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GROUP CLIMATE & INDIVIDUAL FUNCTIONING IN AN ALL-WOMEN ANTARCTIC EXPEDITION TEAM

P.M. KAHN AND G.R. LEON

ABSTRACT: This study focused on four female Antarctic expedition team members who successfully skied to the South Pole in 67 days but did not meet their original objective of traversing the continent. The three phases of data collection included (a) a preexpedition personality assessment, (b) daily self-ratings of mood, task effectiveness, stress, coping, and exertion, and (c) postexpedition interviews about stress and coping. Personality measures showed a group high in confidence and achievement and low in bodily concern and competitiveness. Daily measures demonstrated an extremely well-functioning group with highly effective patterns of work and communication. The most commonly reported stressors were interpersonal, particularly concern about the welfare of another team member. Coping with these involved playful problem solving and sharing positive emotions with others. Results confirmed hypotheses that a female expedition team would be similar to male or mixed-gender teams in many respects but would be more sensitive to emotional concerns.

INTRODUCTION: The study of small groups in hostile and isolated conditions, such as polar expeditions, has attracted much attention in recent years, particularly because such environments have been considered as an analog to space flights (Harrison, Clearwater, & McKay, 1991; Suedfeld, 1991; Ursin, Comet, & Soulez-Lariviere, 1991). Traditionally, expedition, mountaineering, and spaceflight teams have been composed of men. For this reason, the performance of all-women groups in these challenging and stressful situations is sparsely researched. Women have journeyed to the Poles since the late 1700s, but they have only recently begun to participate in polar expeditions (Chipman, 1986). In 1986, as part of an

eight-member team, a woman became the first to reach the North Pole. In February of 1993, she led the first all-women expedition team to reach the South Pole. The present study assesses the performance of this all-women team and builds on the findings from an investigation of the psychological functioning of a successful North Pole team (Leon, McNally, & Ben-Porath, 1989). Such information provides helpful insights about group processes under physical and psychological pressure and provides an opportunity to make comparisons with mixed-gender and all-male groups in similar situations.

Several studies have been conducted on all-women groups engaging in high altitude mountaineering or trekking. Personality data on the first all-women team to climb Annapurna demonstrated similarities between women's scores and the average responses of a group of exceptional male climbers (Kramar & Drinkwater, 1980). Both groups were described as reserved, intelligent, and self-sufficient. In a recent qualitative study, women mountain climbers reported that they were drawn to the sport because of a lack of competition and an opportunity for intense cooperation (Bredemeier et al., 1991). With regard to environmental effects on self and group attitudes and mood, Beuter, Duda, Allison, and Graham (1987) found that satisfaction with personal and group performance and one's perceived physical state were not related to altitude. Petiet, Townes, Brooks, and Kramer (1988) reported that depression was positively correlated with altitude, whereas anxiety was most evident in the period immediately prior to departure. Mood state over the course of the expedition was more strongly correlated with self-perception of functioning than objective measures of neuropsychological performance. From the pre- to postexpedition periods, performance improved on visual motor and attention tasks, thus showing no decrement related to exposure to high altitude hypoxemia.

Assessment of group dynamics in an all-women trekking, expedition indicated that perceived group cohesiveness increased and peaked on the day when the group had to engage, in the most arduous task of the expedition (Allison, Duda & Beuter, 1991). Group conflict was not overtly evident until a later stage in the expedition. Other studies of mixed groups have also found that group conflict occurs at a phase when group members are not interdependent for physical survival (Tuckman, 1965).

Research on mixed-gender North Pole and Soviet-American Bering Bridge dogsled expedition teams (Leon et al., 1989; Leon, Kanter, Hoffman, & Dupre, 1991, respectively) demonstrated an absence of significant psychopathology in all team members. Personality traits of high achievement orientation and feelings of well-being, low stress reactivity, and median levels of harm avoidance were generally evident. In both expedition groups, planful problem solving and positive reappraisal were the primary coping methods reported in dealing with significant stressors. With regard to group processes, emotional sharing and verbal statements of social support were

infrequent; the primary focus of group interactions was on task activities. Perceived fairness of daily task assignments was positively related to daily ratings of group cohesiveness (Leon, Kanter, Hoffman, & Dupre, 1992). A relative absence of verbal social support and a strong work focus may be typical in highly task-oriented time-limited groups and has been noted as well in space crews (Kanas, 1987).

Investigations of all-male Antarctic expedition groups indicated that intellectualization, denial, and repression are commonly reported methods of coping with the stresses of a trek (Leon et al., 1989; McCormick, Taylor, Rivolier, & Cazes, Bergan, et al., 1991). With increasing fatigue course of the expedition, social withdrawal to preserve inner resources of energy was noted (McCormick, 1983, cited in Taylor & McCormick, 1985). Marines who underwent cold-weather training reported using escapist coping strategies (thinking about better times and places) more frequently than a comparable group who underwent summer warfare training (Vickers, Kolar, & Kelleher, 1989). This strategy was thought to have contributed to negative emotions observed in the cold.

