button.

Faculty member (Green), Article (Red) and Keyword (Blue)



Multi-theoretical, Multi-level (MTML) Collaboration Recommendation Heuristics

I prefer people who...	Heuristic	Social theory	Relations	Metric
Work in my organization	Affiliation	Homophily	affiliation	neighbor
Have a high H-index	Most Qualified	Self-interest	authorship	h-index
Have worked with people I have worked with	Friend of a friend	Balance	co-authorship	count of geodesics
Have worked with many researchers	Follow the crowd	Contagion	co-authorship	in-degree centrality
Serve as brokers in my network	Mobilizing	Collective action	co-authorship	betweenness

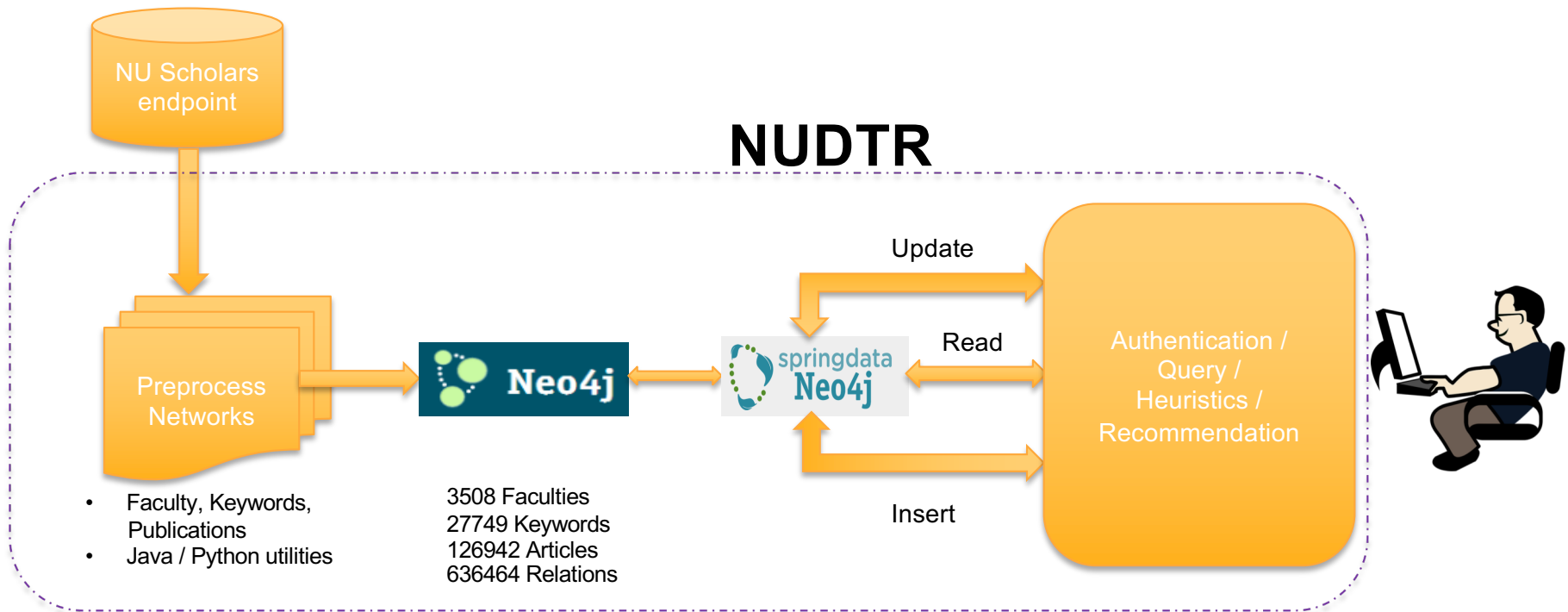
Monge, P. R. and N. S. Contractor (2003) Theories of communication networks NY: Oxford University Press

NU Scholars

- Northwestern Scholars is a searchable database of expertise across all disciplines at Northwestern University.
- Shows research interests, publications, grants, productivity, trends and much more.
- Helps find expertise and mentors for students, postdoctoral fellows, and other researchers.

