



# TAKING THE ANTARCTIC ARTIC PULSE

IPY 2007-08

## HUMAN BIOLOGY & MEDICINE RESEARCH

### URUGUAYAN ANTARCTIC INSTITUTE

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#### INTRODUCTION.

The present paper contributes to the international investigation denominated Antarctic Multinational Psychological Research Project (AMPRP), with data successfully obtained in Scientific Antarctic Base Artigas (SABA/Uruguay) during the Antarctic Campaigns 2004 to 2006; at first, this work was coordinated by Dr A. Peri, in the scope of the SCAR Expert Group in Human Biology & Medicine (EGHB&M) in occasion of the International Polar Year. The project was received and included in the general proposal under the title EGHB&M "Taking the Antarctic Polar Artic Presses IPY 2007-8 Human Biology & Research Medicine" of the IPY having found a total adhesion of Argentine, Japanese and Uruguayan organizations as well as a partial adhesion of French and British ones. The aim of this investigation was aimed at the physical training conditions, emotive, interpersonal and those expressions of physical, psychological and social adaptation, of the participant teams in the Antarctic expeditions and the relative strategies of management (coping) of stress.

The physical, social environment and the Antarctic operative include several sources of stress that affect the participants in different ways and diverse degree of interest according to the duration (severe and chronic), gravity, association with other causes of stress, the imminence, expectations, etc.

The investigation sets out the following objectives:

- 1) To study the modifications of some psychological parameters that could be verified during Summer/Winter Campaigns, such as humor, coping strategies and somatic symptoms.
- 2) To identify the different strategies of coping used in order to take this information into account for the selection and preparation of the personnel.
- 3) To identify the most frequent coping strategies used on the Antarctic national groups and those more frequently associated to a better social-emotive adaptation in the different national groups.
- 4) To collect data that can be used to prepare preventive strategies of physical and psychic disturbs in such an extended time.

This protocol pretends no more than 3 or 4 questionnaires (at least 3 phases: at the beginning, in the middle of winter and at the end of the antarctic campaign) to groups of different nationalities. The proposed questionnaires for this investigation are: the COPE, PANAS and SHC that will be better illustrated in the methodology.

This work represents a preliminary contribution of the Uruguayan Antarctic organization to the project included in AMPRP, and is aimed at collecting data on the psycho-social variability illustrated above (the state of subjective health, the humor state, the satisfaction of the socio-emotive needs, the management strategies of stress),

of the Uruguayan Antarctic Wintering Crews expeditions and to study the relations that exist among them.

The specific studied population has operated in Scientific Antarctic Base "Artigas"(SABA) (62°11'04 " S; 58°54'09"E) located in King George Island, South Shetland Islands, 100 km. approx. away from the Antarctic Peninsula; 3.012 km away from Montevideo and 3104 km away from the South Pole. SABA born like a scientific station where multidisciplinary and significant activities of investigation would be developed We have had the hypothesis that we would find in the Uruguayan expeditions a social integration and climate generally satisfactory, with a minimum and eventual possible modifications in the time. These small modifications were put in a general consideration, although nonspecific, competition of expedition members, its rigorous medical and psychological selection and the meager number of observed subjects also.

## **METHODOLOGY**

Psychological instrument

### **The PANAS questionnaire.**

The PANAS questionnaire (Watson, Clark, Tellegen, 1988) includes 20 items that explore the humor state and ask for the subject has felt in the last week, it has 2 scales, that include 10 item each: Positive Affection (interest, strength, enthusiasm, pride, activity, etc.) and Negative Affection (affliction, confusion, shame, agitation, nervousness). These items anticipate 5 possible answers that goes from "almost nothing or nothing" to 5 "very great deal". The Spanish version, translated and adapted by M. Barbarito, in charge of psychologic area of the Argentine Antarctic Institute was used. This version that was used in the Argentine Antarctic expeditions can be superposed to the version elaborated by Sandin and Others (1999). The two main scales, the Positive and Negative Affection have shown a generally elevated internal consistency (Alpha 80).

### **The COPE questionnaire**

The COPE questionnaire (Carver and others, 1989) includes 60 items and each one allows four posible answers (nothing, a little, enough, much), referring to whatever the described behavior in the item has been used by the subject to confront himself with the critical experience of the last months.

This can measure (15) specific modalities of management (coping) of stress situations and the active coping (-AC: to take active measures to face the stress situation), planning (-P: to elaborate strategies to isolate the problem), search for social instrumental support (-SIS: to search for information, attendance and advice), search for social emotive support (-SES- to search for moral support, understanding and feeling), suppression of competition activities (-SCA: set aside other projects to avoid the activity distract of the confrontation with the problem), the resort to the religion (-R- to resort to religious comfort and faith), positive reinterpretation and growing(-PRG to elaborate a critical experience in positive terms for human and personal growth), coping of contention (-CC: to wait and send at the proper time, the confrontation with the problem), the acceptance (-A: to accept the situation), the emotions release (-ER: to concentrate in the stress emotions and take them out), the negation (-N: to reject the existence of a critical situation), mental emphasizes (-ME: to insist on activities,

fantasies that can distract from the objective with the interfering problem), the comportamental emphasize (-CE: efforts reduction of active confrontation with the problem or resigns), alcoholic and drugs consumption (-ADC: to abuse of alcoholic and drugs consumption to undergo stress events), humor (-H: to make jokes, to laugh at the situation). The same test was used in the Spanish version, and was effectively used in the Argentine Antarctic expeditions (Barbarito, Cammillucci, Peri, 2004).

