(Love et al. 2021)

Love, Hannah B., Jennifer E. Cross, Bailey Fosdick, Kevin R. Crooks, Susan VandeWoude, and Ellen R. Fisher. 2021. “Interpersonal Relationships Drive Successful Team Science: An Exemplary Case-Based Study.” *Humanities and Social Sciences Communications* 8 (1). https://doi.org/10.1057/s41599-021-00789-8.

Detailed Summary of Research:  
According to (Love et al. 2021), there's limited research exploring the effectiveness of scientific team support strategies like training and team performance metrics, despite considerable investment in collaborative and interdisciplinary projects. (Love et al. 2021) investigates how scientific productivity, advice, and mentoring networks within an exemplary interdisciplinary scientific team contribute to their success, focusing on the team's training processes and their impact on productivity and expertise. Love et al.’s hypothesis suggests a positive correlation between mentoring, advice networks, and scientific productivity, indicating that these elements are integral to the success of interdisciplinary scientific teams. Love et al. uses mixed methods and SNA.

The survey included principal investigators, postdocs, graduate and undergraduate students, and external collaborators. Conducted annually from 2015 to 2019, the survey asked about the extent and type of collaborations, including research publications, scientific presentations, grant proposals, and student committee participation. It also inquired about relationship types like learning, leadership, mentoring, advice, friendship, and leisure activities. [The supplementary material only shows a mid-point survey, which is what SNAP used for the phase one small-teams SNA project.]

The survey data were analyzed using R Studio and UCINET software, with Visone used for visualizations. Three network measures were derived: scientific productivity, mentoring, and advice. These measures were assessed using average degree, in-degree, and out-degree metrics. The study compared advice, mentoring, and scientific productivity networks, predicting a positive correlation. The Quadratic Assignment Procedure was used for statistical significance testing.  
  
Other methods used in this study include case study selection, retrospective team survey, participant observations, interviews, and historical data. The study monitored 25 interdisciplinary teams over five years, recording team outcomes annually. An exemplary team was selected based on interdisciplinary research, team longevity, and fulfillment of the land grant mission. A retrospective team survey was conducted at the study's end, focused on the skills developed by team members and their personal and professional experiences on the team. Participant observations were made at annual retreats and meetings from 2015 to 2019, focusing on interdisciplinary interactions and problem-solving approaches. Interviews with PIs and a historical narrative provided insights into the team's formation and evolution.

Results

Scientific Productivity: The team achieved significant outcomes including 33 extramural awards totaling over $5.6 million, 58 peer-reviewed publications with various organizations, 141 presentations, and training for 21 graduate students and 15 postdocs. They also received institutional recognition and various individual honors.

Interdisciplinary/Transdisciplinary Collaboration: The team comprised experts from diverse fields like ecology, genetics, and veterinary medicine, involving members from 39 universities, 11 federal agencies, 13 state agencies, and other organizations. This diverse collaboration enhanced their interdisciplinary research capabilities.

Durability and Roster Expansion: Starting with four members in 2004, the team grew to 43 by 2018, including 81 individuals over its 15-year span. Their growth was marked by securing major federal research awards, which allowed for significant team expansion and evolution of projects.

Mentorship: The team's mentorship model included undergraduates, graduate students, and postdocs, fostering skills like cross-disciplinary communication and understanding of disease ecology. Team members, including faculty, developed and learned from each other, enhancing their scientific roles and interpersonal skills. The average number of mentors reported by team members ranged from 2.4 to 3.1, with graduate students reporting up to 7.7 mentors. Over time, junior scientists migrated to be core members of the scientific productivity network. [Small-teams position in CUPID network]

Advice Networks: The advice network within the team was strong, with team members reporting an average of 5.1 to 6.4 advisors. This network evolved over time, with a more integrated involvement of postdocs and graduate students by 2018. Team members, including faculty, valued the professional and personal support received from these advice networks.

Interpersonal Relationships and Scientific Productivity: The study found a correlation between mentoring, advice networks, and scientific productivity. Team members reported that being part of the team enhanced their skills, relationships, and professional growth, directly contributing to their scientific success and productivity. Social dynamics are influential in explaining knowledge creation processes. The team’s scientific productivity was driven by their interpersonal relationships.

Fulfilling the land grant mission [this is like fulfilling the grand challenges mission or BSU campus wide goals]

Old writing:

In this project branch, we replicate the (Love et al. 2022) mid-point survey to investigate the characteristics of successful and unsuccessful collaborations in interdisciplinary scientific teams.

Adapting the mid-point survey methodology from (Love et al. 2022). We adapted a question from (Love et al. 2022) to probe this aspect, initially framed as “I understand how their expertise will contribute to the research team.”  Second question posited by (Love et al. 2022) inquires about the respondents’ familiarity with their colleagues’ scientific specializations.

This aspect is quantitatively assessed by examining personal networks’ statistics. For example, betweenness serves as an index for the flow of social support across the team, positing that teams characterized by robust support networks and minimal isolates are likely to exhibit greater resilience (Love et al. 2022).

Teams need members with the expertise to contribute and can gain knowledge by interacting with other members. Love et al. (2022) measured seven teams organized around grand challenges topics on their proportion of women, collaborative social networks from surveys, and turn-taking in team meetings. This research was designed to answer the question, “Can we determine if a team is collaborating and working together in meaningful ways?”

Turn-taking is an interesting idea as it looks at the balance of contributions within the team, but the researchers point out that this might not work in all types of teams as some people might report on their work more heavily in one meeting.

This report did not show figures for social networks. It does cite another author calling for this research as it would apply to one health.