

# Social relations and individual performance of winter-over personnel at McMurdo Station

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Early studies on adaptation and performance in isolated antarctic groups by Gunderson and his colleagues resulted in a general concept of effective individual performance which included three essential components: task motivation, emotional stability, and social compatibility. Intercorrelations between supervisor and peer evaluations of individual performance in these studies ranged from .47 to .67 ( $p < .001$ ). Discriminant validities for criterion components were .60 for emotional stability, .59 for task motivation, and .50 for social compatibility (Gunderson and Nelson 1966; Gunderson 1974).

Predictions of adjustment rendered by clinicians at the time of screening for the Operation Deep Freeze Program, however, were found to have little or no correlation with later reports of supervisors and peers (Gunderson and Kapfer 1966), and biographical and personality variables failed to predict for the same measure of adaptation for all occupational groups. For instance, social background or personality characteristics that predicted social compatibility for Navy seabees did not predict emotional adjustment for that group or social adjustment for another subgroup like civilian scientists and technicians (Doll, Gunderson, and Ryman 1969; Gunderson 1974).

This difficulty in predicting adaptation in winter-over personnel has led us to reevaluate the criterion measures themselves and the role that social networks play in the assessment of individual performance by supervisors and peers. This article, therefore, addresses two specific questions:

- What is the relationship between emotional adaptation and social and occupational adaptation?
- What is the relationship between the structure of social relations and individual performance in an isolated and extreme environment?

Psychological debriefings of winter-over personnel at McMurdo Station were conducted between "winfly" (the third week of August), when the first elements of the summer support crew arrive to assist in preparing the station for the summer season, and the arrival of "mainbody" (the first week of October), the majority of the summer support crew. The debriefings were conducted jointly by a Navy clinical psychologist and a civilian medical anthropologist/research psychologist. Debriefings were mandatory for all military personnel and voluntary for civilians. Of the 131 men and women who wintered-over at McMurdo Station during the study year, 103 partici-

pated in the psychological debriefing process. This included all 53 military personnel available and 50 of the 69 civilian personnel available during the winfly period. Informal interviews were conducted with all but 3 of the 19 civilians who declined to participate in the psychological debriefings. Nine of the winter-over crew were evacuated from McMurdo Station during the week of winfly flights for medical, psychological, work-related, or family-related reasons. The clinical psychologist and/or the principal investigator, however, did have an opportunity to meet with four of these individuals prior to their evacuation.

Subjects were also asked if they experienced any of the symptoms commonly associated with what has been labelled the "winter-over syndrome" (Strange and Youngman 1971). These symptoms include: depression, insomnia, change in appetite, anger or irritability, anxiety, and cognitive disorientation, usually represented as difficulty with memory or concentration. The symptoms were then rated on a 5-point scale (ranging from no reported symptoms to severe symptoms requiring medical or psychological assistance) by the principal investigator on the basis of the severity and duration of the symptom as reported by the subject.

At the end of the debriefing, subjects were asked to make this judgment: "If you were to winter-over again and were given the task of selecting the winter-over crew, name five people from this station you would choose first?" This general adjustment criterion has been found to be highly correlated ( $r = 0.89$ ) with the three specific components of individual adaptation, i.e., emotional stability, task motivation, and social compatibility (Gunderson 1974).

Once the debriefing interviews were completed, evaluations of all 131 winter-over crew members were conducted by the winter-over officer-in-charge, medical officer, ANS resident manager, the Navy clinical psychologist, and the principal investigator. Each member of the evaluation team was asked to rate each winter-over crew member on a 5-point scale using the following criteria:

- adapted well and made a valuable contribution;
- adjusted adequately and made a contribution;
- caused some problems for self and others;
- caused serious problems for self or others; and
- a psychological, emotional, or behavioral casualty.

A cluster (i.e., structural equivalence) analysis (Johnson 1986) of peer nominations of ideal winter-over candidates revealed the existence of 20 subgroups defined on the basis of similar patterns of being chosen and 28 subgroups defined on the basis of similar patterns of choosing others within the group.

A comparison of two measures of social network activity based on the number of nominations—a Centrality Score discussed by Freeman, Roeder, and Mulholland (1979), and ordinal categories of low-high centrality—by supervisor and clinical evaluations of individual performance found significant associations between centrality score and performance evaluations given by the principal investigator, Navy clinical psychologist, officer-in-charge, and medical officer for the entire station (table 1). The evaluations given by these four individuals also displayed moderate correlations with ordinal categories of low-high centrality. The performance evaluations of the Navy clinical psychologist, officer-in-charge, and medical officer were also significantly associated with citation scores and exhibited moderate to strong correlations with ordinal categories of low-high centrality of military personnel. The evaluations of the clinical psychologist alone were significantly associated with citation scores of civilian personnel.

