BINF6399 – Principles of Team Science

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RAW Lab

Lecture 2 - Tuesday Jan 26nd, 2021

Learning Objectives

- Team Building 101

- Team formation and selection

- Topic ideas

- Introduce UNIX on our github page for the course

- Team discussions

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Team building 101

- What is a team?

→ Is a group of individuals (human or non-human) working together to achieve their goal.

- Why form a team?

→ The purpose of creating teams is to provide a framework that will increase the ability of employees to participate in planning, problem-solving, and decision-making to better serve customers. Increased participation promotes: A better understanding of decisions.

- Are you part of team?

→This can be a family, group, sports, religious or national group (American's for example)

- Do you do cross disciplinary research?

→ Provide an example

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Team Science Definitions

- **Team**

→ Two or more people **(our case 3)** working interdependently (collaborating) towards a shared common goal or task

- **Team building**

→ Process of gathering people and getting them to work together to accomplish a goal or task

- **Teams management**

→ Directing a group of individuals to work as a unit to accomplish a goal/task

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Are you part of team? What worked? What didn't?

- Example of a team that worked out well. Why?

→ Write down an example of a team you been on that worked out well.

- Example of a team that worked out poorly. Why?

→ Write down an example of a team you been on that worked out poorly.

- Example of a collaboration that was positive. Why?

→ Write down an example of a collaboration you been on that worked out well.

- Example of a collaboration that was negative. Why?

→ Write down an example of a collaboration you been on that worked out poorly.

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Team Science

- Is an ***Art*** and a **Science**

→ You have to learn to work with others in creative ways

→ You must practice working with others like any other skill

- Teams are made of **People** (in future maybe **AI**)

→ Team as only as good as the people that are in it.

→ Defined by strongest members

→ Limited by weakest links and labor power

- Teams are **intrinsically dysfunctional**

→ Things that can make a team succeed can also lead to its downfall (e.g., Blockbuster)

→ We mobile and find comfort in change including failure and risk

- Teams can contribute to personal and professional **growth**

→ Teams you pick are essential but teaches you to work with a diversity of disciplines and people.

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Team size fallacy

- **More** is **Less**

→ Falling out of sync
→ Communication issues
→ Failure to understand strengths and weaknesses
→ Give due rewards (harder to reach)
→ Lack of opportunities potentially to learn something new
→ Depends greater leadership across many individuals with strong central leadership

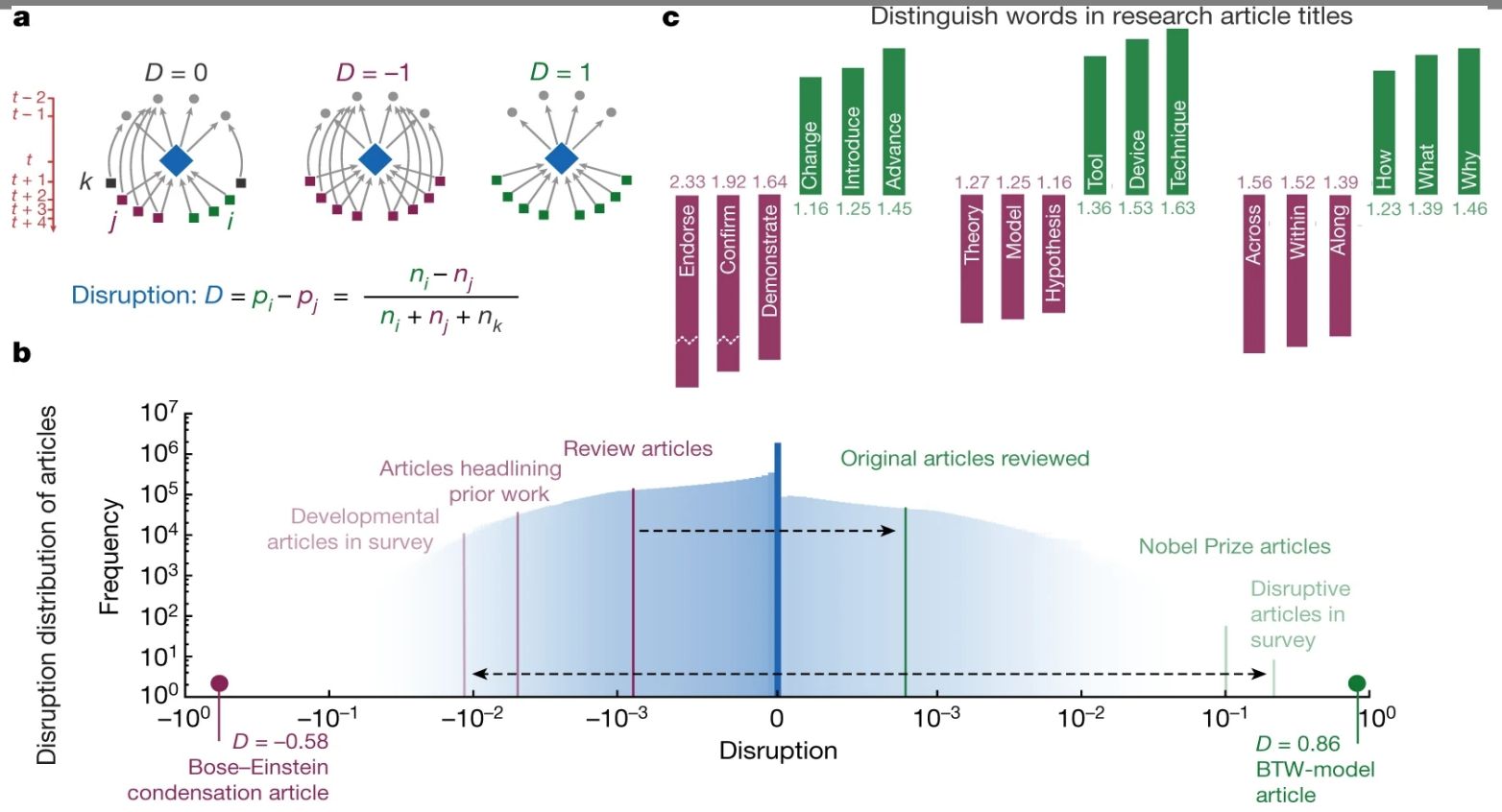
(The - 'Too many **chiefs** not a enough **cooks**')

