# PRELIMINARY STUDIES ON THE PSYCHOLOGICAL ADJUSTMENT IN THE ITALIAN ANTARCTIC SUMMER CAMPAIGNS

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ABSTRACT: Up until now, no significant emotional or cognitive modifications have been found in psychological studies performed during Italian Antarctic summer campaigns, which last from 2 to 5 months. A substantial emotional stability and a general satisfactory adjustment of the expedition participants emerged in the research. To investigate the coping strategies used to deal with the Antarctic environment, the Profile of Mood States (POMS) and the Ways of Coping Inventory were administered to a group of 11 Italian expeditioners before leaving and before returning from the campaign. The results confirm the emotional stability found in the previous studies and show a decrease of several ways of coping. Particularly, there was a decrease in seeking social support and in problem-focused coping. The discussion and interpretation of the findings are reported, and the hypothesis of a frozen reactivity mediated by a possible perceptual defense is suggested.

ENVIRONMENT AND BEHAVIOR, Vol. 32 No. 1, January 2000 72-83 © 2000 Sage Publications, Inc. Italy has been one of the last countries in the world to organize national expeditions to Antarctica. This was due to several reasons, including the geographical distance and the lack of historical, political, and economical interests in that region. The Italian summer station called Baia Terra Nova, located on the western coast of the Ross Sea (74°41'42" S, 164°07'23" E), was built only in 1986 and progressively enlarged in the following years. The Italian National Antarctic Research Program (PNRA) and its agency, Progetto Antartide, have carried out 13 summer expeditions; in the last few years, some of them were to places that are among the most hostile and extreme in the world, such as Dome C (75°06' S, 123°23' E) on the Antarctic Plateau. The summer period in Antarctic expeditions is quite different from the winter period in a number of ways (Misichia, 1991; Taylor, 1987), apart from the continuous daylight. In that period, which lasts from 2 to 5 months, the Italian station usually houses about 70 people who are involved in varied and intensive logistical (air, sea, and land operations) and research (earth science, physics of the atmosphere, cosmology, biology and medicine, oceanography, environmental science, technology, etc.) activities, often in competition for the available logistical resources. The general atmosphere is characterized by human hyperactivity from the high workload (numerous tasks and 12 working hours per day) affecting every participant, time pressure from the need to take the greatest advantage of the favorable weather conditions during the summer season, and continuous social changes from the frequent rotation of research personnel (who usually stay not more than 2 months). The contemporary presence of various field camps makes the psychosocial situation more complex and variable. Due to this very dynamic situation, it is very difficult to schedule and carry out systematic research programs that need a real collaboration of people, to administer tests in the proper time and place, to make behavioral observations to assess individual adjustment, and to do interviews and so forth. On the contrary, this would be somewhat easier in the winter.

For these reasons, very few systematic psychological studies were performed in the Italian Antarctic communities where, fortunately, psychiatric casualties have never been reported and the socioemotional climate, as evaluated by the expedition medical officers, has always been appraised as satisfactory up to this time (Peri, 1996).

In accordance with the medical officers' empirical observations, a preliminary psychosocial debriefing (Peri, Barbarito, Barattoni, Nisi, & Ruffini, 1998), effectuated on a small sample of Italian expeditioners coming from Terra Nova Bay station and from the summer camp of Dome C, confirmed a

highly satisfactory physical, psychological, social, and occupational adaptation. Similar results were obtained from an investigation concerning the life conditions in the Italian expeditions in which the positive effect of the information and preparation courses was emphasized (Peri, Ruffini, et al., 1998). Another preliminary psychometric study (Peri & Tortora, 1989) carried out in the Italian expeditions to assess the possible cognitive, emotional modifications of the expeditioners during their Antarctic stay showed a substantial emotional stability and no reduction of the attention and concentration ability. In fact, the negative emotional states (anxiety, depression, anger) (Peri, 1988) were firmly low during the entire period, and the positive emotional states (tranquillity, satisfaction, agreeableness) decreased, but not significantly, at the end of the campaign. The same decreasing trend affected the physical well-being. A possible hypothesis was taken into consideration to explain the emotional stability, in addition to the effective selection and preparation of the personnel, to the satisfactory life conditions; this was the propensity to defensiveness, to deny the difficulties, as observed in the International Biomedical Expedition to Antarctica (IBEA) group (Rivolier, Goldsmith, Lugg, & Taylor, 1989). This trend could suggest a general emotional withdrawal during the expedition time, a self-distancing from positive feelings to protect the participants from possible frustrating events. To investigate the coping strategies used by the Italian expedition members to deal in such an apparently satisfactory manner with the Antarctic environment, another pilot study was considered and implemented.

