Northwestern

Organizing in Teams

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Teams assemble *from networks*, to *form networks of teams*, whose success can be predicted by looking at the *networks within and between teams.*

The United States Intelligence Community

"17 separate organizations unite"

Source: https://www.intelligencecareers.gov/icmembers.html

From Teams in Organizations to *Organizing in Teams[1]... (teaming![2])*

Teams in Organizations	Organizing in Teams
• Two or more people • Clear boundary • Shared goal • Interdependence is fixed • Appointed	• *Many more* people • Fluid boundary • Shared purpose • Interdependence constantly changing • Self-organizing

"purposive collaborative interaction among a set of individuals"

[1]DeChurch, L.A. et al. (2017). "From Teams in Organizations to Organizing in Teams";
[2]Edmondson, A. (2012). "Teaming: How Organizations Learn..."

Teaming in the Intelligence Community (IC)

- Analysts are embedded in organizations, but must adaptively configure and reconfigure teams within and across organizations as new threats are identified [1,2]
- Four themes: **Assemble, Manage, Detect, Disrupt**
- The scientific problem:
  Teaming from a social network perspective

[1]Chen, Zaccaro et al. (2014). "...Examining Cybersecurity Incident Response Teams";
[2]Steinke, Zaccaro et al. (2015). "Improving Cybersecurity Incident Response Teams"

IC Example:
Iraq WMD Report

- "A ***groupthink dynamic*** led analysts... to interpret ambiguous evidence as conclusively indicative of a WMD program."

- "Groupthink ... so pervasive that formalized mechanisms established to ***challenge assumptions and groupthink were not utilized***."

- The IC needs to: "provide more rigorous analysis that avoids unwarranted assumptions and ***encourages diverse and independent perspectives***."

All emphasis added

Source: Rosenbach & Peritz (2009). "Confrontation or Collaboration? Congress and the Intelligence Community"Belfer Center for Science and International Affairs, Harvard Kennedy School.

IC Example: Post 9-11

- "***Information Sharing***: Bureaucratic structures and complex policies ***impeded, even prevented, sharing of important intelligence*** among the IC and other government agencies, particularly law enforcement organizations. This highlighted the need for these communities to transform from a culture of "need-to-know" to one of a ***"responsibility-to-provide."***

All emphasis added

Source: Rosenbach & Peritz (2009). "Confrontation or Collaboration? Congress and the Intelligence Community"Belfer Center for Science and International Affairs, Harvard Kennedy School.

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Teams Assemble from Networks

Team Assembly

- Self-forming teams avoid diversity[1]
  - Networks often homophilous[2]
  - Cost to socializing newcomers[3]
- Teams tend to assemble in certain optimal sizes[4]
- Teams tend to assemble with previous collaborators[4]

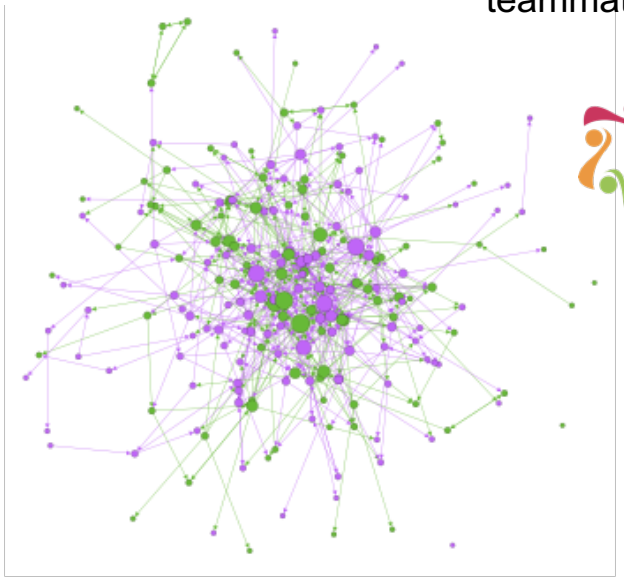
Team Composition

- Membership diversity benefits performance[4]
  - Diverse expertise
  - Balance newcomers and incumbents
- Teams of up to 25 people are optimal[5]