The presence of women on mixed-gender expedition teams changes the dynamics of the group processes. On the North Pole team, the males commented that having one woman as a team member made them feel less competitive with each other (Leon et al., 1989). On the other hand, the female team member experienced a constant feeling of having to prove herself and have her opinions heard. Three of the 12 members of the Bering Bridge expedition team were women and commented that the Soviet men were more likely to offer help in carrying heavy loads and expected the women to perform less well (Leon et al., 1991).

The goals of the current study were to examine group factors including leadership and decision-making processes, cooperation, and emotional sharing, and their relationship to task effectiveness. Interrelationships between perceived stress, exertion, coping, and group performance were also examined. We hypothesized that an all-women group would be similar to mixed-gender and all-male groups in most respects, but that they would be more sensitive to the emotional needs of other team members and would adopt a

Subject Number	Age	Position	Occupation	Team Expedition Experience
1	37	Leader	Former school teacher	Skiing/Dogsledding 1986 North Pole traverse
2	31	Member	Outdoor supply store	None
3	46	Member	Computer programmer	Skiing - 35 Days; Mountaineering - 9 treks
4	39	Member	Outdoor educator	Canoeing - 60 days

Table 1. Subject Information.

more consultative decision-making style.

METHOD

Subjects. Four American women participated in the expedition (see Table 1 for demographic information). The leader was a 37-year-old former school teacher who in 1986 became the first woman to participate in a successful North Pole expedition.

The other team members included a 31-year-old outdoor enthusiast who worked at an outdoor supply store, a 46-year-old computer programmer with extensive experience as a climber and skier; and a 39-year-old outdoor leadership counselor who also had extensive outdoor experience. None were married. Three were in committed relationships at the time of the expedition.

MEASURES

Personality measures. Personality measures included the Minnesota Multiphasic Personality Inventory 2 (MMPI-2) (Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989) and the Multidimensional Personality Questionnaire, (Tellegen, 1982). The MPQ is a factor analytically developed self-report instrument consisting of 11 personality scales, three, higher-order factors, and six validity scores. The personality scales include Well-Being, Social Potency, Achievement, Social Closeness, Stress Reaction, Alienation, Aggression, Control, Harm Avoidance, Traditionalism, and Absorption. The higher-order factors are Positive Emotionality, Negative Emotionality, and Constraint. Convergent validity is demonstrated by correlations with higher-order factors in other inventories, such as the Eysenck Personality Questionnaire and the California Psychological Inventory. Internal Consistencies of the 11 primary scales range from .76 to .89, and test-retest reliabilities range from .82 to .92.

Daily ratings. Mood was assessed by the Positive and Negative Affect Scale (PANAS) that consists of 10 positive mood items (interested, excited, strong, enthusiastic, proud, alert, inspired, determined, attentive, active) and 10 negative mood items (distressed, upset, guilty, scared, hostile, irritable, ashamed, nervous, afraid, jittery) (Watson, Clark, & Tellegen, 1988). Daily effectiveness was assessed by 26 items measuring group cohesion (e.g., helpfulness of other team members, competitiveness, and number of disagreements) and group effectiveness (achieving daily goals and decision making) on a 10-point Likert-type scale. The types of stressors encountered by the members were assessed in a checklist of 28 items consisting of task stressors (e.g., gear and food), physical stressors (e.g., frostbite), psychological stressors (e.g., loneliness), and interpersonal stressors (e.g., communication difficulties). Strategies for coping with stressors were evaluated in a 23-item checklist that included methods of seeking social support, planful problem solving, and escape-avoidance. Perceived exertion (Borg, 1982) and stress were assessed by two Likert-type scale

items, 10 and 5 points, respectively.

Structured interviews. Postexpedition structured interviews focused on information regarding the two most stressful situations encountered during the expedition, means of coping with the stressors, motivations for participating in the expedition, personal gains from participating, sleep patterns during the expedition, concerns about privacy, concerns about health, and feelings about the decision to end the expedition.

PROCEDURE

Three subjects completed the personality measures 26 weeks before the expedition, and the fourth (Subject 2) completed them 2 days prior to the team's departure from Minneapolis, Minnesota. Subject 2 joined the expedition team late, after one of the original team members suffered a physical injury during a preexpedition training session. On the expedition, team members spent 5 to 10 minutes each evening completing the daily ratings. Daily response keys were printed double sided on single sheets of Chindura paper and were bound in individual notebooks. Questions were on strips of laminated paper and were reused daily. Daily ratings were also completed before the expedition while the team waited for their plane to take them to Antarctica and after the expedition while the team waited to return to the United States. Ninety-eight percent of daily ratings were completed across the 14 weeks, of data collection. Three members were interviewed the day of the team's return, and the fourth was interviewed the following day.