**Table 1. Correlations between supervisor and clinical evaluations and social centrality, McMurdo Station, 1989**

Evaluator	Social centrality	
	Centrality score (r)	Ordinal centrality (gamma)
<b>Entire station (n = 103)</b>		
Principal investigator	-.220*	-.324
Navy clinical psychologist	-.297***	-.459
Navy officer-in-charge	-.244**	-.375
Navy medical officer	-.210*	-.211
Civilian resident manager	-.125	-.122
<b>Civilian personnel (n = 49)</b>		
Principal investigator	-.186	-.283
Navy clinical psychologist	-.331*	-.439
Navy officer-in-charge	-.085	-.171
Navy medical officer	-.024	.095
Civilian resident manager	-.031	.038
<b>Military personnel (n = 53)</b>		
Principal investigator	-.235	-.361
Navy clinical psychologist	-.274*	-.455
Navy officer-in-charge	-.387***	-.573
Navy medical officer	-.332**	-.480
Civilian resident manager	-.146	-.293

\* p<0.05.  
 \*\* p<0.01.  
 \*\*\* p<0.005.

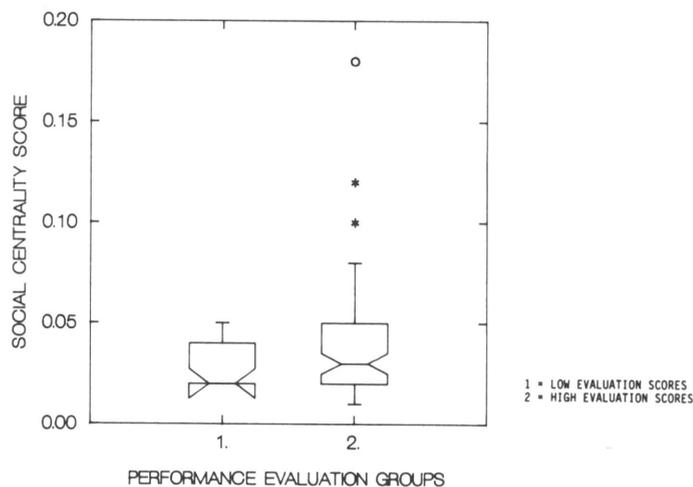
A matrix of gamma coefficients comparing symptoms of the winter-over syndrome and ordinal categories of low-high centrality is provided in table 2. High centrality appeared to be most strongly associated with self-reported symptoms of anxiety and weakly associated with appetite, sleep, and depression. All associations, however, were negative and in the expected direction.

This relationship between centrality and symptoms of the winter-over syndrome was further examined by comparing the centrality scores of personnel dichotomized on the basis of whether or not the combined supervisor and clinical evaluation scores indicated adjustment problems. Despite the wider range of citations among the group who had difficulties adapting to the austral winter, all members of the group with adjustment problems were cited at least once as a preferred fellow winter-over crew member (figure). On the other hand, some individuals with no winter-over syndrome symptoms were not nominated by any fellow crew members.

This analysis produced two noteworthy results. First, highly central station members of McMurdo Station's winter-over crew were emotionally well-adjusted. Contrary to expectations,

**Table 2. Matrix of coefficients comparing winter-over syndrome symptoms and social centrality, McMurdo Station, 1989**

	1	2	3	4	5	6	7
1. Ordinal centrality	1.000						
2. Appetite	-0.122	1.000					
3. Insomnia	-0.123	0.187	1.000				
4. Depression	-0.152	0.043	0.130	1.000			
5. Anger	-0.030	0.137	0.441	0.245	1.000		
6. Anxiety	-0.291	0.050	0.207	0.475	0.333	1.000	
7. Cognitive disorientation	-0.032	0.083	0.171	0.173	-0.018	0.057	1.000



**Centrality scores of winter-over personnel by supervisor and clinical performance evaluations, McMurdo Station, 1989.**

however, station members who scored low on measures of emotional stability and supervisor/clinical evaluations of individual performance were not socially isolated. The winter-over syndrome does not seem to be dysfunctional at the level of social compatibility, as determined by peer nominations. This finding is in contrast to studies which have found an association between depression and a decrease in size of social networks and amount of received social support (Murphy 1983, 1985; Henderson, Byrne, and Duncan-Jones 1981). In Antarctica, depression appears to be unrelated to social network membership and compatibility. The lack of an association may be interpreted as evidence of the tolerance of symptoms of the winter-over syndrome within the cultural systems of antarctic research stations and the use of these symptoms as a means of coping with the prolonged isolation and extreme environmental conditions when other mechanisms have failed (Palinkas 1989).

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