Sources: [1]Lungeanu, Huang, & Contractor (2014); [2]Ruef, Aldrich, & Carter (2003); [3]Hinds et al. (2000); [4]Guimera et al. (2005); [5]Katzenbach & Smith (2015)

Intervention #1:
A Teammate Recommender System

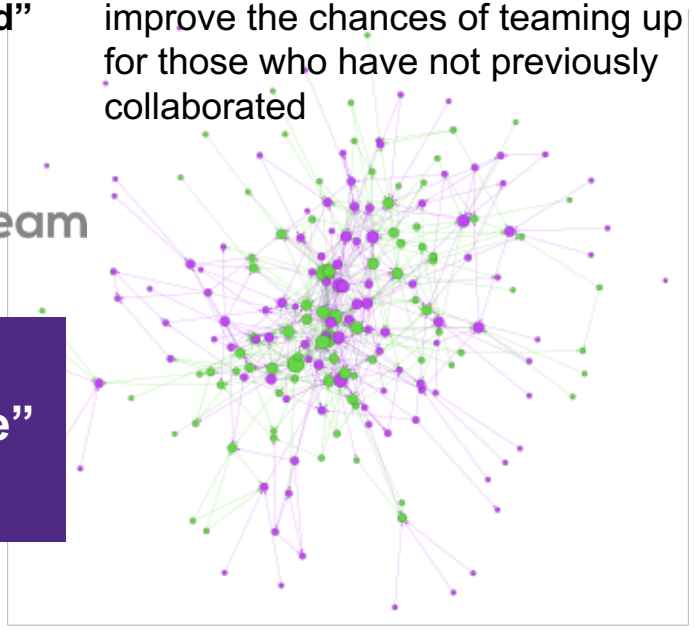
1. People are 3-4x as likely to team up with **prior collaborators**
2. People are 1.5-2x as likely to team up with an **algorithm "recommended"** teammate
3. Algorithmic teammate recommendations significantly improve the chances of teaming up for those who have not previously collaborated