EXPEDITION DETAILS

The team departed from Minneapolis to Punta Arenas, Chile, where their plane to Antarctica was delayed for 11 days because of poor weather conditions and a leaky fuel tank. The team began the expedition at Patriot Hills, Antarctica, on November 9, 1992, and skied 700 miles, towing sleds weighing up to 200 pounds. They reached the South Pole in 67 days. The route was uphill, reaching an altitude of 9,600 feet. The group skied an average of 8 to 10 hours a day, averaging 10 to 15 miles a day in temperatures ranging from -16°F to -27°F . Final decisions were made by the group leader, Subject 1. Prior to reaching the South Pole, the team met to discuss whether some members would be flown out before reaching that destination. One team member had chronic bronchitis and a sprained ankle, and the other experienced chronic fatigue and emotional difficulties. The outcome of that meeting was the decision that all would continue on to the Pole, but if it seemed possible at that point, then two of the members would continue from the Pole to McMurdo Base, the originally planned expedition destination. A second meeting was held once the group arrived at the south Pole, and it was decided that the entire team would end the expedition there rather than have some members continue to traverse the continent, 870 miles further, to

McMurdo Base. The decision reflected both financial and health concerns. The group was unable to make up for the 11-day delay in Punta Arenas and thus unable to reach McMurdo base by February 17 when a home-bound ship offering free transport would be departing.

RESULTS

Group data are presented first, followed by significant individual data.

PERSONALITY ASSESSMENTS

The MMPI-2 findings suggested a group of individuals generally free of significant psychopathology with a tendency to show themselves in a positive manner (see Table 2). The relative lowest mean scores were on the Depression (D) ($M = 46.0$, $SD = 6.5$) and Hypochondriasis (Hs) ($M = 47.3$, $SD = 3.5$) scales. The content scale scores (Butcher, Graham, Williams, & Ben-Porath, 1990) (also presented in Table 2) indicated a group that was friendly, helpful (Cyn or Cynicism $M = 38.8$, $SD = 6.4$), confident (Anx or Anxiety $M = 40.5$, $SD = 4.1$), and relatively free of fear (Frs or Fears $M = 36.8$, $SD = 6.4$). Their scores also indicated few health concerns (Hea or Health $M = 42.3$, $SD = 1.5$), little difficulty making decisions (Obs or Obsessiveness $M = 43.0$, $SD = 7.7$), and a relative lack of driven competitiveness (Tpa or Type A) ($M = 43.5$, $SD = 5.2$). The relative highest score was on social discomfort ($M = 58.5$, $SD = 10.2$), perhaps indicating a preference for more solitary activities.

The MPQ T-scores for each team member are presented in Table 3. The MPQ findings also demonstrated a group that generally did not exhibit a great deal of emotional responsivity (Positive Emotionality [PE] $M = 48.0$, $SD = 5.6$ and Negative Emotionality [NE] $M = 40.8$, $SD = 5.9$). The lowest mean score was on Alienation (Al) ($M = 37.3$, $SD = 5.5$), indicating that members generally felt themselves treated fairly. Their relatively low mean score

Subject	Clinical Scales												
	L	F	K	Hs	D	Hy	Pd	Mf	Pa	Pt	Sc	Ma	Si
1	43	55	54	43	53	47	68	45	63	66	59	53	62
2	76	55	67	51	49	56	60	62	63	53	63	56	51
3	57	41	70	46	44	51	55	74	49	47	53	41	53
4	57	44	65	49	38	54	43	45	49	49	48	51	43
M	58.3	48.8	64.0	47.3	46.0	52.0	56.5	56.5	56.0	53.8	55.8	50.3	52.3
SD	13.5	7.3	7.0	3.5	6.5	3.9	10.5	14.2	8.1	8.5	6.6	6.5	7.8

Subject	Content Scales															
	ANX	FRS	OBS	DEP	HEA	BIZ	ANG	CYN	ASP	TPA	LSE	SOD	FAM	WRK		
1	45	35	50	60	43	58	50	46	47	50	62	72	47	65		
2	37	46	44	42	40	58	42	42	42	41	40	54	45	40		
3	37	35	32	34	43	39	39	35	42	45	49	60	36	40		
4	43	31	46	39	43	39	36	32	36	38	47	48	32	46		
M	40.5	36.8	43.0	43.8	42.3	48.5	41.8	38.8	41.8	43.5	49.5	58.5	40.0	47.8		
SD	4.1	6.4	7.7	11.3	1.5	11.0	6.0	6.4	4.5	5.2	9.2	10.2	7.2	11.8		

NOTE: Scores are K-corrected T-scores. L, F, K = validity scales. Hs = Hypochondriasis; D = Depression; Hy = Hysteria; Pd = Psychopathic Deviate; Mf = Masculinity-Femininity; Pa = Paranoia; Pt = Psychasthenia; Sc = Schizophrenia; Ma = Hypomania; Si = Social Introversion; ANX = Anxiety; FRS = Fears; OBS = Obsessiveness; DEP = Depression; HEA = Health Concerns; BIZ = Bizarre Mentation; ANG = Anger; CYN = Cynicism; ASP = Antisocial Practices; TPA = Type A; LSE = Low Self-Esteem; SOD = Social Discomfort; FAM = Family Problems; WRK = Work Interference.