## METHODOLOGY

## THE SAMPLE

The sample consisted of 11 male volunteer subjects who spent 2 to 5 months in the Italian coastal station of Terra Nova Bay (eight subjects) and in the field camp of Dome C (three subjects) on the Antarctic Plateau. Their biographical data and job in the Antarctic expedition are reported in Table 1.

# INSTRUMENTS

The instruments used were the Profile of Mood States (POMS) and the Ways of Coping Inventory.

		3.1			
Subject Number	Age	Education	Occupation	Marital Status	Number of Polar Seasons
1	50	Primary	Technician	Married	4
2	40	Degree in engineering	Researcher	Single	3
3	50	Degree in engineering	Staff	Married	6
4	42	Secondary	Technician	Married	6
5	45	Postsecondary	Technician	Married	3
6	42	Secondary	Technician	Married	3
7	49	Secondary	Technician	Married	0
8	37	Postsecondary	Staff	Married	2
9	50	Secondary	Technician	Married	5
10	42	Degree in engineering	Staff	Single	1
11	51	Degree in engineering	Staff	Married	8

TABLE 1 Biographical Data of Volunteer Subjects

*POMS*. The Italian version of POMS (Mc Nair, Lorr, & Droppleman, 1971/1991) is a 58-item self-report mood questionnaire that obtains data on six factors: tension-anxiety (T), depression-dejection (D), anger-hostility (A), vigor-activity (V), fatigue-inertia (S), and confusion-bewilderment (C). The instructions ask the subjects to describe how they felt in the last week according to a scale from 0 to 4. The test seems to be very sensitive to the effects of experimental conditions in normal subjects, and it proved to be a very useful instrument for investigating special conditions like the polar environment (Palinkas, Suedfeld, & Steel, 1995).

*Ways of Coping Inventory (revised).* The Ways of Coping Inventory (Scheier, Weintraub, & Carver, 1986) is a self-report measure of a broad range of coping strategies. It is one of the tests included in the Polar Psychology Project (Suedfeld, Bernaldez, & Stossel, 1989), and it was translated to Italian by one of the authors. It consists of 67 items and the format response is a 4-point (1 to 4) Likert scale. The instructions ask the subjects to describe the most stressful situation that they have encountered in the last 2 months.

#### PROCEDURE

The Ways of Coping Inventory and the POMS were administered to the subjects before their departure and at the end of the Antarctic campaign.

## RESULTS

The statistical elaboration of the data was carried out using the Student's test for matched pairs.

In the following tables, M1 and M2 represent respectively the means obtained from the first and the second administration.

### POMS

In Table 2, the average value of the six factors of the POMS obtained from the first (M1) and the second (M2) administration are reported.

No significant difference (p < .05) was found between the two phases. However, in front of the substantial stability of the negative emotional variables (tension, depression, and hostility), a small increase of confusion and fatigue and a small reduction of vigor can be observed.

#### WAYS OF COPING

The average value of every item obtained in the first and second administration of the test is reported in Table 3. Significant differences (p < .05) were found between the two administrations on 11 items out of the 67 that compose the entire test. The differences between the means are from 0.44 to 1.20; they are negative in 48 items and positive in only 9 items. No modifications are in the remaining 10 items. The result for coping strategies, based on seeking social support (Items 8, 31, and 42; p < .05) and on problem analysis and solution (Items 2, 26, 39, 48, and 52; p < .10), decreased significantly. The rare ways of coping that had results that were increased, although not significantly, are represented by acceptance (Items 12 and 53) and by the attempt to get something positive from the situation (Item 5).