- **More** < **Less**

→ More focused
→ More likely to disrupt
→ Limited by weakest links and labor power
→ Usually a single individual leader (PI of a lab)
→ A single leader if poor can limit the team.

Having been criticized for too many cooks in the kitchen, we're going to restructure by hiring more cooks and eliminating the kitchen."

Large team size fallacy part deux



Small teams - Tended to disrupt science and technology with new ideas and opportunities

Larger teams - Tended to develop existing ones

https://www.nature.com/articles/s41586-019-0941-9

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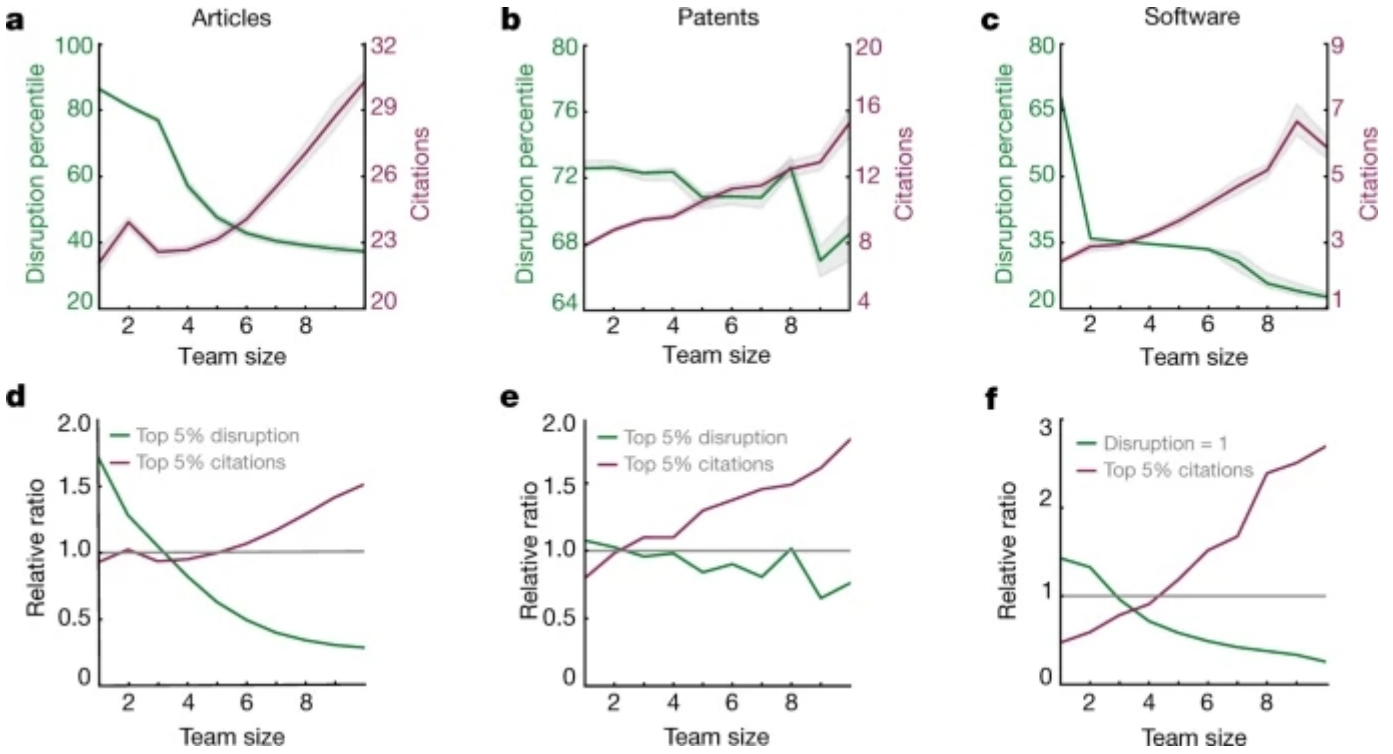
Large team size fallacy part deux