Table 2. Minnesota Multiphasic Personality Inventory (MMPI) Clinical and Content Scale Scores

Subject	Scale													
	WB	SP	ACH	SC	SR	AL	AG	CON	HA	TR	ABS	POS	NEG	CON
1	48	48	42	37	43	40	51	56	36	38	59	43	48	38
2	2	54	48	71	47	29	40	44	56	50	46	55	39	54
3	54	43	60	27	37	40	54	60	43	40	2	44	42	47
4	65	43	49	48	32	40	44	54	32	32	46	50	34	38
M	41.8	47.0	49.8	45.5	39.8	37.3	47.3	53.5	41.8	40.0	38.3	46.0	40.8	44.3
SD	27.6	5.2	7.5	18.9	6.6	5.5	6.4	6.8	10.5	7.5	24.9	5.6	5.9	7.8

NOTE: Scale scores are T-scores. WB = Well-Being; SP = Social Potency; ACH = Achievement; SC = Social Closeness; SR = Stress Reaction; AL = Alienation; AG = Aggression; CON = Control; HA = Harm Avoidance; TR = Traditionalism; ABS = Absorption. Higher-Order Factor scores are PE (Positive Emotionality), NE (Negative Emotionality), and CON (Constraint).

Table 3. Multidimensional Personality Questionnaire (MPQ) Scores

on Stress Reaction (SR) ($M = 39.8$, $SD = 6.6$) suggested that the group overcame upsetting experiences quickly without a significant degree of emotionality. Their relatively low score on Harm Avoidance (HA) ($M = 41.8$, $SD = 10.5$) showed a preference for adventure. The relative highest mean score was on the Control (CON) scale ($M = 53.5$, $SD = 6.8$), indicating a midpoint in terms of tendencies to control others or tendencies of passivity. The second relative highest mean score was on Achievement (ACH) ($M = 49.8$, $SD = 7.5$, consistent with their involvement in this expedition.

DAILY ASSESSMENT

Mood ratings. The mean positive affectivity (PA) score averaged across the 14 weeks of data collection was 2.6 ($SD = 0.78$) and was consistent with the relatively high PE score on the MPQ. Nine items were included in the average score because, one subject omitted one item from her daily reports. Figure shows each team member's PA score across time. In general, the leader scored highest ($M = 3.2$, $SD = 0.65$), and Subject 2 who experienced chronic health problems, scored lowest ($M = 1.8$, $SD = 0.58$). Mean scores were very low before the expedition, during Week 1 and Week 2, when the group was delayed because of plane and weather difficulties. During the expedition, the relative lowest PA scores were in the first two weeks of the expedition (Weeks 3 and 4), in Week 7, when one subject suffered from tendonitis and another from a sprained ankle, and in Week 10, the week of the first meeting. The overall lowest scores were in Weeks 13 and 14, after the team completed the expedition.

The mean negative affectivity (NA) score of 1.6 ($SD = 0.56$) was significantly lower than the mean PA score, $t_{01}(375) = 23.30$, and was consistent with the relatively low mean NE score on the MPQ. Figure 2 shows the mean NA scores across time. The relative highest mean score of 3.0 on NA during the waiting period and at the week of the first (Week 10), consistent with the low mean PA score at the same time period.

Daily effectiveness. Table 4 presents the average daily effectiveness ratings that demonstrate that members viewed the group as having good cohesion and team effectiveness. Relatively high scores were evident on cooperativeness ($M = 7.6$, $SD = 0.89$), team friendliness ($M = 6.8$, $SD = 0.49$), desire to work together the next day ($M = 6.8$, $SD = 0.79$), and helpfulness ($M = 6.5$, $SD = 0.58$), and relatively low scores were evident on tension ($M = 3.5$, $SD = 0.64$) and competitiveness ($M = 1.2$, $SD = 1.0$). Judgments of effective team performance were revealed in high ratings on the efficiency of camp set-up ($M = 7.3$, $SD = 0.66$) and breakdown ($M = 7.0$, $SD = 0.72$), a clear understanding of task assignments ($M = 7.0$, $SD = 1.1$), and well-organized activities ($M = 6.8$, $SD = 0.79$). Team members rated high the quality of decisions made by the group as a whole ($M = 6.8$, $SD = 0.96$) as well as their individual input into decisions ($M = 6.7$, $SD = 1.37$). The team's view

Figure 1. Mean Positive Affectivity Score for Each Subject and Entire Group Across the 14 Weeks of Data Collection.

Figure 2. Mean Negative Affectivity Score for Each Subject and Entire Group Across the 14 Weeks of Data Collection

of the quality of the leader's decisions ($M = 7.1$, $SD = 1.00$) was significantly higher than the leader's view of her decisions ($M = 5.9$, $SD = 1.00$), $t_{01}(192) = 9.287$.

Relationships between mood, daily effectiveness, and performance. PA scores correlated significantly ($ps < .01$) with ratings of overall experience on the ice ($r = 0.49$), how organized the activities were ($r = 0.30$), whether activities went according to plan ($r = 0.29$), and the clarity of personal task assignments ($r = 0.23$). PA scores also correlated significantly with two absorption questions

including changes in one's sense of time ($r = 0.36$) and changes in alertness/attention ($r = 0.23$). NA scores correlated significantly with the number of disagreements ($r = -0.36$). Performance measured in number of miles skied correlated significantly with PA ($r = 0.16$, $p < .05$) and hours of sleep ($r = 0.28$, $p < .01$). Ratings of the exertion ($M = 4.2$, "somewhat strong," $SD = 2.56$) correlated significantly with PA scores $r = 0.32$). Ratings of daily stress ($M = 2.6$, "low-moderate," $SD = 0.84$) correlated significantly with the number of disagreements ($r = 0.21$), ratings of tension ($r = 0.20$), and NA scores ($r = 0.32$).

