

## **ANALOG TEAM DYNAMICS: A MULTI-YEAR EFFORT TOWARD UNDERSTANDING FLUCTUATIONS IN TEAM COHESION OVER TIME**

M. Pearce, S. K. Baard, C.-H. Chang, S. W. J. Kozlowski  
Michigan State University

### **INTRODUCTION**

Over the past four years, our team has worked with U.S.-based analog teams to learn about the dynamics of cohesion in an isolated, confined, and extreme environment (the Antarctic). Our main focus is on understanding how and why certain patterns of team cohesion – *or team members' shared commitment to their task and to one another* – emerge. Throughout this research, we have discovered that team cohesion develops and changes in different ways depending on the personal characteristics of team members, the work they complete on a daily basis, and the environment in which they operate.

### **METHODS**

We have collected data from five US-based analog teams involving a total of thirty individuals. All teams are composed of scientists living in the ice fields of Antarctica for approximately six weeks at a time. Each team follows one of two missions: (1) seeking out new locations in the ice fields for sample collection; or (2) collecting samples from already-known/established locations. The following measures are used in this research:

- We use daily diary surveys to gather quantitative ratings of various team processes and personal characteristics relevant for team cohesion, including workload balancing, coordination, and affect. Qualitative questions (with open-ended responses) are included in daily diaries to provide additional support for quantitative ratings.
- Our participants complete a pre-mission survey to gather information about demographics and personal characteristics (e.g., age; previous experience in isolated, confined, extreme environments; personality; knowledge regarding effective teamwork).
- Participants also tell us their overall reactions to the analog experience, including whether and how their expectations were met, in a post-mission survey.
- Finally, leaders rate the team's performance throughout and after the mission ends. Leaders also provide daily quantitative and qualitative information about the team's task and environmental conditions.

### **RESULTS**

We apply a variety of analytic procedures to identify and understand cohesion patterns in these teams. Cross (lagged) correlations and vector autoregressive models are used to assess the interdependencies among cohesion and other relevant time series data streams (e.g., conflict, team performance). We also look for extreme values within (quantitative) team cohesion patterns and use participants' open-ended diary responses to examine why these extreme values occur. In our poster, we will use charts, tables, and descriptive text to summarize the results of these analyses across our five analog teams.

### **CONCLUSION**

One key finding from our work to-date is that the particular variables important for team cohesion depend on the personal characteristics of team members, the types of work they are doing, and the level of frustration or discomfort induced by the analog environment. Instead of one or a few indicators clearly relating to cohesion across all teams, we find that each team's cohesion interrelates with a different set of variables versus other teams' cohesion. This leads us to believe that each analog team functions as a complex dynamic system wherein a number of events, feelings, and personal reactions continuously and uniquely affect its members' tendencies toward cohesion. We are working toward pinpointing how and why particular variables interrelate with team cohesion for some teams but not others; and how to predict which variables will be most critical for a particular team.

### **NEXT STEPS**

We believe that more focused, long-term, detailed investigations are needed to understand the dynamics of cohesion in analog teams. To that end, we are currently collecting data from additional analog teams in order to expand or replicate our results. One key feature of our NASA-funded research is the ability to integrate our daily diary methodology with an even more "micro" real-time indicator of team status – specifically, physiological monitoring of team member functioning. Over the past four years, we have worked to fully validate and prepare physiological monitoring badges – and we will be implementing them in at least one analog environment in 2014.