Small teams - Tended to **disrupt!**

Larger teams - Tended to **develop!**

https://www.nature.com/articles/s41586-019-0941-9

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Evolution thrives in teams and programs for them

Evolutionary theory of creativity (David Campbell)

- Variation
  - → Different kinds of knowledge
  - → Diverse knowledge
  - → Multidisciplinary teams

- Selection
  - → Filter out poor ideas
  - → Focus on good ones
  - → More efficient

- Retention
  - → Remove the old
  - → Replace by new

OVERALL: Diverse pool of ideas and multiple brains transcend individual limitations. Diversity, equity and inclusion are critical and essential to major scientific findings!

https://www.researchgate.net/publication/234021924_An_Evolutionary_Approach_to_Creativity_and_Innovation

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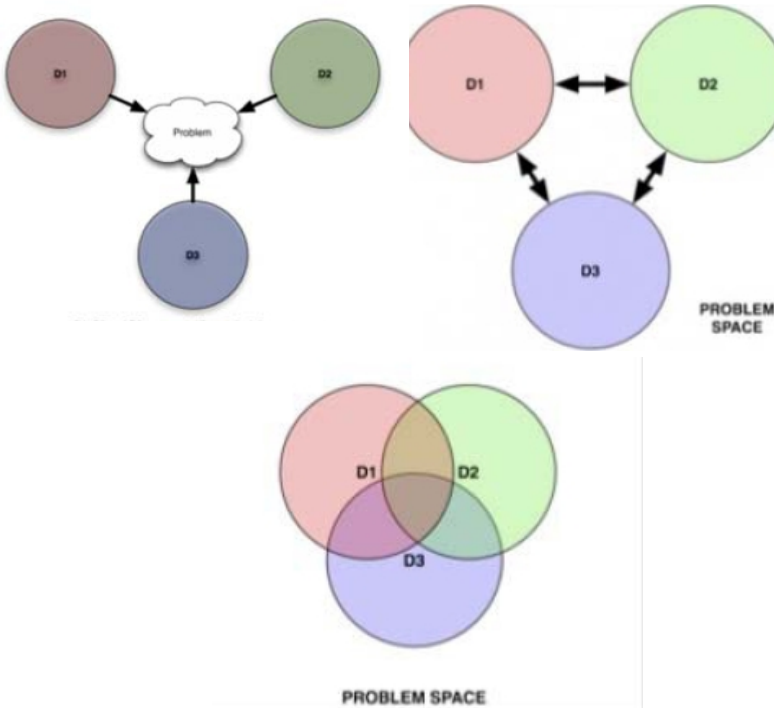
Types of cross-disciplinary research