Stressors. There were four categories of stressors in the daily check list: interpersonal, physical, psychological, and task. The frequency of different categories of stressors is presented as a percentage of total number of stressors. The most commonly reported category of stressors was interpersonal (35%), followed by physical (33%), psychological (19%), and task (13%). The most frequently reported interpersonal stressors were concerns about other team members (8%) and communication problems (6%). Joint pain (7%), fatigue (5%), and muscle pain (5%) were the most frequently reported physical stressors. Concern about self-image was the most common psychological stressor (3%). Subject 4 reported the greatest percentage of stressors (30%), followed by Subject 1 (28%), Subject 2 (24%) and Subject 3 (19%).

Figure 3 shows the frequency of different stressors across time. Interpersonal stress peaked at Week 10 (strategy meeting), remained high when the group returned to Patriot Hills at Week 13, and continued to be high following the expedition. Task problems were highest at the beginning of the trek and tapered off until the final push to reach the Pole. Physical problems also began at the beginning of the expedition but persisted until the end. Psychological stressors remained relatively stable across the expedition, with the lowest during Week 9 in which Christmas was a rest day.

Item	M	SD	Item	M	SD
Set-up efficiency	7.34	0.66	Cooperativeness of team	7.61	0.69
Breakdown efficiency	7.04	0.72	Helpfulness of team	6.52	0.58
Clearly understood tasks	6.99	1.09	Degree of tension	3.54	0.64
Organized activities?	6.81	0.79	Competitiveness of team	1.15	1.01
Plans followed?	5.37	0.21	Working together tomorrow	6.81	0.79
General experience	6.44	1.04	Closeness of team	5.66	0.50
Input into decisions	6.68	1.37	Interest of leader	7.30	1.25
Quality of decisions	6.77	0.96	Fairness of tasks	6.56	1.12
Friendliness of team	6.75	0.49			

NOTE: Scale is from 1 (lowest) to 10 (highest).

Table 4. Daily Effectiveness Scores.

Relation between overall amount and type of stress experienced. Ratings of the amount of stress experienced correlated significantly with psychological ($r = 0.43$), task ($r = 0.35$), interpersonal ($r = 0.20$), and physical ($r = 0.15$) stressor subscales. In each stressor category, amount of stress, correlated highest, respectively, with concerns about self-image ($r = 0.38$) and loneliness ($r =$

Figure 3. Frequency of Four Types of Stressors Across the 14 Weeks of Data Collection.

0.27); cold ($r = 0.27$) and gear ($r = 0.26$); feeling down or stressed because another team member felt that way ($r = 0.19$); and cold symptoms ($r = 0.15$).

Coping. The coping basis of a principle component analysis (PCA). To control for the effects of time in the repeated ratings each coping item was regressed on time (i.e., weeks), and the resulting residuals were used in the PCA. Preliminary measures of sampling adequacy (MSA) for individual item residuals led to the elimination of three items from the subsequent PCA. Subsequent PCA with varimax rotation of factors with eigenvalues greater than 1.0 resulted in 6 factors explaining 56% of the variance. On the basis of these results and of judgments of conceptual consistency, 7 subscales were created. They included the following: (1) focusing on the goal; (2) seeking team social support; (3) reflecting; (4) sharing positive emotions with team; (5) planful problem solving; (6) crying; and (7) engaging in physical activity.

Figure 4 shows the average frequency of different coping strategies across the 14 weeks of data collection. Scores on the goal focusing scale were consistently high during the expedition, reaching a peak at Week 11, the final push for the expedition. The scale of items involving team support peaked at Week 10. Reflection (praying and writing) scores rose at Week 6, when Subject 2 reported using prayer to cope with the cough she had acquired, and remained high throughout the remainder of the expedition. Reflection was also the most frequent coping strategy following the expedition. The scale for sharing positive emotions (fun, humor, being nice to others) reached a peak during the first week prior to the expedition and remained moderate throughout the rest of the expedition. The planful problem solving scale scores were the most variable, reaching a peak at Week 4, a low at Week 8, and a high again at Week 10. Crying was infrequent throughout the expedition. Physical activity as a coping strategy was minimal but steady throughout the expedition.

Table 5 shows the correlation between the seven coping four stressor scales. Task stressors correlated significantly ($ps < .01$) with seeking team social support ($r = 0.26$), planful problem

Figure 4. Frequency of Seven Coping Factors Across the 14 Weeks of Data Collection.