### **The Socio-Emotive Self-Evaluation Questionnaire (SSQ)**

The SSQ questionnaire is a test that has been made by A. Peri and others. (Peri, Barbarito, Corvasce, Peri, to be published), which include 24 items, that explore in a positive and direct way the quality of the interpersonal relations in the Antarctic expeditions. This psychological instrument does not require to evaluate a clearly identified person (this action is considered highly invasive of the internal sphere and destructive of the interpersonal relations in the Antarctic groups), neither of the others persons behavior, but it is related to the own socio-emotive state in the interpersonal relationship with several categories of people, it is only concentrated on the positive aspects of the relations, include a graduation of the possible answers (Likert scale) and just require a short time to be completed. The items explore the aspects that participants of the expedition consider important, with friendly, simple and non technic terms. The direct and positive way to examine the personal parameters, is better accepted by the Antarctic population who is quite well to cooperate when they clearly understand what the expert tries to stand out and measure. The subject is requested to answer how much (1 = nothing to 5 = very great deal) he feels understood, accepted, looked for, recognized and taken into account by the partners of expedition, fellow workers, the officers in charge of the mission, friends and how well he feels with them.

The different items, that can also be separately valued, give a complete indicator of the perceptive quality of interpersonal rapport, the satisfaction of socio-emotive needs of the individual in the relation with different people categories with whom they can be in contact during the expedition. The factorial validation of the questionnaire (Peri, Barbarito, Corvasce, Peri, to be published) has confirmed the hypothetic existence of 4 scales that measure the quality of interpersonal rapport:

- 1) Generally, with the expedition crew.
- 2) With the own concerning group
- 3) With the officers in charge of the expedition.
- 4) With friends.

Such parameters can represent as well the quality perception of the social behavior in the confrontation of the subject as an indirect indicator of the existing socio-emotive climate of the group.

### **Subjective Health Complaints Inventory (SHC)**

The subjective health complaints inventory problems of health (SHC), is a questionnaire that includes 29 items and it was made by Ursin and others. (Eriksen, Ihlebaek, Ursin, 1999), these items explore the intensity and the duration of a series of muscular, gastrointestinal, pseudo-neurological, emotive symptoms, etc. but not necessarily supported by an organic base. The Spanish version of said questionnaire was used and referred in web site: <http://www.uib.no/insuhc/>

## Reliability of the psychometric instruments

The “ $\alpha$ ” of Cronbach were calculated for the scale of the different used questionnaires, which have given different results in the different scales and different questionnaires, perhaps they change from one administration to another. They are worth results, the Positive Affection scale of PANAS (“ $\alpha$ ” of Cronbach = .89/.94), all the scales of the Socio-Emotive Self Evaluation questionnaire (Relations with expeditions crew, the concerning group, the officers in charge of the expedition and friends; “ $\alpha$ ” - .88/.95), the R, SIS, SES, CE, CC, A, ADC, P, H (“ $\alpha$ ” .63/.82) scales of COPE near the validity scales AC, S, D (“ $\alpha$ ” = .54/.57) The SHC scales have demonstrated an “ $\alpha$ ” of valid values only for the scale of the influential problems, constituted only by two items so it was decided to analyze the items behavior in a singular way. These results have taken us to -considering the modest statistical quantity of the examined report and the particularity of the examined population- adjudicate to the instruments scales used, globally reliable, with the SHC exception, and for this reason the analyses have been carried out considering not the scales, but each particular item.

## The Pattern.

The group includes 15 participants of the antarctic expedition who operated in Scientific Antarctic Base “Artigas” (SABA), Maxwell Bay, Fildes Peninsula, King George Island, Lat. 62°11’S, Long. 58°54’W, during 3 consecutive wintering campaigns (5 people per campaign from 2004 to 2006), the period of time of each campaign was nearly an year. The crew average age is 40.4 years old (minimum 27, maximum 50); the crew is exclusively male; all of them are military and with different professional posts (Head of expedition, cook, technicians, diver, etc.). We have not got any another significant biographical information since it was agreed with the participants to maintain the anonymity.

## Administration of Questionnaires

The questionnaires were administered by a Psychologist, at the beginning of the Antarctic campaign (I Administration), by the end of December/the beginning of January: after a few months –April/May- during the last flight of the summer campaign (II Administration); by August/September during the Antarctic winter (III Administration) and at the end of the campaign (IV Administration) when wintering season is finished. Due to organisation reasons it has not been possible to carry out the administration of some questionnaires: it could not be carried out IV Administration in 2005 Campaign and III Administration in 2006 Campaign.

## RESULTS

### PANAS

The average values of positive and negative affection are detailed in Tab. 1

Tab. 1

Scale PANAS	N	M	SD
Positive affection – I Administration	15	3,5533	,61396
Positive affection – II Administration	15	3,6067	,49058
Positive affection – III Administration	10	3,6000	,75865
Positive affection – IV Administration	10	3,64	,82489

Negative affection- I Administration	15	1,1800	,15675
Negative affection – IIAdministration	15	1,2267	,21202
Negative affection – III Administration	10	1,2800	,18738
Negative affection – IV Administration	10	1,3100	,24244