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

MyDreamTeam

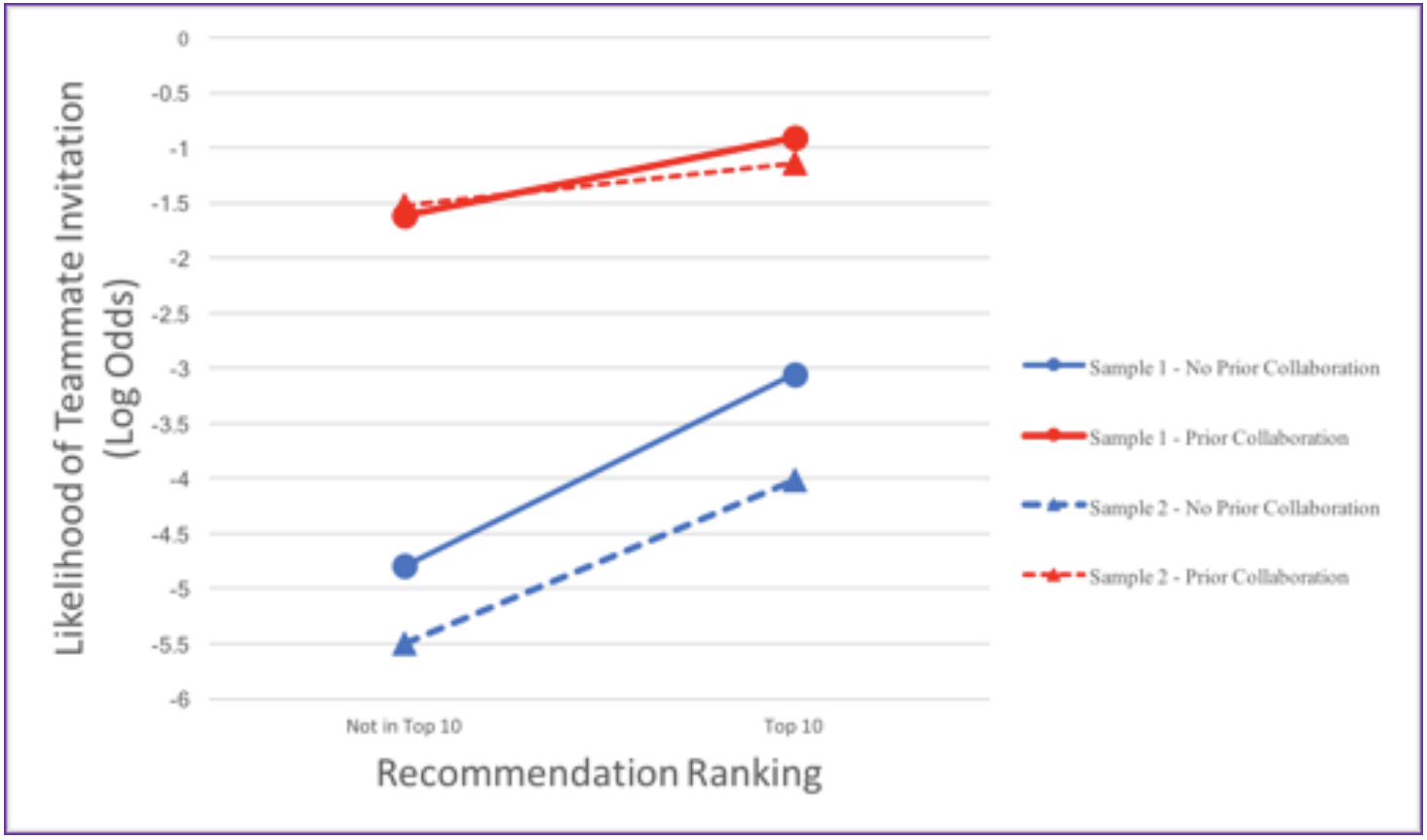
"Invite to collaborate" network



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

Intervention #1 (Continued):
People Were More Likely to Team Up with a Stranger if They Were Recommended



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.

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Teams Form Networks of Teams

Multiteam Systems[1]

- A network comprised of two or more teams each of which pursues team and system goals
- Between-team ties are critical for multiteam system success [2,3]
- Leaders need to focus on both within- and between-team activity [4,5]

Bridging Social Capital [6]

- Informal ties connecting teams to other groups predict performance[7]
- Diverse & weak boundary spanning networks predict team creativity [8]

Sources: [1]Zaccaro, Marks, & DeChurch (2012); [2]Marks et al. (2005); [3]Davison et al., (2012); [4]DeChurch & Marks (2006); [5]DeChurch et al. (2011); [6]Han (2017); [7]Oh et al. (2004); [8]Smith-Perry & Shalley (2014)

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Outcomes Driven by Networks in Teams

Team Interaction Networks [1]

- **Decentralized information sharing networks predict team decision quality[2]**
- **Similar cognitive networks among members predict team performance[3]**

Leadership Networks [4]

- ***Formal leadership:*** **Teams with central leaders more effective [5]**
- ***Informal leadership:*** **Teams with dense influence ties more effective [6]**

Sources: [1]Crawford & LePine (2013); [2]Mesmer-Magnus & DeChurch (2009); [3]DeChurch & Mesmer-Magnus (2010); [4]Carter, DeChurch, Braun, & Contractor (2015); [5]Balkundi, Kilduff, & Harrison (2011); [6]Balkundi & Harrison (2006)

Intervention #2:

Normative Messages Improve Team Information Sharing

1. Information sharing has a low base rate

2. Normative messages improve the **evenness of information sharing networks** & foster **group social exchange** patterns

3. Normative messages that work: (a) **demonstrability** framing, (b) **cooperative** norms, (c) **structured** discussion

Information sharing networks among 185 people in 38 teams while exposed to 4 normative messages (counterbalanced)

Network Statistics	Control	Demonstrability	Cooperativeness	Structure
No. of Edges	77	115	93	129
No. of Isolates	105	73	85	63