Coping Strategy	Stressor			
	Task	Psychological	Physical	Interpersonal
Focusing on the goal	-.008	.1482**	.3234**	-.033
Seeking team social support	.2624**	.3401**	.1769**	.2120**
Reflection	.1122**	.2203**	-.040	.2079**
Sharing positive emotions with team	.1403**	.3532**	-.020	.2820**
Planful problem solving	.1721**	.3513**	-.030	.3027**
Crying	.080	.3572**	.029	.1193**
Engaging in physical activity	.017	.2164**	-.1656**	.2356**

*Significance less than or equal to .05; **significance less than or equal to .01

Table 5. Correlation Between Stressor Scales and Coping Scales.

solving ($r = 0.17$), and sharing positive emotions with the team ($r = 0.14$). Psychological stressors correlated significantly with all coping strategies and most highly with crying ($r = 0.36$), although this coping strategy was used only 2% of the time. The physical scale correlated relatively highest with focusing on the goal ($r = 0.32$) and correlated negatively with engaging in physical activity ($r = 0.17$). The interpersonal stressor scale correlated most highly with planful problem solving ($r = 0.30$) and with sharing positive emotions with team ($r = 0.28$). Fatigue correlated significantly with "sharing emotions with others" (.20). The more stress experienced, the more likely the subjects engaged in planful problem solving ($r = 0.35$), seeking team social support ($r = 0.32$), focusing on the goal ($r = 0.24$), and crying ($r = 0.28$).

INDIVIDUAL RESULTS

Subject 1

Subject 1 was the 37-year-old leader of the expedition and was the first woman to reach both the North and the South. Her relatively high Pt and Wrk MMPI scale scores were consistent with reported worries and concerns about the impending expedition. Her relatively high Sod, Dep, Lse, and Pa scores reflected a tendency toward introversion, a lack of self-confidence, and concern about others' evaluations of her. Her relatively high score on Pd suggested some friction with authority persons (Butcher et al., 1989).

Consistent with postexpedition reports of handling stress by appreciating the sights and sounds of Antarctica, Subject 1 exhibited a relatively high score on Abs of the MPQ, indicating an emotional responsiveness to engaging sights and sounds. This subject's most commonly reported category of stress was interpersonal, and her most frequent coping strategies were writing, using humor and fun, praying, and refraining from explaining. Personal interview data follow.

The most stressful situation: deciding the team would continue as a group but only to the Pole, and coping by positive reappraisal

I had to get to that point of deciding that we would do it as a team. I had to play out a variety of scenarios in my head, privately first, then look at what my options were. I had to also sort out my own heartstrings with the overall picture of this project and that was really hard.... Is one person's slow progress due to injury and sickness worth jeopardizing the traverse? The whole time you've got the calendar pressure and the miles that need to be made ... [and] money - the burden we left back here with people - and the decision of the pilots [flying in dangerous conditions] It was frustrating. I felt distraught, a lot of anguish and loneliness ... and I was trying to sort out my feelings of partial failure in terms of not meeting that objective of McMurdo. I then came to grips with what I really came down to do and that was to lead a group, to move all of us forward ... and that initial feeling of failure to the initial objective started to dissipate.

Coping by writing and sharing emotions with the group

I had to write, for me that's a critical way of coping in these kinds of environments.... Even during the long push days, if there isn't much time to write I'll sacrifice sleep for writing.... I did something that I'm not very good at on this trip and that was to talk about my concerns more than I would normally, be more open with the team about my concerns about them as an individual or our group concerns.

Environment as a motivator during the trip

The terrain itself is a tremendous highlight. People always ask how do you keep yourself going in all that sameness. To me it was different every day. It never stopped changing. I found it extremely interesting all of the time, I never experienced boredom.... I was very charged by the environment we were in.

Comparing the group to mixed-sex group: Need to balance interaction and goal focusing

We did enjoy each other. It was really unique in terms of an overall expedition. There were a lot of laughs compared to

what I experienced before.... It felt like our commitment to making the whole mechanism work and communicate remained high.... I don't experience that in the same way in a mixed group.... [in mixed groups] there isn't a whole lot of communication amongst each other and yet there is that need and want for it.... I found myself getting frustrated at times when the group wasn't moving as quickly as I wanted. I sometimes would wish that they would be more like some of the more male-dominated trips. . . plug in and go ... but how can you find that blend for this particular kind of endeavor?

Subject 2

Subject 2 was a 31-year-old who joined the team a short time before the group departed for the expedition. Her skiing skills were not as strong as the other team members, and her scores for example, her markedly low score on the MPQ Well-Being scale - indicated some anxiety about participating. Her MMPI scores indicated moderate concerns about the impression she made on others (L, K, and Pa). Relatively high scores on Mf and Sc reflected nontraditional feminine interests and some feelings about social alienation.

During the expedition, Subject 2 experienced multiple health problems including a swollen ankle tendon, bronchitis, and neck strain. Her physical problems were the most frequently reported type of stressor and were evident in her low PA score. Nevertheless, her NA did not increase, and, by all postexpedition accounts, her mood was extremely positive given the severity of her physical problems. She coped by writing, praying, sleeping, sharing her emotions with other team members, and thinking positively.