### DISCUSSION

The substantial stability in the experimental group of emotional variables (tension, depression, anger) assessed by the POMS confirms the emotional stability observed in the previous studies (Peri, Barbarito, et al., 1998; Peri & Tortora, 1989). A small increase in the Fatigue and Confusion scales (factors) and a small decrease in the Vigor scale, both statistically nonsignificant, could represent the first symptoms of a forthcoming exhaustion or depression. A longer stay could probably evidence a significant increase of the

TABLE 2 Values of the Six Factors of the Profile of Mood States Obtained From the First (M1) and the Second (M2) Administration of the Test

Factors	<i>M1 (</i> SD)	<i>M2 (</i> SD)	M2 – M1	SD	<i>Student's</i> t	р
Tension-anxiety (T)	41.73 (4.41)	41.45 (4.13)	-0.27	4.22	-0.214	.835
Depression-						
dejection (D)	42.09 (1.14)	42.55 (1.75)	0.45	1.75	0.860	.410
Anger-hostility (A)	43.09 (3.75)	43.91 (5.11)	0.82	3.40	0.798	.433
Vigor-activity (V)	62.82 (7.04)	58.73 (6.60)	-4.09	9.19	-1.476	.171
Fatigue-inertia (S)	40.18 (2.93)	42.91 (6.73)	2.73	6.26	1.444	.179
Confusion-						
bewilderment (C)	37.27 (4.24)	40.36 (6.90)	3.09	7.71	1.329	.213

emotional variables. The decrease of positive emotional states found in the previous psychometric study seems to support this interpretation, that is, the moderate but progressive exhaustion of emotional control.

These results could be easily explained by the hypotheses mentioned in the introduction, namely, having an effective selection and preparation process aimed at recruiting suitable and resistant-to-stress personnel, environmental conditions that are not particularly difficult, and personnel with a propensity for denying emotional problems. However, a further contribution to the comprehension of the psychological adaptive mechanisms used by the expedition participants was expected to be derived from the investigation of the role played by the coping strategies. In fact, the investigation of these aspects offers us the most interesting results about the psychological adjustment. A comparison between the correspondent items of the Ways of Coping Inventory administered before and at the end of the expedition shows that, where there is a significant modification, it is always negative. The general trend seems to be a less frequent use of several ways of coping during the Antarctic campaign. This trend is partially confirmed by the fact that, although the difference between the means (M1 and M2) is not significant, it is negative (71% of items) in most cases. Therefore, in this Antarctic group, one can recognize a general tendency to have less response to stress situations, a sort of frozen reactivity. The low response to stimuli can be explained by assuming a kind of perceptual defense (Levine & Shefner, 1981) against the unwanted stimuli, an increased threshold that is just like a freezing (Barbarito, 1998), the effect of which is to reduce the expenditure of energy. The strategies that seem to involve an active effort on the part of expedition participants, such as seeking social support and problem-focused coping, appear (text continues on p. 81)

TABLE 3 Values of Every Item Obtained in the First (M1) and Second (M2) Administration of the Test