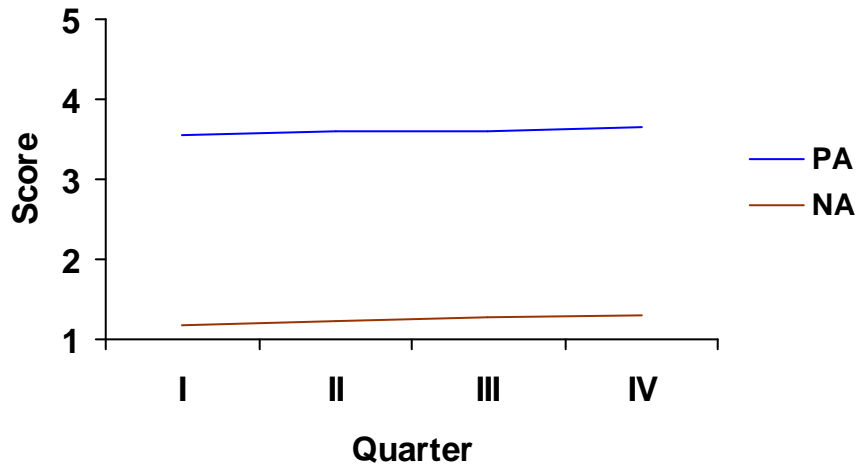
Note:

N = Number of people

M = Average of PANAS scale (Positive or Negative Affection)

SD =Standard Deviation

## PANAS Over Deployment



The scale of Positive Affection (Tab.1) shows an average of enough values but not very high and slightly increasing in the course of the different administrations. The average of Negative Affection values are very low, next to the absence of negative affection manifestations with a slight growing during the wintering season.

The main differences between PANAS scale, in the different administrations was validated, due to the meager number of people examined, by using a non parametric test: the Wilcoxon test for dependent patterns. In almost all cases, said test has confirmed whatever arose from the analyses lead with a parametric test (T. of Student). It should be noticed that not all the groups have completed the questionnaires in the 4 administrations. This explains why the average of the confronted people, only for those who had completed the questionnaires in the different administrations was compared (compare/verify), may not agree with the average of the summarized tables that take into account all the people that have completed questionnaires in that administration. The result of this analysis is reported in Tab. 2

Tab. 2

	Comparassion Adm.	<i>p</i> (Wilcoxon)	<i>p</i> (Sudent)	N people	Media	Media
Negative affection	1 - 4	.04	.04	10	M1= 1.1	M4 = 1.31
Negative affection	2 - 4	.03	.02	10	M2= 1.1	M4 = 1.31

Note: N = Number of people

M1 = Average I. Adm, M2 = Average II Adm., M4 = Average IV. Adm.

*p* = Significant differences.

The variations of the positive affection along the time (Tab 2) are not statistically significant (p 05). It can be observed a substancial stability of the positive affection state in the global pattern of 2004-06 expeditions. The average values of the negative affection slightly grow during the campaign until reaching a significant statistical variation in 4th. Administration, at the end of the campaign, in relation to 1st. Administration (p = 04) and 2nd. Administration (p = 03). The global emotive scope of the group appears characterized by a little or absent level of negative affection conditions that goes to a slight but with a statistically significant increase along the time.

### COPE

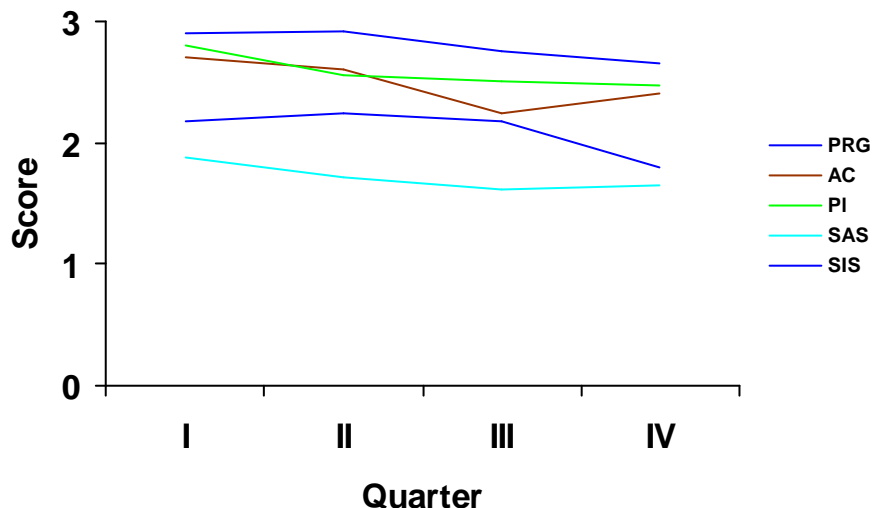
The average values of COPE scale, in 4 consecutive administrations are detailed in Table 3

COPE	TAB. 3							
	1 A	N 15	2 A	N15	3 A	N10	4A	N10
	M	SD	M	SD	M	SD	M	SD
Positive Reinterpretation and Growing (PRG)	2,90	,46	2,91	,57	2,75	,52	2,65	,64
Active Coping (AC)	2,70	,51	2,60	,58	2,25	,61	2,40	,65
Planning (P)	2,81	,71	2,56	,75	2,50	,65	2,47	,86
Seek for affective support (SAS)	1,88	,51	1,71	,54	1,62	,39	1,65	,39
Seek for instrumental support (SIS)	2,18	,49	2,25	,46	2,17	,70	1,80	,46
Suppression of competitive activities (SCA)	2,15	,50	2,01	,55	1,92	,48	1,97	,91
Religi3n (R)	1,88	,57	2,06	,72	2,10	,56	1,92	,80
Acceptance (A)	2,13	,54	2,11	,71	1,92	,65	1,85	,51
Mental emphasize (ME)	1,86	,32	1,63	,41	1,65	,48	1,52	,32
Affective release /AR)	1,73	,42	1,63	,50	1,50	,47	1,45	,45
Comportamental emphasize (CE)	1,20	,34	1,40	,35	1,27	,38	1,07	,12
Negation (N)	1,38	,35	1,48	,35	1,37	,41	1,57	,39
Coping de contention (CC)	2,11	,60	2,18	,56	2,20	,87	2,15	,54
Alcohol and drugs consumption (ADC)	1,05	,19	1,03	,08	1,00	,00	1,00	,00
Humor (H)	1,43	,44	1,38	,57	1,07	,16	1,37	,50