Coping with pain by positive self-talk, crying, and praying

You want to and need to deal with it and move on.... [I did] lots of talking to myself and just positive encouragement. Letting myself feel the pain...going through periods, days, of total bawling, inside my glasses...just really giving myself the space to get through the pain in a way I never let myself do before because I never let myself cry...I was asking for a lot of help from God...I did a lot of praying...as opposed to complaining or whining.... really wanted to let my body feel present with what was going on with me.

On coming to the personal decision not to continue past the Pole given that opportunity. Positive reappraisal

It was hard because I had all the drive and power and passion in the world.... I wanted to push myself more. I wanted to almost accept that fact that I was going to be in more pain to go on.... I would have done that...had there not been so many people involved in this expedition, if it wasn't such a public thing. But that wouldn't be smart and that was not entirely my call either because this was not my baby... Before this discussion. . . I was thinking about why would I not go on and it mostly came down to [the leader].... I had a tremendous amount of respect for her. I really felt committed to what she was doing and that built for the whole expedition and I really wanted the traverse to happen...any way possible and it deserves it and she deserves it...I really felt happy that I made that decision.... This wasn't about me....I grew a lot with that

actually.

Subject 3

Subject 3 was a 46-year-old computer programmer. The relatively high MMPI Mf score likely reflected her interest in high-risk outdoor activities; the relatively low score on the Ma scale may have indicated a controlled, task-oriented approach to activities and people. Her relatively high Sod MMPI score, and her relatively low MPQ Sc score indicated a tendency to refrain from unnecessary social contact. Her relatively low Abs score reflected a reality orientation. Her most frequently reported type of stressor was physical; she experienced back pain during the expedition and had some concern about weight loss and general physical capabilities because she was the oldest of the group. To cope, Subject 3 accepted it, kept the goal in mind, tried harder, and tried to think nice thoughts.

Coping with the decision to leave at the Pole: Frustration and isolation

We had to talk reality ... hearing it said.... finalizing it and hearing, that broadcast over the radio that four were coming out. You can't revoke it at that time.... I was relieved the decision was made. I felt like the trip would always be incomplete. I didn't feel that what we had, achieved was that big of an achievement and that we were missing part to make it what I wanted it to be, to do the traverse that we had started out to do.... [Emotionally] I was frustrated to have done basically things as correctly as we could and to be stumped partially by things beyond our control and also by money which in theory is in your control.

Coping by distancing and positive reappraisal

I distanced myself ... not thinking much about what it meant down the line and trying to internalize or emotionally accept what I know intellectually was a correct decision.... So I did spend a lot of time trying to talk myself into believing that yeah, getting to the Pole was a big deal . . . I was very proud and pleased that all four of us got there ... and I was very glad that our priority became the Pole, the traverse became second at that point, because it's not possible to go on - maybe, maybe not - but to get all four of us was important. I would say withdrawing is the best description [of how I coped with it].

Subject 4

Subject 4 was a 39-year-old outdoor leadership counselor. Postexpedition interview data revealed that she some significant emotional distress during the expedition. However, none of the subject's preexpedition test scores indicated high emotional reactivity; she scored relatively lowest on the MMPI Depression scale ($M = 38$); her MPQ Well-Being score was the highest of the group ($M = 65$) on any scale. Her relatively low score on the MMPI Pd scale ($M = 43$) suggested a lack of problems with authority figures. She scored lowest of the group on FRS and CYN. She reported experiencing more stressors during the expedition than the other team members; the most frequently reported category of stress was interpersonal, especially concerns about self-image and whether she was "holding her own." Additionally, she experienced some physical problems - tendonitis in her foot for a 10-day period at the beginning of the trip and fatigue at

the end. Her most frequent coping mechanisms were accepting it, talking with others, writing in a diary, using humor and fun, goal focusing, and talking positively to herself.

On how the environment detracts from interpersonal communication

It's hard to ... get it across that you're having a hard time.... [W]hen you're skiing along in single file, people can't really see you that well.... [People aren't always] aware of how coping with the environment constrains communication.... At lunch each of us would sit with our back to the wind and face to the sun, so we wouldn't face each other.

Decision to continue on only as far as the Pole: Feelings and confrontive coping

One of the things [Subject 3] said during the discussion was that she felt that in order to continue the traverse ... all your emotional and mental energy would have to be focused on the task at hand and that everything you did would have to be towards getting further down the line.... But it would be extreme.... It made me think, now, is that the kind of experience I want to have. . . . I began to think, probably not.... [I told the group] 'I know that now I'm going to be going through a grieving process so hang with me and ... don't let me just withdraw because that is going to be my tendency' . . . That night I felt angry. I could hardly sleep.... The next day I was sad and scared.... Emotionally I think I feel that I would have been fine if I would have gotten more interaction.