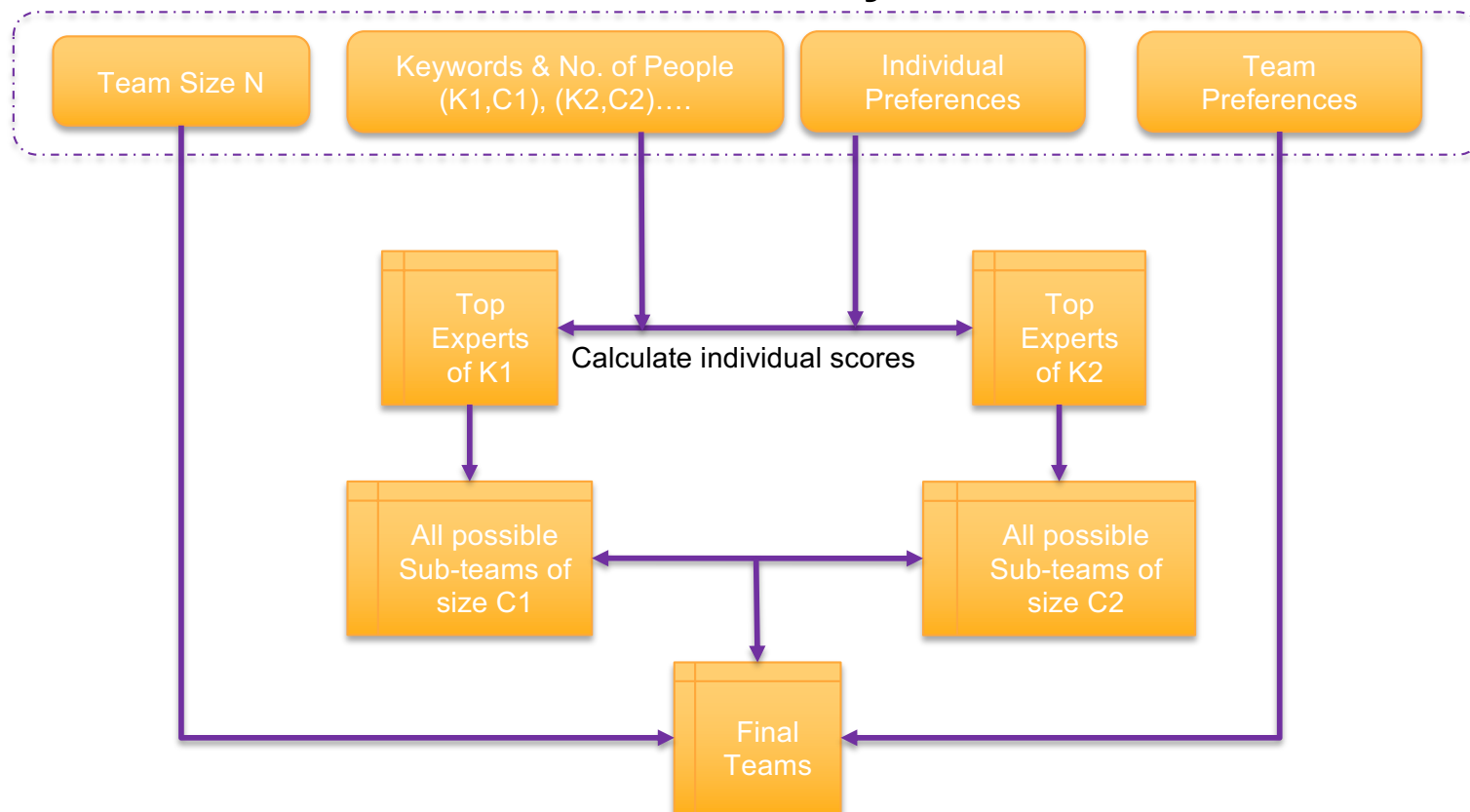
The screenshot displays the Northwestern University Northwestern Scholars profile for Bonnie Spring. The header includes the university name and a search bar. Navigation tabs for Home, Experts, Organizations, Equipment, Grants, and Research Output are visible. The profile section features a placeholder for a photo, Bonnie Spring's name, and her titles: Professor, Preventive Medicine; Professor, Psychiatry and Behavioral Sciences; Professor, Psychology; Core, Clinical Psychology PhD Program; Core, Driskill Graduate Training Program in Life Sciences; and Affiliate, Psychology PhD Program. A 'View Scopus Profile' link is provided. Contact information shows the phone as 'Unavailable' and the email as 'bspring@northwestern.edu'. A citation count of 6383 is shown with a bar chart of trends from 1976 to 2020. Below the profile, a navigation bar includes Overview (selected), Fingerprint, Network, Grants (59), Research Output (222), and Similar Profiles (99). The 'Personal profile' section is active, showing 'Research Interests' (laboratory research on behavioral risk factors, diet, physical inactivity, tobacco use, and cutting-edge technologies) and 'Keywords' (Internet Intervention, Physical activity, Preventive Medicine, Psychology, Behavioral Medicine, Cigarette smoking, Clinical Trial Methodology).