- Multidisciplinary
  → Independent, sequential
  → Task force

- Interdisciplinary
  → Joint, interactive
  → Share ideas over a longer time

- Transdiciplinary
  → Integrative
  → Shared conceptual product



Rosenfield, P. L. (1992). Soc Sci Med, 35, 1343–1357

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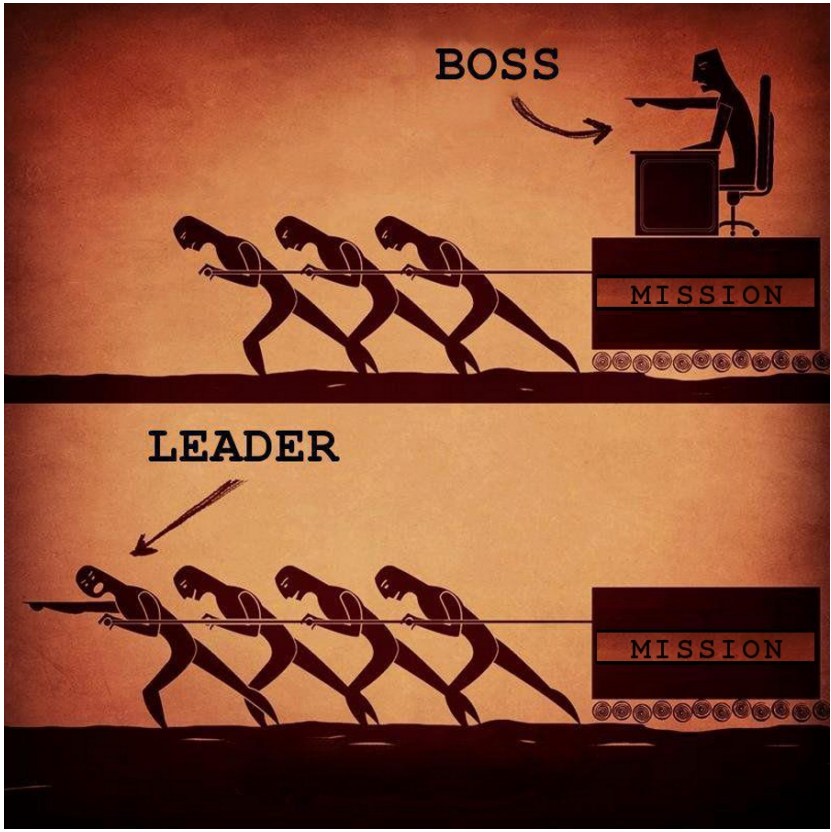
Team leader (CEO)

- Socioemotional needs
  - → Cognitive appraisal of emotional information
  - → Understands feelings, responds appropriately
  - → Social adeptness

- Task needs
  - → Cognitive
  - → Structural
  - → Processual



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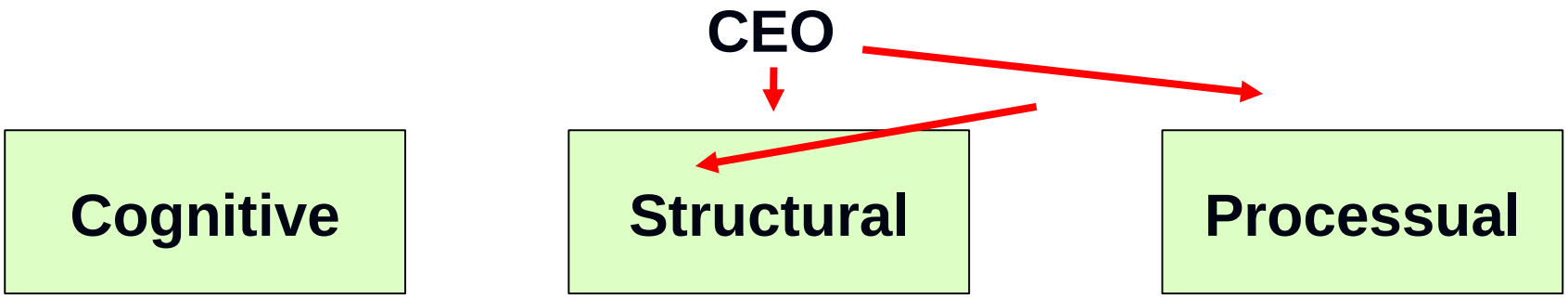
Team leader (CEO)



- Inspires
- Motivates
- Shared vision
- Prioritizes
- Invites members
- Kicks off initial meeting

- Visible
- Administrative liaison
- Acquires funding
- Sets timeline
- Defines rules of engagement

- Defines Processes
- Mediates conflict
- Secures ‘buy in’ from stakeholders
- Negotiates political maze

Best Team leader (CEO)

The Best Leaders

- Must have confidence of team
- Seen as fair, good decision maker, consultative, consensual style, non-hierarchical
- Humble, human, role model due to experience
- Charismatic leaders are not necessarily the best.
- Charisma always helps

Team Selection

- Teams of three (3)

- One CEO (Chief Executive Officer - the prominent leader of the team)

- One CTO (Chief Technology/Technical Officer - leads all technology development)
  - Reports to CEO

- One CFO (Chief Financial Officer - leads all sales and outreach for the project)
  - Reports to CEO

- All team members are responsible for specifications, deliverables, timelines, and work required to reach overall team goals

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UNIX and Bash tutorial

- https://github.com/raw-lab/BINF6399
- https://github.com/raw-lab/BINF6399/blob/main/course-materials/unix-bash_tutorial.md

Syllabus: Team formation and topic ideas

Requirements (to provide):

- Team name
- Product, service, tool related to bioinformatics, genomics, or computation
- Team formation structure (For-profit vs. Non-profit)

Due Thursday - Jan 28th, 2020

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