Topic: Modeling and Resilience

Identifying Cross-Disciplinary Interactions to Assess and Promote Functional Resilience in Flight Crews During Exploration Missions

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Introduction
NASA supports research to mitigate risks to health and performance on extended missions. Typically these risks are investigated independently. In reality, physiological systems are tightly coupled, and related to psychological and inter-individual factors (team cohesion, conflict). We draw on ideas from network theory to assess these interactions and better design a research framework to address them.

Methods
We present proof-of-concept work performed using a subset of publications supported by NASA HRP. The publications were tagged with terms representing factors that influence health and performance. Network representations were created as a visualization of the relationships between factors. This enables future analyses of the structure of the networks based on results from network theory.

Results
Initial results demonstrate interdisciplinary connections in the Human Research Program of various strengths. These are compared with similar analyses from NASA biological studies to show where the two research programs have area of cooperation and to identify gaps in each program. Comparison to a broader selection of research publications further shows where important synergies are being missed by the program.

Conclusions
Such network analysis can elucidate potential improvements by identifying network connections to establish or strengthen for maximized information flow. It can also support an integrated approach to human spaceflight risk reduction.