Application Design



Algorithm

User Query



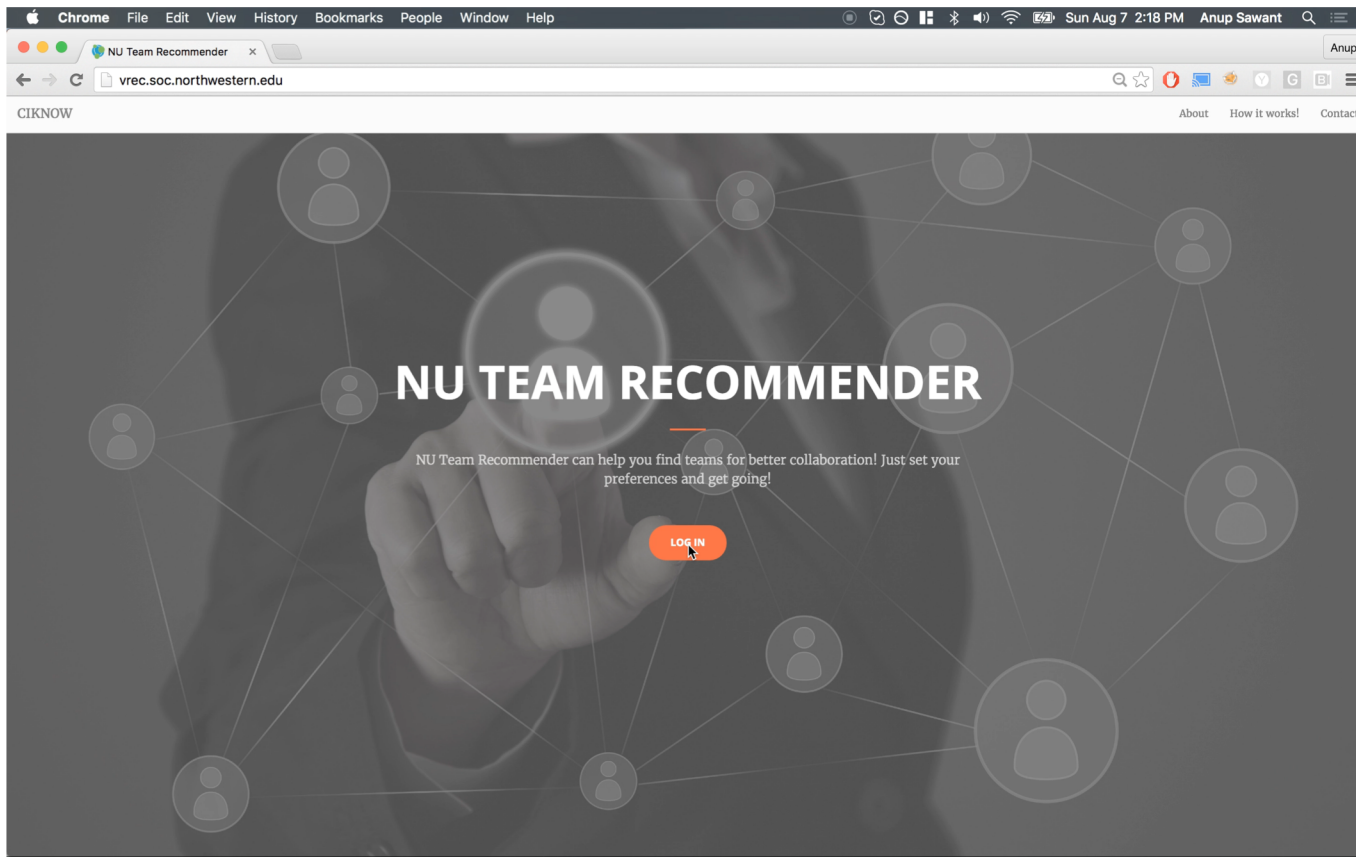
Demo Case

- Consider a situation where, in response to a call for research proposals from NIH, Noshir Contractor wants to put together a team of experts.
- Following are his initial preferences:
 - Team size up to 5
 - Domain / Keywords : Smoking, Evidence-based practice and Depression

Demo Case

- In response to additional questions from the NUDTR, Noshir prefers people who:
 - Work in his organization.
 - Have high H-Index.
 - Have worked with him before.
 - Have worked with many other researchers.
 - Have worked in a Principle Investigator role.

Demo



Thank you!

Questions?