Item	<i>M1 (</i> SD)	<i>M2 (</i> SD)	M2 – M1	SD	Student's	t p
Just concentrated on what I had to do next—the	3 30 (0 82)	2 70 (0 82)	-0.60	1 17	-1 616	140
I tried to analyze the	5.50 (0.02)	2.70 (0.02)	-0.00	1.17	-1.010	.140
problem in order to understand it better	3.50 (0.53)	3.00 (0.94)	-0.50	0.85	-1.861	.096*
Turned to work or substitute activity to	0.50 (4.40)		0.50		0.050	
take my mind off things I felt that time would make a difference—the only thing to do was	2.56 (1.13)	2.00 (0.87)	-0.56	1.74	-0.958	.366
to wait	1.80 (1.14)	1.90 (0.99)	0.10	1.52	0.208	.840
to get something positive						
from the situation I did something which I did not think would work, but	2.00 (0.94)	2.40 (1.07)	0.40	1.35	0.937	.373
something	1.20 (0.42)	1.20 (0.42)	0.00	0.67	0.000	1.00
Tried to get the person responsible to change	()					
his or her mind Talked to someone to find	1.90 (0.99)	1.90 (0.88)	0.00	1.63	0.000	1.00
situation	3.50 (0.53)	2.80 (0.92)	-0.70	0.95	-2.333	.045**
Criticized or lectured						
myself Tried not to burn my bridges, but leave things	1.60 (0.70)	1.60 (0.70)	0.00	0.67	0.000	1.00
open somewhat	3.50 (0.53)	2.30 (0.67)	- 1.20	0.79	-4.811	.001**
would happen Went along with fate;	1.30 (0.67)	1.00 (0.00)	-0.30	0.67	-1.406	.193
sometimes, I just have bad luck	1.20 (0.42)	1.30 (0.48)	0.10	0.74	0.429	.678
Went on as if nothing	2 40 (4 40)	1.80 (0.02)	0.20	0.00	1 1 5 0	270
I tried to keep my feelings	2.10 (1.10)	1.60 (0.92)	-0.30	0.62	-1.152	.279
to myself	2.33 (0.87)	2.22 (0.83)	-0.11	1.05	-0.316	.760
so to speak; tried to look						
on the bright side of things	3.20 (0.79)	3.10 (0.32)	-0.10	0.74	-0.429	.678

Item	<i>M1 (</i> SD)	<i>M2 (</i> SD)	M2 – M1	SD	Student's	t p
Slept more than usual	1.44 (0.73)	1.33 (0.50)	-0.11	0.60	-0.555	.594
I expressed anger to the						
person(s) who caused						
the problem	1.30 (0.48)	1.40 (0.52)	0.10	0.74	0.429	.678
Accepted sympathy and						
understanding from	/	/				
someone	2.40 (0.84)	2.20 (0.79)	-0.20	1.14	-0.557	.591
I told myself things that			0.00		0.050	0 - 4 + +
helped me to feel better	2.70 (0.95)	2.10 (0.57)	-0.60	0.84	-2.250	.051^^
I was inspired to do	2 20 (0 62)	2 00 (0 74)	0.20	1 10	0.040	404
Tried to forget the	3.20 (0.63)	2.90 (0.74)	-0.30	1.10	-0.010	.434
whole thing	1 90 (1 45)	2 00 (1 05)	0 10	0 74	0 4 2 9	678
l got professional help	3 10 (0 88)	2.00 (1.03)	-0.60	1.51	-1 260	239
Changed or grew as a	0.10 (0.00)	2.00 (0.07)	0.00	1.01	1.200	.200
person in a good way	3.30 (0.67)	2.80 (1.14)	-0.50	1.51	-1.048	.322
I waited to see what	( )	( )				
would happen before						
doing anything	1.90 (0.74)	2.00 (1.05)	0.10	1.29	0.246	.811
I apologized or did						
something to make up	2.50 (1.08)	1.70 (0.82)	-0.80	1.23	-2.058	.070*
I made a plan of action	/	/				
and followed it	3.50 (0.53)	2.60 (0.84)	-0.90	0.99	-2.862	.019**
I accepted the next best	2 40 (0 74)	0.40 (0.70)	0.70	4 00	0.000	000*
List my feelings out	3.10 (0.74)	2.40 (0.70)	-0.70	1.06	-2.090	.066
somebow	2 70 (0 67)	2 50 (0 85)	_0.20	1 03	-0.612	555
Realized I brought the	2.70 (0.07)	2.00 (0.00)	0.20	1.00	0.012	.000
problem on myself	3.10 (0.57)	3.00 (0.82)	-0.10	0.88	-0.361	.726
I came out of the						
experience better than						
I went in	3.30 (0.48)	2.90 (0.99)	-0.40	0.97	-1.309	.223
Talked to someone who						
could do something						
concrete about the						
problem	3.22 (0.83)	2.22 (0.83)	-1.00	1.32	-2.268	.053**
Got away from it for a						
while; tried to rest or	4 50 (0 74)	4 40 (0 20)	0.40	0 70	4 000	101
Tried to make myself better	1.50 (0.71)	1.10 (0.32)	-0.40	0.70	-1.809	.104
by eating drinking						
smoking, using drugs						
or medication, etc.	1.10 (0.32)	1.00 (0.00)	-0.10	0.32	-1,000	.343
Took a big chance or did	(0.02)		00	3.0L		
something very risky	1.10 (0.32)	1.00 (0.00)	-0.10	0.32	-1.000	.343