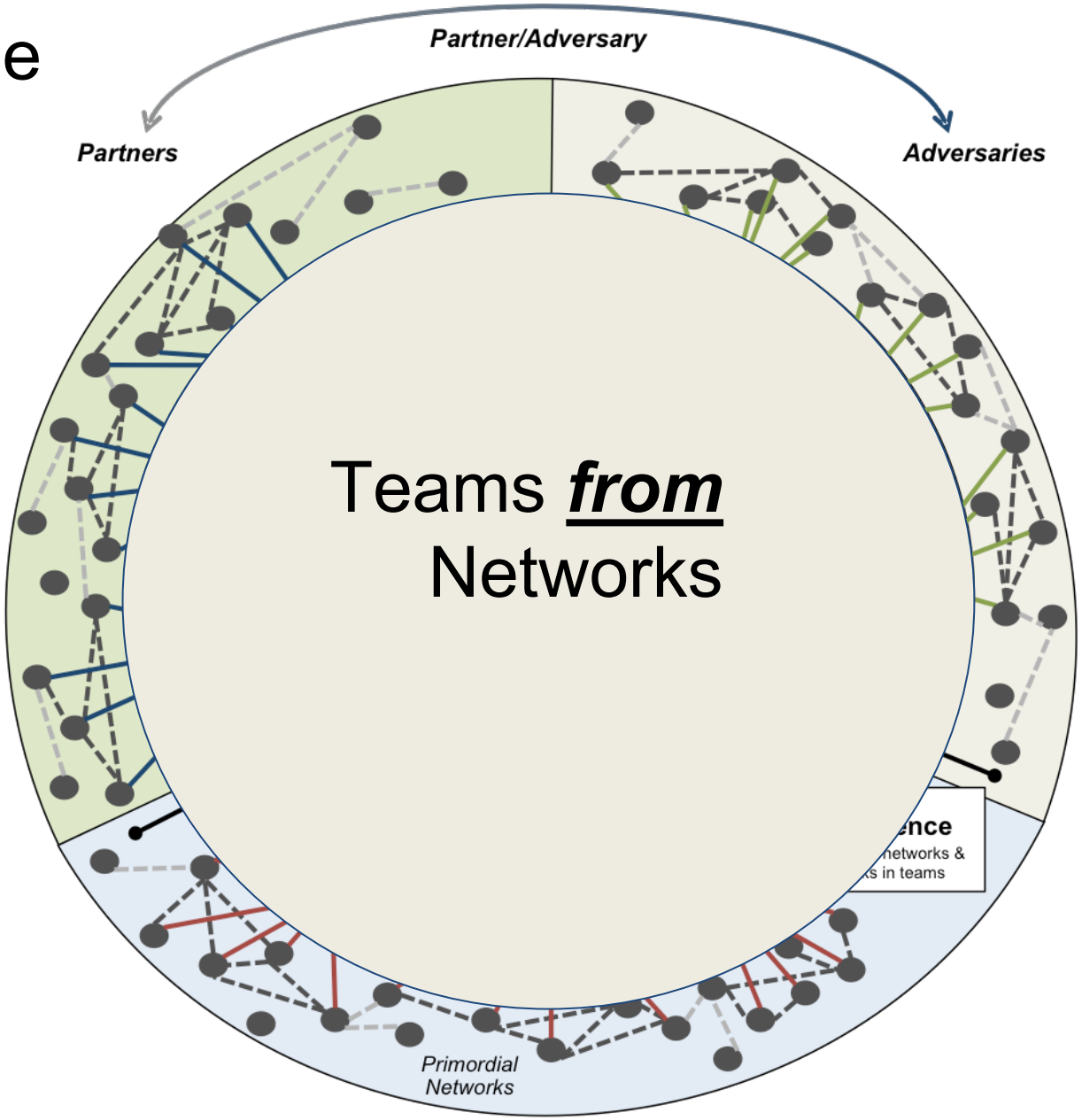
Note. The sample size is 38 teams and 185 individuals. Network statistics are counts of edges and isolates, which correspond to the number of times a post was extended by another team member, and the number of people whose posts were not extended by others, respectively.

Four Themes to Advance Future Intelligence Analysis

- How do we ***assemble*** agile analyst teams?
- How do we ***manage*** these teams?
- How do we ***detect*** adversarial teams?
- Once detected, how do we ***disrupt*** adversarial teams?