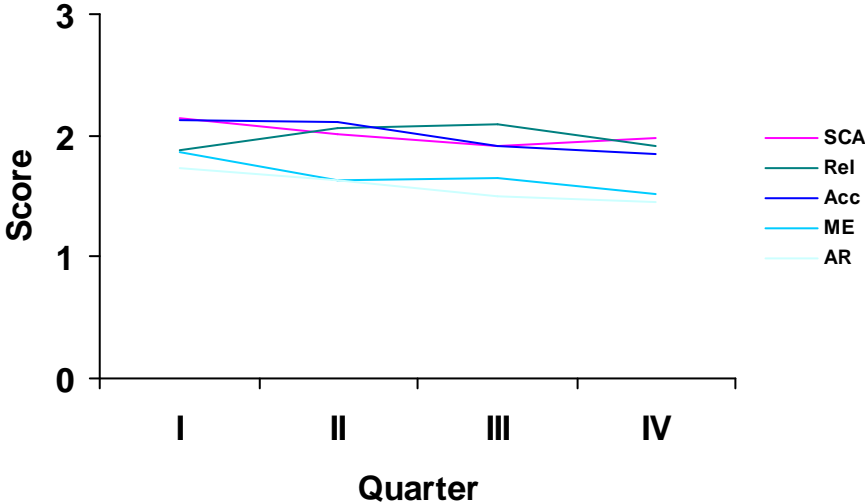
Note:

N = Number of people 1S = I Administration. 2S = II Administration 3S = III Administration.  
4S = IV Administration M = Average of COPE Scale SD = Standard deviation

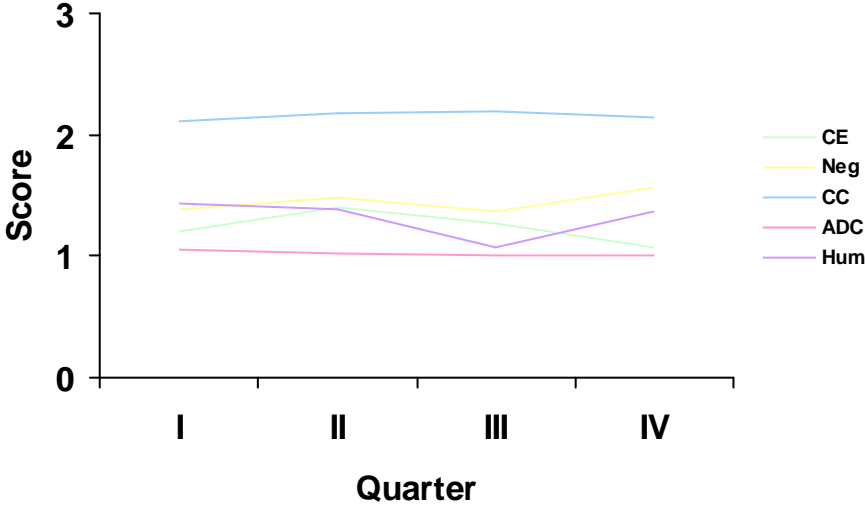
### COPES Factors Over Deployment



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### COPES Factors Over Deployment



In I Adm.(15 people) *the positive reinterpretation and growing, planning and active coping* were the most interesting coping strategies used and *alcohol and drugs consumption, comportamental emphasize and the negation* were the least strategies used.

In II Adm., (15 people), the positive reinterpretation and growing, active coping and planning were the most coping strategies used and alcohol and drugs consumption, humor and comportamental emphasize were the least strategies used.

In III Adm., (10 people), the most coping strategies used were the same ones as in I Adm. and the least used were the same ones as in II Adm..

In IV Adm. (10 people), the most coping strategies used were the same ones as in I Adm. and the least used were the same ones as in II Adm..

The intensity of use of any strategy seems to vary during the campaign.

The significative differences between the scales in the different administrations were evaluated and, due to the meager number of the examined people, by using a non-parametric test (test of Wilcoxon) for dependent patterns. In nearly all cases, said test has confirmed whatever arose from the analyses lead with a parametric test (test of Student). The results of said analyses are detailed in Table 4.

<b>COPE Tab. 4</b>						
COPE scale	Administrations Comparison	<i>p</i> (Wilcoxon)	N people	<i>p</i> (Student)	Average	Average
PRG	2-4	.03	10	.07	M2= 3	M4= 2,65
AC	1-3	.02	10	.03	M1=2.65	M3=2.25
AC	2-4	.02	10	.01	M2=2.80	M4=2.40
A	2-3	.05	10	.05	M2=2.15	M3=1.92
SIS	2-4	.01	10	.01	M2=2.37	M4=1.80
R	2-3	.02	10	.02	M2=2.40	M3=2.10
CE	2-4	.02	10	.01	M2=1.50	M4=1.07

**Nota:** N= Number of people M1=Average I.Adm. M2=Average II Adm.  
M3=Average III Adm. M4=Average IV Adm p= significative of differences

The strategy of positive reinterpretación and growing (PRG) shows a progressive decrease after II Adm. Said decrease is statistically significant ( $p=.03$ ) in fourth stage with respect to the second one. Active coping (AC) shows a progressive decrease from I to III Adm. and a slight increase in IV Adm. that remains remarkably below the initial values.