TABLE 3 Continued

(continued)

**TABLE 3 Continued** 

					<b>a</b>	
Item	<i>M1 (</i> SD)	<i>M2 (</i> SD)	M2 – M1	SD	Student's	t p
I tried not to act too hastily						
or follow my first hunch	2.40 (1.26)	2.10 (0.99)	-0.30	1.57	-0.605	.560
Found new faith	1.00 (0.00)	1.00 (0.00)	0.00			
Maintained my pride and	( )	( )				
kept a stiff upper lip	2.56 (0.88)	2.44 (1.01)	-0.11	0.78	-0.426	.681
Rediscovered what is	· · ·	· · · ·				
important in life	2.78 (0.67)	2.67 (0.71)	-0.11	0.60	-0.555	.594
Changed something so						
things would turn up						
all right	3.33 (0.71)	2.44 (0.73)	-0.89	0.60	-4.438	.002**
Avoided being with people						
in general	1.11 (0.33)	1.00 (0.00)	-0.11	0.33	-1.000	.347
Did not let it get to me;						
refused to think too						
much about it	2.00 (0.71)	1.78 (0.97)	-0.22	0.83	-0.800	.447
I asked a relative or friends						
I respected for advice	3.33 (0.87)	2.56 (1.13)	-0.78	0.67	-3.500	.008**
Kept others from knowing						
how bad things were	1.56 (0.53)	1.22 (0.44)	-0.33	0.71	-1.414	.195
Made light of the situation;						
refused to get too serious	(					
about it	1.89 (0.93)	1.56 (0.73)	-0.33	0.50	-2.000	.081^
lalked to someone about	0.50 (0.00)	0 44 (0 50)	0.44	~ ~~	0 555	504
now I was reeling	2.56 (0.88)	2.44 (0.53)	-0.11	0.60	-0.555	.594
Stood my ground and	2 00 (1 1 2)	2 = 6 (1, 0, 1)	0.44	<u> </u>	1 5 1 0	100
Took it out on other people	3.00 (1.12)	2.30 (1.01)	-0.44	0.00	-1.512	.109
Drow on my past	1.00 (0.00)	1.11 (0.55)	0.11	0.55	1.000	.547
experiences: Lwas in						
a similar situation before	3 11 (0 60)	2 56 (0 73)	-0.56	0 73	-2 204	051**
I knew what had to be done	0.11 (0.00)	2.00 (0.70)	0.00	0.75	2.204	.001
so I doubled my efforts to	,					
make things work	3.38 (0.74)	3.25 (0.71)	-0.13	0.83	-0.424	.685
Refused to believe that it	0100 (011 1)	0.20 (0.1.1)	0.1.0	0.00	01.12.1	
had happened	1.11 (0.33)	1.11 (0.33)	0.00			
I made a promise to myself	(0.00)	(0.00)	0.00			
that things would be						
different next time	2.11 (0.78)	2.11 (0.93)	0.00	1.50	0.000	1.00
Came up with couple of	()	()				
different solutions to the						
problem	2.89 (0.60)	1.89 (0.78)	- 1.00	1.00	-3.000	.017**
Accepted it, because	. ,	. ,				
nothing could be done	1.33 (0.50)	1.78 (0.83)	0.44	0.88	1.512	.169