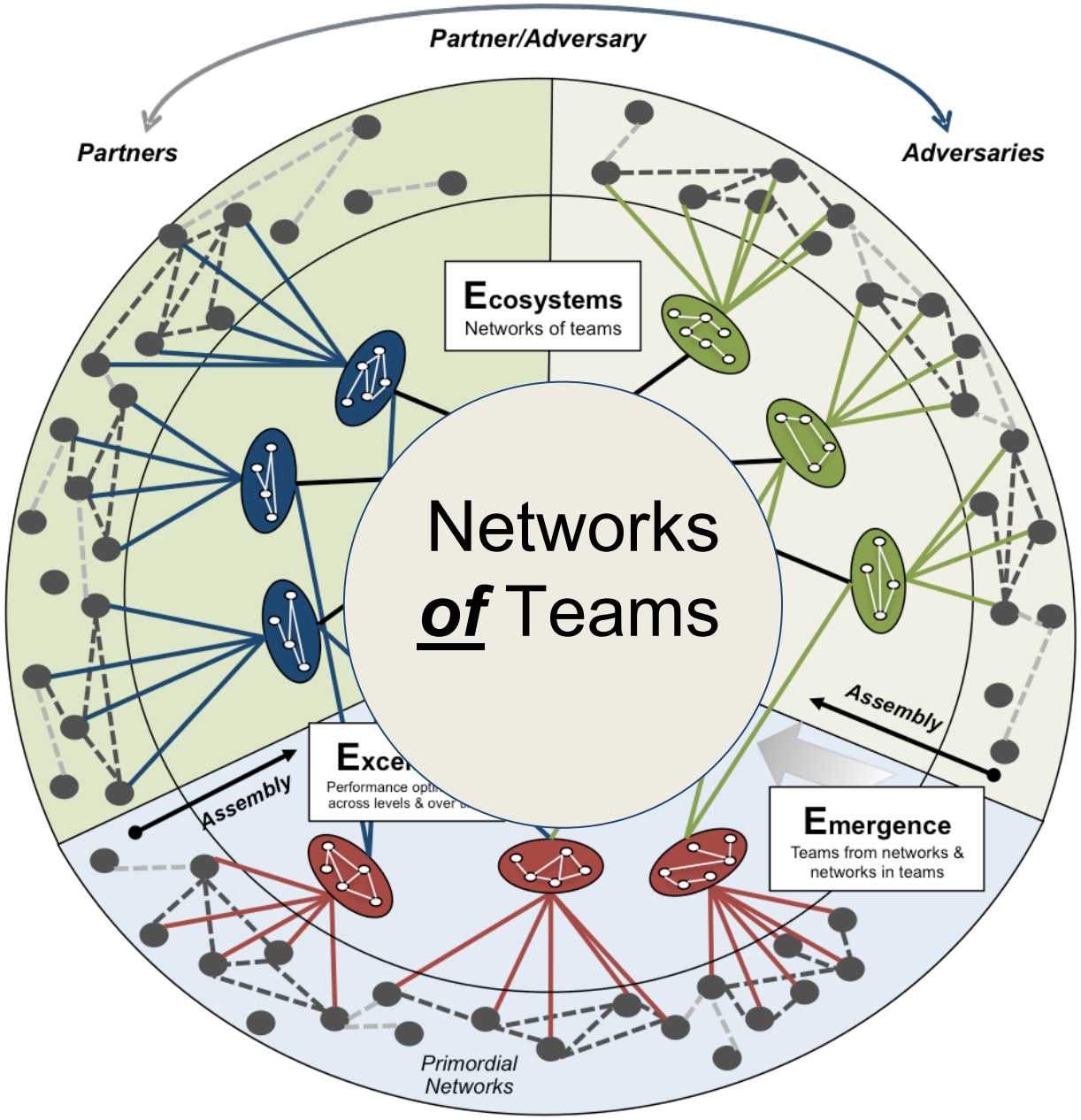
Assemble

Detect



Manage

Disrupt



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Research Priorities

- Support mechanisms needed to enable effective (1) team assembly practices, and (2) team self-regulatory processes

- Research can meet this need by:
  - Revealing networks that optimize analyst teams
  - Validating network interventions
  - Developing technologies that provide team support mechanisms to analysts

Thank You

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