The variations are statistically significant when comparing IV. And II Adm. ( $p=.02$ ) and III with IV Adm. ( $p=.02$ ). The acceptance (A) progressively decreases in the course of the campaign also, but the variation is significant between II and III Adm. ( $p=.05$ ). The search of instrumental support (SIS) oscillates in the first three administrations but it decreases significantly in IV Adm., the difference is statistically significant when comparing II and IV Adm. ( $p=.01$ ). The resort to religious practice (R) oscillate significantly in the course of the campaign and decreases significantly between II and III, Adm. ( $p=.02$ ).

The use of comportamental emphasize (CE), always very little, increases in II Adm. and then decreases in IV Adm. where variation appears statistically significant ( $p=.02$ )

## Socio-Emotive Self Evaluation (SES)

The quality average values of interpersonal relations with the crew expedition, the concerning professional group, the officers in charge of the expedition and friends, are detailed in Table 5.

SES Scale	1S N10		2S N 15		3S N 10		4S N10	
	Media	SD	Media	SD	Media	SD	Media	SD
Partners	3,95	,59	3,81	,74	3,46	,69	3,80	,78
Concerning group	3,76	,57	3,87	,75	3,40	,58	3,95	,87
Head of Mission	3,53	,89	3,46	,66	3,11	,43	3,35	,73
Friends	4,15	,56	4,08	,83	4,11	,67	4,21	,91

Note:

1S = I Administration. 2S = II Administración. S = III Administration 4S = IV Administration.  
N = Number of people M = ASE Scale average SD = Standard deviation

The satisfaction level in the socio-emotive relations is enough and high in each phase of the wintering season as well as in each people category of the expedition. The maximum level of satisfaction of socio-emotive need arise from friendly relationships.

In I Adm. the higher average value of satisfaction has been therefore attributed to the rapport with friends an followed by the raport with the crew expedition, afterwards with the concernig professional group and in the end - in a decreasing order -with the officers in charge of the expedition. In II Adm. the higher level of satisfaction was always valued like the originated from social interaction with friends being followed by de concerning professional group, and with very similar but hardly below values, with the crew expedition and in the end with the officers in charge of the expedition. In III Adm., where a general diminishing of satisfaction level in social interaction is observed, with the exception of those with friends, which slightly grows: in a decreasing quality socio emotive order, the categories of crew expedition are: friends, crew of expedition, the concerning professionals group and in the end the officers in charge of the expedition. In IV Adm., after the friends group, the concerning professionals group is again in second who seems to mainly satisfy the socio-emotional need of the Uruguayan expeditioners, being followed by the crew expedition and in the end by the officers in charge of the expedition.

The significativity of the differences between SES scales in different administrations was evaluated, and for the reasons expressed above, by using the non parametric test of Wilcoxon for dependent patterns. The results of the averages comparison analyses are detailed in Tab. 6

SES scale	Comparación adm.	p(Wilcoxon)	N sujetos	Media	Media
Friends expedition	1-3	.06	5	M1= 3.76	M3= 3.23
Crew expedition	2-3	.03	10	M2= 3.8	M3= 3.46
Concerning group	2-3	.07	10	M2= 3.9	M3= 3.4

Note:

M1= Average I Adm. M2= Average II Adm. M3= Average III Adm. p= Significativity of differences  
N= Number of people.

The carried out comparison through the test of Wilcoxon, between the average values obtained in the different administrations has shown a significant decrease of the social satisfaction level arising from the interactions with the crew expedition: between I Adm.(beginning of campaign) and III Adm. (shortly after half of campaign) and between II Adm. (2 or 3 months after the beginning of wintering season) and the III Adm. A similar decreasing (statistically significant) was identified between II and III Adm. in the concerning group. The average values of any symptoms intensity (and the relative standard deviation), the days they have lasted, the percentage of people that have been related in each one of the 4 administrations, are detailed in Tab 7.