DISCUSSION

This investigation demonstrated a number of commonalities with findings from all-male and mixed-gender expedition groups (e.g., Leon et al., 1989; Leon et al., 1991; Lester, 1980). The personality characteristics of the participants revealed good psychological adjustment and an absence of sensation-seeking tendencies. During the expedition, there was a strong task focus that overrode sometimes intense physical problems and concerns; coping with stressors through planful problem solving and prayer was also evident. Other research has demonstrated that the use of isolation for engaging in reflection and prayer, and other solitary activities was a frequently report means of coping by women serving in the Antarctic (Rothblum, Morris, & Weinstock, 1993) and by a mixed-group dogsled expedition team (Leon et al., 1989). The current all-women group was more likely than previously studied polar expedition groups to report stressors related to concerns about the well-being of other team members, coping by sharing emotions with other members of the group, and high satisfaction with the leader's decisions.

The main type of stressor that the women's group as a whole experienced was interpersonal and primarily involved concern about the welfare of another team member. This contrasts with results from the study of the mixed-sex Bering Bridge team (Leon et al., 1991) that found environmental stressors to be highest, followed by interpersonal. In the latter group, interpersonal stressors primarily involved issues of group strategy and how to carry out particular tasks. A direct comparison of group functioning in the Bering Bridge team relative to the present one cannot be made because the assessment tools in the studies differed. However, both included the same postexpedition structured interview, and it

revealed differences in the degree of emotional sharing and of disagreements over leadership decisions. For instance, a coleader in the North Pole team reported that one of his "greatest disappointments overall was the lack of heart and the lack of compassion and sensitivity in the group as a whole" (Leon et al., 1989, p. 171). This stands in contrast to the present leader's descriptions of a team dedicated to good communication, to the team's high ranking of group friendliness, and to the reported use of social support as a coping mechanism. The women's group reported no such conflict and consistently ranked high the quality of the leader's decisions. In the Bering Bridge group, conflict over the leader's decisions included disputes about how to cross the Bering Straits, and, in the North Pole team, about a "final assault" strategy to reach the North Pole (Leon et al., 1989). Such differences may not necessarily reflect the gender makeup of the teams but may be due to the coleadership and/or the international composition of previous polar expeditions.

The daily effectiveness ratings further demonstrated an extremely well-functioning group, with a clear understanding of task assignments, well-organized activities, and relatively low tension and competitiveness. The significant impact on the emotional climate of the group of effectively communicating the daily task assignments and schedule has also been demonstrated in other types of expeditions (Leon, Fulkerson, Luepker, & Yunov, 1993). Ratings of positive mood were significantly higher than those of negative mood and were related to more general perceptions, often based on the number of miles skied, of how group activities were going. Interestingly, positive mood and perceived exertion were positively associated, perhaps because exertion was related to mileage progress. As one might expect, negative mood was associated with the number of disagreements between team members. Consistent with findings from all-women mountaineering groups (Beuter et al., 1987), negative mood was highest prior to the start of the expedition when anxiety about the impending trek and distress about the unexpected, lengthy delay were evident.

Group communication and positive attitude in terms of humor, fun, and being nice to others were significant means of coping with interpersonal stressors. Along with planful problem solving, these strategies were highly adaptive in enabling the group to continue to pursue its expedition goals while maintaining a good emotional climate. It is interesting to note that the interpersonal stressors reported centered around concerns about other group members rather than disagreements with others. Rothblum et al. (1993) pointed out that social support processes in women can themselves become elicitors of stress. Women tend to become more emotionally involved than men in the problems of others and thus experience greater emotional distress in relation to others' difficulties.

Concerns about the welfare of other members were related to the significant physical problems some of the team members' were experiencing, and indeed physical stressors were the second most frequent category of stressor reported. The extreme physical burden of pulling heavily loaded sleds up to a high altitude took its toll on each in the group. The prevalence of joint and muscle pains reflected this physical toll and is, in contrast to reports of frostbite as the most frequent physical problem in women engaging in long-distance dogsled competitions (Mischler, 1989). For the current group, focusing on the goal as a means of coping with physical problems was an important strategy. Contrary to results from an all-male group (Taylor & McCormick, 1985), social withdrawal was not used to preserve inner resources in times of physical strain.

A significant issue with which the group had to deal was the

decision to terminate the expedition at the South Pole with the full group reaching this destination rather than for two of the group members to continue on to the original goal of McMurdo Base, some 870 miles further. The interview data confirmed the quantitative information about the high level of functioning of this group. Although all were disappointed, the group abided by the ultimate decision made at the South Pole and did not splinter between those who felt physically capable to proceed further and those who did not.

The results of this investigation supported our hypotheses that an all-women group would be similar to mixed-gender; groups in many respects but would be more sensitive to emotional concerns. However, given the small number of group-process investigations of all-women groups in challenging and adventurous situations, one cannot rule out the possibility that our findings are specific to unique characteristics of this particular group. The greater concern and feelings of stress engendered due to the emotional and physical needs of other team members is consistent with the literature regarding gender differences in social support effects. Such concerns, coupled with financial concerns, prompted this group's decision to end the expedition as a team rather than have two of the members try to cross Antarctica. Even so, all were able to agree to and achieve a significant goal of becoming the first all-women team to reach the South Pole. It is important for future research to continue to evaluate the functioning of women in a range of challenging situations to determine whether there are differences between all-women and mixed-gender and/or all-male groups working together in isolated and hostile conditions, or whether situational demands override gender difference.

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