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Item	<i>M1 (</i> SD)	<i>M2 (</i> SD)	M2 – M1	SD	Student's	t p
I tried to keep my feeling						
from interfering with other						
things too much	2.56 (1.13)	2.11 (0.93)	-0.44	0.73	-1.835	.104
Wished that I could change what had happened or	9					
how I felt	2.11 (0.78)	1.89 (0.78)	-0.22	1.39	-0.478	.645
I changed something						
about myself	1.89 (0.78)	1.67 (0.87)	-0.22	0.67	-1.000	.347
I daydreamed or imagined						
a better time or place thar	ו					
the one I was in	1.56 (0.73)	1.56 (0.73)	0.00	0.87	0.000	1.00
Wished that the situation						
would go away or someho	W					
be over with	2.33 (1.00)	1.89 (0.78)	-0.44	0.53	-2.530	.035**
Had fantasies or wishes						
about how things might						
turn out	1.44 (0.73)	1.67 (0.71)	0.22	0.83	0.800	.447
l prayed	1.44 (0.53)	1.44 (0.53)	0.00			
I prepared myself for						
the worst	2.67 (1.00)	2.11 (1.05)	-0.56	0.73	-2.294	.051**
I went over in my mind						
what I would say or do	2.78 (0.97)	2.78 (1.09)	0.00	0.71	0.000	1.00
I thought about how a person I admire would						
handle this situation and						
used that as a model	2.22 (0.97)	1.89 (0.93)	-0.33	1.00	-1.000	.347
I tried to see things from						
the other's point of view	2.56 (0.88)	2.00 (1.00)	-0.56	1.33	-1.250	.247
I reminded myself how much worse things						
could be	2.44 (0.73)	2.22 (0.83)	-0.22	0.83	-0.800	.447
I jogged or exercised	2.22 (1.30)	1.67 (0.87)	-0.56	1.59	-1.048	.325
I tried something entirely different from any of the		, , , , , , , , , , , , , , , , , , ,				
above (please describe)	1.29 (0.49)	1.29 (0.49)	0.00	0.58	0.000	1.00
	· /	. ,				

 $p \le .10. p \le .05.$ 

to have diminished. The expeditioners probably tend to invest much less, from an emotional point of view, in what goes on around them to protect themselves from frustration and from emotional deprivation that often

characterizes the situation in Antarctica. All the findings collected up to now seem to support this kind of emotional leveling (Barbarito, 1998) that is typical of personnel returning from an Antarctic campaign. The invariability of some psychophysiological parameters, such as the heart rate and the galvanic skin response, observed in the same group before and after the campaign (Peri, Scarlata, et al., 1998) and before and after the administration of a cognitive stressor, make one consider the possibility that this emotional freezing is global and not only subjective and experiential.

An experience like that lived in Antarctica is absolutely original and unrepeatable, according to most of the people who have been there (irreparably affected by the so-called *mal d'Antartide* [Misichia, 1991], i.e., the nostalgia for Antarctica). This would normally lead one to imagine some tangible effects on the variables in question; however, this was not verified.

#### CONCLUSIONS AND PERSPECTIVES

The smallness of the sample examined obviously prevents the generalization of the results obtained. However, the fact that some modifications evidenced in the Ways of Coping Inventory have been statistically significant, despite the reduced number of subjects, leads one to suppose that the repetition of the research on a larger sample would give ulterior confirmations to what has been found in this investigation. In any case, the results lead one to think that, in this Italian Antarctic group, there is a more or less conscious tendency to use certain ways of reacting to stressful events with different frequency when compared to usual situations. An empirical support of the findings of the research comes from informal conversations made with veteran expeditioners. In fact, they report that they somehow noticed a phenomenon that they were not able to describe precisely. The feeling that they express is a lack of interest in what goes on around them, especially for unimportant matters. This seems to happen even when they are aware that, in other times, their behavior would be different. According to the veterans' accounts, this lack of interest is considered completely normal and is usually ignored. The people who probably induce a kind of introspection and self-analysis through their continuous requests aimed at promoting a quick return to normality are the loved ones, the relatives, and the friends. Certainly, it could be interesting to program other research to confirm the results, and if so, to carry out a follow-up to verify how long the increased threshold of reactivity lasts in the expeditioners after returning from Antarctica.

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