Table SHC

<b>Tab. 7</b>												
<b>Item SHC</b>	<b>1a Adm N 15</b>			<b>2a Adm N 15</b>			<b>3a Adm N 10</b>			<b>4 Adm N 10</b>		
	<b>M</b>	<b>SD</b>	<b>%</b>	<b>M</b>	<b>SD</b>	<b>%</b>	<b>M</b>	<b>SD</b>	<b>%</b>	<b>M</b>	<b>SD</b>	<b>%</b>
1. Cold, flu	.20	.41	20	.13	.35	13	.20	.42	20	.30	.48	30
Number of days	.53	1.1		.60	2.0		.50	1.0		.50	.84	
2. Cough, bronchitis	.20	.41	20	.07	.25	6.7	.10	.31	10	.10	.31	10
Nr. of days	.46	.99		.13	.51		.20	.63		.20	.63	
3. Asthma	.00	.00	0	.00	.00	0	.00	.00	0	.00	.00	0
Nr. of days	.00	.00		.00	.00		.00	.00		.00	.00	
4. Headache	.40	.50	40	.40	.50	40	.60	.51	60	.50	.70	40
Nr. of days	.53	.83		.47	.64		.70	.67		.50	.70	
5. Neckpain	.33	.48	33	.33	.48	33	.60	.51	60	.10	.31	10
Nr. of days	.53	.83		.47	.74		.80	.91		.20	.63	
6. Pain upper part of back	.13	.35	13	.00	.00	0	.20	.42	20	.00	.00	0
Nr. of days	.27	.70		.00	.00		.20	.42		.00	.00	
7. Pain lower part of back	.13	.35	13	.20	.41	20	.20	.42	20	.20	.42	20
Nr. of days	.47	1.3		.33	.72		.20	.42		.50	1.0	
8. Pains in arms	.13	.35	13	.07	.25	6.7	.10	.31	10	.10	.31	10
Nr. of days	.27	.70		.07	.25		.10	.31		.20	.63	
9. Pains in shoulders	.00	.00	0	.13	.35	13	.40	.51	40	.10	.31	10
Nr. of days	.00	.00		.13	.35		.40	.51		.10	.31	
10. Migraine	.00	.00	0	.00	.00	0	.00	.00	0	.00	.00	0
Nr. of days	.00	.00		.00	.00		.00	.00		.00	.00	
11. Extra heart beats	.00	.00	0	.00	.00	0	.00	.00	0	.00	.00	0
Nr. of days	.00	.00		.00	.00		.00	.00		.00	.00	
12. Chest pain	.00	.00	0	.00	.00	0	.00	.00	0	.00	.00	0
Nr. of days	.00	.00		.00	.00		.00	.00		.00	.00	
13. Breathing difficulties	.07	.25	6.7	.00	.00	0	.00	.00	0	.00	.00	0
Nr. of days	.07	.25		.00	.00		.00	.00		.00	.00	
14. Pain in the feet during exercise	.13	.35	13	.07	.25	6.7	.10	.31	10	.10	.31	10
Nr. of days	.27	.79		.07	.25		.20	.63		.20	.63	
15. Heart-burn	.00	.00	0	.00	.00	0	.00	.00	0	.10	.31	10
Nr. of days	.00	.00		.00	.00		.00	.00		.30	.94	
16. Stomach discomfort	.27	.45	26	.20	.41	20	.40	.51	40	.50	.70	40
Nr. of days	.67	1.4		.20	.41		.40	.51		.60	.84	
17. Gastritis, ulceration	.27	.45	26	.13	.35	13	.40	.51	40	.20	.42	20
Nr. of days	.27	.45		.13	.35		.40	.51		.30	.67	
18. Stomach pain	.13	.35	13	.00	.00	0	.20	.42	20	.00	.00	0
Nr. of days	.27	.79		.00	.00		.20	.42		.00	.00	
19. "Wind"	.40	.50	40	.20	.41	20	.40	.69	40	.00	.00	0
Nr. of days	1.1	1.7		.47	1.0		.80	1.3		.00	.00	
20. Diarrhoea	.00	.00	0	.00	.00	0	.00	.00	0	.00	.00	0
Nr. of days	.00	.00		.00	.00		.00	.00		.00	.00	

21. Constipation	.00	.00	0	.00	.00	0	.00	.00	0	.00	.00	0
Nr. of days	.00	.00		.00	.00		.00	.00		.00	.00	
22. Eczema	.00	.00	0	.00	.00	0	.00	.00	0	.00	.00	0
Nr. of days	.00	.00		.00	.00		.00	.00		.00	.00	
23. Allergic skin problems	.00	.00	0	.00	.00	0	.10	.31	10	.00	.00	0
Nr. of days	.00	.00		.00	.00		.10	.31		.00	.00	
24. "Flushes", heat sensations	.00	.00	0	.00	.00	0	.00	.00	0	.10	.31	10
Nr. of days	.00	.00		.00	.00		.00	.00		.10	.31	
25. Sleep problems	.07	.25	6.7	.00	.00	0	.10	.31	10	.10	.31	10
Nr. of days	.47	1.8		.00	.00		.20	.63		.10	.31	
26. Tiredness	.67	.61	60	.20	.41	20	.20	.42	20	.60	.96	40
Nr. of days	1.6	1.8		.20	.41		.30	.67		.60	.84	
27. Dizziness	.00	.00	0	.00	.00	0	.00	.00	0	.00	.00	0
Nr. of days	.00	.00		.00	.00		.00	.00		.00	.00	
28. Anxiety	.13	.35	13	.00	.00	0	.20	.42	20	.10	.31	10
Nr. of days	.20	.56		.00	.00		.30	.67		.20	.63	
29. Sad, depressed	.14	.36	14	.00	.00	0	.10	.31	10	.10	.31	10
Nr. of days	.20	.56		.00	.00		.10	.31		.20	.63	

Note:

1S = I Adm. 2S = II Adm. 3S = III Adm. 4S = IV Adm. N = Number of people  
M = Average of SHC Ítems. SD = Standard deviation. % = Percentage of people that have informed the symptom.

The intensity of the subjective symptoms and the percentage they are related, appear quite limited. Eight of 29 symptoms listed in table 7 were never reported during the campaign. However, of the 29 subjective symptoms, 17 were reported in I Adm., 13 in II Adm., 18 in III Adm. and 16 in IV Adm. Two symptoms have only been reported by 60% of people in III Adm. (back and neck pain), (after Midwinter, third quarter of the campaign), that shows the period in which more frequently disturbances appears.

In many investigations this represents the most difficult period of the whole expedition (Bechtel, Berning, 1991). It should be noticed a slight increase of Cough/influenza by the end of the campaign, when the wintering group is exposed to new germs/ virus that have been brought by the new group, when depressive conditions affect the immune resistance. A similar version shows a higher percentage of fatigue in I Adm. during summer season, when there are many different works to be completed in relation to II and III Adm., as these are intermediate periods characterized by smaller activities due to darkness and the severe weather conditions. In this pattern, the functional disturbances pretend to grow after midwinter season allowing the hypothesis of the third quarter period phenomenon, expressed under the way of somatic subjective problems.

In order to find a possible association (prediction) between the use of the different coping strategies, that can be measured at the beginning of the campaign, and the consecutive emotive adaptation, it was carried out the analysis of correlation between COPE scale values in I Adm. and PANAS scale in the four administrations, for those people that had completed the questionnaires in the examined period. For the reasons expressed above, it was made a non parametric statistical analysis by using the "r" of Spearman. Said analices relative significativity (p), are detailed in Tab. 8.

#### Correlation COPE I Administration/PANAS I-II-III-IV Administrations

	P	REL	DM	D	A	SE	DC	U
Positive Affective 1	.60	-.56	-.57	-.71				
Positive Affective p	.018	.027	.026	.003				
Positive Affective 2				-.70			-.58	
Positive Affective p				.003			.023	
Positive Affective 4				-.77				
Positive Affective p				.008				

Negative Affective 1					.69	.60		
Negative Affective <i>p</i>					.004	.016		
Negative Affective 2								-.67
Negative Affective <i>p</i>								.006
Negative Affective 3		.64	.78					
Negative Affective <i>p</i>		.043	.007					

The level of self valued used by the subjects at the beginning of the campaign, from some coping strategy to manage stress, is correlated with the positive and negative affection values measured in the different stages of the campaign. The use of planning (P), is associated with the positive humor at the beginning of the campaign.

The resort to religion (R), shows an inverse correlation with the beginning of campaign positive affection and a direct correlation with the negative affection of III Adm. (third quarter of the campaign). A similar behavior shows mental emphasize (DM). The use of Negation (N) is inversely associated with positive affection in all the campaign with the exception of the third quarter period.

The Acceptance (A) and the Emotional Release (ER), show a direct association with the negative affection the beginning of the campaign.

The comportamental emphasize (CE) is inversely associated to the positive humor and the Humorism (H) is inversely associated to the negative humor in the II Adm. (2 or 3 months after the beginning of the wintering campaign).

The values of “r” Spearman and the relative significativity (p) obtained in the comparison between COPE scale values in I Adm. (beginning of campaign) with the Socio-Emotive Self-Evaluation scale in the four administrations for all the examined subjects that had completed the questionnaire in the examined period, is detailed in Tab.9.

The analysis was carried out with the objective to identify the prediction of the coping strategies in the social adaptation during the campaign.

#### Correlations COPE I Administration/Socio-Emotive Self-Evaluation I-II-III-IV Administrations

	P	RSE	RSS	S	DC	D	CC	U
Companions III. Adm								.65
Companions <i>p</i>								.041
Companions IV Adm						-.72		
Companions <i>p</i>						.018		
Group II. Adm						-.54		
Group <i>p</i>						.038		
Group III Adm		-.73						
Group <i>p</i>		.015						
Group IV Adm						-.73		
Group <i>p</i>						.016		
Friends I Adm	.83			.68			.66	
Friends <i>p</i>	.003			.029			.037	
Friends II Adm	.55		.53			-.57		
Friends <i>p</i>	.032		.039			.026		
Friends IV Adm					-.61	-.79		
Friends <i>p</i>					.05	.003		

The most intensive use of the Planning (P) at the beginning is associated to a high value of satisfaction level in the social interactions with friends at the beginning and after

some months of starting the Antarctic campaign. The search of emotional support (SES) is proportionally inverse to the satisfaction from the socio-emotive necessities of the subject in the relations with the concerning group in the third quarter of the campaign. The search of instrumental support (SIS) is inversely correlated to the quality of interpersonal rapport with friends, this was measured in II Administration. The suppression of the competitive activity (SCA) is associated to a positive valuation of friends at the beginning of the campaign. The comportamental emphasizes (CE) is associated to a smaller positive value of friends at the end of the campaign. The Negation (N) is the strategy that more frequently is associated to a less positive values of the quality of interpersonal rapport with the companions of expedition at the end of the campaign, with the concerning group two-three months after the beginning and at the end of the campaign. Coping of containment (CC) correlates with a greater positive valuation of friendly relations at the beginning of the campaign and humorism (H) with the companions of expedition in the third quarter of the campaign. Values of “r” the of Spearman are detailed in a and b of Table 10 and the relative significativity (p) obtained from the comparison between the values of the COPE scale in I Adm. (at the end of winter) with the item of SHC questionnaire related to the subjective problems referred by the subjects that have completed questionnaires in the most severe period of symptoms appearing at the three fourth part of the campaign. The analysis has been carried out to identify the association between coping strategies and the subjective physical health after the mid-winter period.

Correlation COPE I Administration /SHC III administration (N = 10)

Tab. 10 a	SHC 2	SHC 5	SHC 5ng	SHC 18	SHC 18 ng
GPR		-.64 (p.043)	-.75 (p.011)		
AC					
P		-.74 (p.013)	-.63 (p.048)		
SES					-.73 (p.017)
SIS		-.70 (p.013)			
ER				-.82 (p.003)	-.82 (p-003)
CC		-.73 (p-016)			
H	.63 (p.047)				

In this stage, one slight association between the respiratory problems and the use of the humorism at the beginning of the campaign is observed, an inverse association between the pains in the skeletal muscle of the neck and the positive reinterpretation and growing (PRG), planning (P), search of instrumental support (SIS), coping of containment (CC), an inverse association between the stomach pains and the emotional release (ER), a direct association between the intestinal gas formation and mental emphasizes (ME), between sleep disturbs and comportamental emphasizes (CE), between the anxiety and planning (P), coping of containment (CC) and humorism (H). More than the symptoms intensity, the correlations are also observed by the duration of them. An inverse correlation between the duration of the skeletal muscle pains of the neck and positive reinterpretación and growing (PRG), planning (P) is shown, between the duration of stomach aches and the search of emotional support (SES). Emotional release (ER), between the duration of flatulence and the positive reinterpretation and growing (PRG), a direct association between the duration of sleep disturbs and comportamental emphasizes (CE), between the duration of anxiety and planning (P), coping of containment (CC), Humorism (H).

## **DISCUSSION**

### **Affective Conditions**

The Uruguayan Antarctic population shows the average values of the positive affection scale (Tab. 1) of PANAS high enough and going up during the campaign, but the variations in the period (Tab.2) do not reach the preselected statistical significance ( $p < 0.05$ ). What is observed is a substantial stability of the positive emotional state in the all pattern of expeditions 2004-2006. The average values in the scale of negative affection are very low, next to the absence of the negative emotional manifestations. They grow slightly along wintering season until reaching a significant statistical variation at the end of the campaign, in relation to the beginning and to the second administration conducted after the three first months. The negative emotional state of the group appears therefore characterized by a little level of such manifestations that tend to a slight but significant growing along the time.

The variations expressed above show a slight but progressive emotional deterioration, especially after the phase of midwinter and seems to aim at the phenomenon of  $\frac{3}{4}$  (Bechtel, Berning, 1991) or the tip of midwinter (Palinkas, 2002). Although slight, the increase of the negative emotions does not affect the reduction of the intensity of positive humor, but do in a substantial stability. Naturally, a particular analysis of each campaign can demonstrate a particular course of these items but the modest number of examined subjects has kept us to analyze the general pattern. The emotional operation of the group itself, detailed by these data, shows a moderately positive global picture and rather satisfactory, considering that is an isolated environment, subject to a remarkable degree of sensory and affective deprivation, with hardly perceivable levels of negative humor, affective displeasure that does not do it different from described situations in studies of other Antarctic populations ((Barbarito, Cammillucci, Peri, 2004).

### **Adaptation Strategies**

The more used coping strategies during the whole campaign to face the Antarctic stress are the growing and positive reinterpretation, followed by the planning or active coping that alternate the second place. The less used resource is the use of alcohol and drugs and the comportamental emphasizes to which it is associated, in the first place, the negation and the humorism. To base one's opinion on these results we can say that the mechanisms of adaptation to the socio-operative environment of the expedition is always based on the "active" coping strategies (planning, active coping), type problem solving, effective even in different environment from the polar ones that is possible to be aimed at the positive reinterpretación of lived experience. This growing and positive reinterpretación may constitute a new meaning for severe situations, by reducing the stress and reactivating the coping actions focused in the problem (Caver, Séller, Weintraub, 1989)

### **Socio-Afective Environment.**

In the different analyzed groups, the positive socio affective relationships referred by the subject as the more satisfactory ones in each stage of the campaign, make us suppose a climate of positive understanding, serenity and interpersonal confidence. Naturally, the great level of satisfaction of the socio emotive needs, understanding,

acceptance, consideration, recognition, etc, comes from the relations with friends, who represent the ideal reference with whom they compare the interpersonal relations. However, it is enough high also compared with the other categories of subjects that compose the expedition. Both poles of the affective needs satisfaction is represented like a constant between the category of "friends" and "head of expedition", the highest and lowest level respectively and between them the other categories are rotated.

## **Health**

The observed health conditions of the examined population were quite good and satisfactory. Some subjective symptoms like tachycardia, chest pain, migraine, diarrhea, cutaneous allergies, etc. were not shown during the campaign. When they appear are of a very brief duration and moderate intensity.

During the most difficult considered period of the expedition (midwinter), it only appears two muscle-skeletal symptoms of relevance that are: the neck and spine pains, that were reported by 60% of the subjects. In this population the functional problems seem to grow after the first midwinter time, allowing us to make the hypothesis of the third quarter, also expressed under the form of subjective somatic problems.

## **SUMMARY.**

This paper shows the results of an investigation about the physical, psychological and social adaptation of human groups living in the scientific Scientifica Antarctic Base "Artigas" (King George island, Lat. 62° 11' S, Long. 58° 54' W). Five subjects participated of the research, during three winter expeditions from 2004 to 2006. A full amount of 15 subjects participated in the investigation. In order to explore the possible changes of physical, emotional, social conditions and coping strategies, the following psychometric tools were used: The PANAS, the Socio Emotional Self Evaluation (SES) questionnaire, the Subjective Health Complaints (SHC) Inventory, the COPE questionnaire. The psychological instruments were administered four times during the winter campaign about one year long. The obtained data, although we have to consider some district related to methodology, show a satisfactory psychosocial adaptation in the groups. A little but significant increase of negative mood was observed, a little but significant deterioration of social relationships with group mates and professional team mates, and a little deterioration of subjective health after midwinter, was recorded. No significant changes in the coping strategies were observed except for a decrease of the two most intensely used coping strategies (positive reinterpretation and growing, active coping) after midwinter. These changes suggest that second half of the campaign or the third quarter of Antarctic stay is the most difficult and critical. The above results also suggest a fatigue, a general exhaustion, although temporary, of the resources used to deal with the Antarctic stressors and a high interdependence between physical, psychological and social factors in a confined and isolated environment.

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